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A CASE STUDY OF HOW STUDENTS ENROLLED IN CTE PROGRAMS AND FACULTY UNDERSTAND AND ASSESS THE IMPLICATIONS OF GLOBALIZATION ON CAREER PREPARATION

by

Mohammad A. Moradi

A Dissertation Submitted to the Faculty of the Graduate College in partial fulfillment of the requirements for the Degree of Doctor of Philosophy Educational Leadership, Research and Technology Advisor: Richard Zinser, Ed.D.

Western Michigan University Kalamazoo, Michigan December 2011
Globalization reflects a shift in the workforce development paradigm. This descriptive qualitative case study was conducted at a Midwestern university with 12 student participants and three faculty members from three engineering programs. The purpose of this body of work was to explore the participants’ perceptions of globalization, and to understand the implications of globalization on career and technical education (CTE) programs, program selection, and career choices, the training of the students enrolled in CTE programs, and the role of teaching faculty and the college in this process.

How CTE programs aligned many diverse programs to meet a growing demand for skilled labor was reflective of the changing role of career and technical education in workforce development. This perception necessitated a closer look at the phenomenon of globalization and its implications at the postsecondary level.

The five central research questions of the study were specifically attributable to the focus of the study to explore how the CTE students prepared for employment in a “flattened world,” (Friedman, 2005) derived from their own perspectives. It was also important to find out how the college—through various means, such as curriculum
designs aligned with industry needs, technology integration, contextual learning, and multidisciplinary curriculum integration—may achieve the aim of the programs as outlined in the academic program reviews published by the college.

The primary instrument of data collection was an open-ended interview protocol. There was a total of 19 interview questions derived from the research questions. The collected data was transcribed and sorted, and, as described by Glaser and Strauss (1967), utilized the constant comparison method of coding to illustrate the emerging concepts.

Sample selection was purposive and utilized a small group limited to one location. The findings were not assumed to be generalized to the total population. The findings generally were positive; student satisfaction was high, and funding of CTE programs and public-private partnerships were a major focus.
Education can enrich lives, and educators can shape the mind. They can leave a powerful and everlasting footprint in the hearts and minds of their students that even the sands of time cannot erase. My parents were not educators but they were responsible for my education. My parents gave me hope and my teachers inspired me to dream. Every child has a favorite teacher or two. I have mine. My first teachers were my parents. They worked very hard but they were adamant that their children (all seven of them) would have a better life than they did. That dream of our parents was thankfully, realized.

Favorite teachers become our mentors, friends, open new windows to the world of discovery, and what is beyond reach. They become a significant part of our lives. They introduce us to what every young mind thirsts for. They inspire and instill in us a sense of curiosity, discovery and love of learning. They teach us to hope and dream, and travel the globe without leaving our small little world, through books, and imagining all that could be. They inspire us to believe in ourselves, to ask questions.

I want to thank all those teachers, friends and mentors, here and abroad, that were such a positive force in my life. Thank you for your passion and love of teaching and your kindness. You are greatly appreciated.

Though I have achieved a good deal in my life, I could not have done this without the love and support of my family, especially my parents. It is because of this unequaled support that I dedicate this body of work to the loving memory of my mother Mrs. Goalchaman Bayat and my father Mr. Pasha Moradi with hearts bigger than the sky, and
Acknowledgments—Continued

for all that they sacrificed to make sure their children were educated and successful. Thank you Mom and Dad, I wish you were here. I miss you dearly.

Equally, I am appreciative of the love and support of my brothers and sisters that have always kept an eye on me from a distance. Thank you for your kindness, love, support and encouragement.

I want to thank my dissertation chair and my teacher, Richard Zinser Ed.D. For all his help and support in guiding me in this process with patience and thoughtful leadership in keeping me and this work on track. In my culture, educators have a special place in their pupil’s life and Dr. Zinser will always be part mine.

I wish also to thank Dr. Brian Horvitz with his enthusiasm and the love of being a positive force in his students’ life. Professors such a Dr. Horvitz and Dr. Robert Leneway who selflessly give of their time and talent for the benefit of their students help to create a new generation of educators that are taught to pay it forward. I thank them for all their time and support. As a graduate student at Western Michigan State University many professors and friends were an influence in my learning and the path I choose. I want to thank Dr. Charles Warfield, Dr. Palmer, Dr. Reeves and many more that were instrumental in my education.

Finally, no student can be successful without the love and support of his or her family. For that I want to thank my lovely and caring wife who has given up the dining room for so long, has read all my work many times and has offered valuable insight in keeping me on track. Thank for all that you have done for me and pushing me to stay focused. I love you.
Acknowledgments—Continued

I want to thank my children for all their support and being my cheerleaders encouraging me on. I hope that my children will continue to further their own education because education is the key that opens multiple wonderful doors in every person’s life.

Finally, I wish to thank the students and faculty of the college for allowing me to share in their experiences. I particularly wish to thank Dr. Donald Green that allowed for this study to take place in his college. I would be remiss if I did not extend a great thank you to Nancy Moore, assistant to Dr. Green, because without her I would not have been able to do this. Equally I wish to extend a great thank you to Diane Bourgeois for all that she has done in helping me. I appreciate all your help and I am grateful for the contribution that all of you have made to my education and enriching my life. Keep the hope alive. Thank you to all of you.

Mohammad A. Moradi
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CHAPTER I
INTRODUCTION

This case study of how students enrolled in career and technical education (CTE) programs and the faculty who administer the programs understand and assess the implications of globalization on career preparation was designed to address the role of CTE in a postsecondary setting within a global context. Globalization is reflective of change, relevant knowledge, and integration of technology present in competition for jobs and resources, shift of paradigm in the global economy and global interconnectedness. The focus of this body of work was to explore the effects of the globalization phenomenon on the career preparation efforts by the students and teaching faculty at a Midwestern university. This study included three teaching faculty participants and 12 student participants from three engineering programs at this Midwestern university. Each program contributed four student participants and a faculty member to the study. All students were enrolled in traditional classes with no online components. The three CTE participating programs were: Digital Animation and Game Design; Product Design Engineering Technology, and the Manufacturing Engineering Technology.

This inquiry was conceived to explore participants’ perceptions and understanding of globalization. The focus of this descriptive qualitative study was on documenting and describing the phenomenon of interest, to discover, as stated by Marshall and Rossman (2006) “what were the salient actions, events, beliefs, attitudes,
and social structures and processes occurring in this phenomenon?” (p. 34). Further, states Patton (2002), a more traditional qualitative researcher learns from the participants’ lives, but maintains a stance of “empathetic neutrality” (p. 72). Accordingly, this research focused on explaining the results of the study from the perspective of the participants relevant to globalization and the programs that they were enrolled in.

The choice of a qualitative case study methodology meant that this study was focused on gaining a deeper understanding of the phenomenon under investigation. This choice allowed the investigator to explore, and to understand the participants’ perceptions about globalization, its implications for their programs of study (POS), and career planning. Faculty members were a key component of this investigation due to the relevance in a global context of their education, skills, and experience of what they do in the classroom. The implication of globalization for CTE programs in the context of global workforce development was a key question for this study to explore.

**CTE in the Context of Globalization**

Vocational education (now called career and technical education) is an enterprise that has been in transition for decades, and has evolved with every turn in the national labor market’s demand to remain relevant. The role of CTE has traditionally been focused on preparing students for entry-level jobs after secondary school or even at two-year- community college and higher levels. However, in an era of globalization, CTE was suddenly overwhelmed by a shift in paradigm in skilled workforce development due to the change in demands brought about by global competition and technological advancements requiring new skill-sets from workers.
In response, CTE had to change its emphasis to include more academic preparation. Levesque, Lauen, Teitelbaum, Alt, and Librera (2000) stated, “The available data signal that change is occurring in the directions advocated by recent reforms, although such change is small and preliminary” (p. 183). CTE at its core has been based on a belief that the purpose of education is to enable an individual to obtain a job for the benefit of self, the community, and the society at large (Rojewski, 2002; Rothwell & Gerity, 2008; Stone, Alfeld, Pearson, Lewis, & Jensen, 2006). CTE has long been part of the educational process in the United States. However, with the recent changes in the global economy and the competition for cheaper labor and resources, the role of CTE in such a competitive environment has once more drawn attention to the role and the relevance of CTE in a globally competitive workforce arena. Thus, it is important to ask what role CTE could play with relevance to the national economy in meeting the needs of the skilled labor force of tomorrow. Hopkins (1999) as explained by Castellano, Springfield and Stone (2002) advocated for an expansive view of CTE in which students are exposed to the contemporary workplace along three non-exclusive vectors: education through work, education about work, and education for work (p. 13).

One criticism of CTE regarding its role and relevance to the national economy and effective workforce development has been that CTE programs are not clearly defined. According to Feutz (2010) as articulated by (Humphreys, 2009; Meeder, 2008):

The criticism has been that there is no relationship or connection between the national vision of CTE as outlined by the Perkins Act of 2006 and the schools offering CTE courses in every state particularly in the areas of integration of various components with connections to measureable outcomes. (p. 13)

It is difficult to identify how these diverse and dissimilar CTE programs, lacking connection from one school to another or from one state to another, align their individual
programs to meet a certain need in the labor market. One problem might be attributed to the lack of national coordination and planning based on a plan of action relevant to the economic and industry needs of the nation. This lack of clarity also could be due to the structural complexities of the programs and policies and individual state plans and federal requirements. CTE is comprised of a maze of career pathways and career clusters, with varied names and numbers and other related programs operating on their own. This lack of cohesiveness on a national scale only helps to emphasize the diversity and complexity of the system that makes its structure confusing and its effective management on a national level just as difficult. This notion of relevance particularly at the secondary level has lead to various characterizations, including CTE programs being the dumping grounds for less academically inclined students, as stated by Lewis (2000).

There are compelling arguments to acknowledge these deficiencies and attempt to explore alternatives in making CTE a major component of general education, coupled with technical education. “The United States has more or less shifted from a manufacturing- to a service- and information-based economy” (Levesque et al., 2000, p. 183). The shifts in economic paradigms are indicative of changes and trends that will have two important implications for vocational education (CTE) programs. Because according to Levesque et al. (2000) “these trends signal an ongoing shift in the education and training fields that are required of the U.S. workforce, as well as the levels of that education and training” (p. 183). The demand for high-skilled workers is not an issue that is unique to the U.S. alone, because all the participating countries in the new era of global competition are searching for and increasing the level of competition for such talents,
because these technologically skilled workers are essential to their global presence and success.

According to Lankard-Brown (2003), “The new economy, not only in the United States but globally, demands a newly educated workforce” (p. 3). Crucial elements to this type of economy are information, ideas, and technology, leading to innovation by educated workers. Thus, Lankard-Brown (2003) explained, “Businesses are looking for workers who are skilled, knowledgeable, and creative—who know not only about technology, but about how to use it; who can not only use technology, but who have the intelligence and creativity to develop new technology that will make them competitive” (p. 3). This overall shift in workforce development created a new level of significance for the role of CTE in a global environment, and required CTE to train front-line workers with new, flexible capabilities in order to assume multiple tasks (Wu, 2003, p. 2).

This study’s intent was to explore and explain the historical background of CTE and to seek out answers to the relevance of CTE in a modern, technologically advanced workforce development system. One way to get at the relevance of CTE programs was to focus on recording and reporting the firsthand account of participants’ experiences, perceptions, and the value they sought from a contextual learning approach as a hallmark of CTE programs. This body of work explored the participants’ perception of globalization and its implications for their programs of study, career choices, and degree-attainment goals relevant to the job market. The faculty’s understanding of globalization and their ability to translate and to incorporate their experiences into classroom teaching was a key point in this study. Therefore, it was essential to explore how, and to what
extent if any, the design of CTE programs and courses reflected workforce preparation in response to the implications of globalization at this college.

From this investigator’s perspective it was important to ask questions that would lead to learning about how students felt about their level of preparedness and their chances for success in global competition for jobs. Another aspect of pursuing this notion was to learn about the role of education and the kinds of skills the participants had acquired during their course of studies. The role that the college and its faculty played in this process of creating opportunities that would help these students prepare for competition in a global economy was also essential to explore. Globalization has changed the nature of the work, as well as the work setting. The workplace is in constant flux, and workers must go where the jobs are. Therefore, tomorrows’ workers must adapt to fast-moving targets. Skilled workers are expected to be critical thinkers, problem solvers, good communicators, skilled decision makers, and must possess an acceptable level of academic knowledge as well as technical know-how critical for success.

**CTE: A Brief Background**

CTE programs across the United States have focused on equipping students with technical education and life skills to help them become productive citizens. CTE plays an important role in the economic competitiveness of the United States, especially since the emergence of globalization as a major factor in the new economy (ACTE Issue Brief, 2008).

CTE has evolved extensively at least over the past one hundred years, and its role became more important after the release of the report, *A Nation at Risk*, published by the National Commission on Excellence in Education in 1983 that represented the need for
action in reforming the U.S.’s educational system to address many deficiencies. This report in part was the first step in recognizing the need to prepare a workforce ready to compete on a global scale. Generally, CTE from its beginning was focused on developing a skilled workforce prepared to meet a need in certain career fields in occupations requiring less than a Baccalaureate degree. Over the past 15 years, as stated by Levesque et al., (2000), this purpose has shifted towards broader academic preparation in conjunction with technical skill development through academic and technology integration.

This shift in purpose began with tech-prep articulation agreements in the mid-1980’s, and was first passed into law at the federal level with the 1990 Perkins Act, and was further confirmed by the passage of the 1998 Carl D. Perkins Act (Levesque et al., 2000). Programs such as Tech-Prep, stated Daggett (2002), “emphasized academics in such areas as applied communications and contextual mathematics and physics” (p. 2). Other programs such as School-to-Work and school-to-career were helpful in developing a better understanding of the complexities of the American workplace and the need to connect education to work (Daggett, 2002). CTE has changed its direction and along with it, the public perception of low-skill “occupational training” to career and technical education, with transferable skills applicable to various occupational settings, anchored in strong academics with the ability to compete successfully in a world market (Daggett, 2002; Johnson, 2002). The shift in direction demonstrated by CTE was designed to prepare students for high-skilled, high-demand, and well-paying jobs of the future.

The history of the CTE and its evolution reflected different perspectives, from skilled training for the purpose of employment with little or no educational/instructional
components, to a perspective of school and education for employment as an objective, wherein CTE cast a wider net to include articulation and postsecondary education, enhancing the importance of CTE programs in a globally competitive work environment. It is precisely because of the role that CTE programs have played in the economic life of this nation that the membership of the National Association of State Directors for Career and Technical Education Consortium believes that “now more than ever, CTE programs were needed to help to ensure the strength of our workforce, global competitiveness, and the economic health of our nation” (NASDCTEc, 2009, p. 1).

Thomas Friedman (2005) coined the phrase, “The world is flat,” drawing attention to the issue of increasing global competitiveness. However, globalization is not a new phenomenon. Historically, the degree by which globalization impacted peoples’ lives around the globe was dependent upon the technologies of the time. The advancements made in computer and communication technologies were the two most important contributors to global competitiveness, hence making competition possible from anywhere in the world. Physical boundaries of all nations, able to acquire the necessary technologies and the technical competence required for competition, made the idea of borders irrelevant and distance a non-factor in their ability to produce goods and participate in a global marketplace. Today, the advancements in the new and emerging communication, computer technologies, and vast improvements in global transportation systems have made global communication much easier, faster, less expensive, and have eliminated various barriers to spur global competition (Jacobs & Hawley, 2009; National Academy of Sciences, 2007). The development of new technologies and the speed by which these technological advancements have occurred have accelerated the pace of
globalization at a higher level of intensity not experienced in the past (Augustine, 2007; Jacobs & Hawley, 2009).

The rise and the global reach of the new and emerging economies presented a challenge to the United States’ standing in the world. The implication of globalization on the U.S. economy due to various influences was a call to action and necessitated a closer look at educational reforms, if the U.S. was to remain competitive on the global stage, culminating in the 1983 report, *A Nation at Risk*. These articulated reforms acknowledged the need for explicit workplace preparation for a different kind of workplace. In 1990, the Secretary of Labor Lynn Martin commissioned a group consisting of 31 representatives from the nation’s schools, businesses, unions, and governmental agencies. The Commission issued its first report, “What Work Requires of Schools” in June 1991 (Copple, Kane, Matheson, Meltzer, Parker & White, 1993, p. 8). The Secretary’s Commission on Achieving Necessary Skills (commonly referred to as SCANS) issued a report on the competencies, skills, and personal qualities needed to succeed in the high performance workplace (Copple et al., 1993; Lankard-Brown, 1996) characterized by technological advances and a delineation of work rules and responsibilities. While the SCANS report did not emphasize globalization, almost twenty years later the report is still relevant. The SCANS report’s recommendations are in concert with the constant changes affecting both employers and employees in a workforce that is in constant flux due to shifts in the global economy.

With growing awareness that globalization increases both the rate and degree of change in the workplace, according to Lankard-Brown (1996), the SCANS report began a conversation about redefining workforce needs for the U.S. (p. 1). This conversation
acknowledged that “industry needs flexible, broadly skilled employees who are highly skilled, can work in a less structured environment, and who are able to respond rapidly and effectively, by means of a process of lifelong learning, to the changes that are occurring in their work, organization and career” (Van Zolingen, 2002, p. 1). These employees were expected, explains Van Zolingen (2002), “to acquire excellent social and communicative skills, a customer-friendly attitude, commercial acumen and outstanding sales skills, and also be able to work with information and with computers” (p.2).

Robinson (2000) stated:

This conversation continued into the new millennium, emphasizing that the next generation of workers need to have the necessary basic skills, critical thinking skills and the personal qualities that will equip them with the ability to solve problems, and make good decisions. (p. 4)

Current additions to the literature on workforce preparation assumed constant change in the work place and, thus, the importance of a workforce that possessed the ability to adapt, as the nature of the work changed and competition increased (Van Zolingen, 2002). The evolving conversation in the literature regarding desired workforce competencies and dispositions has been paralleled by a conversation about the role of educators. For instance, Daggett and Pedinotti (2005) and Michigan Career and Technical Education (2007) emphasized that it is imperative that the educators responsible for the training of the high-skilled workforce of tomorrow are themselves current on both educational pedagogies and the technical knowledge associated with contextual settings such as those that form the basis of CTE programs and course offerings. Additionally, CTE educators were advised to stay current on the labor market needs and trends in the fields their courses address (Institute for a Competitive Workforce, 2008) so as to insure that the courses offered to the students enrolled in CTE
programs are reflective of both the needs of the employee and that of the employer to meet the economic and skilled labor needs of the country in a globally competitive economic environment.

**Statement of Problem**

There is a need in CTE for development of an operational framework that includes the understanding of students enrolled in CTE programs, the faculty teaching CTE programs, and the impact of globalization on education in the United States in general and CTE education in particular. Similarly, this framework must include an assessment of the relationship between CTE and the interrelated elements of globalization: technology, competition, new economy, demographic shift, and political change. A discussion of globalization must include an understanding of these related elements.

Very little is known about the impact of globalization on CTE program development. The current thinking of the course-design professionals, particularly in higher education, is that the course should be reflective of the needs to meet a particular industry demand. Therefore, it is important to ask how those individuals designing CTE courses envision a course-design approach that is mindful of the impact of globalization on student preparation, in a manner conducive to the nature of the global competitive workforce. As stated previously, one of the criticisms directed at CTE programs nationwide has been that there was a lack of relationship or connection between the vision of CTE as outlined by the Carl D. Perkins Act of 2006 and the states and schools that offer CTE programs (Feutz, 2010, p. 13). Essentially, there is diversity in course design development and implementation, seemingly unrelated to a collective approach to
seek an alignment between the course design and meeting of the skilled labor needs of the industry.

This point was made clear from the findings of this current study, as stated by the faculty that the required time to design and implement a program cannot keep pace with an actual demand in real-time, due to rapidly changing work environment needs. These issues were interconnected and this statement only reflected the complexities and the challenges that these unique situations present in CTE.

Globalization has altered the needs of the workplace to technologically literate workers at all levels, and it also has forced restructuring of America’s educational system through various reforms in response to these requirements, due to global competition. Education, according to the National Academy of Sciences (2007), Bill Gates (2008), and Levesque et al. (2000), is the key to developing an economy powered by innovation and technologically literate skilled workers. Education is not simply part of the solution, but is the only solution in developing the ability and the technical competence to preserve America’s global competitiveness. Career and technical education is the most important component of this strategy. This study revealed that students and faculty participants viewed CTE programs as the only choice for people to return to school, to update and upgrade their skills and education. The questions to ask then are how schools offering CTE align their programs to meet a certain need, and how they know if their programs are effective in meeting those needs.

According to Daggett (2005), CTE programs are among the most successful programs in the U.S. for improving student achievement. The role of a comprehensive educational strategy, with CTE as one of its prominent components, is to point to a
destination, to lead the way where the nation is headed educationally, where all students are prepared to meet the challenges of life, education, and competition from all corners of the world. Developing an educational model responsive to the requirements of the information age is essential to developing strategies to compete in the new and emerging economies.

**Purpose of the Study**

There is a gap in our knowledge regarding the impact of globalization on CTE programs in the United States. This qualitative case study examined how CTE students and the faculty teaching CTE undergraduate courses understand and act on their understanding of what it means to prepare for life and work in a global economy. The faculty’s role and understanding of the impact of globalization, and the way they translate their understanding to course planning and implementation, was essential to prepare students to be competent, adaptable, and skilled members of a global workforce. Therefore, this study sought to generate a better understanding of the impact globalization has on the students enrolled in CTE engineering programs in the context of globalized competition.

One of the key components of effectiveness associated with any project or program is to be able to accurately assess the relevance of the program to its objectives. In response to globalization, the re-Authorized Carl D. Perkins Educational Improvement Act of 2006 (this Act will be referred to as Carl D. Perkins IV Act of 2006 throughout this document) has envisioned explicit steps to that end, and has placed certain requirements on CTE programs of study (POS) and their evaluation. Among its extensive recommendations, this act requires inclusion of competency-based applied learning,
which contributes to an individual's academic knowledge, higher-order reasoning, problem solving skills, and the occupational-specific skills necessary for economic independence as a productive and contributing member of society. The Carl D. Perkins Act IV of 2006, through its mandates at the national, state, and local levels is very helpful when examining the role of institutions and how they might be contributing towards preparation of students in a changing global economy.

The data gathered through qualitative studies (e.g. Feutz, 2010) and the college’s own academic program reviews (APR) demonstrated a high degree of satisfaction on the part of the students and employers regarding the three engineering programs under study. From the data gathered through the interviews and reported as findings, student Participants were reported as confident in their abilities and skills in a contextual learning environment. To better understand and corroborate this understanding, this investigation was focused on learning first-hand and viewing these issues from the perspective of the study’s participants. This exploration was related to the student participants’ learning and their perception of globalization, the learning that was taking place in the classroom, and how were these experiences aligned with the employers’ needs. The relevance of this learning and its application was directly tied to its relevance and alignment with the job market. This issue was not clearly articulated as to how these objectives were aligned to meet a certain need.

Investigation of this topic revealed that the impact of globalization on CTE programs at the educational level has not been thoroughly researched. To that end, this study explored the impact of globalization and how it may influence CTE students’ plans and what they are doing, or additional steps they were taking to prepare themselves to
compete in technologically advanced and knowledge-based economic environment. The role of the institutions offering CTE programs was just as essential to this study. It was also important to explore and evaluate the implication of globalization on CTE programs and whether the courses are designed with workforce development in mind.

**Conceptual Framework of Study**

The conceptual framework presented here offered a central and theoretical understanding for this study, serving as the underpinning for the understanding and the relationship between the topics under investigation. As explained previously, the current structure of career and technical education and a perception of the lack of national cohesion among all CTE programs make it that much harder to prescribe to an all-inclusive or uniform format. Nonetheless, there are still many commonalities among these programs. Considering the similarities on state and national levels, this representation in form of a conceptual framework highlights the theoretical constructs of the study that are elements of globalization and their impact on CTE students enrolled in an educational institution. This study also focused on other elements, such as the role of the faculty and the educational institution itself. Additionally, other influences such as the global impact of the new economies, historical reform efforts, and legislative activities as outlined in literature reviews were included to further focus the direction of this study.

Figure 1 represents various elements of globalization and their influence on CTE programs, the role of current research, literature reviews on the topics under study, and the possible outcomes for CTE students impacted by this phenomenon. The impact of globalization resulted in the manifestation of varied responses from students, faculty, and the college programs impacted. The outcomes varied for groups depending on their
perceptions and understanding of the role of globalization in their lives, along with institutional operations. The students’ needs were addressed through individual planning, POS selection, and taking responsibility for their choices. Therefore, what students enrolled in CTE programs know about globalization was proposed as a research question.

Research question 2 addressed individual actions required of student participants in preparation into the labor market. How faculty teaching students enrolled in CTE programs translate their understanding of globalization into the programs offered to students, as proposed by research question number 3, directed the study’s focus to the

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*Figure 1:* Conceptual Framework: Career and Technical Education and Globalization
role of the faculty, POS design, academic program reviews, and other elements as stated in this conceptual model.

Institutional responses to the impact of globalization and its influence on workforce planning deserved consideration in this conceptual outlook to address the role of the college in a global marketplace and efforts at workforce development strategies. Research question number 4 asked how the design of CTE programs and courses reflects workforce preparation in response to globalization, in order to address this element of the study.

Additionally, the role of technology in instructional delivery and training and the relevance of the technologies utilized in the classrooms as opposed to technologies used on the job were considered. The role of assessment and evaluation of students’ work in conjunction with the alignment of those skills with the labor market needs were pertinent issues to focus on as part of this study.

The planning and execution of this study was focused on various elements present at this university. This conceptual framework focused the research to explore commonalities and/or differences among the participants from the three different programs selected for the study. For the purpose of this study the student investigator considered the development of a conceptual framework to be a crucial part of the research plan, since the conceptual framework guides the decisions about what kind of data are needed to answer the proposed research questions. Similarly, the conceptual framework serves as a road map highlighting the relationships that exist between various elements, and offers a platform for understanding multiple points of views and perceptions. The discussion of these topics as reflected by the proposed research
questions provides a framework for both data collection and analysis. It also provided a valuable means for coding and developing categories and themes as the study progressed.

**Rationale for the Study**

According to Feutz (2010) (citing Millett, Payne, Dwyer, Stickler, and Alexiou, 2008), there is a “dearth of empirical data on student learning in higher education” (p. 19). This study focused on learning about three CTE programs from the student participants’ perspective of to what extent their learning was preparing them to fill a need in their respective fields. This study utilized APRs’ provided by the college, for the purpose of learning how the college planned to prepare these students. The use of multidisciplinary modes of curriculum planning to meet a larger goal was also learned. One aspect of the study focused on the kinds of technologies used by the students and whether these technologies were the same or similar to what was used in the industry. Faculty understanding of this process, technology integration, adequate assessment, and evaluation of learning in the context of relevance to the labor market needs were key components of this understanding. The participants were interested in the faculty members’ knowledge of their field. The APRs’ representing multiple perspectives shared by interested stakeholders was a valuable form of feedback to the college, the faculty, and students useful in decision making.

CTE “presents the business community with an actionable agenda for solving growing workforce shortages” (Cheney & Roth, 2008, p. 3). The value of CTE on the national economy as part of an educational system has been debated for over a century. In view of the controversy over the importance and effectiveness of CTE, many states and the federal government have taken steps to strengthen the POS in the form of various
Carl D. Perkins Acts including the reauthorized Perkins Act IV of 2006. These stakeholders have re-established new rules and guidelines in developing POS, to improve CTE as part of a comprehensive education and learning plan, in order to afford the U.S. students enrolled in CTE programs the opportunity to compete on a global footing. In doing so, these new requirements have improved and have reemphasized the role of various skills necessary for success in the workplace. These skills included basic skills, critical-thinking, and problem solving, in addition to other competencies advocated by the SCANS report.

Globalization forced the restructuring of the workplace and, as a result, educational reforms were undertaken to address the shortcoming of the educational system. The release of the report, A Nation at Risk, caused various responses to fixing the gaps in the educational system to make it more responsive to the national labor needs and the global competitive environment. One such recommendation applied was to integrate technology with a more rigorous core curriculum. According to Rojewski (2002), the major components of CTE can be represented in categories such as: curriculum, instruction and delivery options, student assessment, clientele, and program evaluation. There are various internal and external influences affecting CTE such as the emergence of the new economies, educational reforms of the past decades, student learning, and societal influences.

Recognizing the history of CTE in technical workforce development and its role in the national economy, and because of challenges from around the globe, it was essential to explore any links between globalization and CTE, and the influence of globalization on the future of workforce readiness. Although there were numerous
studies about the effectiveness of CTE, there were no direct studies done on the impact of globalization on career and technical education. The shifts in trends in the U.S. economy as previously stated by Levesque et al. (2000) from a strictly manufacturing-industrial-base to a more knowledge-base economy created a skills gap. Although serious changes have transpired in the nation’s current labor force needs, the American Society for Training and Development (ASTD) research in 2009 identified two underlying causes of this chronic skills gap: “1) jobs are changing and 2) educational attainment is lagging” (Galagan, 2010, p. 1). Jobs are changing due to global technology advancements and our educational apparatus are unable to produce adequate numbers of skilled workers to meet the needs of the country. This gap has a consequence for individuals, organizations, states, and indeed the country, as organizations cannot grow and remain competitive because they are unable to fill critical jobs with employees who have the right knowledge, skills, and abilities (Galagan, 2010). According to Galagan (2010), “In a 2009 American Society for Training and Development poll taken by 1,179 organizations, 79% said there is a skills gap in their organization now and 51% stated that the number one reason for a skills gap in their organizations was that the skills of the organization’s current workforce did not match changes in strategy” (p. 1).

There are many references made to globalization in the context of CTE or the role of CTE in the nation’s economic life in the current literature. However a review of the literature does not provide direct evidence of studies done to establish a relationship between CTE and globalization, and most studies are small and done in computer science-related research (research of computer and related technical fields, including the three fields that are the focus of this study) (Runeson & Host, 2008). Therefore,
according to Daggett (2005), “while we do not know for certain which technical skills will be most in demand for the jobs of the future, we can identify the academic skills that underpin our technological world” (p. 2). But we do know according to the Carl D. Perkins Act IV of 2006 and the SCANS report what kind of skills and competencies are required for success in the job market today. The failure to research the impact of globalization on jobs in the U.S. labor market in general and its effect on CTE programs in particular, in order to develop a better understanding of this phenomenon, can potentially lead educators and policy makers to ignore a very significant component of the educational system in the U.S.

This study offers a way of conceptualizing the potential impact of globalization on CTE programs. The role of CTE in the United States’ national economy and the impact of globalization on CTE required further exploration. This study further suggested a closer look at how CTE students graduating from a university can contribute to our knowledge of the topic under study. Three different engineering Bachelor of Science programs of study—Manufacturing Engineering Technology, Product Design Engineering Technology, and Digital Media Software Engineering—were selected for this study. Accordingly, the POS development, student program selection, and career choices were investigated. The role of the faculty was explored and students’ and faculty perceptions of globalization and its impact on CTE programs offered at this university were also examined.

**Research Questions**

“An important step in designing a study is defining the research questions, while addressing the substance and form of the questions proposed” (Yin, 1994). The task then,
in conducting a qualitative study, is to “raise a question about something that perplexes and challenges the mind” (Merriam, 1998, p. 57). This study elected to utilize qualitative research methodology because as stated by Creswell (2003) in a qualitative project, “The author will describe a research problem that can best be understood by exploring a concept or a phenomenon” (p. 74). Qualitative research is descriptive in nature and the case study method of inquiry allows the researcher to explore in-depth a program, an event, an activity, a process, or one or more individuals, wherein the researcher collects data from various sources to address the problem (Creswell, 2003; Yin, 1994). This case study, using a qualitative methodology attempted to seek answers to the following research questions:

1. What do students enrolled in CTE programs know about globalization?

2. How do students enrolled in CTE programs understand the implications of globalization for career planning, course selection, and the desired degree in their field of study?

3. How do faculty teaching students enrolled in CTE programs translate their understanding of globalization into the programs offered to students?

4. What are some similarities and differences between how students and faculty convey their understanding of the globalization as a phenomenon impacting their world?

5. How does the design of CTE programs and courses reflect workforce preparation in response to globalization?
Methodology

The impact of globalization on students enrolled in CTE programs, and their understanding of globalization was a primary focus of investigation. The understanding of the concept and the spread of globalization as a contemporary phenomenon due to advancement in computer and communications technologies and the use of these technologies in the process of teaching and learning by students and faculty were essential points to focus on. Other internal and external factors of importance, such as the role of the faculty and the college in the process of workforce development and the implication of such influences on CTE program design and its relevance to meet a labor market need were also explored.

Adoption of a qualitative case study is very common in the field of education. As a research endeavor, “the case study contributes uniquely to our knowledge of individual, organizational, social, and political phenomena” (Yin, 1994, p. 2). In addition to taking place in a natural setting where the participants are, the case study method is deemed suitable where the investigation of the topic requires an in-depth evaluation of a contemporary phenomenon, and where there is a lack of clarity between the boundaries and the context of the investigation. Utilization of a case study in the process of examining the impact of globalization on CTE programs and the understanding of students and faculty at this college regarding globalization was appropriate in the exploration of the research topic.

Evaluation of a phenomenon through a naturalistic data collection process provides a rich description of the people, the setting, their interactions, and the evaluation of artifacts that leads to deeper understanding of the phenomenon under investigation.
The student investigator responsible for collection and analysis of data for this study was not well-known to the participants.

The sample size for the study was relatively small. A total of 12 students—four students from each of the three programs along with three faculty members, one from each of the programs—were selected to take part in this study. The students’ ages were varied but had no bearing on the result of the study. However, the level of experiences and confidence in their abilities were different from program to program, and/or if they were already employed.

The interviews were conducted on site. This study utilized a structured, open-ended interview format due to the time limitation and study’s duration. The same interview questions were asked of all participants in the same order which proved to be helpful for data reduction and analysis. This methodology provided a rich and detailed amount of data. The collected data then was transcribed, and the results were reported in Chapter Four.

Limitations/Delimitations

The benefits of this study were to learn about the impact of globalization on CTE in a global context, and to explore answers to the questions that have not been asked in previous studies. All research is useful and can provide a window into understanding and evaluating events while it also could produce new theories to pursue. This study explored how globalization is understood among the students and faculty of a Midwestern university. The college that served as the site for this study and the state where this university is located have historically been at the forefront of technological innovation and workforce development strategies.
Creswell (1998) reflects that “delimitations describe the narrowsness of the focus of a study while limitations describe and explain the weaknesses in a study” (p.150). The limitations of the study are due to the small sample size and being confined to a single geographic location. However, this case study is not concerned with generalization of findings, as various authors and experts believe that a case study can be an effective form of research methodology especially in education related fields. Yin (1994) argues that “case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes, and the generalizations will apply only to participants in the study” (p. 10). The findings of this study may not be conclusive, as larger studies are needed to further explore this topic. However small the sample size and narrow focus, this study adds to the knowledge base about this research topic and may be of interest to CTE and other researchers to pursue the questions and topic further. Another limitation of this case study was related to its duration, which by necessity was limited to a one-hour interview session during the 2010 -2011 school year.

Summary

Chapter One introduced the topic, provided an overview of the CTE programs, outlined the purpose and the rationale of the study, and stated the problems. Research questions were proposed to address the concerns of the study in a qualitative case study format using a structured open-ended interview format with 12 student informants and three faculty members. The definitions appropriate to the study and limitations and delimitations of the study, were outlined. The purpose of this single case exploratory qualitative study was to add to the knowledge base about CTE, its relationship to globalization, and its impact on participants’ career and educational choices.
CHAPTER II

LITERATURE REVIEW

Introduction

Three engineering programs were selected to participate in a qualitative case study to explore: (a) the student and faculty participants’ understanding of globalization, (b) to learn about their awareness of globalization and its implication for career planning, program selection and degree attainment, (c) to recognize how the faculty translated their understanding of globalization into teaching and (d) to what extent the design of CTE courses reflect workforce preparation in a global economy. The 12 participants in this study were selected from among the students enrolled in CTE programs along with three faculty members. This university has a strong history of offering CTE programs to undergraduate and graduate degree-seeking students from a local, national, and international base.

Chapter Organization

The review of literature was organized to address the topics essential to this study, background of CTE, globalization, public–private collaboration as internal and external factors, adapting to change in CTE, and the study’s conceptual framework. The headings under the teaching, learning, and related issues were described as programs of study, CTE programs, integrated curriculum design, academic program reviews and assessment, and technology integration.
Discussion of globalization included the interrelated concepts associated with technology, competition, new economy, demographic shifts, and political changes globally. CTE’s background provided a brief discussion on history of CTE, related programs and legislative actions. The focus of the teaching- and learning-related topics covered CTE programs and contextual learning, role of programs of study, skills requirements for students in the context of the global labor market and completion, technology integration, and integrated curriculum design. The academic program reviews from the three participating departments were examined, and the last part of the review explained the topic of collaborative efforts between the public and private sector, and the chapter summary.

Career and Technical Education (CTE)

Background

The challenge in examining the long history and background of vocational education was a daunting task. The history of CTE is fraught with so much change that a brief overview such as this would not be able to cover it all. The best way to approach this was to mention only some major milestones and continue on. According to Barlow (1976), the history of CTE—at least during its first 100 years—was that it existed separately from general education in the U.S., whereby those in the skilled trades were involved without the benefit of formal structured education (p. 1). Barlow (1976) chose to divide the history of vocational education into four 50-year periods, where the period from 1776-1826 was dubbed “awakening” and was reflective of the need for education. The second 50 years, 1826-1876, showed much independent action by individuals and groups as they sought to react to the needs of the industrial revolution in America which,
according to Barlow (1976), led to an understanding and a conviction about the need to provide general education for all as exemplified by the case known as the Kalamazoo case which ultimately opened high schools to vocational education (p. 2).

The third 50-year period culminated with the emergence of vocational education as it is known today. Barlow (1976) indicated the forth 50-year period of 1926-1976 was considered a “coming of age” marked by the great growth and development of vocational education in the United States, wherein vocational education emerged as an educational program great in size, of high quality, and related to fundamental objectives of American life how one earns a living (p. 3)

A new era of vocational and technical education began with the authorization of the Carl D. Perkins Act of 1984 and again in 1998. The purpose of this act according to the United States Department of Education (2008) was to increase the quality of education in the United States (p. 2). This act was reauthorized in 2006 and became known as the Carl D. Perkins Career and Technical Education Act of 2006, also known as Perkins IV. The new law, according to the U.S. Department of Education, had three major purposes: (1) “to replace ‘vocational education’ with ‘career and technical education’, (2) to maintain tech-prep as a separate entity, and (3) to maintain state administrative funding at 5% percent of states’ allocation” (p. 2). The new law also required the development of articulation agreements and strengthened local accountability and provisions including additional funding for CTE programs in all 50 states (U.S. Department of Education, 2006, p. 2)

Career and technical education provides technical knowledge and skills aligned with the academic standards that are needed to prepare for further education and careers
in current or emerging professions as stated in the Carl D. Perkins Career and Technical Education Improvement Act, P.L. 109-270 of 2006 (Levesque, Laird, Hensley, Choy, Cataldi, & Hudson, 2008, p. 1). CTE spans secondary and adult education levels. According to Levesque et al. (2008), at the high school level, CTE encompasses family and consumer sciences education, general labor market preparation, occupational education, and may form part of a course of study leading to college, employment, or both (p. 1). At the post-secondary level, CTE is linked to preparation for employment in specific occupations or careers, and postsecondary credentials in career fields may lead to further education (Levesque et al., 2008). In turn, explain Levesque et al. (2008) adults participate in formal education and training to acquire, maintain, and upgrade their workforce skills (p. 1). This case study as reported in its findings on this topic, reflective of participating faculty members’ perceptions, reaffirmed this point as they stated that CTE was the only viable place for people to return to upgrade their skills and education to become employable in tough economic times.

Vocational education in the United States has experienced an extensive evolution in the process of reaching its current form. “Economic, educational, and societal issues have generally exerted influence on the definition of vocational education, as well as on how, when, where, and to whom it will be provided” (Gordon, 1999, p. 1). According to Rojewski (2002), two of the most important influences that have shaped vocational education are federal legislation and philosophies about the nature of vocational education (p. 3).

The purpose of providing this historical perspective on career and technical education was to review the evolution of CTE from at least the early 1900’s to the present.
day. The review of the pertinent literature focused on discussing various factors and highlights the importance of CTE to America’s educational process. It also emphasized the role of the CTE programs to workforce development initiatives. CTE is rooted in an educational perspective that inspired passionate debate for or against its relevance from the very beginning. This literature review addresses the philosophical perspectives dominant in CTE’s history. CTE enjoyed the support and advocacy of educators such as John Dewey, believing in vocational education and its importance to society. CTE also had its detractors; those who consider CTE as a dumping ground for less academically inclined students, as stated by Lewis (2000), including the current reform efforts discounting vocational education as relevant or significant to the current educational discourse.

The first formalized vocational education system in the U.S. can be traced to the apprenticeship agreements of colonial times (Gordon, 1999, p. 4). Early in the 20th century, vocational education was a prominent topic of discussion among American educators as schools struggled to meet the labor force needs consistent with the shift from an agrarian to an industrial economic base (Writh, 1972, p. 215). In response to the shifts in labor market demands resulting from the new and emerging technical needs of the nation due to the emergence of new technologies and new market innovations, states Hyslop-Margison (2001), President Theodore Roosevelt in his 1907 address to the Congress advocated a major initiative (p. 2). The proposed initiative was conceived based on the need to respond to the global industrial growth and technological advancements, and to develop a workforce in turn-of-the-century America that could meet those needs. According to Hyslop-Margison (2001), President Roosevelt proposed reforms to develop
industrial education in urban centers and agricultural education in rural areas to provide training an education that would meet the needs of the nation (p. 2). This also illustrates that shifts caused by globalization in new labor market needs and trends have been part of the history of career and technical education for at least a century, as CTE programs explore ways to respond to current labor needs.

Nearly every contemporary work that examines the nature, scope, and possibilities associated with career and technical education pays significant attention to the historical roots and subsequent development of vocational education (Rojewski, 2002, p. 3). Two men with dramatically opposing perspectives are at the center of influence on the philosophy and the rationale for the development and implementation of vocational education. According to Kantor (1986) (as cited by Hyslop-Margison, 2001), the strength of various lobbying efforts influenced Congress to authorize President Woodrow Wilson to appoint a commission to study whether federal aid to vocational education was warranted (p. 3). Charles Prosser, a student of social efficiency advocate David Snedden, was the principal author of the commission’s eventual report to Congress (Gordon, 1999; Hyslop-Margison, 2001). Consequently, reflecting the views of his mentor, Prosser considered separately administered and narrowly focused vocational training as the best available way to help non-academic students secure employment after completing high school (Hyslop-Margison, 2001). This report led to the passage of the Smith-Hughes Act of 1917, allocating federal funding for vocational education implementing Prosser’s description, which emphasized job-specific skills to the exclusion of the traditional academic curriculum, and remained the dominant vocational training position until the 1960s (Hyslop-Margison, 2001; Rojewski, 2008).
Criticizing Prosser’s brand of vocationalism, American philosopher and educator John Dewey believed that such specific skill training was unnecessarily narrow and undermined democracy (Gordon, 1999). Dewey (1916), as stated by Hyslop-Margison (2001), warned that this approach would validate class stratification by accepting an educational philosophy of social predestination (p. 4). Dewey (1916) believed:

Any scheme of vocational education, which takes as its point of departure from industrial regime that now exists, is likely to assume and perpetuate its vision and weaknesses, and thus become an instrument in accomplishing the feudal dogma of social predestination. (Hyslop-Margison, 2001)

In sharp contrast to Prosser and Snedden, Dewey believed that the principle goal of public education was to meet individual’s needs for personal fulfillment and preparation for life (Rojewski, 2002, p. 5). This required that all students receive vocational education, be taught how to solve problems, and have individual differences equalized (Rojewski, 2002). This argument is just as applicable today as it was when Dewey expounded upon it. Hyslop-Margison (2001) states, “Dewey rejected the image of students as passive individuals controlled by market economy forces and existentially limited by inherent proscribed intellectual capacities” (p. 4). Hyland (1993) as cited by Hyslop-Margison (2001), states; in Dewey’s view, students were active pursuers and constructors of knowledge, living and working in a world of dynamic social beings (p. 4).

“Diametrically opposed to Snedden’s social efficiency view, Dewey believed vocational education should be included as part of a comprehensive curriculum to help students develop a greater range of personal capacities that expanded, rather than limited, their future occupational options” (Hyslop-Margison, 200, p. 4). Scheffler (1995[a]) as cited by Hyslop-Margison (2001), stated “vocational guidance must not be conceived as leading up to a fixed and irretrievable choice” (p. 4). Dewey maintained, “The only
adequate training for occupations is training through occupations” (Hyslop-Margison, 2001; Rojewski, 2008).

Dewey’s work is recognized as a significant part of a philosophy known as pragmatism (Rojewski, 2002). According to Braundy (2004), Dewey states that schooling could lay the groundwork for understanding the practice and implications of producing for society’s needs (p. 1). Dewey wanted people to understand that technologically literate individuals and their collective knowledge of production were important to the development of thoughtful citizens capable of critical thinking, problem solving, and the well-being of their community collectively (Braundy, 2004, p.1).

There have been many attempts at reform and approaches to better tailor the relevance of the career and technical education to various historical events with national application. There is a long list of federal legislation to support development and implementation of career and technical education throughout the century. The most recent legislation started with the Carl D. Perkins Vocational Education Act of 1984 (Pub. L. 98-524 known as the Perkins Act I) that continued the affirmation of Congress that effective vocational education programs are essential to the nation’s future as a free and democratic society (Gordon, 1999). According to Gordon (1999), the Perkins Act of 1984 had two interrelated goals, one economic and one social: (1) the economic goal was to improve the skills of the labor force and prepare adults for job opportunities—a long-standing goal traceable to the Smith-Hughes Act and (2) the social goal was to provide equal opportunity for adults in vocational education (p. 8).

The consecutive Perkins Acts have been the driving force behind the funding of CTE programs in the United States for a quarter of a century, culminating with Perkins
Act III of 1998. This Act III emphasized improving academic achievements, and preparing young people for postsecondary education and work (Rojewski, 2002). The Perkins Act III was set to expire in 2004, however, through bipartisan support, in 2005 Congress approved the measure as The Vocational and Technical Education for the Future Act (as H.R. 366), and the Senate (as S. 250) (Lake, 2007, p. 110). The Carl D. Perkins Career and Technical Education Improvement Act of 2005 were reconciled in congressional committee as the Perkins Bill 2005 (Lake, 2007). In 2006, the Carl D. Perkins (S. 250) Career and Technical Education Improvement Act of 2005 was reauthorized and amended and became known as The Carl D. Perkins Career and Technical Education Improvement Act of 2006, often called Perkins Act IV (Lake, 2007).

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 covered several topics relevant to this study. Four of the main points of the Perkins Act of 2006 were utilized here to restate the relevance of the factors included in this study’s conceptual framework. Perkins Act IV of 2006 provided for an increased focus on the academic achievement of career and technical education students. This Act strengthened the connections between secondary and postsecondary education, and improved state and local accountability (U.S. Department of Education, 2006, p. 2). As stated in the Carl D. Perkins Career and Technical Education Improvement Act of 2006:

“The purpose of this Act is to develop more fully the academic and career and technical skills of secondary education students and postsecondary education students who elect to enroll in career and technical education programs, by:
1. Building on the efforts of states and localities to develop challenging academic and technical standards and to assist students in meeting such standards, including preparation for high skill, high wage, or high demand occupations in current or emerging professions

2. Promoting the development of services and activities that integrate rigorous and challenging academic and career/technical instruction, and that link secondary education and postsecondary education for participating career and technical education students

3. Supporting partnerships among secondary schools, postsecondary institutions, baccalaureate degree granting institutions, area career, and technical education schools, local workforce investment boards, business and industry, and intermediaries; and

4. Providing individuals with opportunities throughout their lifetimes to develop, in conjunction with other training and education programs, the knowledge and skills needed to keep the United States competitive.” (U.S. Department of Education, 2006, p. 1-3)

While the world has changed considerably from the early 1900’s to the present in terms of work, family, and community, the basic philosophical arguments for and against various forms of vocational education have remained relatively the same (Rojewski, 2002). Traditionally, the role of career and technical education has been viewed as preparing young adults for entry into the labor market. Over the past 15 years however, this purpose has shifted toward broader preparation that develops the academic, vocational, and technical skills of students in vocational education programs (Levesque et
al., 2000). This preparation involves the integration of academic and vocational education, emphasis on all aspects of an industry, and implementation of academic performance measures, among other reform efforts (Levesque et al., 2000).

In the United States, according to Wu (2003) (referencing Castalda, Schray, and Lyons (2002), career and technical education is seen to be education for the 21st century (p. 2). Wu (2003) further explains that “Career and technical education must follow economic trends in order to develop its own directions and strategies for fostering technical manpower” (p. 3). Career and technical education, historically, has responded to the needs and the shifts in demands for higher skilled workers. High-quality CTE can ensure America’s future competitiveness through increased student engagement, the innovative integration of math, science, and literacy skills, and by meeting the needs of both employers and the economy as a whole (ACTE, 2006, p. 3).

In 2005, a committee of the U.S. National Academies addressed this issue in a widely disseminated report, *Rising above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, stating that “the trends in high-tech manpower threatened the United States ability to compete in the global marketplace” (Lucky, 2008, p. 1). The report concluded that high-quality jobs are necessary for both individual and national prosperity and that advances in science and engineering are needed to create such jobs (Lucky, 2008).

A letter from the leadership of the National Sciences Foundation to the President’s Council of Advisors on Science and Technology *Sustaining the Nation’s Innovation Ecosystems* report on Information Technology Manufacturing and Competitiveness (January 2004), explained their concerns as state:
Civilization is on the brink of a new industrial order. The big winners in the increasingly fierce global scramble for supremacy will not be those who simply make commodities faster and cheaper than the competition, they will be those who develop talent, techniques and tools so advanced that there is no competition. (National Academy of Sciences, 2007, p. 26)

Concern over America’s economic status in the world is the driving force behind the recent efforts to reevaluate the state of the education in the U.S. and its impact on the future of the nation. The United States is no longer the de-facto world economic leader (Daggett, 2005, p. 1). The world has grown smaller due to advances in communications technologies, making distance irrelevant and allowing competition from all corners of the world. The United States is still the leading engine for innovation with the best graduate programs, the best scientific infrastructure, and the capital markets to exploit it (Daggett, 2005, p. 4). Faced with worldwide economic growth and global competition, explains the U.S. is in a truly global environment, and those competitor countries are not only wide awake, they are running a marathon while the U.S. is running sprints— if left unchecked, this could challenge the United States’ preeminence and capacity to innovate (Thomas Friedman, 2005; Daggett, 2005).

In March 2008, Bill Gates, chairman of Microsoft Corporation, in a written testimony before the U.S. House of Representatives Science and Technology Committee, underscored the importance of improving the educational opportunities and technological advancement to be able to compete on a global stage. He stated:

If the United States truly wants to secure its global leadership in technology innovation, we must, as a nation, commit to a strategy for innovation excellence. I believe this strategy must place top priority on achieving the fundamental goal of strengthening educational opportunities, so that America’s students and workers have the skills they need to succeed in the technology and information-driven economy of today and tomorrow. (p. 4)
The 1983 report, *A Nation at Risk*, published by the National Commission on Excellence in Education, observed that the United States was losing ground in international economic competition and attributed the decline in large part to relatively low standards and the poor performance of the American educational system (Levesque et al., 2000, p. 2). Responding to various political, economic, and social forces, current debates on the future of public schooling are increasingly framed within the discourse of occupational relevance, globalization, and preparation for international market competition (Hyslop-Margison, 2001, p. 2). CTE has been and remains an integral part of education in the U.S. and the current efforts at reform of the educational system in general education and particularly in CTE fields has only heightened the sense of relevance of the CTE to the United States’ future workforce development strategies.

The role of CTE should be to provide the business and industry with an action plan as outlined specifically in the Carl D. Perkins Act IV of 2006, a plan that is geared to deal with the workforce development and the shortage of skilled workers. As it was stated, the role of CTE is not well understood and its objectives to its critiques are not well defined. But CTE programs include diverse sets of knowledge, skills, and abilities that, as stated by the Institute for a Competitive Workforce (ICW) (2008), that employers in many industries need to fill their fastest growing jobs (p. 3). ICW also characterizes a good CTE program to include models that integrate rigorous academics with relevant, project-based learning, and effective drawn-from-the–real-world work (p. 3). This goal can be enhanced when not only academics are integrated into a learning environment, but also when the learning takes place in the context of career relevance.
Globalization

The primary focus of this study was to understand the implications of globalization from the participants’ perspectives for the three CTE programs selected as part of this study. The overview of the terminology used in defining globalization in relation to the framework envisioned for CTE (Figure 2) in the context of a global economy was essential in exploring this phenomenon and its implication for CTE programs and students. As explained by Weber (2002):

Irrespective of whether one identifies globalization as primarily driven by economics or as a cultural phenomenon occurring in the context of technological change and a transformation of lifestyles, it is now clear that the social sciences face the challenge of somehow ‘making sense of it.’ (p. 301)

The term “globalization” became current in the west in the domains of economics, politics, sociology, and the mass media during the 1990s (Zolo, 2008, p. 1). It refers to the process by which the social relations between human beings have tended to extend globally, to cover the territorial and demographic space of the entire planet (Zolo, 2008). Thomas Friedman (2005) calls this the interconnectedness of the global economy where the competitive playing field between industrial and emerging market countries is “flattening.” According to Zolo (2008), the term became widespread at a time of accelerating economic and social integration, which, according to some analysts, was already under way in the West by the time of the industrial revolution in the 18th and 19th centuries (p. 1).

Globalization became more important and prevalent to the U.S.’s economic status in the world in the latter part of the 20th century and has accelerated in the first decade of the 21st century. In this more specific sense, according to Zolo (2008), the term “globalisation” [sic] is used to indicate the social process, highly influenced by
technological development, increasingly rapid means of transport and the “information revolution,” which has created a truly world-wide web of spatial connections and functional interdependence (p. 1). Thomas Friedman (1999) defines globalization as:

The inexorable integration of markets, nation-states, and technologies to a degree never witnessed before-in a way that is enabling individuals, corporations and nation-states to reach around the world farther, faster, deeper and cheaper than ever before and the spread of free-market capitalism to virtually every country in the world. (p. 8)

This network brings into contact an ever greater number of social actors at economic, political, cultural, and communications events, which previously existed in isolation, separated by geographical remoteness or various kinds of cultural and social barriers (Zolo, 2008). For the English sociologist Anthony Giddens, as cited by Zolo (2008), “globalisation designates the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa” (p. 1).

The explanations provided here reflect the magnitude of changes that have transpired globally with far-reaching implications. The Soviet Union is no more; cold war has given way to perestroika and the Berlin wall has tumbled down. New countries are born, new alliances are formed, and new economies have emerged. China and India are the newest and fastest growing economies threatening Americas’ long standing global domination (Jacobs & Hawley, 2009).

“From Eastern European nations and Russia, to India and China, we have witnessed the rapid spread of capitalism to over half of the world’s population in just a couple of decades” (Daggett, 2005 p. 2). These and many other countries aspire to emulate America to create a prosperous middle class (NAS, 2007). A century ago, posits
Daggett (2005), the United States understood the challenges and the enormous effort required to become a prosperous nation during a significant time of transition (p. 2). China, Russia, India, and the other emerging market countries are emulating the steps that made the U.S. the greatest economic power in the history. In contrast to previous eras of global economic development, the current situation has occurred rapidly and at a level of intensity not experienced previously (Jacobs & Hawley, 2009). America must be prepared to meet and exceed the challenges of the new global competition in this new information/knowledge-based economic age.

Globalization as a recurring theme in our contemporary society has restructured the pre-existing notion of markets, products, and powers with a far-reaching effect (Kozak, 1992, p. 65). The impact of globalization on economic competition has been profound and in some ways unexpected and, at its simplest level, globalization has increased the intensity and the nature of competition (Carnevale, 1991, p. 28). The expanding growth of the world output, stated Kozak (1992), crossing national boundaries, because of dramatic advances in transportation, and information services, has advanced the concept of a one-world economy (p. 65). Somewhere in the world, markets are open and it is commonplace for a product to be produced in one country, while utilizing materials and resources from a second country, to be exported ready for sale in yet another country (Kozak, 1992).

This study intended to explain that although globalization is not a new phenomenon, it reflected change on a global scale driven by knowledge, economy, and technology. In such an environment, no American company can remain immune from foreign competitors, therefore it is not surprising to see a great number of American
companies seek opportunities overseas to produce and market their products utilizing a cheaper labor market (Kozak, 1992, p. 65). Globalization creates an environment that is not bound by geography (Rothwell & Kolb, 1999, p. 49). The challenge for universities and community colleges offering CTE programs is to deliver globally consistent and locally responsive training programs to meet the needs of the local economy and produce technologically prepared workers to enhance our ability to compete in a global marketplace.

**Technology**

Technology in its most basic form represents advancement of ideas leading to discovery of a new way of doing things or to improve on existing technology. Technology has been in the process of evolution since the beginning of human history with constant and relevant improvements, but today technology exists to a degree unprecedented in history (Wright, 2003, p. 1). Accordingly, referring to *Technology for All Americans Project 2000*, Wright (2003), puts forward the following statement:

People, who are unfamiliar with technology, tend to think of it purely in terms of artifacts: computers, cars, televisions, toasters, pesticides, flu shots, solar cells, genetically engineered tomatoes and all the rest. But to its practitioners and to the people who study it, technology is more accurately thought of in terms of the knowledge and the processes that create these products. (p. 9)

The more recent advancement in the development of new technologies for the purpose of communication and the emergence of the internet as a bridge to link nations to nations and manufacturers to buyers and suppliers has intensified the pace of change globally. Although technology takes many forms (Jacobs, 2002), globalization could not occur without an efficient vehicle by which to send and receive information across great distances. Access to information is made possible at a much faster pace through
development of satellite and internet communication technologies over long distances, and without this ability, developing countries would be incapable of becoming service-providers and producers on an equal footing with companies in developed countries (Jacobs, 2002). According to Carnevale (1991), the new market standards would not have been possible without an equally new role for technology (p. 33).

The advances in communications technologies make it possible for firms to invest in and locate human talent with cost effectiveness and enhance their ability to compete for markets. “These advances are essential where access to information and knowledge will be critical for individuals to take part in work and social life in the future” (Cho & Imel, 2003, p. 5). The current belief is that globalization will continue to develop at a faster pace with the development of a new generation of communication technologies. One aspect of globalization manifested in competition for skilled labor around the globe has changed the requirements of work as such that according to Cho and Imel (2003), “in a global competitive work environment technology will continue to effect work and the workplace and how work is performed” (p. 5).

The National Academies Sciences (NAS) publication “Rising Above the Gathering Storm” (2007) points out that innovation is the key to ensuring that the United States is the premier place in the world to innovate; invest in downstream activities such as manufacturing and marketing; and create high-paying jobs that are based on innovation (p. 137). Unless the nation has the science and engineering experts and the resources to generate new ideas, and unless it encourages the transition of those ideas through policies that enhance the innovation environment, we will not continue to prosper in an age of globalization (NAS, 2007, p. 137).
The review of the literature presented thus far highlights the impact of the global shift in manufacturing (seeking cheaper labor, supplies, and workers) that poses a new set of challenges for the United States. The recent decade has been signaling a shift toward service and an information-based economy. These new developments have two major implications for career and technical education. These trends signal an ongoing shift in the education and training fields that are required for the U.S. workforce as well as the levels of that education and training (Levesque et al., 2000, p. 26). In order to prepare students for the industries and occupations of the 21st century, it is crucial for vocational educators and policy makers to understand the transitions taking place (Levesque et al., 2000, p. 26). The U.S. economy is in the midst of what Alan Greenspan (the former chairman of Federal Reserve Bank) calls a “once-in-a-century event,” a “structural technological advance” in information technology that is changing the shape of the economy and the nature of work (Levesque et al., 2000, p. 20). Greenspan argues, as stated by Levesque et al. (2000), “the development of the transistor and integrated circuit and the resulting explosion of advancements in the computing and telecommunications technologies have fundamentally changed the structure of the American economy, much like the industrial revolution, which caused people to move from working in the fields to working in factories” (p. 20).

Greenspan believed information technologies are causing employment to shift from factories to service producing firms where industrialized economies are becoming more “knowledge-based,” advocating that creation, distribution, and use of information and knowledge—including both technology and human capital—are becoming increasingly important (Levesque et al., 2000, p. 20). According to some calculations,
explains Levesque et al. (2000), more than half of the total gross domestic product of the major industrialized economies is now knowledge-based, including industries such as telecommunications, computers, software, pharmaceuticals, education, and television (p. 20). High-technology industries have almost doubled their share of manufacturing output over the past two decades to around 25 percent, and knowledge-intensive services are growing even faster, as by one reckoning, “knowledge-workers”—from brain surgeons to journalists—account for 8 out of every 10 new jobs (Levesque et al., 2000).

**New and Emerging Economies**

“What accounts for the decline of manufacturing and the movement toward a service-based economy” was the question asked by Levesque et al. (2000). The decline of manufacturing is often referred to as “economic restructuring,” a term the encompasses technological change and new competitive pressures on firms as explained by Levesque et al. (2000), while stating that not all economists can agree that international trade is the main driving force responsible for widespread changes in the manufacturing sector (p. 20). New and emerging economies such as China and India, with an enormous pool of labor both skilled and un-skilled workers, are becoming major players in the global economy. Daggett and Pedinotti (2005) state, “Not since the era of the Roman Empire has a nation sustained its position as a world superpower as long and as dynamically as the United States has” (p. 1). As further explained by Daggett and Pedinotti (2005), “That leadership was evident in production and manufacturing, innovation in new technologies, and the contributions made to improve quality of life at home and abroad” (p. 1). The faculty and student participants were pointedly aware of

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this shift in the global dynamics taking shape in the U.S. and in countries such as China, India, and Russia as explained in this case study’s findings.

As posited by Rojewski (2002):

From its beginning, the public career and technical education in the United States has been influenced by new economic trends with an impact on the content and direction of curricula at secondary and postsecondary level, with a predictable pace until recently. (p. 7)

However, over the past decade or so most economists and labor analysts have identified a *new economy* emerging in the United States and around the world often referred to as “globalization” (Rojewski, 2002, p. 7). The global interconnectedness spoken of by Freidman (2005) and Zolo (2008) highlights new and current realities of the new global market place. The emergence of new economies and the addition of thousands of highly trained and millions of untrained workers (Manpower, 2008) have consequences for the labor markets in many nations, including the United States. The emergence of these new labor pools also impacts CTE, and the degree of preparation required to manage this influx.

All of these changes have implications for vocational educations according to Hawke (2000). In the 1960s and 70s, it was generally accepted that vocational education was about individual development and also about the development of the society as a whole through enriching the working lives of its members (Hawke, 2000, p. 9). In the 1990s however, as Hawke (2000) reflects, the goal of vocational education became reoriented towards improving the economic position of the nation and, through that, to enhance the lives of all (p. 9).

While specifics about the new economy are sometimes in dispute, people’s understanding, explains Rojewski (2002) (citing Carnevale, 1991; International Labor
Organization, 2001; Irons, 1997; Riech, 2000; and U.S. Department of Labor, 2000)

“reflects on the emerging economy and expectations for the foreseeable future to include an accelerated level of growth in manufacturing spurred by advances in technology” (p. 7). Rojewski (2002) asserts:

Globalization of markets leading to increased competition for labor and goods, increased emphasis on information management, restructuring of management practices through downsizing, higher level of attention paid to technologically savvy individuals, and outsourcing of most work to be other related components of this understanding. (p. 8)

These factors will force all institutions, for profit and not-for-profit to be innovative and to do it all better, faster, cheaper, and continuously with constant restructuring for better efficiency and productivity (Rojewski, 2002, p. 8). Historically, there have been many eras that globalization has created new challenges and opportunities to evaluate, plan, develop, implement, and take the steps necessary to make the technical leaps crucial for adaptation to inevitable change. Through various actions both in policy and with legislation, career and technical education has always been an integral part of the adapted vision of the time, to develop a workforce prepared to make it possible for the U.S. to compete.

This study attempted as stated by Carnevale (1991) to describe a new economy founded on a new set of competitive standards that have transformed organizations, economic cycles, jobs and skill requirements (p. 8). The new economy will require that workers possess a broad set of abilities that include both technical and interpersonal/communication skills (Rojewski, 2002, p. 9). Carnevale (1991) observes that in the new economy, the role of technology is increasing in a broad array of jobs. Additionally, he explains that the higher-order thinking skills such as decision-making
and problem solving, as well as flexibility, creative thinking, conflict resolution, managing information and resources, and the capacity for reflection will also be expected from workers of the future as outlined in the SCANS report (p. 113).

Career and technical education stands poised to affect positive change in terms of support, preparation, and guidance in the areas of people's lives likely to be affected by changes in the new economy. However, to be relevant, professionals must critically examine and modernize their underlying assumptions about the world of work and family life, and be willing to reconcile "the way we've always done things" with emerging directions of the economy, and needs of the workforce as described in this section. To do otherwise, it seems, is to quickly relegate the profession to a footnote in the history of public education in the U.S. (Rojewski, 2002).

**Demographic Shift**

One issue of importance with implications for workforce readiness of the United States in a globally competitive new economy is the aging of the current workforce. The report *Confronting the Talent Crunch* released by Manpower (2008) states:

Demographic shifts (aging populations, declining birthrates, economic migration), social evolution, inadequate educational programs, globalization and entrepreneurial practices (outsourcing, cross-border recruiting, on-demand employment) are between them causing shortages, not only in the overall availability of talent but also – and more significantly – in the specific skills and competencies required in industrialized, emerging and developing economies. (p. 2)

With the baby boomers getting ready to leave the workplace, a gap in qualified workers is created that will hinder the nation’s ability to compete. As explained by Daggett (2005), in early 1900, people generally entered the workforce at the young age of 14 (not legal today), and often worked until they retired. Today the average age at which
an individual takes their first full-time job is 18 years 7 months (p. 3). However, a point that merited inclusion in this discussion was that the changes occurring in the workplace are driven by technological innovations that increase productivity, while reducing cost and the need for a large workforce. Additionally, the participants in this case study believed that they are technologically more prepared than their predecessors.

Manpower (2008) states that “as a result of technological advances and productivity gains, many low-skills, routine jobs are being eliminated and once in-demand skills are rapidly becoming obsolete” (p. 3). According to Daggett (2005), there are two major demographic influences on the current workforce development efforts: the departure of the baby boomers generation from the workforce, and a disproportionate 3:1 ratio of retirees to job market entries (p. 4). This situation has been aggravated by the new reality across the globe of birth rates in industrial and the emerging economies declining and life spans increasing, presenting new challenges (Manpower, 2008). This according to the Manpower report (2008) has led to too few people in the right age or skill groups or the right locations that are able to enter the workforce for the foreseeable future (p. 3). The U.S. workforce, which has grown by more than 50% percent over the past 20 years, will slow in its growth dramatically over the next few decades (Jacobs, 2002). To complicate the situation, with a lower birth rate in the U.S., it will not be easy to replace the workers leaving the labor market. Therefore, it is crucial to increase both in quality and quantity the educational opportunities afforded to the next generation of workers (Daggett, 2005; Jacobs, 2002).

According to Harvard economist Alvin Hansen, as cited by Alois (2007):

Three things drive economic growth: population increases, new resource exploitation, and technological innovation. With population decline a foregone
conclusion in the developed world and resource depletion becoming a serious problem, technological innovation alone will have to drive the global economy. If it is unable to do so, an economic model predicated on perpetual growth may be unsustainable. (p. 5)

It is believed that there are plenty of jobs currently available in the industry but employers are unable to fill this gap because those seeking jobs lack the necessary skills needed in today’s job market. Such scenarios have serious implications for the U.S. manufacturing base and the U.S. economy.

In 2006, a taskforce on the aging of the American workforce chaired by the former Assistant Secretary of Labor for Employment and Training, Emily Stover Derocco, was charged with the responsibility to develop a proposal to serve as a blueprint for action addressing the issues raised by the aging of the labor force. According to the report of the taskforce on *Aging of the American Workforce* (February 2008):

With the aging of the Baby Boomer population, the United States is facing a radical demographic change. According to the U.S. Census Bureau, by 2030, 19.7 percent of the population, or about 71.5 million Americans, will be 65 or older, compared with just 12.4 percent in 2000.

The “graying” of the American people will affect many aspects of our society, from the health care system to financial markets. In particular, the aging of the population has many implications for the U.S. labor market, including possible labor and skill shortages. Employers will be challenged to find and train replacements as some of their most experienced workers retire. (p. 5-6)

The trends highlighted here are not unique to the United States and have global implications as indicated by the Manpower (2008) report; this trend in itself will create other circumstances that make competition for educated and skilled workers more intense, with serious implications for the scope, size, composition, and cost of having a trained workforce (p. 2).
Political Change

Political change, as a component of globalization as stated here, was not meant to imply a change in the political system of governing; rather that “globalization implies global social and political change” (Weber, 2002, p. 301). In the past, international trade was strictly the domain of the governments, managed through prevailing policies and politics. Today, governments internationally realize that an open door policy of allowing individuals and firms making decisions to produce goods and services makes more sense for their national identities. For one thing, “there seems a reduced reluctance on— and almost encouragement for economic partnerships to occur among governments, non-profit organizations, and the private sector” (Jacobs, 2002, p. 7).

Historically, explains Jacobs (2002), these sectors preferred to steer clear of each other, however, these days, governments are less concerned with being involved in decisions that have market implications (p. 7). The political changes in Europe, through emergence and integration of the Eastern European countries as part of the new European Union as a single market, affords these nations the opportunity to compete both within Europe and in international markets. Globally, the nations are more open to accepting foreign investments, and individual investors are more willing and eager than ever to invest internationally (Jacobs, 2002). While according to Jacobs (2002), governments demonstrate more openness and transparency in legislation of financial systems and private ownership (p. 7).

The emergence of the global marketplace makes it possible for other nations to join the World Trade Organization (WTO) and take advantage of the opportunities it creates. China, a nation that until a decade ago existed in obscurity, is a member of WTO,
and a major player in the global marketplace with the second fastest growing economy behind India (Jacobs, 2002). China has gone as far as adapting a capitalist financial system, created a stock-exchange infrastructure for both national and global investors to be able to buy and trade stocks of Chinese assets (Jacobs & Hawley, 2009). To spur investment and to make improvement to its transportation system, Jacobs and Hawley (2009) indicate the Chinese government began selling stocks of the government-owned railway system while placing no limits on ownership (p. 9). Political decisions such as these are necessary and in the best interest of people, and demonstrate a new global reality that most nations find essential to their survival (Jacobs & Hawley, 2009).

The globalization’s historical streams—technology, competition, new economy, political change, and demographic shifts—at the center of this study have challenged all nations to respond in fundamental ways: (a) upgrading transportation infrastructure, (b) improving communications systems, and (c) revitalizing public schooling (Jacobs, 2002, p. 8). Explains Jacobs (2002), of interest here are the national and organizational responses in providing individuals opportunities to acquire the appropriate competence for work (p. 10). Education of people is at the core of the democratic values espoused by a nation, affecting the well-being of its people, and its social, and economic success.

**CTE and Programs of Study**

What is career and technical education? And what are programs of study? These are the two questions that are paramount to the relevance of this study and the focal points at the center of this body of work intending to explore the implications of globalization on CTE programs and students participating in those programs.
As stated previously, this study was not about the structure of the CTE, programs of study, policies, laws, mandates or a whole host of other possible issues. Rather, this study was focused on explaining the role of CTE and programs of study in workforce development. Consequently, the terms CTE and programs of study were defined as outlined by the principle federal act, the Carl D. Perkins Act IV of 2006, governing its functions. This view was briefly presented from both the state and federal perspective of what CTE and programs of study are and what they were designed to accomplish.

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 define CTE as follows (U.S. Department of Education, 2006):

“(5) CAREER AND TECHNICAL EDUCATION.”— The term ‘career and technical education’ means organized educational activities that —
(A) offer a sequence of courses that—

(i) provides individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions;
(ii) provides technical skill proficiency, an industry-recognized credential, a certificate, or an associate degree; and

(iii) may include prerequisite courses (other than a remedial course) that meet the requirements of this subparagraph; and
(B) include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of an industry, including entrepreneurship, of an individual.” (p. 4)

The Carl D. Perkins Act IV of 2006 also defines a program of study as stated above as a sequence of courses to “link career and technical education at secondary level and CTE at the postsecondary level, including by offering the relevant elements of not less than one career and technical program of study; and to ensure learning in the core academic subjects (as defined in section 9101 of the Elementary and Secondary
Education Act of 1965; and to provide the student with strong experience in and understanding of all aspects of an industry, which may include work-based learning experiences and some other related features (U.S. Department of Education, 2006, p. 53).

CTE includes six well-developed career pathways and 16 career clusters. At the high school level the training takes place in areas known as specific labor market preparation (SLMP) and general labor market preparation (GLMP) and family and consumer sciences education (FCSE), as explained by Levesque et al., (2000, p. 3). The State of Michigan following the guidelines established by the Carl D. Perkins Act IV of 2006 has a unique and elaborate method of addressing this process as do many other states in the country.

The State of Michigan utilizes what is known as consortia. “Michigan has divided into 25 Tech Prep consortia, along similar lines as the 25 Michigan Works’ Agencies (MWAs) that were established to implement the federal Workforce Investment Act (WIA) programs and funding” Office of Career and Technical Education (OCTE) (2008-2013, p. 6). As stated in the State of Michigan (2008-2013) Action Plan:

The Tech Prep consortia are comprised of secondary and postsecondary CTE educators and administrators and 7 representatives from industry. The consortia work at developing articulation agreements in regions of the state and are an especially good mechanism for developing statewide articulation agreements, particularly in light of Michigan’s new standard high school curriculum and the goal to increase early college credit opportunities for high school students. (p. 6-7)

Just as the Perkins Act IV of 2006, the State of Michigan has its own objectives of achieving a positive workforce development outcome. According to Michigan’s Career and Technical Education 6-year plan (2008-2013), the State of Michigan CTE state-approved program elements required at both the secondary and postsecondary level will include the need to:
• Strengthen the academic, technical, and employability skills of students
• Provide students with strong experience in, and understanding of, all aspects of an industry
• Develop, improve, or expand the use of technology in career and technical education programs
• Provide comprehensive professional development for involvement with academic, guidance, and administrative personnel, including CTE and academic teachers/faculty, counselors, and administrators
• Develop and implement evaluations of the programs carried out with funds under this title, including special populations
• Provide services, activities, and instructional program offerings that are of sufficient size, scope, and quality to be effective
• Link secondary and postsecondary career and technical education. This includes Tech Prep, articulations with 2+2+2 curriculum alignment, dual enrollment, direct credit, and other linkages. (p. 7)

This blueprint for action provides a path of communication between the states and the federal government and cleanly articulates the focus and the value of this partnership at least on paper. The focus of this brief explanation was to create a connection between the topics presented in this study and the workforce development strategies at the university, the state, and the federal levels in preparing postsecondary students for employment in a global economy.

The Carl D. Perkins Act IV of 2006 articulated more roles and responsibilities for states and educational institutions and educators. The purpose of developing programs of study is to ensure a link between secondary and postsecondary education, introduction of rigorous and relevant technical content that is aligned with challenging academic standards, and appropriate measures developed to gauge effectiveness of a POS (Lewis & Kosine, 2008, p.10).

Lewis and Kosine (2008) suggest that the last quarter of the 20th century saw many attempts to forge stronger links between secondary and postsecondary education
and between education and work (p. 10). One important aspect of this study was to explore how so many diverse and dissimilar CTE programs around the nation align their program to meet a collective need as required by the labor market. Development of effective POS can help to achieve that venerable but elusive goal of making education through occupations as explicit as education for occupations (Lewis & Kosine, 2008).

The objective of this discussion was to establish a frame of reference for further evaluation of programs offered at the postsecondary level and what they are likely to accomplish. Additionally, to focus attention on seeking clarification of relevance of POS and its alignment with the industry needs in meeting a demand. The link between education and economic performance has been the foundation of the many efforts to increase rigor, especially in mathematics, science, and technology, so that schools and colleges will teach the skills needed for our nation to compete successfully in a global economy (Lewis & Kosine, 2008).

**CTE Programs**

Legislative and political actions have influenced CTE programs at the secondary and postsecondary level just as any other educational issue by various means and the prevalence of social trends (Gordon, 1999). In the early 1980’s for the first time a connection was made between the national economy, education, and global competition (Levesque et al., 2000). Publication of the report *A Nation at Risk* (National Commission of Excellence in Education, 1983) was one such influence bringing the issue of educational reform to the forefront of the American educational scene as it continues today. The CTE under the legislative mandates of the Carl D. Perkins Act of 2006 and other similar initiatives continues the reform path of improvements.
All CTE-related legislation going as far back as the Land Grant Act, Smith-Hughes Act, and now Carl D. Perkins IV Act of 2006 stress the need for allocation of resources and training of individuals to meet the country’s labor needs. There have been various programs implemented to spearhead labor market needs and prepare people for entry into the world of work. Tech-prep, School-to-Work Act of 1994, Goal 2000, CETA (Comprehensive Employment and Training Act 1973, 1982), JTPA (Job Training Partnership Act), Welfare-to-Work, Work-Based Learning and many other similar programs at the national level were all designed to ensure that individuals had the skills to become employed (Jacobs, 2002, p. 9).

Small, specialized schools such as career academies (as a successful marriage between CTE and tech-prep), vocational high schools, career pathway schools, career and technical centers, and other similar programs with local ties and influences are all geared toward offering students opportunities to discover training toward employment. One issue of importance however, is the close articulation among these various institutions (Jacobs, 2002; Levesque et al., 2000). According to Judy and D’Amico (1997) as cited by Jacobs (2002), sustaining national well-being depends more and more on having human competence available, and those areas of human competence will likely change on a continuing basis (p. 9).

CTE includes various programs, but the goal of this study was to concentrate on the technical and manufacturing aspect of such programs offered at 2- and 4-year colleges and universities specifically where this study was conducted. The jobs of the future in these fields require higher levels of education and skill and are influenced the most through globalization of technology and economy. Labor market trends of the future
point to the direction of growth in the services industry with little impact on the manufacturing and technical base impacted through globalization or production and marketing (Levesque et al., 2008). This reflects a change in educational requirements and skills needed to compete for high-wage high-skill jobs of the future. Workforce 2000 a study conducted by the Hudson institute for the U.S. department of labor estimated more than half of the new jobs between 1984 and 2000 would require some education beyond high school, and one-third would require a bachelor’s degree or more (Johnston & Packer, 1987, p. 86).

More recent projections anticipate that average growth will be greater for occupations requiring at least an associate degree than for occupations requiring less education, according to Silvestri (2006, p. 53-86) The 10 occupations with the highest-projected growth rate, explains Levesque et al. (2000), require more education and training as compared with 10 occupations with highest projected increase in number of jobs, which require relatively lower training and education (p. 24). The research reflects that there is a relationship between a higher level of skills, training, and the potential for earning higher income. Students participating in CTE programs at 2- and 4-year colleges and universities have a higher earning potential than those in traditional settings (Levesque et al., 2000, p. 26).

**Integrated Curriculum Design**

The environment today for teaching and learning is much different from the days of old. Just as the concept of “Taylorism” and mass production in engineering, product development, and marketing has served its usefulness and become obsolete, so is the approach to teaching and learning with an idea of one-size-fits-all. Today, workforce
training needs are largely the result of fundamental changes in the operation of the U.S. economy, in particular, a shift from an economy based mainly on natural resources and economies of scale made possible by mass production for a large, relatively isolated American market, to a more competitive global-information economy (Schrimer & Goetz, 1996, p. 3). According to Jacobs (2002) and Schrimer and Goetz (1996), economic success depends mainly on the quality of human resources, human competence, and of interest here are the national and organizational responses in providing individuals opportunities to acquire the appropriate competence for work.

Despite the federal mandates, posit Stone, Alfeld, Pearson, Lewis and Jensen (2006), there is still no uniformity and agreement on what curriculum integration should look like (p. 8). However, the goal of curriculum integration is to demonstrate to students the connection between academic subjects (Stone, et. al., 2006). A way to ensure that the skilled and competent human resource is developed and is available to the labor market is to understand where the technical labor needs are and prepare to meet those needs. This then calls for a process where the industry and educational institution and training facilities come together and develop a framework for the training of a skilled workforce that meets the local and national needs (Eisen Jasinowski, & Kleinert, 2005). Colleges and universities need, in partnership with industry, local, state and federal government, to develop a framework for curriculum development, implementation, and evaluation that has adequate resources and funding to be successful.

Promoting mathematics and science is essential to development of programs that offer U.S. students the ability to compete with the rest of the globe using a
multidisciplinary pedagogical approach. Bill Gates (2007) states another area where America is falling behind is in math and science education. He explains further:

> We cannot possibly sustain an economy founded on technology pre-eminence without a citizenry educated in core technology disciplines such as mathematics, computer science, engineering, and the physical sciences. The economy's need for workers trained in these fields is massive and growing. The U.S. Department of Labor has projected that, in the decade ending in 2014, there will be over two million job openings in the United States in these fields. Yet in 2004, just 11 percent of all higher education degrees awarded in the U.S. (p. 4)

Academic and technical integration is an important component of curriculum design. Loepp (1999) citing Vars (1991), states that the topic of curriculum integration is not new. He explained the fact that Dewey and Kilpatrick advocated forms of integration early in the century (p. 1). However, in the more recent era of reform and accountability, rigor and relevance of content and instructional methods have found more prominence as advocated by academia and educational policy makers and legislative mandates like the Perkins IV Act of 2006. The topic of academic integration is often discussed in connection with other terms such as contextual learning, applied academics, applications-based instruction, inter- and cross-disciplinary studies, and career majors (Zinser & Poledink, 2005, p. 3). In Jacobs' (1989) definition, “interdisciplinary” means conscientiously applying methodology and language from more than one discipline to a theme, topic, or problem (Loepp, 1999). Zinser and Poledink (2005) reflect on Johnson, Charner, and White’s (2003) statement describing integration as "a series of conscious and informed strategies used to connect academic and vocational content so that one becomes a platform for instruction in the other over an extended period of time” (p. 3).

Zinser and Poledink (2005) referencing Finch and his colleagues (1997) state, building on the "all aspects of industry" framework, suggests that curriculum should
include instruction on a "wide range of industry or field-wide functions, concerns, issues, and technological knowledge and skills" such as community, environment, economic, finance, health, labor, leadership, management, planning, safety, and underlying principles of technology (p. 3).

With the publication of the report, *A Nation at Risk* (1983), the pace of reform accelerated, creating an impetus for meaningful changes in CTE at the secondary and postsecondary level. As a result of the report’s findings Levesque et al. (2000) states, many educators and reformers started to advocate the strengthening of the academic learning and better preparing of the students for the world of work (p. 2). Integration was seen as a means to make academic learning more meaningful for all students, to prepare all students more broadly for employment, to improve student engagement and learning, and to improve the academic content of vocational courses, among other objectives (Levesque et al., 2000).

To consider the learning environment in an abstract and isolated form, in a unitary subject matter presentation, devoid of any relationship or relevance to other related parts deprives the learner from getting the whole picture. Literature, going as far back as Dewey and others is full of examples of consideration for various integration methods ranging from academic to social and technical to environmental factors. Zinser and Poledink (2005) appropriately highlighted the importance of taking a more holistic position as they cited Seemann (2003), asserting that to understand the particular, one must understand its relation to the whole, and the understanding of interdependencies between subjects helps create meaning (p. 4).
CTE programs are designed specifically to incorporate a multilevel instructional approach to teaching and learning. The new requirements of the Perkins Act IV of 2006 has gone further than any other legislative act to highlight the role of institutions, states, and individual, and the curriculum design advocating rigor and relevance.

According to Edling and Loring (1996), a major objective of education should be to keep open a range of options for students, not simply skills for work or academics for college (as cited by Zinser & Poledink, 2005, p. 4). Even though there is a well-developed body of knowledge for core academic subjects—and it seems to make sense to teach them in isolation—Zinser and Poledink (2005) ponder that the reality of modern life emphasizes context, relationships, and wholes, which is best exemplified by occupations (p. 4). So teaching academics in the context of a profession such as engineering provides a framework for higher, reflective learning, which includes analysis, synthesis, and systems thinking; and teaching engineering using a foundation of academics and process skills helps students grasp and apply the concepts from both areas (Zinser & Poledink, 2005, p. 4).

**Academic Program Reviews, Assessment, and Evaluation**

Academic program review and evaluation can be used for many types of decisions as stated by Posner and Rudnitski (1994) citing Cornbach (1963), identifying three components for purpose of evaluation: (1) course-improvement decisions, (2) decisions about individual students, and (3) administrative regulation (p. 167). All three aspects stated are important in an evaluation process, but perhaps as stated by Cornbach (1963), using evaluation for course improvement contributes more toward improving education than do other uses of evaluation (Posner & Rudnitski, 1994, p. 168). The college taking
part in this study utilizes a program assessment tool to evaluate program success based on data gathered from an advisory committee consisting of different stakeholders. This guideline or evaluation tool is called academic program review (APR). The purpose of this guideline is to accomplish what Posner and Rudnitski (1994) described previously in discussion of program evaluations and the necessary components needed to accomplish such objectives. Every department/program undergoes this evaluation process at least every 5 years. The participants in this case study also agreed with the value of the data contained within the departmental APRs’ for program selection, college selection, and for administrative decision-making as reported in the findings of this study.

A critical aspect of program evaluation is designing an evaluation model (Ruhland, 2003, p. 38). This study did not specifically focus on exploration of curriculum development as part of this study to establish whether there is a relationship between the curriculum design, course selection, and the local and national needs of the workforce in relation to globalization. However, it must be stated that through interview question many topics regarding the curriculum, integration of technology, and other teaching tools were articulated by the student and faculty participants as emergent views as reported in the findings of this study. Nonetheless, according to Conrad and Wilson (1985) as described by Ruhland (2003) “an evaluation model not only provides the overall framework for evaluation but also gives shape to the research questions, organizes and focuses the evaluation, and informs the process of inquiry” (p. 19).

The APR guidelines provided to this investigator for purpose of this study described the overview of the programs as designed to explain: (a) program goals, (b) program visibility and distinctiveness, (c) program relevance, and (d) program value
The findings of the data relevant to the PDET program as outlined in the departmental APR additionally highlighted some positives and also the shortcomings of the program including: (a) student enrollment, (b) characteristics, quality, and employability of students, (c) quality of curriculum and instruction, and; (d) and composition and quality of the faculty (APR, PDET, 2006).

The APRs’ make a great deal of significant data available to the college to be used for the purpose of program design, curriculum alignment, and decision making purposes. The process of the APR development as stated in the document called “The APR Guide 2010” from the Department of Academic Program Review of this university requires that all departments follow a similar format in the composition of the departmental APRs. Therefore, this investigator did not see the need to repeat a similar explanation for every department. The result of the collected data by the college from various participating stakeholders varied and it was reported in the findings of this case study.

The department APRs for the purpose of program evaluation was defined by Hitchcock and Hughes (1989) as "a systematic study of a particular program or set of events over a period of time in order to assess effectiveness" (Ruhland, 2003, p. 37). Asserts Ruhland (2003), program evaluations assess how well a program has worked in terms of its stated goals and affirms that methods of evaluation range from individual reviews of performance to statewide assessments (p. 38). According to Dutton, Hammons, Hudis, and Owens (1994), asserts Ruhland (2003), evaluation may occur at
regular intervals throughout a program to measure progress (formative), or may occur at the end of a time period to summarize the results (summative) (p. 38).

According to Airasian (2005), assessments can be standardized or non-standardized, and often it could be used for academic reinforcement, curriculum evaluation by state or a federal agency requirement, and may lead to further endorsements for job purposes (p. 2). However, technological literacy is an integral part of the assessment process. According to Brand (2003), “because CTE provides the opportunity for contextual and integrated learning and allows students to see how the material is applied in the real world, studies become more relevant to future plans, and students remain more engaged in their learning” (p. 4). Assessment can take varied forms, the form of which depends on whether it is geared to assess and evaluate student learning or it is designed to measure program effectiveness. Development of student assessment as a process for student benefit should to be designed in such a way that requires learners to demonstrate the ability to be a critical thinker, problem-solver and pragmatic decision-maker in addition to the mastery of the subject matter. According to Gagel (2006):

Students need to develop an understanding of the effects of technology on society and culture; to know the history of technology; to recognize its relationship with the environment; to master the necessary skills to plan, produce, and evaluate; to tolerate uncertainty and adapt to new technologies; and to recognize the interconnections between technology, the workplace, and everyday life. (p. 73)

This study focused on student learning as perceived and explained by the participants. The majority of the participants’ experiences reflected a hands-on learning approach or where otherwise contextual learning was taking place. This type of evaluation can be explained based on the degree or the level of technology integration
and how the learning is gauged. This form of assessment is known as authentic or performance–based, and to a certain extent it is advisable to seek some sort of testing that demonstrates knowledge acquisition.

This type of assessment process puts the learner in a position to create a link between the realities he/she has constructed, the grasp of the knowledge acquired, and demonstration of understanding of the concept. At its core, authentic (or performance-based assessment) is a reaction to the deficiencies perceived in a traditional approaches to testing (Rojewski, 2002, p.13). Authentic assessment requires students to demonstrate their grasp of knowledge and skills by creating a response to questions or a product that demonstrates understanding (Wiggins (1990, p. 13). “According to Kerka (1995), this type of assessment reflects the complexities of everyday life and a belief that learning is actively constructed knowledge influenced by context” (Rojewski, 2002, p.13).

Not only the training and the educational institutions have a role and a responsibility to teach the core requirements of a program as outlined by the state CTE plans and Carl D. Perkins Act IV of 2006, they also have an opportunity to develop other essential skills required in today’s ever-integrated environment. Although program evaluation and assessment was not a primary focus of this study, nonetheless, as stated by Rojewski (2002), program evaluations are very essential in the overall conduct and construct of a course of study. The findings of this study also yielded relevant data as explained by participants as to how they were actually learning and how they viewed the value of their learning to the job setting.
**Technology Integration**

Technology integration in instruction must play a prominent role in leveling the playing field and giving the new generation an opportunity to compete with the rest of the world. This integration can take many forms, but it will not be relevant if it is not developed and implemented with contemplation for newly developed technological advancements in various arenas. Traditional approaches will need to be supplemented with greater emphasis on emerging pedagogical approaches like integrating academic and vocational education, tech prep, and contextualized teaching and learning forums (Rojewski, 2002, p. 21). Zinser and Poledink (2005) explain, today's employers want workers to use initiative and solve problems, skills previously associated with employees who had been to college and have a good academic foundation in subjects like statistics (p. 4). Plank (2001) suggested that “an integrated curriculum provides students with a strong academic program and a foundation in work applications so that they can pursue a variety of levels and combinations of work and college” as posited by (Zinser & Poledink, 2005; Threeton, 2007). Integration is to incorporate technology in a manner that enhances student learning (Eisenberg & Johnson, 1996, p. 3).

Technology integration, state Eisenberg and Johnson (1996), is also using software supported by the business world for real-world applications so students learn to use computers flexibly, purposefully, and creatively (p. 3). Technology integration is also having the curriculum drive the technology usage while seamlessly combining technical discipline to create elegant solutions. Finally, technology integration is organizing the goals of the curriculum and technology into a coordinated, harmonious whole (Eisenberg & Johnson, 1996). The open-ended interview questions asked of participants in this case
study explored this topic from their perspectives and reported the results as findings as an emergent aspect of teaching in current CTE programs at this college.

In their discussion on using contextual learning to build cross-functional skills, referring to Freeman, Field, and Dyrenfurth (2001) Zinser and Poledink (2005) pointed out that “skill such as teamwork, communication, decision-making, managing resources, and information gathering are important for performance and stability in employment because employees are required to interact across functional boundaries” (p. 5). Thus, a purely academic or technical education is not enough to prepare students for modern realities (Rojewski, 2002; Threeton, 2007; Zinser & Poledink, 2005). The benefit of utilizing an integrated approach to teaching and learning, to offer students the tools necessary to construct relevance and meaning in their lives and careers are essential components in today’s workforce development. This topic was found to be an important factor when students were making decision about attending this college, according to the data collected from the study’s participants.

**Role of Institutions and Public-Private Collaboration**

According to a new report sponsored by Deloitte and the Manufacturing Institute authored by Morrison, Maciejewski, Derocco, McNelly, Giffi, and Carrick (2011), a strong manufacturing base has been fundamental to the economic success and effectiveness of the U.S., and we see little evidence of that changing this was (p. 1). As many U.S. manufacturers attempt to regain their momentum, they are likely to face some well-documented challenges in the form of a talent shortage, stated Morrison et al., (2011) as businesses look to grow and actually find the right talent to move forward (p. 1). One way to alleviate this situation according to the Manpower report (2008) is that
“governments and employers can enhance the future labor market supply by becoming better at organizing and improving the effectiveness of the public-private partnerships” (p. 8).

Recalling the objectives of the Carl D. Perkins Act IV of 2006 and the Michigan Works’ Agencies (MWAs) that were established to implement the federal Workforce Investment Act (WIA) programs and funding, it was only reasonable to ask how these programs and the postsecondary educational institutions such as this university are working together to meet those objectives. Educational institutions at the postsecondary level have a prominent role in the promotion of CTE programs to all students interested in CTE programs. Jones and Domenico (2006) explained:

Identifying and building strong education communities and partnership with business and interagency coalitions, use of research based strategies to attract new enrollees in nontraditional fields, and effectively utilizing articulation agreements are among many possible alternatives to the current situation. (p. 4)

Additionally, institutions offering CTE courses must also seriously evaluate the programs and procedures in place regarding curriculum planning and development, and technology integration consistent with the requirement of the changes taking place in the community (industry) and nationally (Mitts, 2008, p. 82). The Skills Gap Report (2005) conducted on behalf of the National Manufacturers Association cites a declining percentage of students in U.S. universities studying science and engineering as one of the major concerns in the U.S.’s ability to compete with other emerging economies (p. 2).

According to various sources cited throughout this study, the nation’s economic well-being and its ability to compete on a global scale to a large extent is dependent upon the educational institution’s ability to recruit and educate both in quality and quantity students in science and engineering fields. The cooperative efforts between universities,
business, and industry, and other interested stockholders is an essential step in this process. The International Labor Office, Geneva, “Competing for Global Talent” (2006) as reported by Manpower (2008) stated that “the demand for higher education is likely to increase as people will want to succeed in the knowledge economy and education required in different contexts can be expected to be valued particularly highly with the internationalization of production and increased cross-border trade” (p. 8).

On March 12, 2008, in a hearing commemorating the 50th anniversary of the House Committee on Science and Technology, Microsoft Chairman Bill Gates testified on the state of American innovation and competitiveness, as well as the future challenges America will face. With other countries such as China and India investing more and more in basic research, Mr. Gates noted that America needs to continue to be proactive in promoting innovation. He stated:

If the United States truly wants to secure its global leadership in technology innovation, we must, as a nation, commit to a strategy for innovation excellence—a set of initiatives and policies that will provide the foundation for American competitive strength in the years ahead. Such a strategy cannot succeed without a serious commitment from—and partnership between—both the public and private sectors (p. 4).

The current economic trends and the downturn in global economic environment pose new challenges. Two Skills Gap reports (2005 & 2011) conducted by the Deloitte on behalf of the Institute for Manufacturing were utilized as part of this study. The basic laws of supply and demand as they operate in the labor market suggest an even more difficult future: on the demand side, the Skills Gap Report (2005) states employers want more highly skilled employees that are exceptionally engaged and innovative, but the basic demographic, social, and educational trends indicate a gloomy labor supply outlook (p. 2). The newly released Skills Gap Morrison et al., (2011) reiterates the same points
that the shortage of skilled talent is persisting and hurting the manufacturing sector’s ability to grow (p. 1-1).

For many years both the private and the public sector have been aware of these shortfalls especially in our inability to recruit, train, and retain qualified engineers (Augustine, 2008; Eisen et al., 2005). The manufacturing industry knows what it needs: the investment in training programs through the Perkins Career and Technical Education Improvement Act of 2006, and states offering educational institutions the opportunity to develop plans to head off these concerns. The review of the APRs received from the college indicated that their objectives were in line with recommendations made thus far by the Carl D. Perkins Act IV of 2006 and from the State’s CTE Perspective in aiming to align their programs to the industry needs. The APRs also stated the utilization of advisory committees in working with individuals with school and industry ties to assess the relevance of their programs.

An area of concern according to The Skills Gap Report (2005) is “a very large percentage of respondents to their survey either never heard of government workforce programs or have never been contacted by workforce investment boards” (p. 2). The lack of communication and plan of action to offer manufacturers the opportunity to share their needs and concerns undoubtedly is not helpful to this situation. Through a well-planned and research-based communication mechanism, improvements can be made to increase the communication and collaboration level between the business world and educational institutions as explained by the state CTE plan. Improved communication and collaboration are required to better utilize these programs and to improve the
effectiveness of the public education system in preparing students for the workforce and future careers (Lewis, 2000; Skills Gap Report, 2005).

The most common bases of university-industry interface are in the education of talented, critically thinking people, and in research and development (R&D) and innovation, where such partnerships are fundamental to a region’s overall economic performance (Johnston, 2004, p. 2). Universities contribute directly to the needs of the private sector, and to the economic growth of any region, states (Johnston, 2004). Universities, asserts Johnston (2004), are the main source of the highly qualified and skilled personnel essential for industry to operate and compete effectively in the knowledge economy (p. 3). Regional economic growth requires an initial investment in research (knowledge creation), and it also requires effective interaction between universities and the private sector (technology transfer and commercialization)—and, posits Johnston (2004), effective regional economic development strategy needs both elements (p. 4). To be successful in a knowledge-based economy, explains Johnston (2004), firms must be able to generate and use knowledge to develop new or significantly improved products, processes, and services and collaboration with universities is an effective way to carry out such development work (p. 4).

Adapting to Change in CTE

“The central purpose of education is to ensure that we have a skilled workforce and engaged citizenry to keep our nation, economy, communities, and families healthy and productive” (Brand, 2008, p. 3). Career and technical education (vocational coursework) is a notable part of this mix (Plank, 2001, p. 13). The education in the United States is no longer preparing to ready individuals for a post-agricultural or post-
industrial world. The U.S. economy and education system has entered a new age in which knowledge and technology drive the economic engine and educational process.


This world is a new world of fast communications and information, rapid decision-making, and intelligent social skills that are needed to deal with economic, technical, ecological, and ethical issues identified with complex problems facing every economic, social, or political system. (p. 15)


The new economic and labor model is characterized today by international activity, cyberspace, ever-changing market demands and standards, rapid product life cycle, ever-increasingly sophisticated computers and need for a more thorough knowledge of the holistic (the gestalt) of the business environment rather than just specific skills or narrow job tasks.

Today's workplaces are often in multiple locations characterized by cultural diversity—almost mosaic, fragmented or "different" organizations and infrastructures, periodic economic restructuring, and constantly changing worker roles and duties. (p.16)

Participants in this study were keenly aware of what Lynch (2000) described as they pointed to multiple examples of such occurrences in their own experiences.

Carl D. Perkins Career and Technical Education Act IV of 2006 ushered in a new era of accountability, program design, academic integration, and assigned roles and responsibilities to all stakeholders (U.S. Department of Education, 2008). These programs enroll a highly diverse student population reflective of the increasing diversity of the United States population at large.
In an era of accountability and educational reforms, Daggett (2002) stated, “If
CTE leaders are to meet the challenges, they must build upon the lessons learned and
successes they have experienced with such initiatives as Tech Prep, career academies,
high schools that work, applied academies, school-to-work, and school-to-career
programs” (p.1). This study has reiterated the changing nature of the work and the
required work skills in today’s workforce. According to Daggett (2002):

That change can be seen most dramatically in our workplace. Strong academic
skills and the ability to apply those skills to solve real-world predictable and
unpredictable problems and situations has become a minimum requirement for the
vast majority of American jobs. There is little room for the academically inept in
today’s contemporary workplace (p. 3).

CTE has responded to the call for making changes that would make it a more
integrated educational model as stated by various authors in this study including
Levesque et al. (2000). Career and technical education plays a significant role in
providing training for people in a variety of technical fields for a future in a technological
occupation. CTE covers a broad range of educational fields such as trade, commerce,
health care-medicine and sciences, engineering, and agriculture, and various other
opportunities (Levesque et al., 2000).

With a major emphasis on educational reform, CTE programs in secondary and
postsecondary educational institutions are a major part of the education process and
workforce development. It was important to recognize that today’s CTE programs are in
transition.

As explained by Doolittle and Camp (1999) citing (Wirth, 1972) “the
philosophical debates of the early 1900s settled the question of the role of career and
technical education for many years” (p. 15). The CTE professional or the CTE profession
would prepare workers for skilled positions in the workplace through a public system of pre-employment, on-the-job, skill-upgrading, and worker-retraining programs (Doolittle & Camp, 1999, p.15). CTE has always played in important role in workforce development (Rojewski, 2002), and even in a changing society and workplace, according to Doolittle and Camp (1999) certain practices must remain central to practice in the profession (p. 16). Career and technical education as envisioned by the Carl D. Perkins Act of 1984 “had two interrelated goals, one economic and one social” (Gordon 1999). According to Doolittle and Camp (1999):

In order for career and technical education to meet its obligations to society, to the education community, to business and industry, and to its student-clients, we must continue to identify employability and workplace skills and to transmit those skills to students (16).

Doolittle and Camp (1999) citing (McNabb, 1997), stated that the precise nature of those skills may have changed from repetitive, manipulative tasks to problem-solving, collaborative tasks yet the fact remains that providing employability and workplace skills is a fundamental task for career and technical education (p. 16). The rationale for presentation of this brief explanation was to describe the fact the role of CTE has changed because the nature of the work and the required skills have changed. But that was why the role of CTE had precisely remained the same to provide what the Carl D. Perkins Act of 1984 and the pursuant Act had envisioned: for CTE to meet its social and educational/training obligations of the community.

**Globalization and Conceptual Framework of Study**

The conceptual framework of this study attempted to offer an understanding of the knowledge base in sync with globalization as a reality and its influence on postsecondary students’ educational and career choices, enrolled in CTE programs, as
influenced by a phenomenon that is out of their control. The conceptual framework of this study addressed the current realities related to globalization aiming to make good use of past and present literature available on CTE. This framework also included a discussion of current educational reforms, provided some perspectives on the future of the global economy, and the statewide trends in workforce development, and the role of CTE. Zinser and Poledink (2005), citing Bragg (1999) explain that “such a conceptual framework, should employ integration of academic and technical curriculum in the context of work, family, and community (i.e., all aspects of modern life) as the vehicle for engaging students in learning the most central, essential aspects of the academic discipline” (p. 3).

As Rojewski (2002) asserts, “this study attempted to articulate “a” (rather than “the”) conceptual framework for CTE and globalization based on the extent of the literature, current state of education reform, and projections of future direction for economy, work-family-community demands, and role of career and technical education” (p. 2). An appropriately designed framework reflects the underlying purpose of the CTE. In order for CTE to reflect the beliefs and values of the clients it is intending to serve, the future direction of the program, its impact on all interested stakeholders, and the existing discourse among the groups cannot be ignored.

Rojewski (2002) states that the need for a conceptual framework has never been greater. Considering the state of the workplace in our society, there is a strong emphasis placed on the need for workers with technical and higher-order thinking skills. Today’s workforce as identified by the SCANS report must possess certain basic and technical skills as well as certain foundational competencies to be able to compete in a global
marketplace of ideas. Lewis (1998) as stated by Rojewski (2002), posited that “two
related forces shape policy discourse and curriculum in vocational education: (1) a global
economy in which economic competitiveness is presumed to be linked with workforce
readiness, and (2) the changing nature of skills, work, and jobs, wrought largely by the
impact of technology and by high-performance work organizations” (p. 3).

Students enrolling in CTE programs at the postsecondary institutions of higher
learning attend these institutions to immerse themselves in programs designed to place
them in settings managed by a community of professionals (faculty) that are expected to
be experts in their fields. This setting is designed to offer students the opportunity to
learn about the work, and develop the social and critical skills necessary in becoming
effective and productive workers in today’s globally competitive workplace. Lerwick
(1979), as reflected by Evanciew and Rojewski (1999), states that “Dewey advocated this
form of education during the late 1800’s when he suggested that education should take
place within the community rather than in isolation from the community” (p. 2).
Similarly, Vygotsky (1978) considered social institutions, culture, activities, and
cognition a critical element of a successful learning process, by hypothesizing that
learning occurs most effectively when it is relevant and meaningful to the completion of
activity found in a particular culture or society as referred to by (Evanceiw & Rojewski,
1999). This theory is known today as constructivism in educational settings, and that is
what students enrolled in CTE programs learn to do, to create meanings out of their
experiences.

The literature review of this study considered many of the issues as stated,
because development of any conceptual framework of CTE in context of this study must
contend with all influences (Rojewski, 2002). Accordingly, students enrolled in postsecondary CTE programs in manufacturing, product design, software engineering and game design are expected to demonstrate an acceptable knowledge of technical and required professional skills and knowledge of learned subjects. These skills and competencies are best described in the Carl D. Perkins IV Act Career and Technical Education Improvement Act of 2006 and SCANS report. Similarly, students ought to recognize changes taking place in their field of work and community, and possess the necessary skills to adapt to those changes.

The conceptual framework of this study also assigned a similar role and responsibility as a requirement to the faculty, emphasizing curriculum knowledge and familiarity with relevant pedagogical knowledge, and stressed the importance of the role they play considering the demands of the global influences on their decisions. The role of both faculty and students as two major components of this study, and their relationship to each other, are best highlighted by Daggett and Pedinotti (2005), Michigan Career and Technical Education (2007), and ICW (2008). The difficulty in conducting this study was lack of similar research on the topic of globalization and its implication for CTE students and programs of study, and other related influences emerging from data collection. Although there were studies that mentioned globalization in some form, none were particularly designed to deal with CTE program such as the technical programs under investigation in this study. There was very little to compare and contrast the findings; at the same time it was important to create a concrete conceptual model notwithstanding the research outcome derived through data collection.
The conceptual model of this study was designed to look at two distinct phenomena; CTE and globalization and how one might impact the other. This conceptual model as explained dealt with various issues, the students learning experiences, and the faculty’s ability to deliver quality instruction. The role of globalization, its impact and influence on students, faculty, and instructional delivery relevant to a global workforce preparation also was addressed. Similarly, individuals’ personal lives and career planning as influenced by globalization had importance in the context of relevance of CTE and career preparation in this study. Additionally, the role of technology on instructional delivery, the relevance of the incorporated technologies to real world applications, assessment and evaluation of students’ work, and their understanding of globalization as a factor of influence on their future plans was also examined.

Miller (1996) as cited by Rojewski (2002) expressed that a conceptual framework, contains: (a) principles or “generalizations that state preferred practices and serve as guidelines for programs and curriculum construction, selection of instructional practices, and policy development,” and (b) a philosophy which makes assumptions and speculations about the nature of human activity and the nature of the world” (p. 2).

The planning and execution of this study aimed to explore various components present or absent, at this Midwestern state university, and whether a conceptual framework existed or should exist, which could reflect commonalities and or differences and the vision of the future relevant to CTE programs. “A viable conceptual framework for CTE or any other enterprise should represent consensus among its members concerning the scope, mission, and methods reflective of the profession” (Rojewski, 2002, p. 1). Such a framework according to Rojewski (2002) “should be dynamic, and
subject to frequent debate and ongoing refinement” (p. 1). For the purpose of this study the student investigator considered the development of a conceptual framework to be the most crucial part of the research plan, because an appropriately designed conceptual framework guides the decisions about what kind of data are needed to answer the proposed research questions. The departmental APRs obtained from the college made references to the very points stated here.

Rojewski (2002) further explains, “that a conceptual framework should accomplish several things: (a) establish the parameters of a profession by delineating its mission and current practices, (b) account for historical events to allow understanding of how we got to where we are, (c) establish the philosophical underpinnings of the field and underscore the relationships between philosophy and practice, and (d) provide a forum for understanding needed or actual directions of the field” (p. 3).

The conceptual framework for this study as explained served as a road map highlighting the relationships that existed between various factors and offered a platform for dialogue between multiple points of view and interests. The discussion of these topics provided a framework for both data collection and analysis, and was a valuable tool for coding and developing categories and themes as the study progressed.

Globalization in most of the academic literature is defined to include: modern communication technologies, emergence of a new economic model, friendlier shifts in political attitudes towards trade and competition, and shifts in demographics. The conceptual design of this study included defining the role of society and individual responsibility. The perception of what institutions do in the process of preparing a new kind of worker equipped with the ability to be technologically advanced and adaptable
with necessary levels of soft and critical thinking skills, as an important aspect of the preparation process in a new global workforce.

The role of educational institutions, use of modern and relevant technologies, course planning, development, evaluation, and student learning in this process were critical to the direction and the relevance of such programs and to the local and national economy. The conceptual framework of this study explored these issues and evaluated and examined the factors considered as influences of globalization on CTE students’ career choices, educational plans, and their perceptions in the preparation process to develop workers from all socioeconomic backgrounds. The role of government, with the Carl D. Perkins Acts I to IV, as stated throughout the literature relating to the history of CTE, and with educational reforms at the state and federal level, and also the role of the public sector in partnership with educational institutions were also discussed. This study sought to provide explanations to the research questions asked through a platform as outlined in the study’s conceptual framework. Figure 2 demonstrates the interconnectedness of the topics in preceding discussions.

**Summary**

Chapter Two provided a glance into the literature pertaining to globalization and its influence on workforce development in general, and the role of CTE programs in particular. This chapter attempted to cover all the major issues relevant to CTE programs, programs of study, program evaluation and assessment, public private partnership, changes that CTE needs to adapt, the role of educational institutions, and the conceptual framework. Ultimately the purpose of this chapter was to highlight the role of CTE in the U.S. educational system, the society, and its place in a global economy.
Figure 2: Globalization, Educational Reform, and Historical Influences

Chapter Three will introduce the research methodology and will discuss related aspects of the research: methods and procedures, participant selection, instrumentation, and other important facets required of a researcher and the research topic.
CHAPTER III
METHODOLOGY

Introduction

Methodology, as described by Corbin and Strauss (2008) refers to “a way of thinking about and studying social phenomenon” (p. 1). This study utilized an exploratory qualitative case study methodology conducted at a university. The purpose of the study was to explore the impact of globalization on postsecondary CTE students’ program of study and career choices, as well as students and faculty understanding of this rapidly evolving phenomenon from their perspective. Additionally, the study attempted to provide a description of the faculty’s role, and how they transferred their knowledge about the industry into their classrooms, as well as the relevance of their experiences and skills to the alignment of the programs they were teaching in meeting the industry’s skilled labor needs. Consequently, the implication of globalization for CTE programs had to be examined while seeking to explore the similarity and or differences of the understandings between the groups, APRs, and the programs selected for this study.

The challenges presented in conducting such a study were to review the collected data and to be able to compare the findings with the findings of other similar studies, which were hard to find. Although there are various literature, books, reviews, and some studies on globalization, there were none that were specifically designed to address the implications of globalization at the postsecondary CTE program level. The APRs, however, filled that gap in availability of relevant data since each program had an APR.
developed in 5-year intervals to measure program efficacy. The data provided by these departmental APRs, although important, did not clearly demonstrate how the program evaluations led to program alignment with the business and industry needs. The APRs generally utilized a mixed research methodology by using a Likert-style survey method combined with short open-ended questions to arrive at answers to demonstrate stakeholders’ perception of the programs.

Most of the data available through APRs dealt with program satisfaction and other program-related issues. It did however prove helpful to this investigation to compare current students’ perceptions and understanding of their programs to that of graduates, advisory committee members, faculty and employers in the past five years. The combining of data in the form of findings from this study and the data from other sources including APRs, although helpful, was not specific enough in addressing globalization and employers needs in a measurable form dealing with student preparedness and the job readiness. Therefore, there will be a need to further investigate how to measure student skills levels and the employers understanding of those skills relevant to the work setting.

**Case Study Method**

Corbin and Strauss (2008) describe the methods part of the study as techniques and procedures for gathering and analyzing data (p. 1). Qualitative analysis is a process of examining and interpreting data in order to elicit meaning, gain understanding, and develop empirical knowledge (p. 1) Selection of case studies, especially qualitative case studies, are prevalent throughout the field of education (Merriam, 1998, p. 26). As a research endeavor the case study “contributes uniquely to our knowledge of individual, organizational, social, and political phenomena” (Yin, 1994, p. 2). Case study therefore is
defined (Creswell 2003; Huberman & Miles, 2002; Lincoln & Denzin, 1998; Merriam, 1998; Yin, 1994) as a study in which the researcher explores in-depth a program, an event, an activity, a process, or an organization, a classroom or a student or a school. These authors consider a case(s) to be bound by time and activity, and researchers collect detailed information using a variety of data collection procedures over a period of time.

This study “A Case Study of How Postsecondary Students Enrolled in CTE Programs and Faculty Understand The Implications of Globalization on Career Preparation” utilized a qualitative, exploratory case study method portraying a situation or a phenomenon (Runeson & Host, 2008, p. 135). The case study method is deemed suitable for understanding a phenomenon, states from the perspective of those involved with it and arriving at findings inductively derived from data rather than testing a pre-determined hypothesis (Merriam, 2001). Case studies are generally considered to be bound by time, and the boundaries determine the limits of the unit of the study (the case) as stated by Creswell, 2003 and Yin, 1994.

This study addressed globalization as a phenomenon by providing descriptive and vivid details about the participants, programs, the setting, beliefs, values, perceptions, and practices relevant to postsecondary students enrolled in CTE courses at this university (Merriam, 1998). The study focused on how these students understand the impact of the changes brought about as evident through globalization, manifested by competition for a competent, adaptable, skilled, new workforce. Three CTE programs that utilized technology as part of their education and training were selected as part of this study. The student and faculty participants all were also chosen from these CTE programs.
The primary data collection instrument was a structured, open-ended interview format with 12 student participants and three faculty members. Interviews have various benefits for the researcher as a means of gaining direct access to an interviewee’s experiences (Schwandt, 2001, p. 136). Qualitative researchers rely quite extensively on in-depth interviewing (Marshall & Rossman, 2006, p. 101). Kahn and Cannell (1957) described interviewing as a conversation with a purpose (p. 149).

In order to achieve the objectives of the study it was important to ask appropriate questions to explore, and to describe the level of understanding conveyed by the student participants concerning globalization and its implications on their career and educational choices. The interpretation of understanding of globalization into educational experiences and career choices as perceived by the participants was important to this study. The understanding of globalization by faculty and the extent to which they were able to translate their understanding of globalization, their past experiences with or within the industry, and their educational experiences into their programs were another subject for exploration. The impact of globalization and its implication for CTE programs development was another area that needed to be explored, because this was one area that relevant data from previous studies was not available.

Huberman and Miles (2002) explain the rationale for defining the research questions to be as though the researcher is testing a hypothesis without a research focus; it is easy to become overwhelmed by the volume of data (p. 11). The focus of the study was then directed to utilization of an interview protocol to gain answers to research question. The interview questions generated a great deal of rich and descriptive data reflective of the understanding of the participants view of globalization and other related
question to get to the essence of their lived experiences. This qualitatively collected data as explained by Locke, Spirduso, and Silverman (2000) is one of the most common purposes of qualitative research when the investigators pose the basic question, and ask “What’s going on here?” to understand the value of the data to the study (p. 96). This data is bulky; unorganized, and reflective of the complexities of the task at hand. Nonetheless, the collected data when organized can demonstrate commonalities and the differences among participants perception of various topics under investigation. Appropriately designed research questions are at the heart of this process.

**Methods and Procedures**

**Overview**

Understanding the rationale for case selection as the focus of the study, as opposed to choosing individual participants, and attention to details are important parts of conducting a qualitative case study research. As a descriptive, qualitative case study design within the same school, three different programs of study; Manufacturing Engineering Technology, Product Design Engineering Technology, and Digital Animation and Game Design Engineering were selected purposively as part of this study. These programs of study were the career and study fields believed to be facing serious competition from all corners of the globe because of their high-tech nature and influence of other factors. All candidates willing to take part in the study received a consent form created for this purpose, complying with HSIRB protocols.

Data collection in a case study, as stated by (Yin, 2003; Creswell, 2003; Patton, 2002; Merriam, 2001) can utilize varied sources including interviews, observation, archival and historical data. This study focused on individual interviews with students
and faculty, and collected and used various artifacts such as APRs, course guides, course syllabi, published articles, program brochures, and the software integrated or blended in as part of instructional delivery mode. Inclusion of such artifacts was beneficial when used in combination with data collected from the interviews to facilitate triangulation and to add to the richness of the study’s findings. This approach also provided a glance into the program’s recent past to reflect how and to what extent if any the programs have changed and evolved to their current form.

As is often the case with qualitative research, utilizing a small purposive sample, as was the case with this study, is best suited with a qualitative case study methodology. Qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter (Denzin & Lincoln, 1998, p. 3). This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena, in terms of the meaning people bring to them (p. 3). Based on these characteristics, this investigator conducted a qualitative case study to explore and seek answers to research questions as outlined. It was the goal of this research, as a qualitative case study, to add to a better understanding of human behavior and experiences while seeking to grasp the processes by which participants construct meaning and describe what those meanings are (Hatch, 2000; Creswell, 2003).

Qualitative research in a naturalistic context relates to cultures, lives and experiences, while using written/spoken words, and facilitation of learning from the participants (Locke, Spirduso, & Silverman, 2000; Hatch, 2000). Due to the nature of qualitatively designed case studies, this study used multiple sources of data: interviews and collected artifacts, and was focused on CTE participants and programs in a
globalized context, seeking answers to research questions, while mindful of emergent categories of data (Marshall & Rossman, 2006; Creswell, 2003).

**Role of the Researcher**

The role of the researcher, as the primary data collection instrument, particularly in qualitative research, necessitates the identification of personal values, assumptions and biases at the outset of the study (Creswell, 2003, p. 200). “Although the investigator may utilize various forms of data collection and analysis, in the final analysis the researcher is the primary instrument of inquiry in a qualitative research and his/her contribution to the research setting can be useful and positive as how to behave and what data to use or not to use” (Locke, Spirduso, & Silverman, 2000, p. 99). Qualitative investigators, according to Locke, Spirduso, and Silverman (2000), should try to be aware and conscious of the perspectives they bring to the study by explaining their education, background, and interest. This investigator was conscious of the perspectives he espoused by explaining his current and past experiences both as an educator and graduate student in this field. It is natural for people to espouse certain biases, however, every effort possible was made to remain objective although it was natural to have a reaction during the interviews to certain points made. This applied to data transcription, reporting of the data, and interpretation process.

This investigator remained focused on the goal of the study, which was to listen and to learn about participants perceptions and report those understandings. As an educator in career and technical education, this investigator attempted to “bracket” himself to suspend judgment and to set aside assumptions, not allowing his perception to interfere with the understanding of the phenomenon under investigation (Schwandt,
2001; Marshall & Rossman, 2006). As suggested by Creswell (2003), bracketing allows the investigator to understand the experiences of the participants under study (p. 15). Marshall and Rossman (2006) state that through bracketing the researcher gains “clarity” from his own perception and then sets aside prejudgment and personal experiences (p, 105). I followed this advice regarding my personal experiences. I acknowledge, as stated by Hatch (2002), that “no matter how much you try, you cannot divorce your research and writing from your past experiences, ‘who you are’, what you believe, and what you value” (p. 34). Qualitative researchers try to acknowledge and take into account their own biases as a method of dealing with them (Hatch, 2002, p. 32).

I have been involved in education for almost 25 years and have served in various capacities. I obtained my undergraduate and graduate degrees from colleges and universities in Michigan. I was involved in teaching business education and computer applications. Most of my adult work was focused on teaching careers and employability skills to secondary students. I was always interested in education for the purpose of employment as I saw education to be essential to my success and the quality of life for my family. I was an entrepreneur and I was well-prepared to undertake this study, because I was interested in understanding how the next generation of skilled workers viewed the role of education and technology not only in their future but the future of the nation. I was absolutely certain not to influence anything the participants stated. I was content to listen and to understand and to report on participants views.

Site

The site for this study was a Midwestern university. This university has various extension branches statewide. This site was chosen because it was a predominately
technical college, because of the programs offered at this location, and its central focus on CTE programs. This site offered the participants and the student investigator the opportunity to explore the questions important to the investigation of the topic in a familiar environment and without undue disruptions. This university has a strong presence in the state and the community, both in cooperation with other schools and community colleges, and specifically at its main campus as a major center for development of career and technical education. This university/college was primarily selected because it offered an excellent opportunity to learn about teaching, learning, and the specific programs of study offered to students in CTE programs.

A secondary rationale for selecting this site was to learn how this university was using technology in preparing the new generation of academically and technologically advanced workers in sciences, technology, and engineering. This site was neither selected nor designated as a typical or exemplary institution. Nevertheless, it was reasonable to explain that this university attracts a diverse population to its technology programs from around the state and the nation. Therefore, this study was concerned with the issue of generalizability of the sample, although the sample selection was purposeful in selecting the participants for the study (Yin, 1994). Therefore, this investigator felt that this university, while offering proximity and access was the appropriate site to conduct this study. This site offered a pool of participants and choice of the programs that were central to the focus of this study in the student investigator’s hometown.

Sample and Sample Characteristics

The primary sample for this study included 12 student participants. Four participants from each program of study were (including one alternate from each
program) selected as study participants. All students from freshmen to seniors were eligible to take part in the study although preference in some cases was given to more upper-classmen getting ready to enter the labor market. The second sample was comprised of three faculty members, one from each of the three participating programs. The faculty chose to participate in the study voluntarily so that the value of data was not compromised.

The student participants were purposefully selected from a pool of volunteers agreeing to take part in the study. The following characteristics as requirements for participation were considered in this study; including the selection of participants with a diverse background, gender, grade level, and program major. The three programs were different and offered varied educational and work experiences. In addition, the participants could not be enrolled in a job-retraining program, or have had many years of experience in a field, and must attend classes on campus (i.e., no online classes were considered for this study). The reason a student could not be enrolled for job retraining program was that although their job situation may have caused them to reevaluate their situation, (and although the CTE programs are a logical choice for many to consider as an option for returning to school to upgrade their skills and education), they were not the target participants for this study. This study was looking for a random selection of participants that have not yet held a major career for many years and are in the forefront of the technical education that is the subject of the global competitive edge.

The total number of interested students completing the questionnaire and the consent form expressing the willingness to take part in the study from each of the three groups, had no bearing on the final selection process, regardless of how many forms were
completed. As it was stated in the questionnaire, as long as they met the initial criteria for participation the required number of participants for the study from each group was selected at random and without regard to any other issue. It was clearly stated that the participants must be at least 18 years old, and must be enrolled in one of three specific programs at the college as stated in the questionnaire, as follows;

- Manufacturing Engineering Technology, B.S. program
- Product Design Engineering Technology, B.S. program
- Digital Animation and Game Design Engineering, B.S. program

There were no other limitations imposed for participation. The selected participants were enrolled in CTE programs that were assumed to be or would be impacted by globalization of the workforce and competition for skilled professionals based on literature review.

Through this process, using purposive sampling, this investigator attempted to select participants from a cross section of the student population enrolled in three specific CTE programs that were exposed to the issue of globalization, and the impact it may have had on their educational and career plans. Mindful of the diversity of participants, the investigator did not and would not focus on race, gender, course-taking patterns, grades, or other demographic data. However, it is important to recognize that previous research demonstrated that participants’ perceptions and experiences vary systematically along those dimensions (Gilligan, 1982). Accordingly, the completed questionnaire provided a glance into the participants’ lives and offered the researcher with an option to choose randomly and purposively those participants that best met the criteria outlined for this study.
The factors considered during the sample selection process and selection of three different programs and participants were important to the study, in that they made it possible (Shen, 2008- Lecture) for the researcher to explore the homogeneity within and/or to discover variations across these programs. By considering all the factors cited and an explanation of limitations, the goal of this study was to learn about the participants’ perceptions and understanding about globalization that were either dramatically shared views or categorically very different. By including the faculty in this study, this investigator was able to explore and learn about opposing viewpoints from different perspectives.

**Access and Sample Selection**

The research design section of a proposal should contain plans for negotiating access to the site and the participants through formal gatekeepers in an organization regardless of an institution’s function (Marshall & Rossman, 2006). The gatekeeper is very important in the process of aiding the researcher to gain access to a group and serve as a liaison between the researcher and the institution (Creswell, 2003). Proximity and access were two primary considerations for selection of this site. The access to the site was negotiated and secured. A room within this site, with the help and consent of the dean in charge of this institution or his/her designee (the gatekeeper), where the interviews took place was reserved.

The study was planned and conducted between March of 2010 and March 2011. Attention was drawn to the study by posting informational flyers in strategic locations (bulletin boards in hallways and classrooms) with permission of the gatekeeper. The flyer contained the name of the study, the investigator’s name as the contact person, including

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the contact information with telephone number and an e-mail address where those interested to learn more were encouraged to make contact.

When contacted by individuals interested to learn about the study, the investigator explained the purpose of the study and was available to meet with student(s) at their convenience. It was clearly explained to would-be participants that they cannot volunteer any information at this point until they receive and read the informed consent form. If they were satisfied and clear about the focus of the research and were willing to participate, they then were asked to sign the consent form and complete the demographic questionnaire. The specific criteria for participation in the study as outlined in the consent form and the demographic questionnaire were an important part of the study’s focus and were considered in the selection process.

After gaining access to the site through the gatekeeper, a table was set up near a break room, or near the cafeteria where traffic was generally higher during the day, at lunch and dinnertime, at least twice per week. I was available to share information and discuss the topic with interested individuals. The consent form and the demographic questionnaires were made available to the students and teaching staff at this time. An adequate number of copies of both forms were available. The participation criteria for face-to-face meetings followed the same rationale explained in the preceding paragraphs. This investigator talked with the faculty one-on-one to explain the study and seek their participation. When they chose to participate, the same procedure applied to student informants was applied with the faculty. Informational flyers advertising the study were posted throughout the campus.
This study was conducted with the utmost due diligence keeping in mind the established norms and policies adhered to in this institution. The investigator’s approach was impersonal with a desire to build trust, maintain a good relationship, respect the norms of reciprocity, and sensitively consider ethical issues (Marshall & Rossman, 2006). The conduct of the study, as asserted by Marshall and Rossman (2006), often depends exclusively on the relationship the researcher builds with participants, where interpersonal skills are paramount (p. 82). Therefore, all interested participants were contacted through various means such as phone calls and e-mail, because this was the first and most important step for the investigator and the participant to begin a mutual dialogue based on trust and respect for one another’s role. After selecting four participants from each of the three programs (with one alternate) those participants not selected were notified with an expression of the investigators gratitude for their time.

After all participants and alternate participants were selected, they received an acceptance letter or an e-mail or a telephone call, based on their stated preference to receive communication from the investigator (as provided in the student questionnaire), informing them of their selection. Three such forms were prepared for this purpose. All participants signed the consent form before they were allowed to take part in the interview session.

The investigator then developed an interview schedule with the time and date for each participant to include the site, site address, and room number. The participants were informed individually of this format and they received a copy by e-mail. A separate interview schedule was developed for the three faculty members.
The Participants

As a primary instrument of data collection, as noted by Creswell (2003), face-to-face, open-ended interviews with three groups of student participants (four students per group) and a group of faculty (three faculty members per group) were conducted with the intention to elicit views and opinions from the participants (p. 188). A limited number of questions were designed in advance with two introductory questions and 17 exploratory questions. When necessary, these questions were followed with clarifying probing questions. The average interview lasted under one hour and an audio recording device was used to record the proceedings with the interviewees’ consent (Arksey & Knight, 1999; Bailey, 1996). Each interview was assigned a code, for example “FP1_DAGD” and depending on the number of interviews conducted on a given day and which side of the microcassette tape was used to record the interview, the label of “Side A or B” was added. The interviews were conducted in a natural setting on a research site and artifacts such as academic program reviews (APRs’) and program information material were collected as historical artifacts to highlight the program’s history and possible changes in the past five years. These artifacts were helpful when comparing the content of these sources, used by the university, as a guideline to measure program relevance, with collected data from students related to their understanding and/or perceptions of the programs under investigation (Creswell, 2003).

As asserted by Marshall and Rossman (2006) and Creswell (2003), at this stage this investigator was concerned with the organization of data, immersion in the data, coding of data, generation of categories and themes, offering interpretation of data, searching for alternative understandings, and writing a report in presentation of the study.
Accordingly, collected data was transcribed by the student investigator and redundancies were removed, and the text of each document was read many times. An open coding format similar to the constant comparison method (Glaser & Strauss, 1967) was utilized. The transcribed data was then compiled in a table with multiple columns (one column for each participant). The first column was used to record five research questions. Column 2 was used to record interview questions, while column 3 was used to record the participants’ reply in a narrative format. This method was followed for all student and faculty participants. As the result of producing these narratives, laid side-by-side, many categories were derived and reduced down to generate themes. Compilation of the categories derived from the narratives yielded seven distinct themes for student participant groups and eight themes for faculty participant groups as overarching topics with few sub-themes in reporting of the study’s results. Emerging themes, the positive and the negative comments, and also the participants’ closing comments derived from the data were noted.

In order to ensure and to verify the accuracy of the transcribed data, meaning to confirm and to substantiate the accuracy of the transcribed data according to statements made by the participants (Schwandt, 2001), and individual transcripts were sent via e-mail to all student and faculty participants. About one-third of the student participants reviewed the transcripts, made corrections or modifications to their previously recorded statements, and returned the transcripts to the investigator. Among the faculty, two-thirds returned their modified transcripts.

Due to the nature of using electronic mail, as a fast, acceptable form of information delivery vehicle, all students and faculty could remain in possession of the
transcribed documents. Therefore, the investigator wanted to make sure that the electronic version of the interview transcripts that were sent out to the participants did not compromise the integrity of the process. This investigator was concerned with providing a reasonable degree of security for confidentiality of the data and anonymity to protect the identity of student participants and the faculty, understanding that this cannot be accomplished with 100% certainty (Marshall & Rossman, 2006; Rudestam & Newton, 2001). Initially, though all participants were assigned a pseudonym that was meant to highlight the group organization; using an alphanumeric combination associated with their participation number and program of study (e.g., SP1-PDET, Student Participant 1 from Product Design Engineering Technology) this investigator felt the need to add another layer of security for protection of participants, integrity of the data, and the data collection process.

To address this concern and to minimize any adverse outcome due to post-data collection and data verification activities, all students and faculty were assigned new pseudonyms without program association to make it harder for others to recognize student participants and the faculty. This modification was more helpful to protecting student participants’ identity then the identity of the faculty taking part in the study. This was simply due to the ratio of faculty to the students taking part in the study. Creating new pseudonyms was deemed helpful to alleviate concerns for protection and anonymity of all participants. This measure was considered in the spirit of the agreement between the investigator and all participants as outlined in the consent forms signed by the investigator and all the participants, and also as stated in the ethical concerns segment of this study (Marshall & Rossman, 2006).
Table 1 shows three student participant groups and the faculty group naming convention employed. In the results and finding segment of this study the student participants were assigned a single first name at random, without a linkage to their initial assigned pseudonym (e.g., Sue), which this investigator maintained in a separate file, but did not make that distinction in Table 1. For faculty (FP=Faculty Participant plus a number, i.e. FP-1) two letters of the alphabet and a single number were used without mentioning program affiliations. Student participants’ names were chosen using a familiar nickname style. The investigator created back-up files of the original transcripts to make sure the initial process was not compromised. The following table reflected the changes incorporated to create and implement the new pseudonyms structure for the student and the faculty participants:

Table 1

*Group Participants’ Pseudonyms*

<table>
<thead>
<tr>
<th>Participating Group Pseudonyms</th>
<th>Student Participant Groups</th>
<th>Faculty Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A DAGD</td>
<td>Group B PDET</td>
<td>Group C MET</td>
</tr>
<tr>
<td>Liz</td>
<td>Jon</td>
<td>Gil</td>
</tr>
<tr>
<td>Mia</td>
<td>Jax</td>
<td>Cal</td>
</tr>
<tr>
<td>Bob</td>
<td>Zac</td>
<td>Don</td>
</tr>
<tr>
<td>Jay</td>
<td>Ben</td>
<td>Sam</td>
</tr>
</tbody>
</table>
Interviews

“Interviews are a widely used tool to access people’s experiences and their inner perceptions, attitudes, and feelings of reality” (Zang & Wildemuth, 2009, p. 1). Based on the degree of structuring, according to Fontana and Frey (2005) interviews can be divided into three categories: structured interviews, semi-structured interviews, and unstructured interviews (p. 1). This proposed case study utilized a structured interview: an interview format that had a set of predefined questions, which were asked in the same order for all respondents (Zang & Wildemuth, 2009). Structured interviews are administered orally rather than in writing and follow a sequence of questions as opposed to an unstructured, informal interview method; this standardization is intended to minimize the effects of the instrument and the interviewer on the research results (Zang & Wildemuth, 2009).

This qualitative case study employed the use of an in-depth interview with a time limit of one-hour. The interviews were recorded using audio-recording device to record participants’ responses. Audio recording of participants’ responses provided for accuracy of collected data and also facilitated in the data transcription process.

As stated by Locke, Spirduso and Silverman (2000), “Interviews and various forms of observations are the most common means of data collection, though they are sometimes supplemented by the collection of documents” (p. 99). During the interview, this investigator took some notes as needed to serve as a reminder of what was important to consider, as needed, to be used during the data reduction phase of the study. Based on the responses provided by the participants, it was often needed to further probe and to redirect the interview and the interviewee to get more meaningful replies. In-depth interviewing involved asking open-ended questions, listening to and recording the
answers, and then following up with additional relevant questions (Hatch, 2002; Patton, 1987). Interviewing allows the evaluator to enter another person’s world, and to understand that person’s perspective (Patton, 1987).

Interviews add an inner perspective to outward behavior where interviews become a source of meaning and elaboration for program observation (Patton, 1987; Marshall & Rossman, 2006). Since it is not possible to observe every aspect of people’s lives, interviewing allows us to enter another person’s perspective (Creswell, 2003; Patton, 1987). The open-ended interview method allowed the investigator to carefully construct a set of questions that can be asked of all participants in the same manner and sequence to minimize variation to questions asked of participants (Patton, 1987).

Using this format, the investigator was able to focus on participants’ educational and vocational experiences, and particularly focus on their perceptions and understanding regarding globalization and its impact on their plans. The participants were asked to share their plans on how they are preparing for changes caused by a global environment and to discuss their awareness of programs, partnerships, and the role of the institution as facilitators of their success. The institutional responses gauged the participants’ understanding and perception of changes and reforms in historical perspective. The faculty discussed their experiences and perceptions of globalization and whether this has caused any changes in teaching, learning, assessment, and the role of the university in this process.

The objective was to schedule interview sessions group by group conducting at least 2-3 interviews per day until done. The interview should be conducted according to the interviewee’s schedule and availability (Feagin, Orum & Sjoberg, 1991). Every step
was taken to be mindful of accommodating participants’ needs to make the interview time and process as convenient as possible. The interview sessions were recorded and this investigator then listened to the audio recording to make sure that all responses by each of the participants were recorded. The data from audio tapes were then transcribed and proofread. At the conclusion of each interview session the investigator saved the notes (Patton, 1987) taken during the interviews as comments to be used later. There was no need to repeat any of the interviews because there were no technical problems with the recording process.

**Trustworthiness and Validity**

Trustworthiness is a general term representing what conventional researchers think of as internal and external validity, reliability, and objectivity (Rudestam & Newton, 2001). The trustworthiness issue is a reflection of the validity of the research by demonstrating that the data collected was truthful, had a basis in application, and allowed for other means to show that the researcher had exercised neutrality and the data collection process had been consistent (Locke, Spirduso & Silverman, 2000). Schwandt (2001) cited Lincoln and Guba (1985) as they defined trustworthiness as quality of an investigation (and its findings) that made it noteworthy to audiences (p. 258). This process was further solidified through member checking by designating a colleague or another researcher to read through the transcripts to ensure the accuracy of what had been recorded (Locke, Spirduso & Silverman, 2000). In addition to asking a colleague to help with member checking, the review and modifications to the transcripts helped to verify the accuracy of the collected data.
Due to the nature of qualitative research the investigator places him/or herself in the natural research setting. The investigator in qualitative research as stated by Marshall and Rossman (2006) is the primary instrument of data collection and additionally his or her presence in the lives of the participants invited to take part in the study is fundamental to the methodology (p. 72). “It is also the role of the researcher to collect data, interpret and report data, while attempting to maintain a stance of “empathetic neutrality” (Patton, 2002). Accordingly the investigator must do all the right things to put the participants at ease and reduce the level of intrusion in participants’ lives. This investigator selected an environment in which neither the faculty nor the participants knew him. In The Role of the Researcher section, this investigator has clearly stated his role and objective to include his personal and professional life with a commitment to remain true to what was explained to him.

**Ethical Considerations**

Ensuring total anonymity never can be guaranteed, and ethical issues are never simple in any study including qualitative research (Locke, Spirduso, & Silverman, 2000). Nonetheless, as the student-investigator responsible for conducting this study, every measure including those measures that previous works of research have advocated for protection of the participants and accuracy of data collection and analysis was considered. The researcher explained his role as a graduate student and his profession as a teacher including his past roles and responsibilities. Participants in this study had ample opportunities to share their concern with the investigator or his department chair or the office of the Human Subjects Institutional Review Board (HSIRB) at Western Michigan
University with all contact information provided to all participants in the consent form should they need it.

The most important issue for this investigator was to learn from knowledge and the experiences of previous researchers and to put their advice to constructive use. This investigator tried to anticipate and negotiate entry (Locke, Spirduso, & Silverman, 2000), reciprocity, role maintenance, and receptivity, and at the same time adhere to ethical principles. The necessary steps were taken to maintain the security and integrity of the collected data as outlined in the informed consent form and HSIRB application on file, as this investigator was committed to ethical principles for responsible research.

Data Collection

In a qualitative research, various methods for collection of data appropriate to the subject and the setting can be utilized. In keeping with the tradition of qualitative research this study focused on learning about the perceptions and understanding of participants and their experiences and the degree by which they felt prepared to enter the world of work. As stated previously, this case study employed an in-depth interview format. Interviews have particular strengths and yield data in quantities quickly (Marshall & Rossman, 2006). As stated by Locke, Spirduso, and Silverman (2000) “interviews and various forms of observations are the most common means of data collection, though they are sometimes supplemented by the collection of documents” (p. 99) The researcher should be able to demonstrate through the conceptual framework that the purpose of the study is to uncover and describe the participants’ perspectives on events—that is, that the subjective view is what matters (Marshall & Rossman, 2006).
According to Locke, Spirduso, and Silverman (2000), “Qualitative researchers usually work inductively, trying to generate theories that help them understand their data. This is in contrast, for example, to the experimental tradition in quantitative research for which hypotheses are set a priori and then deductively tested with the collected data” (p. 98). During the interview sessions an audio-recording device as a primary recording medium was utilized.

Artifacts such as course catalog, newspaper articles, historical data on changes in program design and implementation, APRs, pictures, course guides, and instructor syllabi can be helpful tools in connecting the past to the present. For every qualitative study, data on the background and historical context are gathered, although these artifacts may not be a major part of data collection. However, at least in proposing a particular setting, the researcher gathers demographic data and describes geographic and historical particulars (Marshall & Rossman, 2006). When researchers are reviewing a document, browsing a website, reading a newspaper article, or searching through archives, they are collecting data (Marshall & Rossman, 2006). However, it is prudent to exercise caution in what to use. The artifacts utilized as part of this study created a meaningful link between the objectives of the study and their value to data triangulation and the topic of research. No work samples from the participants as artifacts were collected.

Faculty members associated with the departments selected for this study were also interviewed. These faculty were responsible for course-content delivery, selection, and use of an appropriate pedagogical instructional model and program of study implementation. The purpose of these interviews was to gather data on course design, rationale, planning and implementation, and transfer of knowledge through content-
instructional delivery method(s). Additionally, brochures, course guides, course overview literature, and historical records such as academic program reviews (APRs) were collected. Collection of such material allowed the researcher to triangulate the interview data, derived from the research questions with the data from APRs and other sources.

In order to protect the identity of the participants, no informant was referred to or recognized by name. All participants’ identities were kept confidential. The collected data was kept in a safe place in the student investigators place of residence. At the conclusion of the study; after data was transcribed, with the knowledge and consent of the study’s chair, all audio tapes were destroyed. The transcribed data, in following HSRIB procedures for data handling, were sent to Western Michigan University archives and will be discarded after 3 years following the HSIIRB procedure.

Data Analysis

Data analysis provides the means for analyzing and interpreting data based on the primary focus of the study. The process of analysis is bringing order to data, organizing what is there into patterns, categories, and basic descriptive units (Patton, 1987). Interpretation involves attaching meaning and significance to the analysis, explaining descriptive patterns, and looking for relationships and linkages among descriptive dimensions (Patton, 1987). “In qualitative studies the data that emerges are descriptive. That is, data are reported in words (primarily the participants’ words) or pictures, rather than in numbers” as reported in Creswell (2003) (citing Fraenkel & Wallen, 1990; Lock et al., 1987; Marshall & Rossman, 1999; Merriam, 1988).

Often, a great deal of work is done to develop a conceptual framework and well-articulated research questions only to be forgotten in the data analysis phase. In this
study, data analysis focused on the primary purpose of the study as an essential platform to continue with analysis and interpretation. The central purpose of this study was to assess the influence of globalization on CTE students, their perceptions, their preparation process, individual and institutional responses, and changes in CTE programs over the years.

As an appropriate method of data analysis in qualitative research, all the data collected through interviews was transcribed. The transcribed data then was studied and sorted out to explore common and or new and emerging patterns. The collected data from interviews was coded using a constant comparison method organized in a table using Microsoft Word editing software, to develop categories of data, looking for similarities and differences. The constant comparison analysis method outlined by Glaser and Strauss (1967) lead to the development of common themes or new ones. From there the results were used for the analysis of collected data and report generation.

One of the most difficult aspects of conducting a qualitative research is the analysis of enormous amounts of transcribed data. Qualitative data are textual, non-numerical and unstructured and coding of gathered data has a crucial role in analysis of such data to organize and make sense of them (Basit, 2003). Because this was a qualitative research, a priori code development was set aside in favor of a post-hoc or an open-coding method to analyze the collected data. This study employed the use of a post-hoc open-coding format based on the Glaser and Strauss method (1967) known as the constant comparison method. The purpose of developing a post-hoc coding method was to facilitate data transcription, category, and theme generation and data reduction while seeking a solution to the problem posed by this study based on what the data may reveal.
In a qualitative research methodology, it is best to let the data dictate what issues are of importance rather than looking for pre-established codes. Gathered data may not support those codes.

**Coding of Data**

Qualitative research generates enormous amounts of data and as stated. One of the most difficult aspects of analysis of collected data is to organize it into meaningful chunks. As Marshall and Rossman (2006) explain: the process of bringing order, structure, and interpretation to a mass of collected data is messy, ambiguous, time-consuming, creative, and fascinating (p. 154). “Qualitative research is research that involves analyzing and interpreting texts and interviews in order to discover meaningful patterns descriptive of a particular phenomenon” (Auerbach & Silverstein, 2003, p. 3). “Qualitative analysis transforms data into findings” (Patton, 2002). The purpose of data analysis was to lead the researcher to identify salient themes, recurring ideas or languages, and patterns of beliefs that link people and settings together as the most intellectually challenging phase of data analysis and one that can integrate the entire endeavor (Marshall & Rossman, 2006).

According to Marshall and Rossman (2006), matching research questions to the purpose of the study in an explanatory setting will lead to investigation of a little-understood phenomena, identification or discovery of important categories of meaning, and the generation of hypotheses for further research (p. 34). In this case the research questions were designed to ask what is happening in this social program, what are the salient themes, patterns, or categories of meaning for participants, and how are these patterns linked with one another (Marshall & Rossman, 2006). Case study research
methodology involves a detailed description of the setting or individuals, followed by analysis of data for themes or issues as stated by Stake, (1995), and Walcott (1994) and cited by Marshall and Rossman (2006).

After transcription and review of the collected data, this investigator utilized “the process of inductive analysis” Patton (2002). This process is employed to lead the investigator to exploring and “discovering patterns, themes, and categories in one’s data” as opposed to the use of deductive analysis where the analytic categories are stipulated beforehand “according to an existing framework” (Patton, 2002). Therefore, five research questions, two background questions, along with 17 interview questions and a number of follow-up/ probing questions were asked of participants as needed. Furthermore, all interview questions were aligned with a research question. To make the process more manageable, all participants were asked the same questions in the same order.

This study used a process of open-coding which is similar to what Glaser and Strauss (1967) call constant comparison method that is appropriate for use in various qualitative formats (Harnish & Lynch, 2005, p. 176). By utilizing the constant comparison method, first the data transcribed from a single interview was imported to a table as described. Next, another set of data was embedded in this table to compare the data within each group followed by comparing the data from all three student participant groups. All the data from all the participants were laid side by side to make comparison easier. Finally all the data were cross-compared from all three groups to gain a better understanding of emerging themes and divergent issues. The same format was followed for the faculty group. These processes lead the researcher to discover the common threads in data and to explore the differences and highlight the positives and negatives. From this
process the dominant themes of the study emerged. Although this may appear to be
difficult, confusing, tedious, and extremely hard to manage (Auerbach & Silverstein,
2003), this allowed the investigator to see the data side by side and determine how to use
the results. By employing this combination of generic and specific research design steps
the investigator was able to generate categories and themes (Creswell, 2003).

Following the aforementioned procedures allowed the investigator to use direct
codes, segments or complete sentences in each group. From this then the investigator was
able to generate an adequate number of categories and further refine them to develop
themes for the Results chapter of my research. This process allowed for review of the
data again and again, and it was reduced to seven main themes for student participants
and eight themes for the faculty group to explore and explain what the participants were
saying and what this meant for the study (Auerbach & Silverstein, 2003; Creswell, 2003).
These themes were utilized in the Results and Finding chapters to provide answers to the
proposed research question and therefore, in the final steps these processes lend
relevance to interpretation and the meaning of the data to the study stated by Lincoln and
Guba (1985) as cited by Creswell (2003) what were the lessons learned (p. 194).

Program Overview and Course Offerings

Secondary data used in the study as it was integrated here was offered to create
interest for the reader while capturing useful information (Creswell, 2003). The program
plans offered here corroborate the intent of introductory questions asked of participants
and faculty during the interviews. The intended purpose of offering this overview was to
familiarize the reader with the layout of the programs and course contents. However, as it
is customary in this type of study the names pertinent to the college or the programs were
not used; this offers a generic overview of these programs and their intended outcomes. These are citations and are reported verbatim from the colleges’ website.

**Digital Animation and Game Design Program Plan**

**Background.** Bachelor of Applied Sciences (B.A.S.), Digital Animation and Game Design (DAGD) is designed as a multidisciplinary degree. Disciplines covered include 3D animation, programming, design, and business. Likely participants will have a desire for careers in animation, design, simulation, and programming. The digital animation concentration builds on the existing B.A.S. format. This format includes a required concentration for depth, an elective section that offers greater breadth in the discipline area, and general education requirements targeted toward courses serving employees in digital technology.

**Entry into the Program.** The Digital Animation & Game Design, B.A.S. is a course-specific degree completion program with a four-year sequence that begins promptly upon acceptance and enrollment. It is expected that students entering this technology intensive program already have solid foundation skills in dealing with personal computers (PC’s). Individuals are encouraged to enter the program as a first-year student and be dually enrolled with XXX College. Dual enrollment requires a student to be admitted to XXX College and register there for the appropriate (University) equivalent courses in this degree. Once accepted into the program, students are expected to enroll in University’s Digital Animation courses, i.e. DAGD 100, 101, etc. A completed Associate Degree is not required to be admitted. While students with earned college credit may apply to the program, students are encouraged to apply as a freshman/first-year student. Students interested in the degree should set up an advising
appointment with the DAGD advisor. ** Financial aid is available for dually enrolled students. To review the course schedule see appendix GADG.

Manufacturing Engineering Technology Program Plan

Manufacturing engineers get involved on the ground level of the production of a variety of industrial and consumer goods and develop the expertise to see production through to completion. Their knowledge of process design, analysis, planning, supervision, manufacturing methods and equipment is used from start to finish. The location of every machine, the movement of each tool or part, the order of operation and the selection of the machines themselves are all decisions that manufacturing engineers make as part of the total production process.

Employment opportunities exist across the spectrum of manufacturing industries. Specific position titles such as manufacturing engineer, process engineer, production engineer, tool engineer, quality engineer or industrial engineer often are given to the individual performing manufacturing engineering functions.

Good manufacturing engineers can determine how to make their company’s products better, faster, safer and less expensive than competitors can. These abilities are always in demand, and the Manufacturing Engineering Technology program gives the student the skills necessary to enter into a good professional position with an excellent salary. Students learn to identify and select materials based on production requirements and work closely with computer-aided design equipment. They conduct time studies, complete cost estimates, utilize computer software to aid in solving manufacturing problems, formulate plant layout requirements, understand management control systems,
justify and select quality equipment and automated systems and design a total product manufacturing system.

Typical students who enter this degree program are adults, working either full- or part-time, who often have direct experience in some aspect of manufacturing. All classes are offered at the Satellite campus and are offered only at night. This program is designed for part time students; it will be difficult to attain a full-time schedule.

Product Design Engineering Technology Program Plan

The Product Design Engineering Technology program at this university offers intensive instruction and practical experience in all facets of product design. Students are prepared to effectively participate in a design environment, generate conceptual design sketches and drawings, create complex design layouts, perform static and dynamic analysis, create models and prototypes, create and define complex surfaces and shapes, understand and integrate manufacturing principles into design. Study also emphasizes communication, mathematics and analytical skills. Students receive extensive hands-on experience.

A product designer begins with a concept, and then transforms it into a working design that specifies the size, shape, style, dimensions and materials needed. Because this skill is needed for the production of millions of industrial and consumer goods, designers are in great demand. Their knowledge of design, engineering analysis, manufacturing processes and communication techniques are valued in industries across the United States. Employment opportunities exist across the spectrum of the product design field---wherever products are produced, designers will be found. Specific job titles might
include product designer, layout drafter, project manager, product developer, computer-aided designer, mechanical designer, project engineer, and design engineer.

Admission requirements are discussed on the next page. Many of the courses identified under General Education requirements can be completed at XXX College or other colleges.

**Academic Program Reviews**

The investigator gathered and incorporated 3 documents in this study in the Findings chapter known as academic program reviews (APRs). These documents helped to make a case for both triangulations of study and validating the accuracy of findings by using different data sources of information by examining evidence from other sources to build a coherent justification for themes (Creswell, 2003, Rudestam & Newton, 2001). The investigator did not evaluate individual courses and the related assessment processes used to measure student achievement. However, the investigator considered the APR evaluations as an assessment of effectiveness of CTE programs which is done in five-year intervals.

APRs consist of an APR review panel. The panel includes a Program Review Chair, faculty, non-program faculty, outside educational participants, and industrial participants. The APR describes the goal of each program, program visibility and distinctiveness, program relevance, and program value. The data for APR was collected through various data collection methods to gather relevant data from graduate follow-up surveys, employer follow-up survey, graduating student exit survey, student program survey, faculty perceptions, and advisory committee perceptions (APR-University Name-2005-2010)
The data from these sources were reviewed carefully and in conjunction with the studies objectives. Given the investigator’s knowledge of the content of his own collected data from interviews as compared with the content of the three APRs, the investigator was convinced of the value of using this data to further validate the strength, accuracy, and value the data presented in Chapter Five. The insight gained from review of these data is shared in the Findings chapter.

Implications

This study has implications for both the research and development of CTE programs in response to globalization issues that are emerging at a rapid pace. This work can contribute a great deal to the body of knowledge that is currently not as evident in response to the study of globalization and its impact on all aspects of CTE students’ life, education, and industry. Although this study is small when compared with multi-site case studies, the depth of the descriptive data it provided offers valuable insight into the effectiveness and or shortcomings exhibited either by CTE programs, the college, and other stakeholders or institutions in a globalized competitive environment.

This study could conceivably have an impact on how the collected data from APRs are utilized from both the students and the college’s perspective and how this might impact program selection in response to program value in a globalized skilled labor market. Other researchers might find it useful or a worth-while research project to further look at globalization and its impact on CTE or other technical programs. Although the sample size was small, the richness and the depth of data collected and analyzed and reported as findings may prove to be helpful to other educational institutions offering similar courses such as community colleges and technical schools in the state and
nationally. Since this study is being conducted in a state with troubling unemployment statistics, it could provide some value when planning and evaluating similar or future plans.

**Limitations and Delimitations**

This study dealt with an abstract, not well-researched phenomenon especially in CTE educational settings where there was very little evidence in the form of research, particularly qualitative case study research, to offer a way to measure the impact of globalization on CTE programs of study. All proposed research projects have limitations, state Marshall and Rossman (1999), citing Patton (1987); none is perfectly designed, and there is always a trade-off (p. 42). The limitation of this study is derived from its conceptual framework and study’s design (Marshall & Rossman, 1999). Globalization is a broad subject with far-reaching influences where there is no universal agreement on its definition. Another limitation may be the rationale to conduct a small study in one geographical area, limited by the boundaries or research design, and research questions. This may offer a limited opportunity for an understanding of the phenomenon under study. The scope of this study does not afford a full understanding of the impact of globalization on all students and faculty.

However limited the sphere of this study, and with the understanding that no qualitative studies are generalizable in the probabilistic sense, their findings may be transferable (Marshall & Rossman, 1999). This study, just as other small qualitative studies, is bound and situated in context, and the readers have an opportunity to decide on the usefulness of the case in other settings (Marshall & Rossman, 1999). Proper protocol for the study was followed, and just like other research, it can offer others the opportunity
to conduct their own research on other or the same aspects of this study. The purpose of this study was to answer questions regarding globalization and its impact on CTE students and faculty, and add to the knowledge base about the topic.

**The Researcher**

This investigator sought to explain a phenomenon from the perspective of those participating in the study of their lived experiences and the ways they understood those experiences to develop a worldview (Marshall & Rossman, 2006). In the tradition of conducting qualitative research, the investigator must bracket off his or her experiences from those of the interviewees as described by Marshall and Rossman (2006).

This investigator was mindful of systematically reflecting on who he is in this process of inquiry while remaining sensitive to his personal biography and how to shape the study (Creswell, 2003). This introspection ingrained in the philosophy of qualitative research required an acknowledgement on the part of this investigator of his biography, biases, values, and interests (or reflexivity) as the personal self-self becomes inseparable from the researcher-self (Creswell, 2003). Based on this understanding as it was described in the Role of The Researcher segment of this study, though it is not reasonable to assume that one can suspend total judgment, however, providing an account of those experiences was helpful to the study. The following statements of self-examination describe my worldview to provide clarity of my perceptions not focused on a single event (Marshall & Rossman, 2006; Patton, 1990).

As an educator I found myself immersed in a new culture with varied norms and standards. I started and finished all my undergraduate and graduate education in the local private and state colleges and universities in the state of Michigan where I have been a
resident for the past 34 years. I received two undergraduate degrees in business and science (the later in vocational education). My graduate degree was in Information Systems Management, and then I began my doctoral studies in the fall of 2005.

I began my career in the food and hospitality management as a working chef. I was also a licensed real estate agent. Additionally, as a business owner dealing with international trade, I experienced firsthand the effects of the global economy on my entrepreneurial experiences, specifically when it came to competition of marketing my handmade, quality products as opposed to mass-produced products, imported from the far East. As a certified, highly qualified teacher at the secondary level, I taught various courses in computer-related subjects since 1996. A significant part of my responsibilities dealt with career preparation, course taking, career counseling and related functions. These duties and responsibilities often put me in contact with employers, human resource professionals, recruiters and meeting with representatives of industry as speakers. Teaching students interview skills, resume writing, and discussion of skills required on the job and my familiarity with these topics often forced me to reflect on the responses received during the interviews for this study.

I sought to separate my personal perceptions from the participants’ worldview and attempted not to allow my age and experiences in such matters to influence my view of the articulated replies. As the investigator, I sought to transcribe, review, and report the results as accurately as possible to maintain data integrity as expressed by the participants.
Summary

Chapter Three introduced the research methodology and provided an overview of the case study. The case study method was selected and explained in detail and its appropriateness for use with the proposed study was discussed. Chapter Three also focused on the methods and procedures for the instrumentation, setting, access, and sample characteristics, and sample selection, and outlined the use of proper methods and documents needed in the research process. The format and procedures for data collection and data analysis were outlined and appropriate measures discussed. It was also important to point to the limitations and the delimitations of the study given the scope of the phenomenon and the need for further exploration of the topic and the relevance of the study to CTE programs in this state, and perhaps the nation, to add to our knowledge.

There are many reasons for opting to conduct a qualitative research, but perhaps the most important is “the desire to step beyond the known and enter into the world of participants, to see the world from their perspective, and in doing so make discoveries that will contribute to the development of empirical knowledge” (Corbin & Strauss, 2008). This student investigator selected a qualitative case study method because of curiosity and an attempt at creativity while dispelling the fear associated with this type of research and trusting his instinct (Corbin & Strauss, 2008).
CHAPTER IV

RESULTS

Introduction

This study used a qualitative, descriptive case study method conducted at the university. The purpose of the study was: (a) to investigate the perception and the understanding of the students enrolled in CTE programs about globalization; (b) to explore the implications of globalization on participants’ program of study; (c) to understand and explain the faculty member’s role in curriculum design and delivery by utilizing their expertise and experiences to address the implications of globalization for the programs they teach; (d) to explore the role of career and technical education (CTE) in modern workforce preparation affecting students enrolled in CTE programs at the college.

The exploration of the globalization phenomenon as an important subject with implications warranting varied interpretation necessitating the use of a research methodology that offered a better understanding of the participants’ realities. The use of a case study methodology allowed the investigator to construct meanings from participants understanding of the topic under investigation. It highlighted the factors influencing participants’ choices. It led to reporting on the role of global competition for jobs and demand for highly skilled workers, and it helped to develop an understanding of trends in the job market. It contributed to the role of the necessary employability skills in participants’ preparedness for entry into the job market and the role of technology in the
marketplace of the 21st century. Additionally, it explored the role of the university, by relying on academic program reviews, based on data collected from interested stakeholders to align its programs with the industry’s needs.

The themes and sub-themes resulting from this process based upon the participants’ responses culminated in the following themes to: (1) participants’ background, college selection, and programs of study, including the factors contributing to participants’ decision to attend this college; (2) student and faculty participants’ perception of globalization, the impact of globalization on social, cultural, and educational opportunities globally, and the factors contributing to global competition; (3) preparation for careers in a global economy, to explain employability skills for the new economies, and career trends, role of the university and faculty in this process; (4) role of technology in the global economy, instructional relevance, and exploration of real world applications; (5) individual responses in career development, internal and external factors, role of education and faculty in the preparation process; (6) institutional responses, changes in career development process, public and private partnership efforts and implications of globalization for workforce development and multidiscipline linkage between various academic curricula; and (7) academic program reviews and its value to workforce development. Further, theme number 8 reported the role of education in workforce preparation, and discussion of change to Americas’ educational approach from the faculty participants’ perspective. These themes have been aligned with a relevant research question in Chapter Five and are discussed in greater detail.

The interviews were conducted in October and December 2010. The research’s results from the collected data from interviewees will be reported in this chapter.
The Participants

All student participants attended on-campus classes at this satellite location of a Midwestern state university. Among those students interested in participating in the study, whom had completed a consent form and a demographic questionnaire, four participants, three from each program (with one alternate per program) were selected to take part in the study. Three faculty, one from each of the 3 programs also agreed took part in the study. The age and experiences of student participants was varied although participants’ age was not a determining factor for participation in the study. All of the student in PDET programs, about two thirds of the students in MET program were employed full-time. Very few of the student participants from DAGD were currently employed.

It was stated in Chapter Three that none of the students will be from a category of workers returning to school for the purpose of retraining to update their skills and education in order to be able to compete in the new job market environment. The investigator felt a clarification was required at this junction since all the students in Product Design Engineering Technology (PDET) were currently employed, and some of the participants in Manufacturing Engineering Technology (MET) also had jobs. In the reporting of the results few student participants stated that they were here to update their skills and education, to either better themselves to keep their current jobs or even to move upward in their current position. The investigator thought it to be important not to confuse the student participants currently employed and simultaneously attending college with someone that is returning to school with a lower education level but years of experience in various fields to begin a new career. As stated, none of the students taking
part in this study as participants was specifically returning to school for education and training in order to obtain a new job or to begin a new career. Few had transferred to these fields because it offered more job choices and opportunities, some felt that they needed to have a better education in newer technologies to create more opportunities for themselves.

Students enrolled in all three programs came from Michigan and surrounding states. Some student participants transferred from other states or other programs, particularly in Manufacturing Engineering Technology. Demographic questionnaire on each participant indicated that they had a GPA of 3.00 or above, all attended classes on campus, and two-thirds of whom would be graduating in 2011. Students enjoyed participation in various clubs according to their programs of study. The facilities (lab settings) and classrooms were well-lighted and the machinery seemed to be in good working condition.

The faculty participants came from diverse educational and academic backgrounds. All had extensive industry related experiences and were well educated and possessed the skills necessary to teach their courses. They all had full load of teaching schedules and had obtained leadership capacities within their programs and the departments. All had served or were serving at some student advisory capacity.

To summarize, 12 student and 3 faculty participants took part in this study. Programs selected for this study were offered at this Midwestern university. About two-third of the student were graduating in 2011. The age of the participants was not a consideration for the taking part in the study. Depending on the program both the age and the experiences of the students varied; PDET participants were mostly in late 20’s
and early 30’s and all were currently working, while the MET student participants were mostly in their early to mid 20’s, and almost half had a job. The DAGD student participants were perhaps the youngest group and were mostly fulltime students. Faculty was active in various capacities with full time teaching schedules. They brought a wealth of knowledge to their classroom due to their experiences in private sector. They were well educated and some were still involved in consulting clients.

**Emerging Themes, Student Participants**

The analysis and coding of data resulted in seven themes and sub-themes. These themes were then used to explain what the participants had said in response to each interview question, corresponding to a research question reflecting their views, perceptions, and understanding of their experiences.

**Theme One: College Selection and Programs of Study**

The first two interview questions were designed to learn about participants’ programs of study and the key features of these programs that attracted the prospective students to attend this school. Students joined this university to take advantage of CTE programs offered for a variety of reasons: Chief among the themes emerging from the interviews were that students liked the classroom, hands-on approach, and lecture combination, as opposed to simply learning theories of how to do something. As stated by Don “I like the hands-on part of the university’s teaching, because it is not all theory-based, it’s really practical.” Perhaps due to the nature and the strength of the industrial and manufacturing base in the state, various factors influenced the participants’ choice of attending classes at this institution.
Choice of College and Programs of Study

The programs selected for the purpose of this study were the Manufacturing Engineering Technology Program, B.S (MET), Product Design Engineering Technology program, B.S (PDET), and Digital Animation and Game Design Program, B.S (DAGD). From the student participants’ perspectives these programs afforded them some unique opportunities. Student participants viewed these programs as relevant, hands-on, and well-positioned within the states’ strong manufacturing base while students from software design programs saw their choice as the only college level course of its kind in the state. Unfortunately, due to various reasons this unique program did not have a strong foothold in the industry.

Sam was enrolled in a welding program at the same school, but decided to switch to Manufacturing Engineering Technology (MET), because it offered him more options in industrial design and automation. Don described his rationale as, “I think there are a lot of opportunities in manufacturing engineering, because it’s pretty broad-based so you can do anything from plastic injection to assembly of a car, so I do not feel I am limited in my options while looking for a job.” Zac, Jax, Sam, Don, and Gil described their reasons similarly as they believed that their programs of study was unlike some other engineering programs, because their programs were more hands-on, application-based as opposed to theory-based programs, where they got to work on projects and gain experience.

Some of the participants enrolled in the Digital Animation and Game Design program (DAGD) believed that their program offered them the opportunity to get educated in a field that did not have a strong traditional presence and appeal to the local employment scene. These participants wanted to capitalize on availability of these
programs and their value to the state and the job opportunities created through their education. Bob stated that this is one of the few public colleges in the state that offers this program that the credits will actually transfer. Jay also stated that this was the only program of its kind offering game design in addition to software engineering and programming. Liz and Mia touted the value of what they learned in their programs as very evolved and involved, while expressing the depth of the teaching and hands-on learning that takes place in their classes in preparation for the job market.

It was important to this study to offer the student participants’ perspective on the kinds of courses that they were taking and what they were learning in preparation for the future. Participants in the study offered strong beliefs and discernable conviction in what they were doing. They saw themselves as the future of manufacturing engineering in the state. Sam said: “They always say service spreads wealth where as manufacturing creates wealth. I see that the country needs more manufacturing and I feel that I can help.”

Jax explained the role of an engineer as someone that typically originates a new and better process or features of a product, the study of advancements, to better advance a product or it may be a solution to a problem. Cal believed that in his engineering classes he learned to machine parts, and use computers utilizing programs like CATIA, Pro-E, CNC, and other similar applications and technologies. This has prepared him to be able to carry out his tasks. Upon further reflection he explained: “They say in manufacturing engineering you never do the same thing on a daily basis, because there are lots of other jobs for you to do, therefore, you never get bored.” Zac also described his schooling experiences in line with what he did on his current job, which was basically to design, engineer, and evaluate, and test a product with different means. He stated, “In my job we
basically do the same types of things that I am learning at school too, so it’s very relevant.”

Participants Liz, Jay, and Mia considered their program of study to be pretty comprehensive where students could be involved in various aspects of production of multimedia program development. Liz explained the program best:

“For me, I’m a student of Digital Animation and Game Design, which is a program offered by the university where students can go down a number of different paths, all related to the creation of digital interactive media, which includes games and other little things like DVD menus and things like that. Some students pursue special effects and things like you see in the movies, while others go more for 3D modeling. My particular track is actually the technical artist and programmer, so I know how just about all of the different software pieces work in the industry, but I specifically work with the programming and bringing things together sort of creating a bridge between art and programming aspects at the same time.”

Bob stated that he was leaning toward environmental modeling that could lend itself to various applications. Mia also pointed out that her program of study was pretty broad-subject, offering students various options to pursue including programming, 2D and 3D artists, or pursuing just the game design aspect of the program.

**Location**

The location of the school and its proximity to the downtown area of the city and the ease of access to the school and its programs was viewed as a key feature of the school by the students. Ben explained that his love of CNC and math drove him to the engineering field and he looked at all the other schools in the area and looked at their programs and this was the school he chose to attend. He stated, “To be perfectly honest I do like it because it matched me to the T.” Zac, Ben, and Jay also discussed the fact that the program was local, provided an ease of access, and the distance from their place of residence was a major factor in their decision to enroll at this college.
Jay explained his choice of POS this way:

“The thing about this program is that it was local. It was very close to where I live. I literally drove about 15 minutes to get here and I can do that every day, and then it was exactly what I wanted to do. I looked at other schools, some offered software engineering programs or some kind of really in-depth computer programming classes, but nothing about game design. So when I found out that this university had a game design program downtown, I was all for it, so here I am.”

**Family Ties.** Some of the students at this university enjoy the benefit of a free education because of their immediate family members’ involvement with the university as an alumni. Bob pointed out that because my dad is an alumnus of the university; I get a scholarship as a direct relative of his every year. “It’s like keeping-it-in-the-family-type deal.” Jay felt that recognition of his creativity was an important factor in his decision to attend the university. He stated: “I’m a very creative guy and I like to throw my ideas out to people and see what they think about it. I’m always one of those people that are open for you to critique (constructive criticism). The other big influence is that the college gave me a full ride scholarship.”

Mia attributed her passion for computer technology and game development to her father’s involvement with computers. She explained: “At about age five I started to pay attention to my dad playing on a computer, so I got involved in the games and I started to wonder how it was made and it sort of progressed from there to get to where I am today.”

Sam was also influenced by his father’s chosen profession. Sam states, “My father was a big push. He has always dealt with manufacturing in one form or another and I knew that I wanted to get into that type of industry.”

Jax shared his father’s role and influence by recounting his experience as:

“I’ve always been a mechanical guy, and I’ve always been great with mechanics and probably one of the biggest things is that my father is an engineer. So I
instantly got into engineering. So once I got into engineering classes and some of the mechanical classes, taking a couple of design courses, I realized that I really wanted to design and develop rather than do the mechanical side of things.”

Ben, Jax, and Jon all preferred the design side of their engineering program. Jon’s experiences related to others when he expressed his reasons in pursuit of becoming an engineer: “As a kid I always took things a part just to see how they worked, and it was interesting to me. From the manufacturing perspective, growing up, my dad worked in a machine shop, so being able to go there on Saturdays and see them machine parts; it was always interesting to me, so it was kind of a natural progression.”

**Other Considerations**

This investigator realized that there were other reasons in addition to those stated in previous topics that deserved consideration. For instance Ben noticed that as a CNC programmer, over the years, the number of programmers in his company had been reduced from 10 people to one. He reflected: “I saw the writing on the wall as what the trends were. So I felt it was time to upgrade my education and skill set to be more compatible. I didn’t want to go backwards, to rely on old skills; I had to develop new skills.” Jax was totally convinced that even the money did not matter to him. He wanted to be in this field because he enjoyed working, designing and thinking about the ways to work things out while doing it hands-on. He attributed this to his mechanical mindedness. Then there was Zac that saw this as an opportunity to advance in his current job.

For Jax the ability to attend classes at night was an important factor. He also stated: “I grew up in the area and loved boats and boating and I liked the design aspect of the course. So that one day I may be able to design my own boat brand.” Don stated that he was attending college in Texas but did not like being so far away from his family so he
transferred and switched his major. Although he was studying to become a mechanical
engineer, after much research he felt that Manufacturing Engineering Technology (MET)
was the right choice for him. He thought because of his personality traits, what he was
interested in, his hobbies and all that kind of thing were all geared toward engineering.
He said, “If I was a doctor I wouldn’t be a very good doctor because I just don’t have a
passion for it.”

Another interesting observation was made by Mia and Liz. Mia’s personal goal
had been generally “finding a way to make people happy through her work” and she
admitted that “this was a different way of doing it.” Liz stated that she was always
interested in and played around with neural networks and artificial intelligence stuff as a
kid. Although she obtained an undergraduate in biology to become a biologist, she felt
that “physically [she] was not athletic enough to compete with others in the field.”
Consequently she decided that “there were a lot of commonalities between studying
living things by going out and doing field-work versus making living things basically on
a computer which was much less physically demanding of her.” The investigators citation
of these diverse views expressed by the participants on POS and choice of school
reflected the values that were important in the decision-making process relevant to
participants’ future plans.

**Theme Two: Participants’ Perceptions of Globalization**

Globalization in a general term means different things to different people
depending on their situation. Due to various factors, globalization has led to
unemployment in some parts of the world while it has created various opportunities to
others. The opportunity to compete for skilled workers from around the world has
intensified competition for jobs and resources. The student participants from the CTE programs at this college of technology shared their views on this topic. The first interview question sought to gauge the participants’ perceptions and or understanding of globalization as a much talked about issue in recent years.

Jax, discussing globalization, reflected that to him the term globalization meant the interconnectedness of the world in not just one area but in any topic discussed. He mentioned economics as an example, since the world economies are all connected and it is more than that; it is jobs, it is in technology, and in competitiveness through technology.

Liz thought of globalization as the removal of traditional walls that are normally erected around the societies. Ben explained his understanding of globalization as learning about different cultures, its impact on jobs in the U.S., collaboration between U.S. and foreign companies to produce parts, learning about how other people think and the health impact of all the global interactions. He said: “everything is opened up, so globalization pretty much affects every aspect of our life and not just jobs, or money but everything.”

Jon attributed the impact of globalization to the development of technologies that has allowed access to resources on a global scale. Technology has allowed communication across the world with ease thus allowing people to work off-site, anywhere. This allowed other competitors in different markets from different countries that might not have normally been there without this technology to compete in a global market. Globalization phenomenon of today can be compared to the urban sprawl of the industrial age.
Zac’s basic understanding of globalization was that “20 or 30 years ago everything was kind of American-made and we had our own industries. I guess we were pretty much self-sufficient but in today’s economy, globalization is basically like a one world economy. America does business with China who does business with Russia and England and products flow in and out of each country pretty freely. Sam also mentioned this notion that in a globalized market place, basically, a company can have their work outsourced, whether they are having the whole product built overseas or just a certain part of it to reduce cost. The big thing that I have noticed is like you can be designing here in Michigan with somebody in India at the same time through CAD programs to develop a product, process and run it in here or there or at both locations.

Bob explained that just because “we are sitting in the middle of two oceans, we are not immune from what happens in the rest of the world, it does affect us.” He also stated: “We import twice as much goods than we export because of cheaper labor in other parts of the world producing less expensive products.” Jay’s explanation of globalization considered various aspects pertinent to the discussion of the topic. He summarized his understanding of globalization as having an influence on cultures and economic structures around the world coming together and having similar underpinnings. The ability to communicate with other people beyond language barriers regardless of cultural differences, removal of economic barriers, and the things of that nature where the world is becoming a smaller place, and ideas being communicated easier.

Another similar sentiment was expressed by Mia as she considered globalization to “encompass many things influenced by technology and computers such as local and global business, people, religions, and cultures, basically everything.” Mia further
explained: “To me, it’s kind of the idea of how things are changing on a world-wide scale and how things are almost meshing together and relating and just evolving as time goes on.”

**Globalization in the 21st Century and the Contributing Factors**

The presence of globalization was considered a constant throughout world history. However, what was important was not to ignore or to minimize the role of the globalization in human social interaction and technological advancements of the past to the global community, but to recognize the rapid pace in the spread of globalization in the past two decades. The majority of references in related literature to the topic often have recognized this era to be different than any other historical period. As a phenomenon under investigation it was essential to look at the causes that have made it possible to examine the contributing factors with such a global impact.

Consequently, various factors became agents for change on a global scale, impacting jobs, education, standard of living, and to some extent, contributing to social and cultural shifts. Participants were asked to share their thoughts on what factors may have accelerated this global shift in paradigms. It was necessary in some instances to ask probing question to elicit deeper responses from participants into the causes for the rapid pace of globalization. It was important to ask the participants relevant questions to draw out responses as to why this phenomena, although not a new concept to our understanding of global relationships, was impacting the global community much different than any other time in the world’s history.

All student participants to some degree agreed on many similar terms that established a consistent base to pursue this dialog such as; internet, information,
information technologies, transportation, and communications technologies. Ben stated that he did not think that anyone could deny the role of information and the internet technologies as a main factor in the current global environment. “It’s just opened up everything.” In Jax’s opinion technology was a main contributing factor to the rapid pace of globalization. Ben and Jax both extolled the possibilities afforded to the global community and the various avenues of communication that have been opened, such as ease of access to information through browser engines such as Google. “It’s the information, it’s the cell phone.” Ben and Jax agreed that it’s people in the most unlikely and remote parts of the world having access to information and technology.

Ben stated, “It is technology; that’s what has spurred it on, and it’s just going to keep going.” Jax commented that in his opinion, “It would be that we can communicate with somebody around the world through Skype, through video chats, by e-mail, and through phones (obviously telephones have been around). With the newer communications technologies you can have a video conference now with people all around the world which you never could do before, they can see live information on the stock markets from around the globe and make financial and business related decisions very quickly. So, really technology as a broad term, technology is really the cause of the fast spread of the globalization.” Don and Jon also stated that technology, cell phones, the internet, and other communication technologies like video conferencing, has sped up pace of information sharing and hence the pace of globalization. Liz’s statement followed similar thoughts expressed thus far by other participants. She stated:

“I think the internet and its related technologies to be the main factor in the spread of globalization phenomenon. Because suddenly the physical barriers are pretty much gone and all you have left are the language barriers and amazingly enough, people find ways of getting around those. It is much more common to run into
people who know multiple languages today than just even 10 years ago when I was a kid.”

Jay cited the internet as one of the primary factors contributing to the fast paced spread of globalization as a tool used to make business communication easier. For Bob it was the technology in the 21st century, computers, and internet. With click of a button and in millisecond later communication arrives at its intended recipient computer. Orders are placed and shipments are made usually the same day. Mia agreed with other participants, adding that the advances in computer technology to be pretty much one major factor in this process. Cal explained: “Because of the technologies that we have, everything is much faster now. We can communicate with others with the touch of a button on a cell phone or click of a mouse on a computer instantly.” Jon explained that he thought globalization would not be termed new but ever expanding and that is just mostly due to technology.

The student participants also considered other factors as important in this discussion. For example, the standard of living in U.S., educational possibilities and whole host of other issues, are considered by individuals from other countries, wanting to come to America to live and work here as stated by Gil. He continued: “That could be either positive or negative, depending on the circumstances, impacting job opportunities in America.” Jax also considered the positive and negative effect of globalization. He explained: “The positive impact due to advances in science, medicine, and auto manufacturing will help everyone, and a negative aspect is competition for jobs as more manufacturing gets done overseas to produce product for import to U.S. impacting various aspects of our lives.”
Zac observed that a country like China can produce goods for less while businesses investing in other countries and the collaboration that takes place between companies at home and abroad are major contributing factors to the impact and spread of globalization. To Sam, the NAFTA (North American Free Trade Agreement) was the beginning of opening up everything to competition. Don also pointed out that better transportation and communication technologies are important in the spread of globalization.

**Contributing Factors to Increased Global Competition**

A tremendous surge in global competition as a consequence of globalization, competition for cheaper labor and resources, development of emerging economies and markets, and possible cultural influences in an evolving global community were of major importance and interest to this study. The question of implications of globalization and the idea of competition for cheaper resources and a skilled and educated labor force was put forth to the participants to explore the impact of globalization not only on the state or at the national levels but also to include competition at the international levels as well.

Due to the selection of the POS as a relevant part of this study, it was essential to understand whether these factors might impact the participants’ choices of POS as they are presently and in their future plans. Some participants’ firsthand account of events had helped to frame their perceptions, understandings, and or fears of the unknown possibilities. For example Sam’s big concern was that this past summer while working at John Deere, he learned that John Deere was building a competing plant in Russia. Sam attributed this to probably being cheaper to build a plant in Russia and therefore he was anxious about the prospect that if he got into that, there was always the risk that they
might outsource the plant somewhere else. “So you might lose your job completely or you may have to go with the job.”

Examining the influence of globalization on jobs, whether in the U.S. or abroad, either as a positive or a negative development for affected workers, Ben reflected: “We’ve seen our manufacturing base spread outward. Why would I have someone down the street produce an item making $10 an hour if I can hire someone in Mexico to do it for $3 or $4 or whatever? That’s great for them. Here’s the positive; the workers in the developing countries that were held down by politics, strife, and war, all of a sudden see these businesses coming to them and saying, ‘Hey, I’ll hire you.’ They’re getting jobs. They’re getting medical insurance. They’re getting medical supplies. They’re getting education. That’s huge for these countries. A lot of the countries have gained 30 years in the past 10 years because suddenly they see possibilities and opportunities. Now they realize that they have a chance to get an education, and get a job, and provide a better life for their families.”

Zac believed that the relevance of this scenario is dependent on the countries that affected workers reside in where one worker will lose his or her job while another gets a new opportunity. For example, he emphasized that “I think globalization is taking away jobs that other people in America could have while in the underdeveloped countries where most of these jobs are going, these people are becoming more exposed to technological advancements that they otherwise wouldn’t necessarily be exposed to if this situation did not exist. So with that, “the education, transportation, and all those type of things that you need to develop a country are being introduced and making that country perhaps better.”
Bob also emphasized “the impact of globalization on the job market in local context as a negative while he believed that the competitors benefited more from such interactions.” In his view, in some aspects it’s a good thing for countries like China and India. For the last couple of decades these countries have emerged as economic forces. For them it’s only a good thing because they have a constant influx of money coming into the country. But for those of us that are feeling the opposite effect of this imbalance, it’s because we can’t really compete due to various reasons such as minimum wage requirements and a higher standard of living that in part is tied to skills and wage scales that are higher than the rest of the world.

The consensus among the participants, including Gil, was that in today’s job market you have to go where the jobs are. Cal echoed his understanding of the issue, as basically “every company deals with manufacturing of some sort, and us, being skilled workers in manufacturing and engineering, when our jobs are being sent overseas that is going to definitely impact how many jobs are going to be here as opposed to over there.” That means fewer jobs here. When discussing the issue of competition, Don stated: “I think it has definitely made me have to work harder to market myself to a company.” They could move to India and I know there are a lot of engineers over there that are extremely smart and will work for less than I would. So “I feel the pressure to do a better job of marketing myself today much more than 20 years ago.”

There was this uneasy acceptance of competition not only from all areas of the globe but primarily from China and India. Ben agreed with Don as he expressed a similar concern about competition from those countries. He explained: “This will impact my career. I am not competing with my neighbors. I am competing with the rest of the world,
because as a product designer I have to work with people from China collaborating on designing a part and the reverse would also be true. This means I am competing with people around the world because it’s all information and I am competing with some sharp people from China and India. That’s who I am competing with.”

Global competition for resources and highly skilled, highly technologically educated workforce has contributed to the idea that the world is flat, due to how international trade is conducted. Traditional barriers are removed to pave the way for less restrictive participation in a globally competitive environment. Participants’ perceptions of such issues were important to explore. Jax contributed some of the shortages for engineers in the U.S. to the retirement of a large portion of the baby boomers’ generation. He further explained: “On one hand this should make it easier for new engineers to find jobs but on one other hand because of the globalization of the labor force many people have actually lost their jobs. I think this will hurt me because there are a lot of engineers out there looking for technical jobs, but in a specific field for a specific job like product design.” He continued: “My generation, generation X per-se is what we need to take us into the future.” He contended that globalization has taken people from all around the world and brought them to China, India, Japan, U.S., and Germany and to other countries to study and work and do other things. Jax also mentioned: “The younger generation of engineers getting into the job market with less experience have to compete with people that have more experience than they do. This definitely creates a skills gap between the baby boomers and my generation. There is a big gap between technically skilled people.”

Review of other comments regarding global competition drew this response from Jon. He indicated: “For instance we have seen a lot of engineers being educated out of
India recently. They are working from their home country and some of them are moving here. Their schooling is allowing them to be competitive and at times work for less money or be more competent to do a better job. He continued by stating that “globalization of the labor market definitely has an impact.” We have to do whatever we can to become more versatile because competition is greater now.” He also reiterated the comments made by other participants that “you are not just competing for jobs with people in your area, or your city or your state; you are competing in a global marketplace.”

The following responses were presented in contrast to what had been stated so far. Zac believed: “Parts still have to be designed in the U.S. although they may be produced elsewhere.” As he put it, “I am not concerned about that because as far as development and design is concerned they are still done in the U.S.” There was a notable contrast worth exploring that developed at this junction. It seemed that the separation of the fields of study, meaning what POS the participants were in and what they were learning as a trade, could be immune from the influences of globalization as perceived by some of the participants from software engineering programs as opposed to MET or PDET Programs.

Bob and Jay were among those participants that down-played the impact of globalization on their field. Bob stated: “Because we’re a technical school, we focus on a lot of computer-related technologies, programs and stuff. I don’t really see much of a downside to what we do because everything that I read says that this specific industry is constantly growing and sales show it as well.” Jay followed by adding: “This might be just the fact that I’m not old enough to know better, but I’m not too worried about globalization in my field because I have two aspirations. One is to be an independent
game designer, meaning I would work for my own company, and the only thing that I would have to worry about is rival companies in different places of the world, and then the other one is to be a comic artist, which it’s not so competitive. And especially if I’m doing it all on my own and I’m trying to move forward by myself. If I’m not part of a bigger company I guess I don’t think I have to worry about it too much.”

An issue of consensus among participants was that they saw themselves at a disadvantage regarding familiarity with and the ability to speak a second language as a tool for competition, as they viewed their competitors. Liz explained: “That due to the nature of my future activities in my field, there’s a chance that I’ll need to communicate with people who English isn’t their first language and I only know English.” Ben also added that “he may have to pick up a second language in order to be able to compete.”

The previous comments led to the exploration of the role and place of language in a global economy. Regarding these possible barriers and the other unforeseen issues, Jon reflected that “my company does a lot of work with China. A couple of years ago our Chinese partner was to do the engineering and the design work and send the design to us to sign off on it. I could not tell you whether this was due to the language barriers, or understanding of what was needed, or lack of necessary skills, but I can tell you that did not work well and cost more time and money and delays in production. Consequently, today we do more of the engineering and design work ourselves right at home. And that’s a specific instance. “As a whole I wouldn’t be able to say how much change has occurred in the past years that I have been working as an engineer.” He further explained that: “I have not seen a major shift. If there were major changes to occur, as other nations
become more capable of doing that type of work, the Americans and American companies have to become more project managers than engineers at that point.”

Mia also expressed concern over the role of language while seeking a job in a global market. She explained that “it is a little scary that I don’t know a foreign language because that does limit me to just the people who are speaking English, so it would be advisable for me to actually learn another spoken and written language at some point in time to be more competitive. And that is something I might not have considered before.”

It seemed that there was a pattern or evidence of the types of collaborative attempts to share design and production ideas between the U.S. side of business and the international counterparts across the globe. To this Sam added; this summer I interned at John Deere Company in one of the manufacturing plants. We actually had a girl from India come in and work with us. John Deere has a place over there, all they do is PPPAs which is pre-production part approval, which basically they pay them to figure out how to do all this stuff. When they have new products coming out they ship somebody from India over, they do the PPPAs. So I have seen that kind of impact.

In order to further explore how globalization might impact various aspects and the components of a globalized economy contributing to intensification of competition, a probing question was asked to further explore and understand the issue. Ben stated: “The competition is going to contribute by opening up my market to competition and create a larger competition field for me.” Jon stated that technology and the demand for it, quicker designs, cheaper designs, and cheaper investments upfront are some reasons that competition keeps increasing.
Implications of Globalization on Social, Cultural, and Educational Opportunities

Responding to the question of factors influencing global competition and the possible influences it may have on other cultures, Bob pondered on the current unemployment on the state and the national stage pointing to steadily rising unemployment at a historically higher rate than average, with Michigan having a higher percentage of unemployed because of our focus on the auto industry being unable to compete with foreign competitors. Unemployment in the U.S. translates into jobs and higher quality of life elsewhere like China as they gain a higher share of the global market. More and more, China is becoming a world powerhouse in terms of their global market presence and we are losing a larger share of that market. You can equate our relationship with other emerging economies to highly competitive sport teams. You got one team really good for a while and then just things kind of start to fall apart; players get old, younger players go to other teams, so, one team that used to dominate, is no longer dominant while you got these other teams rising. However, I do not believe it would affect the younger engineers out of college as much as the older generations because we are familiar with newer technologies more than the retiring or older engineers out of work.

Mia, responding to a follow-up question exploring the influence of globalization on competition and its impact on other cultures stated that “competition and the opportunities that it creates is a major influence. Because competition for jobs is no longer a local matter, as we compete not only with people in our cities or the country, but we are also competing for jobs with people from around the world.” “You’re competing with people world-wide because companies are willing and able to talk to people
anywhere in the world and hire the talent they need. They send the people to where the jobs are and where their needs are.”

Sam recounted his experience through the eyes of his competition. He said: “One thing that always comes to mind is that there was a company in my town that decided to take their operation to Mexico. People here did not think that was a big deal. A camera crew followed the company to their new location. The environment was totally different down there. The people were elated to have this company come to their town and offer those jobs, and the opportunity to have a better quality of life.” Another example was offered by Ben. He explained his thoughts on the topic of globalization and its influences and cultural effects consistent with similar results mentioned in this study and from the literature reviews. He explained:

“When I was growing up we barely heard the term Muslim or Buddhist or other similar terms. Now we’re introduced to that on a daily basis. We see different cultures in school and on the streets. Our jobs are affected by globalization. We’re sending people to China to work with people over there and we’re dealing with a global market. We’re dealing with Mexico, China, and India. Everything’s opened up. Education, I’m not just learning about what happened in Texas in the Alamo, I’m learning about Gandhi and Marxism and all this stuff around the world. Because you need to understand how other people are thinking. So, globalization pretty much affects all aspect of our daily lives, not just jobs, not just money, but everything.”

“Because of what is happening in a global marketplace, I think people perceive each other differently,” Ben explained. He believed: “It used to be really interesting to see someone from another country. Now, it is a common occurrence and people are more accepting.” Jax credited globalization and the advancements of the communications technologies as a vehicle to allow us to communicate all around the world. As an example he offered access to better education by all people globally leading to a changing environment. Even if people cannot come to the U.S. this will allow them to be educated
in their own home countries and become our competitors. This will improve the quality of their lives.

Gil was asked to discuss some of the causes of globalization as why this era may be different from any other time. He explained: “Because it is a global happening, the cultures are blending in; the world-wide communication is better than it has ever been. In other historical periods although people may have lived in close proximity of their neighbors they did not have this level of communication available to them. Today the world is all connected as one global market and different cultures are becoming more part of this trend. This is happening in search of jobs, education and through immigration, integration. People are moving around because of their jobs.” Don’s response was in line with comments made by other participants thus far, regarding factors contributing to ever evolving globalization of jobs, education and markets. He credited the “improvements in the global transportation systems, communication technologies, use of the internet technologies, and other countries being able to compete in larger markets as major issues to consider.” Don also stated that: “People can make things in one place and sell it somewhere else. This adds to the competition for all kinds of things.”

Jay emphasized a similar opinion. He considered the internet and the technology as the major factors in making it possible for people from around the world to compete with each other. Another aspect of Jay’s view dealt with the individual responsibility when it came to global competition. He suggested that we know we have competitors from all around the world and we have to try harder to make ourselves better and draw attention to ourselves. Mia, while offering a similar explanation, considered competition as dramatically much more of an important factor in the terms of getting the job. “We
have to be aware of what’s going on and if you’re not actively involved in what you’re doing, unfortunately, you’re going to fall behind. For my degree specifically, access to newer computers and field related technologies are the key to staying in the mix. Lack of resource at this stage may mean that one cannot be competitive because they lack necessary skills.”

**Impact of Globalization on Careers and Programs of Study**

One aspect of globalization often discussed as a major source of concern in various literatures including the recent publication of the National Academy of Sciences “Research on Future Skill Demand: A Workshop Summary” (2008, p. 8) stated:

“Over the past five years, business and education groups have issued a series of reports indicating that the skill demands of work are rising, due to rapid technological change and increasing global competition. The reports call for rapid improvements in K-12 and higher education to prepare young people with the higher skills said to be required for the coming century (Business–Higher Education Forum, 2003; Partnership for 21st Century Skills, 2005)”.  

America’s standing in the world in the face of serious challenges posed by developing nations such as China and India and many European and South American countries has often prompted much debate. It is often said that competition is good and brings out the best in people. However, to be able to compete on a global level various issues must be considered. Education of a technologically savvy workforce, prepared to meet the challenges of a globally competitive labor force, is among the issues of concerns. What has been done to prepare students enrolled in CTE programs at this university to make certain that these students were ready to face their competitors was an essential component of this perspective.  

This discussion included student preparedness on an individual level and through educational resources and opportunities offered through their school and whether they
felt prepared to step out and join the sea of highly motivated competitors from around the globe. To that end, the students were asked to consider the reality of globalization. Based on their understanding of this evolving trend, they were asked to explain whether they felt prepared or concerned about their place in a very competitive global labor market. It was also important to learn from the participants about their perceptions and experiences whether they had noticed or experienced a trend or an impact on their POS or their future careers of choice.

The participants’ responses from the interviews mostly had a positive and confident tone to it regardless of their POS where Bob, Liz, Mia, Jay, Sam, Gil, Cal, Don, and Zak all indicated they were ready. Ben, Jax, and Jon had concerns regarding competition in their fields. Although Liz felt good about her chances, she nonetheless had some reservations.

Starting with Gil, he stated: “I feel optimistic. I think my hands-on experiences will give me a good shot to have a good job and a good career despite the market expansions.” Cal liked his chances by explaining that “right now I feel pretty good because they say the economy is coming back up. I do have a job working as a manufacturing engineer now which I feel pretty lucky to have. I got my hopes up.” Don was optimistic and pretty sure as he said, “I feel pretty confident. I feel like I have a lot of opportunities that I am able to go out and I feel confident that I will be able to find a good job.”

Zak stated: “Personally, I don’t feel that threatened about my job per se. I think still the globalization as of right now is more of a manufacturing aspect of actually producing the part than more of the design of the parts.”
Jay saw being in school and learning as a way to prepare to be able to compete. He explained: “That’s why I’m still in school, to learn and get ready. Will I be prepared when I get out? I hope so, and that’s why I’m taking some steps to better myself and just to be aware of what’s around me. I review the competitors’ new games on the market to learn what is out there and what I need to do to appeal to the same demographics.” Mia shared some of the similar insights offered by Jay. She explained:

“I’m always kind of aware and watching to see how the industry is progressing because I don’t want to fall behind. There’s always that sort of unknown factor where I wonder what other people are doing and trying to get into this job. But I’d say this program actually sat me up pretty well in the sense that I feel like if somebody were to ask me to do something, I can definitely do it and do it quickly.”

Bob’s view was reflective of the importance of the curriculum being taught in helping him to be prepared for competition with others. He considered his POS “nothing but high-skilled and that the degree alone doesn’t necessarily mean you’ll get a job anywhere. The technical level of our knowledge is essential for employment. Employers don’t have to hire you because you are an American. Employers have too many choices to pick their employees, from anywhere in the world.”

Liz explained her doubt by indicating that “I suppose there is always sort of that self-doubt and I don’t really know if anyone ever gets passed that point. But when you get away from it you realize that there are a finite number of people who really excel in these things and communication is absolutely massive for the field that I am in.”

The discussion then centered around the reasons that Ben, Jax, and Jon cited as a source of concerns for them. Ben shared his concern regarding the role of globalization in his field. He explained: “I’m very concerned about the globalization. It’s harder. You got to be sharp. Am I sharper than some 18-year-old in my position? Probably not, but I have
to find my niche that other people don’t want or that they don’t have the skill set or the drive to do. To succeed you need to take few steps like you got to get to work on time, be proactive, and you got to be a team player and all that comes into play in employment situations. I can do this better than some young guy. I can stand up in front of 300 people and talk to them. And, again, that’s something that they teach here. We’re always doing speeches and projects in class. I would say 10% of the first class here is that you’re doing projects that involve speaking with groups and that’s going to help.”

Jon believed that although the competition may be there, it is up to the individual to take action. He made this observation: “You always feel less secure because there is more competition but my outlook is that you have to change your vision as to what the job might be, to adapt, and make yourself competitive or valuable to the company you’re working for. If they need you to project manage and understand what they are doing or what they are going through, than that’s what you got to do.” Jax felt that the risk was greater, because it is easier for people from around the world to become educated. “I do think it is a risk because everybody still wants to come to the U.S. to live and work. This opens the door for more competition even in the U.S. by people that migrate here. They may not necessarily take my job but this creates more competition and offers employers a larger selection to choose from and perhaps at a lower cost.”

Noticeable changes and trends in labor market needs, employment opportunities and its possible impact on POS or their preferred career plans were posed as follow-up question to the participants. Cal replied:

“Yes. It has impacted our field already as companies are just sending jobs overseas. My fear has to do with not being able to find a job so the best I can do is to prepare myself by getting a degree and continuing for higher education.”
Ben viewed these trends both as good and bad. He explained: “As more people come to the U.S. to work alongside American workers, that can be a plus because, now all of a sudden we can pick up stuff from other countries that we did not even think about before… they think differently, which is great. If we could just tweak our minds a little bit and think a little bit differently, that can help.” He further reflected: “On the downside, I got more competition. It’s always going to boil down to that you’re going to have more competition, but you’re also going to have more opportunities. And these businesses, they’re competing on a world market, and if they’re doing well, they’re going to hire you. It’s as simple as that.”

Jon emphasized that “because of globalization, I think that things will stay the same as today. On the question of whether he felt prepared to get in the job market, Jon put it plainly: directly out of school, no. But within several years of working in the right environment I may be.” He further clarified that “school doesn’t prepare you on globalization, project management, dealing with other cultures, the experience does.”

Zak’s reply dealt with a deeper issue, as he put it:

“I guess if the U.S. isn’t prepared to train our people to do those high skilled jobs or to produce high-end technical parts, then that will hurt our place in the world. Like I said before, since we’re not just competing against somebody in the next state rather competing against somebody across the world than that’s where those jobs will go.”

Gil concluded that “I am prepared as much as I could be without actually going out and interacting with people, the rest comes with experience.” For Don the issue had to do with Americas’ desire to be better than other countries as he concluded his thought this way: “I think there is always a concern for that and that’s what drives America. We
want to be better than China and Japan and all that. And so I think it is a driving force to help us keep improving.”

Sam reflected on his past experiences: “I was in high school when NAFTA passed. Being from the Detroit area, we really got hit badly. I thought, man, I don’t want to get in manufacturing but attending school here, I am kind of learning more about it and learning about the ways that we can keep our plants here and keep them competitive. I kind of felt more confident that it will come back because of these things that we are learning and change within it.”

For Jay, Mia, Bob, and Liz, although they mostly felt good about their futures, finding a local job was more of a challenge and Liz considered those changes as a plus for the industry. Bob expressed that:

“I know I’ll probably end up having to relocate. I mean the market just isn’t here in the Michigan area and I’m prepared to do so. It’s just where I’d be relocating to that is on my mind. I have no problem going wherever the work is. If I can land a steady job that would be secure, I myself definitely wouldn’t have an issue relocating to Europe, or to China or even Japan, as long as I could get a secure job and just be able to work.” He also explained that: “I come from a small town and industries are much set and that makes it hard for older people to relocate but those of us that’ll be fresh out of college, it shouldn’t be a major concern.”

Jay reflected that “I might not be working for a studio in the U.S. as I might have to travel to Europe or to Asia to find the market that I’m looking for or to find an employer. I never really thought about it until now. But if it keeps going as it is, then there might be big game companies all over the world.” Mia suggested: “I believe that globalization has already impacted my field. This field has a worldwide audience, and the products are marketed all over the world. That is a positive thing for the industry.” She believed that the market has kind of opened up in the sense that she is not limited to just this area, “which is great, because unfortunately Michigan doesn’t offer a lot of job
opportunities for game design. I could be working in California or in Russia or Australia or Japan, wherever I need to go.”

**Theme Three: Preparation for Careers in Global Economy**

Participants’ understanding and possession of few prerequisite skill-sets deemed necessary for employment in today’s global competitive environment was a relevant aspect of this study. The participants were given an opportunity to explain their understanding of such employability skills and tools based on the results gained from a survey conducted by the National Association of Manufacturers (Eisen et al., 2005) stating that the employers are not satisfied with the level of basic skills and critical skills exhibited in the new employees. Therefore, this study asked the participants to explain what they perceived as necessary skills in addition to appropriate theoretical knowledge necessary to obtain and keep a job. Additionally, the participants were asked to reflect on whether these skills are taught in the course of their studies and how would such skill help both the employer and the employee.

**Employability Skills and the Employers’ Expectations**

Participants’ responses to the proposed question were varied ranging from teamwork, to communication, and fitting into a corporate culture. The ability to communicate was a common response. Jay mentioned: “The ability to communicate well, public speaking, time management, having confidence, being able to present yourself well, and blending well into the social aspects of having a job is important.” Jay concluded:

“From what I had learned in my class that the employers valued time management, appropriate social skills and being confident as valuable skills. Employers are looking for well developed skills in their employers and being a good game designer alone may not be enough.”

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Mia also described her understanding of the topic as: “Being part of the company culture. Most companies are interested in somebody that has the ability to fit into the business culture and actually get along with everybody and having the skills to do what’s needed in the time that’s needed. That’s really important. Skills such as project management, and what is going to take to get the job done, and understanding how everybody else is going to do their part are important.”

Following up with the ability to communicate, Liz commented that “the ability to communicate especially in the area that I’m looking at, being a bridge between the artist and the programmer, a lot of times the lingo and the personality types vary quite differently between the two groups. Being somebody who has a little background in both fields and can see various sides of the story can be a big help. But I think employers really like the communication skills and value adaptability, especially because the industry changes really fast, so being able to pick up new pieces of technology very quickly is important. And if you haven’t learned how to learn to be able to use new software correctly when it comes out the first time, that’s going to be troublesome for you. And that’s actually one of the things that I really like about this specific program that [the university] has. One of my professors specifically, works very hard to get the programmers to start thinking about how to answer programming questions themselves instead of just memorizing one language. It is important to know enough about as many programming language as possible to very quickly figure out exactly what is needed to get the job done.”

Liz expanded on her explanation stating that one of her programming instructor’s teaches them how to do something by providing an example and explaining the tools and
how everything worked. Next, the students will receive a problem allowing them to work independently as much as possible. “The instructor keeps making you work a little bit… he’ll tell you in the end if you really can’t find it, but he’ll keep probing you to try and figure it out on your own for a while which is a really an effective method.” Liz expounded on her previous response, clarifying: “The communication and the group-work has been missing a little from the course work. But in the last year or so they’ve started integrating that more into the existing classes and are even starting up a new course that’s going to be very heavily based on working together as a cohesive group which is so important. The team building thing is huge in the industry.”

Bob expressed his understanding of the topic according to his own experiences where he works. He stated that the things that they value the most are teamwork and communication. “Here we do a lot of work by ourselves but at work it’s definitely a team effort to get things done for the day. If you can’t communicate with your co-workers or your managers as to what you’ve done or what needs to get done or what needs to improve, then nothing is ever going to change. He also explained that we have a few assignments that I’ve done that have been team-based that mimic a real world experience.” In response to importance of these skills in a job setting, Bob said that he considered these skills to be essential.

Jax explained: “On my job being a problem-solver is the most important thing.” He explained that most engineers are given a problem and told to find a solution. “I think in a globalized work environment these skills, including good communication skills, are important and are not done individually but in teams, in groups in all projects. Team communication is part of the solution. However, I do not believe globalization skills are
necessarily taught here. We learned how to keep track of our work through use of folders and binders but as far as team work and communication, we do team projects in teams and I definitely think that teamwork and communication are definitely taught and these skills are absolutely necessary.”

Among various reasons considered for asking employability-related questions in this study, in addition to the concern of the employers, was referring to the SCANS’ report (1991) outlining these skills not only as an essential part of educational process, but also as a tool to allow the CTE students to be prepared in a globally competitive setting. Following this logic Ben was asked to share his thoughts on the topic proposed. Ben considered promptness, loyalty, and the ability to speak well and to be able to communicate as effectively as possible. He explained that these skills are important because things happen quickly now. “You can’t be set in your ways and just go down one path. You have to be able to change at a moment’s notice and go on to something else, multitask, work with technology. ‘Here is the latest and greatest, learn it.’ It is crazy to assume these skills are not needed. We learn a lot of these skills in our classes.”

Jon offered: “Project management, organization and flexibility and being knowledgeable about your trade to get your job done every day as important.”

To Zak dependability was important to just show up every day. “This is not something they can teach you. You have to be able to think through a problem, to evaluate a problem, and to come up with a solution. These are the things you learn as you do and not something that can really be taught.”

Sam reminded this investigator as to why he chose the university he was attending: “This is a very hands-on school, so that if a machine breaks students are right
there fixing it. We gain hands-on experience. We kind of learn to think for ourselves, not just the theory behind how it would work; we know actually how to do it. We think out of the box.” Don was in agreement with Sam regarding the value of hands on experience as he explained:

“I think that the hands-on experience is really valued by employers. That is one thing that I have noticed in talking with companies. The main thing they really want is experience and common sense, being able to think on your feet, not just book smart but having the ability to make decisions. I do not know if you can teach common sense but it is the kind of thing you can learn. You need to think before you speak, think through stuff to learn to troubleshoot and solve problems.”

To Gil, computer skills, personal skills, the ability to communicate, and being confident were the big ones. “You learn these skills dealing with people. These skills offer me a greater opportunity to get a job.” Cal mentioned, “People skills and communication, not being shy and being able to express yourself as important.” He agreed with other participants that these skills are definitely important. He explained that “if you can communicate well with others and get along with them then you can work with them.”

**Career Outlook**

The issue of career outlook in the national economy was tied to the needs of the employers. This was pertinent information in order to understand whether participants in CTE programs were receiving education and training relevant to the job market. Therefore, the participants were asked to consider this question: How did they know what kind of high-skill jobs were in demand in their local, state or national labor market and or how did they know what employers were looking for in order to meet their talent needs? Most participants mentioned using the internet as a starting point to look for jobs, to look
at postings to see what kind of jobs are in open (in-demand) or what kind of skilled
workers the employers were looking for. To that end Ben, Jax, Jon, Zac, and Bob
mentioned the use of the internet as a good beginning point. Zac said:

“I think you have to do a little bit of research to find out what kind of jobs are in
demand and sometimes search the firms that do research on potential growth in
job markets to learn what are going to be high-demand jobs in the future.”

Jon pondered the question and stated that “I don’t know if I can answer that
accurately. Personally, I haven’t looked recently. Sometimes you look at Monster.com to
see what is out there to see what jobs in what areas are available. But, most of the time I
don’t know. I don’t have a good answer.

Jax explained:

“That’s actually, kind of a tough question for being a guy that has always looked
for a better company or a position to work for. It’s kind of tough to find that
through different types of job searches and using head-hunters. I am always
perusing job search web sites.”

Ben explained that the “Internet gives you a lot of information on that.” Sam
reflected on the topic:

“We use what teachers experience (teachers ability to use their connection with
the industry they know- their input) and use that as a tool. This summer, we did
our internships at a large company. It’s really promising because I think that
roughly 80% of us already have job offers on the table. What we hear a lot is the
number of graduates in manufacturing is actually down and numbers of jobs are
actually up. Therefore, the companies are actually taking mechanical engineers
and training them to do our jobs.”

Cal also agreed that the job fairs are also a good way to learn about the job
market. Sam continued, “We go and talk to companies. They talk to us because a lot of
them need people really bad. John Deere alone picked 500 interns during the summer.”

Gill had a different spin on the topic as he mentioned:

“By being involved in your local businesses, being involved in local community,
you can find out what is out there. Being involved in the workplace, not just
coasting through day-by-day, and paying attention to what is going on in other industries around you. Groups like SME (Society of Manufacturing Engineers) offer you updates. You can get all kinds of information from a source like SME, such as what employers are looking for, what skilled are needed and where, also there are local places like that too. And if you have a degree obviously you are considered more skilled I think.’’

Cal explained that in addition to attending job fairs it was beneficial to talk with big companies that one might be interested in working for to find out what is in high-demand. Don also reflected on what he learned through job fairs and resources offered by his school. He explained, “Our school conducts a survey and based on results gained from the field, they tell us that this is a good major and we have this job placement rating and all that stuff, so I’d say looking at this kind of data is a good way to start. By going to job fairs you learn also what companies are looking for, for example today (job fair) a lot of companies where looking for engineers and welding engineers to be specific. So, it’s important to do some digging on your own.”

Liz considered the word of mouth as a way of learning what is out there. She was not certain how to respond to the question stating, “That’s a really good question and I’m not really entirely certain how. I guess one way is looking at where a company is located, because like for my industry in particular, it’s an entertainment industry. Products we create end up all over the world. There’s not a lot of demand for people who do this stuff in Michigan and there really aren’t that many studios in Michigan, therefore the demands’ not here. But if you go to California, Arizona, Texas, Washington State, those states have tons of studios in them so the demand for people to move there to do the work increases. So I guess you look at where the studios are, for the most part, or the related industries as well.”
Bob mentioned that using various media for local, state and national level news and using the internet sources like MSN.com can be very helpful in a job search. Utilizing data compiled by local, state and national-governmental agencies that track and collect labor market information can be very valuable. Jay responded: “students have to do some work before selecting a school or a program of study and learn about job outlook in that field.” Another issue to consider Bob explained “is for employers to look at the prospective employee to learn about their school and degree and where they got their degree, because some schools are better than others in some programs due to instructors’ knowledge of the field and experiences.” I know that’s a lot of work but it definitely would seem to produce the results. He also mentioned talking with school counselors to find out what is going on in the field. Also talk to people in the field. Talk with your teachers. Mia also mentioned utilizing the job search sites on the Internet like monster.com to see how often a job type shows up to learn about what is in demand. Going to specific conferences like Game Developers Conference (once a year in California) and that is like career expo where you get to directly talk with the companies.

**Preparation for Entry into the Job Market**

John Dewey’s contribution to educational philosophy in 20\textsuperscript{th} century was a significant factor in understanding the role and the purpose of education. Dewey believed that the purpose of education was to create opportunities for good jobs. According to Braundy (2004), Dewey stated that schooling could lay the groundwork for understanding the practice and implications of producing for society’s needs (p. 1). Dewey wanted people to understand that technologically literate individuals and their collective knowledge of production were important to development of thoughtful citizens.
capable of critical thinking, problem solving and well-being of their community collectively (Braundy, 2004). In lieu of the understanding that is derived from such a well-known doctrine, the participants in the study were asked to elaborate about the role of the education that they were receiving and whether their studies were helping them to prepare for employment in a highly competitive labor market seeking skilled individuals.

Jax explained the relevant of his education to labor market skill needs as:

“I think that the types of skills that they are teaching are like feather in your cap, per-se. Through the CAD work that we use in the Material Science and the physics classes and other course, you are able to say you know how things work. It obviously gives you the leg up in that industry. But, you can counter and say a lot of schools teach the same courses. I think what the University does well is that they do a great job of real world and technological integration together.”

Ben asserted: “This program has given me the CAD skills, the engineering skills like, machine design and relevant skills that I will need. And a lot of employers don’t want to hire someone without a bachelor’s degree. So the bachelor’s degree is important. Despite my skills and experiences, even though I work for the company, a lot of times I’m competing with 50 to 100 people with bachelor’s degrees and they take precedent over me because I have not received a degree. So when I got my degree, I will get hire and will receive a raise.”

Zak, emphasizing the value of his program, explained:

“I believe this program, which is unlike some other engineering programs; it’s more of an application base versus a theory base. This program doesn’t have as much math involved in it and the Calculus involved in it is used with on the computer in the lab. You actually get to work on projects. I’ve worked on projects in a couple of the classes. I’ve worked on projects that I’ve actually had at work so you can also gain a dual benefit there.”

For Gil the life experiences of the instructors were an important aspect of what he was learning. He expressed:
“Job market I think is improving from everything that I can see. Prospect are looking good. A lot of companies I’ve talked to are hiring at multiple staff levels. I think the program is supplying good people for market place. They are doing some revamping though, but that is always on the up and up.”

Cal found his classroom learning relevant to the job market. He made it clear that the classes offered here like machining are being used in the real job setting. “We are getting hands on experience to be prepared for when we go out. We also read a lot, testing process in our field.”

Don’s explanation included the use of relevant technology in the classroom setting. He further elaborated:

“We have a lot of new technologies available here to us at this University. We run a top of the line CAD software called CATIA and that’s the same software Honda uses but is very expensive. So we use some high end software that we have here at our finger tips. We also have really nice new CNC equipment that we are able to work on in our undergraduate program.”

Sam also reemphasized that the instructors’ experiences outside the classroom influenced what they taught in the classroom. As he put it: “They are teaching us basically what they used in the industry. They also find what is the most cutting edge software like CATIA which we are working with so we can optimize the process. They are finding that CATIA is basically comparable to MASTERCAM. With stock CATIA you are getting more optimized tool packing and more. On top of that as soon as you learn the software you can optimize it further to get out all the wasted time.”

The underlying mindset of the participants regarding the role of their programs in their future success was well-ingrained in their belief. Additionally the role of their
instructors in facilitating this perception was also well founded as other participants reiterated the same understanding. As Liz explained:

“There are the basic skills, but the instructors are very good. They explain how a person is progressing straight up. If you are not cutting it, they will tell you this wouldn’t work in the real world. Passing a class does not mean success. They are focused on you and you actually have to produce a good portfolio, and they help students to learn to network like taking us to Game Developers Conference (GDC) in California.”

Bob also mentioned the role and the importance of attending GDC in California to meet with people in the industry to see what is going on and what is new in the market. Jay also reemphasized the role that instructors play in their development. Mia attributed her satisfaction with her program of study to the “availability of resource that is needed.” She mentioned: “She instructors tell the students what programs are most common and what types of skills are valuable and how to sort of manage your time and really be competitive. What is great is that if you do not have the resource on your own, you’ll have it here. The participants cited the ability to work in groups and solve problems as a pre-cursor to an employment environment. They also stated that the technology and the software offered as a learning tool available to them were among the best in the industry.” Some participants mentioned that there were various versions of these tools and software available to employers but were very expensive to own in a college setting.

**Theme Four: Technology in Global Economy**

Although not a new phenomenon, It has been reasonably established that globalization in the digital age was spurred on by the tremendous advances made in communications technologies, Internet technologies, and improved transportation infrastructure globally. Consequently, various opportunities have arisen to contribute to leveling of playing field for various global participants in a competitive environment. The
participants and programs selected for this study were to some extent the beneficiaries of the recent technological advancements and to some degree the recipients of its possible negative consequences if any. Therefore, defining technology, understanding of the role of technology in their learning in global competition for skilled labor, and the relevance of technology with real world applications was considered. From the data analysis theme four of the study emerged to include a definition of technology.

**Defining Technology**

Computer technology along with its associated components, such as specific software designed for specific tasks uniquely contributed to integration of more advanced uses for these tools. The participants’ perception of technology in general terms, and the role it played in their learning and training in more specific terms, and its real world application and relevance to the industry were the focus of next questions. The question specifically sought to avoid using the term “computer” from technology interchangeably and looked for an understanding among participants as to what technology meant to them. Liz explained her understanding of technology as:

“Technology can be the physical manifestation of things like the computer or an automobile, or a palm pilot or an iPhone, or like Xbox or whatever. But it’s also sort of the idea of the knowledge-base, the thought process, and the way of interacting with all of this stuff that sort of builds on top of each other. So it’s really, everything that enhances the quality of human life for all.”

Bob thought: “Technology meant something that helps you get stuff done faster. I mean, it could be anything, from a car to get you from point A to point B faster than walking or telecommunications wires to help you communicate with someone hours away in an instant. Jay reflected that technology to him meant a more sophisticated way of producing a similar—like-it’s an easier way of—how do I say this? A method is a
series of steps that you take to complete a process and technology is just a machine that
you use to make that method and process faster and easier, and a computer is just
something that you put numbers into. So it’ll do whatever you tell it to.”

For Mia technology was: “Mainly just like advancement. She explained, I would
just describe it as advancement or a progression of something that actually further helps
you do something. So even though computers tend to be a pretty big part of that, it could
also include things such as sciences or advances in agriculture.”

Jax also thought of technology as advancement: “Technology to me would be the
advancement of anything. Technology can be anything. It does not have to be electronic
or computer-based technology.”

Ben explained his understanding as: “When I think of technology, I think of
anything that’s going to get smaller, better, more easily transferred to the rest of the
world as technology. It can be electronic. It can be physical. It can be a tool or it can be
an idea. But when you think of technology you think of innovation that everyone can
easily use.”

Jon considered the advancements mostly in computers and its speed and
capabilities as technologies like CAD with applications for engineering to take things off
paper and use a computer to do the job. Zak explained that technology could be anything
technical whether it is electronic like a TV, to a new breakthrough in a circular saw. Sam
said, “Everything from equipment that we are using or how stuff is done, basically, the
process behind the things, how everything works within an industry.” Gil commented
that “just advancing of our respective industries and making better and faster machines.”
Cal called technology as a “faster way of communicating.” Don considered “the
advancements in everyday things we do as technology like cell phones. I think it is increasing the standard of living or making it easier which sometimes it complicates it too.”

**Technology in the Classroom**

An important aspect of education in the classroom of the 21st century has been utilization of relevant technologies in student learning. The students in engineering programs were offered the opportunity to reflect on what was the role of technology in their learning environment and its import to their ability to be prepared to enter the workforce with a relevant amount of basic knowledge. Starting with Zak, he explained:

“Like in our Machine Design class, we’re developing different components of different machines that you have to have a technical bent towards it, to kind of grasp some of the concepts. We also use computers with the Pro-Engineer to develop a part, play with it, look at it in the three dimensional space instead of just making the part and testing it. With specialized software on our computers we can test a part before we actually even machine a part.”

Ben remarked that the role of technology in his learning environment was to make it easier, faster, and allow him to keep track of what he had done in the past or what others had done. Jon explained: “That some classes have labs centered on learning around the technology that is used. But 70% of the program is built around theory and the rest is actual technology around that. I think that’s a good mix.” Liz considered the “role of technology to be very important in her learning as she explained that technology is part of everything I do and for my specific field that’s very important.” The internet offers basically a giant pool of information available to you where you don’t have to necessarily memorize bunch of things. This aspect of utilizing information on demand, made possible by technology on every topic, like a giant vat of helpful knowledge, is really nice to have access to.
Don also believed that technology was as he put it, extremely important. “We use computers on a daily basis and we are constantly using new equipment like the latest CNC (Computer Numerical Control) equipment that is fairly a new technology. We also use Touch- Probe that utilizes laser technology.”

Jay also agreed that the technology was as he explained it, very important. “It’s not 100% important as we always get hung up on video games, but there are board-games that game designers create and they are very successful in doing so, games like Monopoly and Life. All these options offer various opportunities for employment.”

Mia’s explanation went with her understanding of the changes that had taken place in the animation process. She said: “I would say it’s definitely enveloped by computers and the programs that I’m getting to use. A good example of that would be that in the past you’d have to do everything in low-poly models. It was really hard to try to fit everything due to space constraints but today’s technology has made it must easier. You have more creative freedom, so to say, less worry about restrictions.”

Sam explanation also was relevant to the new uses of technology as he referred to it definitely being used in CNC machines to basically optimize the process. Using the most recent technology for ways to get better parts, quicker, and speed up everything.

Gil considered technology to play a big role in his learning. He stated: “We use bigger and faster and more powerful computers and the machinery we use are equipped with the latest technology available.” Cal mentioned that “we write programs on computer, we have all these software on the computers which runs the machines. Machines themselves are technology with software built into them so everything is just connected to technology.”
Learning with Technology and the Real World Applications

In order to understand the relevance of technological learning environment from an academic perspective in a classroom to work environment managed by deadlines and competition, it was deemed appropriate to explore the topic in the context of relevancy to a future employment value. The student participants were asked to elaborate on the types of technologies that they were exposed to during their studies, whether those technologies were the same as or similar to what was currently being used in the industry, and if the participants saw this as an advantage or disadvantage to their future employment opportunities.

The purpose of these questions were to establish a link or its lack thereof in regards to the relevance of learning that was taking place in the classroom and how this knowledge acquisition was transferable to a job setting. Ben responded that he was introduced to computer programs, software and ideas.

“We do analysis on different software and I’m also introduced to new process of manufacturing and most importantly to the new material types. I think we utilize a lot of the stuff that industry is using with the exception of variations in some software use. You’re taught Pro-E (Pro-Engineer Software) or Unigraphics while other people are using CATIA or Solid-Works. It’s hard to teach someone every software-application you’ll ever need. But I’ve taken the time to actually take extra classes to learn different software so I’m more current."

Jax also remarked that what they were using in their classes were very similar to what was used in the industry. “An employer may go more specific in an area, from designing gears to designing bridges. They are still using the same knowledge-base but it may be more specific to a job.” Jon mentioned that they used only CAD in their classes and the only other thing was using Internet for research. He further explained that using similar machines and technologies is a help although technology is generic, yet specific at
the same time. He further explained that it is impossible to teach and learn all the systems. We use CAD and Parametric systems, as they are similar, but we learn one here. This gives us the basic knowledge but if an employer is looking for someone with expertise in other systems, this might be a disadvantage for us if other colleges are utilizing more systems in teaching their courses.

Zak felt that in their Grand Rapids campus they did not have quite as many benefits as far as some of the testing equipment as on the Big Rapids campus. He pointed out:

“We do have the computer labs down here with Pro-Engineer and that’s pretty much it. In response to the follow up question seeking answers to the value of the technology available to them, he mentioned that from what I have learned from my professors, a lot of it is what’s used in the industry. I mean, there are national standards, standardized tests that are done to get material properties into different aspects, and they’re standardized so it’s pretty much just the same as it is in the field. I definitely think that is an advantage. Liz replied that the physical part, the hardware used is fairly the same.”

Bob explained that the programs on the computers are changing every year. He further explained: “The software companies are always updating, trying to make their programs better, more reliable or faster, to handle more, so that they become like an all-around, all in one suite. Well, even going from CS4 to CS5 in Adobe Photoshop, there are tricks and things that can be done in CS5 that CS4 couldn’t do. So sometimes it takes time for us to get to the industry level. So I ask, why didn’t we do this earlier and stuff like that just kind of blows my mind.”

Bob found it advantageous as he put it:

“We basically have non-commercial rights to programs that the industry actually uses. The programs that we use here are pretty standard so you don’t have to learn a whole new system. That’s one of the things that I know our instructors and our program advisors strive for is having industry standard software and that was another one of the reasons why I came here.”
Jay corroborated the idea of the programs used to be similar to the industry. He explained: well, pretty much every program that we use here at school is an industry standard, 3D- Max is a 3D imaging software that is used by the industry. Adobe Flash is a 2D game development tool or just animation tool that is used by the industry. He considered attending this program as an advantage because as he put it: the big thing about coming to school here is “we get to jump right into what the pros are using.”

Sam discussed some of the courses he had taken and their relevance to the work environment. He stated, “We learn all sorts of things: we have metallurgy class and we learn about various technologies such as CMM’s (Coordinate Measuring Machine) which basically are just portable machines used to check parts like FARO-Arms. Definitely, the CNC is a big part, but we also used some of the older technology with the new ways through SNADVIK. We get different inserts that are used to optimize our process because we can than make larger cuts with this inserts.” He also mentioned that a lot of it is very similar because the machines we have here are job-shop type, whereas at Ford or a big company they have these huge turning centers that are made for spitting parts as quick as they can. He also explained that some of the software and machines used in industry are quite expensive. “Although we use high-end software, our machines are not as quiet as the industry.” The differences in technology kind of help us. I think I brought up the concept of where the manufacturing engineer will do the design and process, and that’s what CATIA does.

Don also mentioned the use of other programs such as Touch Probe, computers and digital cameras. Don agreed that programs and software in the classroom were in line with what the industry used. He explained that “we use CATIA, and sometimes I wonder
if that is the best program, because unless you are a huge company you can’t afford to have enough copies of the software to support your engineers. So a lot of people run like Solid-Works and then use Master-CAM as a CAM package. I know a lot more companies that run Mater-CAM than CATIA. And there are pros and cons to both. Personally I feel like what more companies run is what we should be using because that’s what the companies want to know. Although the learning curve to learn a new package once you know one is definitely lower, they want to know if we have experience with the software they use.”

Gil claimed the technology we have including computers, software, and technology: “We use the most powerful design parametric software in the world. It is not most widely used in the industry but with parametric modeling, 3D modeling is kind of you learn one you learn them all with just minor nuances here and there. The machines we use although very good, they are not the most widely used in the industry but they serve the purpose. They are good initial learning tools for students to learn the basics of machining. Although he believed they were using the right tools he also stated: sometimes I wish we could learn and use more stuff the industry uses so that we are ready for employment.”

**Theme Five: Individual Responses**

Up to this point the focus was on the role of factors and influences that shaped the perception of student participants on the issues that for various reasons was not in their control, mainly competition in the face of tremendous challenges in context of globalization and its possible impact on their future plans. However, it was also recognized that even in the face of such enormous challenges not only affecting nations
but all of the stockholders, individuals ought to take responsibility for their own actions or inaction in the face of such uncertainty. Consequently, the student participants were asked to explain, in addition to the course work, what other opportunities they have explored and what activities they have done to improve their chances and broaden their understanding of their environment? There were additional probing questions as follow-up question to further gain an insight into the participants’ self-preparation activities.

**Individual Responsibility toward Career Preparation**

Success in school or on the job is consistent with a sense of developing a certain level of expectation from self and, in the process, committing to such activities and exploration that would enhance individual opportunities in life. Student participants in CTE-engineering were asked to share some of those actions and activities that they undertook to improve on their educational and career opportunities. To this Ben responded:

“I had the chance to take an elective course, though I already had satisfied this requirement, I took a class called world geography offered on line. I learned so much about the rest of the world because I always thought geography was just dealing with places but it’s about people and cultures. I learned a lot from my classmate in my speech class. By just listening to their speeches and how they talked and presented the topics, I gained a lot of useful information. It’s the same way with software. I took a CATIA class, which is a design-software, not because it was part of my curriculum but because a lot of jobs were posted needing that skill, so I took an intro class.”

Jax explained that “you can join any type of club or outside school activity; such as the race team club and study club, I chose to go to work. With working and going to school, I don’t have a lot of time for other clubs to join. Activities like this can help give you a leg up in schooling. Less experienced students absolutely should take on activities that help them learn about job market. I think that even a part time job with an employer
is better than just doing nothing but going to school.” Jon explained that he did “some outside reading, some project management reading, just mostly textbooks you can get anywhere. I do this because I feel that’s the direction where I see my job and the market is also going towards a little more. Other than project management I keep up with current events and learn what other countries doing, what they are good at, and how they are developing, just to keep up with current events from that aspect.” Sam explained that he changed from welding technology to MET, because he wanted to make sure that his career would not disappear. He also stated: “We have a SME which is the Society of Manufacturing Engineers, and I am currently the president. We are building molds and we do plant tours because a lot of students here have never been in an actual production environments. So we take them to these plants and we expose them to the setting.”

Gil explained that he spends the weekends during the school year working at a company “to learn more about the company and I plan on working for them when I graduate. This helps me to learn about the way the company works when I get a job there. I am constantly updating my resume, keeping it always ready to go. I go out and meet new people at the company I work for all the time, networking with people. I network at the job fairs, and network online.” Cal stated that he works, attends job fairs and applies for jobs.

Don was being proactive in his approach to dealing with his future plans. He explained, “I have started applying for jobs now rather than waiting till next semester. I have applied for 20 jobs so far. That’s because the internet allows me to do that to find out who is hiring. So that’s one way I have tried to get my resume and my name out there, will see what happens. You can always do more, and that depends on how much
time you have, and how much time you can devote to work. I could probably spend more
time with the material that I am learning and really just trying to absorb it. Right now I
am suffering from a little bit of senioritis, so I just do what I need to do to get through to
get done.”

Liz stated that she researches everything pretty much from new tools and games
to social trends, and her own areas of interest, lots of different things. Bob denoted
attending the Game Developers Conference (GDC) every year in March. He believed that
gives him a lot of idea as to where he stands and possibly make a few contacts with
companies as far as getting an internship because of what instructors have said. He was
asked if attends job fairs locally, to which e responded, “Not really. I have got a job at a
store that pays for my essentials and so I am not really kind of looking at the moment.
That stuff will probably happen more as I get closer towards graduating.”

**Role of Education and School Activities**

In addition to the individual’s role in self-preparation and for the purpose of self-
promotion, it was relevant to consider if the students felt that their current education and
training was providing them with a solid foundation to compete in a global economy
seeking highly educated and skilled individuals. They were also asked to offer an insight
into what their school could offer them that would be helpful to aide them in their
preparation process into a challenging global work environment. The participants’
perceptions and understanding of these issues were important to the topic of training and
preparation. Jay pointed out: “I think so; employers are looking for your education, what
you did in school, and how well you did. But the other big thing is if you had the passion
and the initiative to do it yourself. We have always been told to show what you have
done and what you can do through you work and other projects you have done.”

Liz also believed that her education and training was a good first step. She
explained that “for the most part I think so. I can’t say there’s ever really a substitute for
having a bit of experience in the actual field. Even as an intern it’s not quite the same as
actually being an employee, but internship helps in that regard. I think they do a good job
as they can without actually being employed.” She further elaborated that there was a
career counseling center. But she stated that she was not sure if there was one on [her]
campus. “There is a game developer club and also a number of instructors always
available to offer help as well.” Bob elaborated, “Yes, as long as we put in the time on
our models or our programs, whatever aspect we’re specializing in; there is no reason
why you can’t in the time it takes to earn a degree be good enough to get a job
somewhere.”

Mia offered this perspective: “Let’s put it this way, I’ve gone to GDC a couple of
times and while there, talking to the companies, a lot of them surprisingly don’t know
this University, but they always react with a, ‘How did I not hear about your school?’
because they are actually finding that our students are pretty knowledgeable and pretty
talented. I got into this school because it offered multiple facets of a program.” In
response to the question of education and training, Ben gave a resounding reply,
“Absolutely. It’s given me all the skills I needed, like the CAD skills which are
impressive including the terminology you learn, and the people you interact with here in
this field. I’ve picked up a lot from them so you really get a little taste of everyone else’s
careers and you get a chance to kind of probe a little bit.” Zak also believed that he had
made a good choice of program selection as he stated that “I believe this program gives you more of a hands-on experience and covers a broader spectrum of different areas that employers may be looking for. You may attend an engineering degree program that basically teaches theories and you may understand theories but you’ve never actually done it.” Zak also identified some issues that he brought up as important:

“A couple things that come to mind would be like the… this is based on just [this] campus is having some more equipment down here that we could actually do some of the things they do on campus. I know with space limitation that may not be practical. But I think also maybe offering a class in like globalization, like a world economy type class that I’m sure, like I said, I’m in the working world so I’m exposed to it but if you’re thinking of somebody just coming out of high school going into college, they probably don’t have the exposure to globalization, world economies that I already am exposed to.”

Jax also thought of his program as positive and stated that the school could offer students a way to understand what employers do through field trips. “This will help students to learn more about their interest. I also think that work study programs, co-op work studies, and internships and at the minimum even the field trips would be good ones to do.”

A collection of responses from Gil, Sam, Cal, and Don stated their agreement as to the positive aspects of their program. Sam said:

“I have already got my job offer from Deere (John Deere) as soon as I came back to Michigan; I had that locked down the second week of school. I see that as a really good sign that they like what we are doing in here.”

Responding to what school can do to help students, Sam replied:

“It would be good if the college could bring people from the industry to just sit down and talk with us every now and then in an informational session, because we can only take so many kids on plant tours at once. These presenters can take the manufacturing to a personal level where they can discuss; this is what I do and this is what you are probably going to do. That gives us a better view of the industry.”
Gil said: “I think it’s good. All the training we get is practical. It’s very hands-on so we learn how to do everything that we need to know and do on the job.”

Cal pointed out that he believed his education and training was appropriate as he put it: “I believe it does. You can always go for more but that depends on your employers because different employers want different things. This is just the basics of manufacturing engineering, if your employer needs more than you can go for more. Companies always train you specifically for what they want.” Don said, “Yes I feel like it is. I feel like they do the best job they can to try to teach us how to think, and I think that’s what the main purpose of college education. It teaches you how to think. It’s a lot more of how to learn than it is what you learn I think. I mean that’s important too but I think you got to learn how to learn because If you don’t you won’t progress. We are required to do an internship and that is extremely helpful. I know some colleges don’t require that. I feel it should be a requirement because most companies want to see an internship, because that’s a real world experience that you are getting and that’s what really matters to the company.”

Jon explained his course preparation impact as:

“Learning the fundamentals of the engineering and theories, I think flexibility, blending in with the group (team work) and good personality are important. Professionally, being able to adapt to different technologies is the key.”

**Theme Six: Institutional Responses**

Just as individual were deemed to accept a certain level of responsibility for their own success, the role of an institution of higher learning also needed to be investigated in this regard. As students entered a school for the duration of their studies, their path to the future was on an evolving course and in that context changes were taking place locally,
nationally, and globally that no doubt could impact their future plans. As a consequence, it was essential to explore participants’ perceptions of whether or not any changes or modification and courses of action were considered to accommodate for these rapidly evolving situations. These changes were examined in the context of internal or external factors as the demands for highly skilled and well-educated individuals were echoed in various quarters.

The role of faculty in this environment was a crucial piece of the puzzle as how they perceived the events taking shape locally and globally and whether they were responsive either individually or in concert with their institution to translate those events into an actionable agenda for change. The questions asked of the participants dealt with the types of change, if any, that they had noticed in response to internal or external reasons and whether the implemented changes took into account the needs of the industry seeking skilled labor. Also the participants were asked to share their views regarding the faculty’s ability to transfer their knowledge of globalization impediments to their classroom and curriculum. Academic programs reviews (APRs) associated with each of these programs had considered these questions as working to produce workers that would be able to meet the needs of their respective fields.

**Change Due to Internal or External Factors**

The topic of change was put before Sam. He explained: “One big thing I have noticed is that they never used to have you design and build the part, we do that now. That’s one thing that I see changing. Another thing they do is, to have a company come in and show us their new products, talk us to about it. These companies show us the cutting edge stuff that when we get somewhere we might see a use for, so that we can
bring something new to the table. So maybe we can introduce what we learned in school to our employers. For example, SANDVIK comes in and shows us parts or drills used in the work setting that cut the process in half.”

Gil mentioned that for an unknown reason, in his first two years they used software that was really complex as opposed to what the industry was using. “But I am getting hands-on and more lab experience and put more time into projects which makes it harder on the student but student get more out of this then originally they were.” When asked to explain changes regarding the curriculum, he replied that “my entire associate program that I went through, the curriculum is completely changed. As freshman I had a class that was an 8 credit hour classes for lab-lecture combination but now that is a two separate 4 credit hour class. They split from one program to two, so instead of being manufacturing tooling you can have manufacturing general, the blending of welding plastics manufacturing and CAD drafting type stuff. You can get all that in one degree instead of focusing on multiple programs.”

In response to the question of change in programs, and or specific changes in curriculum, Cal expressed that he thought they were making changes and as he put it, “It has to be the software. We are always changing from software to software. We have Auto-CAD, Pro-E, and CATIA available to us here. They are preparing us for a very diverse workforce out there. This reflects what is needed out there.” Don expressed that one reason for program changes and meeting the demand for high skill workers was that he noticed they began to recruit more students. Don’s rationale and his understanding were tied to the college’s recruitment efforts:

“One thing that I’ve noticed is that they are starting to recruit more here. Their numbers were down last year and the teachers and professors, (definitely, have
not told us directly) I’ve sensed they have a little more urgency about getting students in and appealing to students interest."

Sam reflected on taking a geography course as a sign of change in educational process, to learn about other cultures. He viewed that as a good thing. He also mentioned:

“The use of the software has changed. They are using a little bit different and more relevant software. It’s no longer 2D as it used be years ago. Everything has changed to 3D in a few years.”

Jax explained that he has not been in the program as long as others. But he stated:

“I have not seen any changes because of industry or because of globalization. I have not seen that.”

All students in DAGD program had a more pronounced view of the changes taking place in their program and curriculum design and delivery. This was attributed to the level of dependence on use of computers and specific programs. Liz offered her view explaining a change in emphasis of the program:

“A lot less emphasis is placed on the modeling art and more emphasis on the actual design aspects and programming. I think that part of it may be related to the globalization because of all of the things that are done in this field. I’ve definitely seen some more emphasis on the communication between the different groups because that is still useful to have, and a lot more focus on the design and the programming. We’re just now starting to get some more focus into the actual animation technique, which is another area that is a little bit more of a skill trade, rather than just reproduce what I have in this diagram but make it 3D.”

Bob’s reply to the question was “Yeah. Of course, there’s a reason for that.” He pointed out that’s “because the programs that we use are industry standard. So if the students did not have access to these tools and fell behind on activities and use of latest software, without school making it available, it would definitely be a shortcoming for
someone who would enter a job.” Jay also focused on use of relevant programs in the field such as 3D design. He clarified his view by stating:

“Well, I think the one big thing in looking at our program is that it seems that 3D design is all over the world. But the big thing is that they’re looking for programmers now and that’s why I decided to take a programming track, as well as they’re looking for actual people to design things and shoot. There was something else- I was thinking of animation. We’re called visual animation and game design, but we have almost nothing in animation yet and we figured if we get an animation class in here that will definitely broaden the scope for what students are able to do.”

Mia focused on the evolution of the program since her arrival here at the school. She explained that “the program definitely evolved kind of since I got there. The changes in applications that we’re using, the processes that we’re doing to get things done and, I mean, almost everything in some way has at least been upgraded or changed around, even the whole structure of the program. I think, not long ago, we actually restructured it so that it included more of the game design and programming end of it.”

**Globalization and the Role of Faculty**

Educators at all levels of teaching are perceived to be an essential part of students’ learning and success. Given the nature of this study, it was relevant to ask questions from the participants to seek their input as what they thought were the role of instructors at their school at a higher education level. The instructors understanding of globalization as perceived by their students, transfer of their knowledge, and understanding of globalization issues applicable to the classroom was deemed to be an integral part of delivering programs of study designed to address the issues related to the phenomenon under investigation. The student participants were asked to offer their views on whether they believed that their instructors understood the role of the globalization and did design and deliver curriculum and content that reflected transfer of their knowledge to the
classroom and was there any benefit to be gained by the students as the result of instructors’ role in this regard.

Generally, participants felt that their instructors were doing a good job. However some felt that due to certain circumstances, some instructors were not as informed or brought the issues to the classroom level. Zak and Jax believed that their instructors/professors did a good job as Jax put it:

“\[\text{\textquoteleft I absolutely do. I think that in an engineering world, I believe that an engineer is always under study. I enjoy learning things and I think that a lot of people with technical mind always enjoy learning more about things. So I think the faculty is very educated. Dr. Jones (not a real name) is one of the most qualified people you ever meet with his PE and Ph.D.\textquoteright}\]

Zak also expressed his belief that his instructors were aware of global issues. He stated that “I do believe they are. I believe the professors that I’ve had I would say most of them have been in the industry at some time. They are aware of how the market actually does work, how the job market is working. It’s not just like they graduated from college and started teaching. They have been in the market and they have an appreciation for how the world market does operate.” Regarding the instructors knowledge of globalization and curriculum planning, he explained that “I believe so. I believe they try to stay up to date as much as they can. They go and talk with the people in the industry to get feedback from them on changes in the industry. They try to incorporate those changes in the curriculum that they need to make to keep us current.”

Jon and Ben agreed that some of the instructors did things in response to change as deemed necessary due to globalization. They both agreed that “not all of the instructors for various reasons were or seemed to be concerned about the issue.”
To that end, Ben described his views as “I would say the majority are. There is some that aren’t, some that are just… I mean you get that everywhere. You get, ‘It’s my job. Here you go. Done, and they move on.’ But the majority of the people, they stay up-to-date and they force you to stay up-to-date. We had a class where every week we had to write a paper and it was always about a relevant person in this field about innovative ideas, the sequel or the movies, how they’re changing. So they were forcing us and they were staying on top of thing.” To the question of course planning due to globalization, Ben responded: “It may be by accident or however much you want to pick up. But as a plan, I don’t think so. I don’t think it is planned out that way. I wish it was more that way. I think it would be helpful. I want to know how they’re doing things in China. Everyone wants to say, well, they are paying them 20 cents per-day. Well, there’s more than that.”

Ben further explained: “They are taking ideas and making them better and selling it right back to us. They are doing so much more than we are even with cheaper labor, they got innovative thinking and they are thinking about this stuff. They have a plan.” Jon followed up by stating: “I would like to experience more cultures, different ideas that we are not getting. It would be nice if they actually brought in some teachers from other places that are seeing things differently.” Jon, in response to the same line of questions regarding globalization replied that “some of the teachers that have recently worked in the market, you can tell that they understand the effects of the globalization of co-working with other countries and even within your country. Some of them have not worked in the industry and you can tell there is a difference.” Jon further elaborated that:

“Sometime they are on a certain subject and instance will come up or a subject will come up kind of out of the blue and they’ll take that opportunity to explain how it works in the business environment. I had a professor that worked with Ford and, sometimes he’d be teaching a theory and he would kind of go off on a
tangent and explain how this worked out, the difficulties, the difficulty with the Chinese suppliers or the Taiwanese suppliers and they use their own experiences to explain how something might be solved or used.”

Liz, Bob and Jay agreed on the principle idea that the instructors understood about the role of globalization. Mia stated: “Some instructor did understand the concept.” Liz began her explanation by stating “Yes. I do. Some of them are very much on top of it to the point where they start talking about the topic, the style of doing something, where it was done or the region of the earth. They try to keep us up to date on things like that and or how a company was doing in the market. So we get news updates actually, sometimes through my instructors. And I’ve even had a few where they literally ask at the beginning of every class, ‘So did anything important happen in the industry or related fields that anyone was aware of?’ And there’s usually somebody who’s heard or seen something.”

Instructors’ translation of events related to globalization to their course planning brought this response from Liz as she put it: “They don’t come out and shout this is way too common across the world’ they tend to be more along the lines of ‘This is a relatively common skill.’ Maybe they devote an extra week to the topic and spent less time on another less important area. When student talk we often learn that the course changes from semester to semester. We compare assignments like; we didn’t do that project or we did this one. And you can see why they’ve changed stuff because this is an industry that changes so rapidly that you just constantly are having new material.”

Bob was also certain about the role that his instructors played in conveying relevant information regarding their field. He stated: “They definitely know what the industry is looking for. We have three instructors that have their own little studio on the side and they are constantly in contact with other representatives from the industry. And
then we’ve got the senior instructors that came from the industry so they’ve good 20 to 25 years in it. And that felt like that it was a time to change and teach like the next generation.”

Regarding the changes because of either internal or external factors causing changes in the curriculum content and its benefit to the students Bob said:

“This is only my second year into the program itself, the classes are constantly evolving. For example in one of my classes, we made a game document that was just basically all text but now because the industry frowns upon nothing but text and reading, we do a lot of little prototyping. So classes are constantly evolving.”

Bob further explained that this would benefit the students “because if we’re constantly changing just as the academia, imagine how the market is changing, being competitive and trying to make money. We try to mimic what the industry does, they don’t stay static. They’re constantly changing and trying to become more fluid, more efficient. That’s the kind of things that we build and focus on here as well.”

Jay stated, “I would say yes, I definitely do. The great thing about the professors here is that they are always well-informed about the field that they teach. For example, instructors A, B and C, they own their own industry related business. They’re always in the market looking and competing against other companies. These instructors, as entrepreneurs, share their experiences with us during class and by giving us tips on how to deal with your competitors and how to be better.”

Mia believed that there are some that are more up to date than others. “Professor Keys (not a real name) is extremely knowledgeable in what’s going on. This professor owns his own small business and he knows what it’s like to compete with major companies.” She explained that there are changes made to the curriculum almost every year by the instructors. “They sort of take a second look at the class and almost rework it
if it’s necessary. For example, Z-Brush is a major 3D program, as it’s being updated, we sort of have to change and refocus to learn how to use it effectively.”

Sam, Gil, Don, and Cal all believed that most of their instructors had real world experiences that were helpful to them in the course of their schooling. Gil explained that in his opinion some were more informed than others. “Some professors here have had lots and lots of industry experience and continue to go to conferences, continue to go to places to learn what is going on in the industry. Others never had more time in the industry than an extended internship. Came back, got a Masters and started teaching.” He also clarified that as he put it:

“The better professors, which are a majority, they present it as a global industry, a global market. The less experienced ones are not as well equipped to deal with this stuff. They mostly lecture. They talk a lot to make people think they know what they are doing. And these people create an environment that is not helpful to the students and our program.”

Sam also explained: “There is some, I don’t know the best way to put it; they have been here too long. Some of the things done in the class like my industrial engineering class, it seemed geared around basically what Toyota does. They tell us this is going to be your competition, they set this process so make sure you at least do this.”

Don pointed out that “one thing I like about this program is that most of the professors have had real world job experiences. It might have been 20 years ago but they all worked in the industry and understand what we are going out into. So I feel they’re pretty up to date on what’s happening. A lot of them still do consulting work and that helps them stay in the real world. You know you get in the university setting and talk about theory all the time and you do not know what goes on out in the real world, so I think they are pretty up to date on what’s going on. He further explained that he believed
that his instructors try extremely hard to develop courses and classes that are representative of what actually goes on out in the industry. I have had some conversations with my professors just about this and he says this is what we did in the industry so this is what I want to teach you how to do.”

**Theme Seven: Academic Program Reviews**

The academic program review (APR) is a document developed by the university in 1998 by the program faculty and College of Technology Administration with articulated goals that have been guiding the process since its inception. Each of the three programs selected for this study all were evaluated within the last five years based on the articulated goals of APR for each program. The purpose of APR according to the *Handbook of Accreditation 3/e*, core component 2c of Criterion two (Preparing for the Future), is cited as follows: “The organization’s ongoing evaluation and assessment processes provide reliable evidence of institutional effectiveness that clearly informs strategies for continuous improvement.” As part of a larger institutional system that collects, disseminates, and evaluates institutional information, an effective academic program review process thus provides evidence that the university meets the criterion (Midwestern University /College APR, 2010, p. 2).

**Student Participants’ Perception of APRs**

As part of the data collection phase of this study and utilization of artifacts obtained from the college, three academic program reviews (APRs) from the three participating programs were collected for the purpose of cross-linking the institutional data in contrast to or in support of the findings of this case study, but more importantly seeking feedback from faculty and student participants about this process. At this point of
the study, this investigator was mainly interested in exploring an understanding of this process from student participants’ perspective, its value as an assessment tool and its benefits to the students. Therefore, the APRs will be revisited in detail in the finding section of this study. A statement included in the interview questions (Question # 17) was read to the students. The purpose of the statement was to explain what the APR was and to explore whether the student participants were aware of this process and consequently would they find this process helpful to them and should the school use this data to benefit general student population in CTE programs and currently the participants of this study.

At the onset, review of the collected data revealed that majority of the students was not familiar with or had heard about APR. Only after further explanation and clarification the participants were able to explain the benefits of the APR to their programs and future plans.

Ben was asked if he was familiar with APR process conducted in his program of study and he thought the question was about the instructor class evaluation. The question was restated with emphasis on academic program review, assessing a program rather than a person. Ben mentioned it’s very important to do that. He was then asked if such program existed would it be helpful to students in their planning process. Ben responded, “Absolutely, because now when I graduate I haven’t learned a bunch of obsolete items or I’m not in an obsolete field. There are some fields that no longer exist and why would you want to do something like that? It would be easy to be steered down that road and you finish school—you don’t have a job. You have to be relevant and it has to be up to-date always. I mean even… every five years, that’s probably the minimum you want to wait.”
Jax responded that he was not familiar with APR and had not heard of the process. He further explained, “I think it would be very good for people in the program, and it would help them because it would make the faculty aware of where they are struggling, what they need help with. And if they were to talk to people from outside the program and got feedback, it would again help them understand what else they could teach or what else they could cover to help to prepare students for the job market. This helps students because I think students need to first realize where they want to go. Where they want to be when they grow up before they can really realize what is going to help them. I think that is done through again like co-op to see if they want to do an internship to see what they want to do. I don’t think that faculty can tell students what they need to do. I think the students need to realize that for themselves.”

Jon also said he was not familiar with APR, but he thought that this process would be helpful because “you would get real growth, feedback. But, if I don’t know about it I wonder how many other students don’t know about it as far as giving you feedback.” Zak was familiar with the APR process as he said: “Yeah, they actually had a luncheon-type thing that I was part of. They asked a bunch of questions like that.” And he thought the APR process to be definitely helpful to the students with less experience. “It would give them a great exposure to some different areas that they may not know about. And it would help the college; I think it would be valuable.”

Liz said “I assumed that they had something like that; I’ve never participated in it personally.” She explained that “it helps the faculty to know what they need to focus on. If something isn’t working in the real world, that doesn’t mean it won’t work in the classroom. So it could be going fine in the classroom but if it turns out students then get
out in the real world and they’re like I don’t know what I’m doing. I mean their whole job is to get students ready to work in the real world. So if something it’s not working out well, I certainly see them wanting to fix that to make it so that it does work out well and of course, the students will benefit from it. So it’s a lot of benefits to the student to know that things are kept as up to date as possible.”

Mia also stated that she was not familiar with it but she thought, “I’d say it’s kind of like how we do our teacher evaluations and class evaluations. It tells them what students feel like they’re not getting enough of, or something that they feel like might not be necessary, which is nice because then the students are getting taught what they feel should be taught. But then the professors can also sort of take all that information and go, ‘Well, this is what we need to teach the students. They’re definitely—they might not be aware of it, but they should be learning this,’ and the school can sort of take everything all again together and remap the program to whatever is necessary to get those skills taken care of.”

**Student Participants’ Closing Comments**

Student participants were thanked for their time and participation and were given an opportunity to express any thoughts, ideas, concerns, or recommendations that they felt it was important for them to share with the investigator.

Ben offered this thought: “I guess for the school I’d like to see us introduced to more cultures and more technology.” Jax recommendation dealt with globalization as a moving target. He explained that “I think with all the questions that we have gone over; I would say that globalization is a moving target because of the advancements in technology and the competitiveness of jobs and ideas. I think globalization is always
moving-evolving. I think that it can help us and hurt us but it is a tough thing to study and look at especially with technology.”

Mia’s recommendation as a concern had to do with the way her class was going to structured in the future. She planned to bring this up to the instructors first to “kind of see how that goes.” She was concerned that her school was trying to restructure the class where it would be presented half in an on-line, half-in-class format. She was concerned about meeting every three weeks “although you still get in-class time,” and she did not mind that, she felt that she was very against it because “it’s just one of those things where you’re paying for the hands-on experience and you’re not really getting it.” She stated that “it takes away the feeling that you’re actually learning something and if you fail to do well on your own then you will probably just going to fall behind.”

Bob explained that he was not familiar with APR and he compared the experience to online shopping: “I mean, if you’re looking at a particular product online that has been viewed and rated by other shoppers, those ratings will tell you something about the product. If students inside the program are willing to share their thoughts and ideas about the program, whatever that may be, even if they’ve only been here a semester, of course, that’s helpful to the school and the faculty in designing programs that are perhaps much more tailored to their current students’ needs and the needs of the industry.”

Jay stated that he was not familiar with APR but he thought it would be useful because “this information is gathered from different people with different views so I think That would help me to take a look and see if certain classes are really necessary for the program, or if certain teachers aren’t teaching a subject very well, or well enough or maybe you just need to change a teacher. It makes the process of choosing their classes
and their major easier and it’s more streamlined. It helps them. They may not understand, they may not know it, but the things that the faculty does really help the students get to where they need to go faster.”

**Emerging Themes, Faculty Participants**

One of the major reasons in selection of a case study methodology for this study was to explore a phenomenon in a natural setting in order to develop an appreciation of complex experiences lived by two groups of participants within the study; student participants and the faculty. As stated by Rudestam and Newton (2001) the participants, if you will, are the experiential experts on the phenomenon being studied (p. 92). There are several forms of sampling that are appropriate at various stages of the study (Corbin & Strauss, 1998) The trick was to choose participants who can contribute to an “evolving theory,” participants whose main credential is experiential relevance (Rudestam & Newton, 2001). The faculty members at this college were precisely selected to lend their expertise through their lived experiences to this study.

The role that the faculty at this institution play in the educational experiences gained by their students was a compelling decision to gather data from more than one source. The faculty views on the subject were a great value to the study. It was important to explore and understand their view of globalization, student training in a highly technical field, response to internal or external factors impacting their programs and most importantly their individual and collective understanding of issues important to them, their students and their college and related program. The coding of data as described previously yielded many categories of data resulting in 8 main themes. Each theme was then explained through various sub-categories according to responses offered by the
faculty. Faculty participants were referred to as FP-1, FP-2 and FP-3 without any further designation to help ensure their anonymity.

**Theme One: Faculty, Education, and Experiences**

Faculty education, their academic experiences, and non-academic work-related experiences were relevant in the context of globalization, in their role of education in preparing a new generation of highly skilled and technically savvy individuals that are able to meet the global challenges posed in the new economy. Faculty experiences were relevant because their credentials enhanced the program value and brought a needed degree of educational and individual familiarity and understanding to their classrooms. In the introduction segment of the interview questions the faculty were asked to talk about the courses they taught, and the responsibilities they had in addition to their teaching schedule, and of course the investigator wanted to know what was the purpose of the programs taught (what was the product) and how this program may help prepare students enrolled in these course. Faculty members selected for this study as part of the college were from Manufacturing Engineering Technology, Product Design Engineering Technology, and Software Engineering program. All three came with a great deal of academic and professional experiences.

FP-1 described the curriculum he was teaching as: “I teach at the freshman, sophomore, and junior and senior levels classes. I guess I teach at all four levels. At freshmen level I teach introduction to CNC and CAM. To sophomores I teach the more advanced CNC/CAM and to juniors I teach a CNC/CAM class to transfer students coming in. I also have a Productions Processes 1 and or 2 classes, which is an intro to the
senior Project class. I teach a Tolerance Charting class that most colleges don’t offer. And then I have the senior Project class.”

FP-1 was asked to briefly provide a general overview describing the program or programs of study he taught and the purpose of those programs. He replied: “The purpose—my main background is bringing students up to a higher level of technology that they’ll need once they get out in the industry. That was one reason I was hired, for my level of technology and most of my classes I teach are along that same line.”

FP-2 provided an overview of the courses he taught as follows: “I teach an assortment of Engineering Sciences, Statics, Dynamics, Thermodynamics, plus, numerous orientation and project-based courses.” He was asked to offer a brief description of his additional roles and responsibilities in addition to his teaching duties and he described those experiences as: “Yes, I’m a program coordinator for two programs, and I previously have been the program Chair, and department Chair.” He was then asked to elaborate on a general overview of the courses that he taught and how those programs help students to prepare for labor market? He replied:

“The objectives of the programs and the courses I teach are to prepare the students to assume a design role, mechanical design role, in a variety of industries, common to Michigan.”

A follow up question was asked to learn about the industries in Michigan that can utilize the skills of the students graduating from this program. He explained:

“They might design furniture, they might design medical prosthetics. They might for example; design containers, such as we’ve had students that design Styrofoam
products. We’ve had students that design floor sweepers for commercial and for residential use.”

FP-3 was also given an opportunity to provide an overview of courses taught, other duties and responsibilities at the institutional level, and value of the program to the university. He provided the following comments: “Actually I teach around—I think roughly 12 to 14 classes, and they range from Introductory Software Engineering, Computer Programming 1 and Computer Programming 2, to all the way up to the Capstone, a certification class in the Software Engineering, Data Structure—Software, Data Structure Configuration Management and Software Testing.”

Regarding his roles and other activities he explained that “I have a number of roles that I serve in and one of them has to do with advising. So I advise the students as to what classes they should be taking. I also talk to them in terms of the internships and prepared for the internships. I also go out in the field and talk to companies to let them know about our students, what their qualifications are, and share information about our program. I also go into the middle schools as well as the high schools to promote the program.”

**Theme Two: Faculty Perception of Globalization**

Faculty understanding of globalization in their respective programs, their perception of competition from around the globe for highly educated and technologically competent individuals, and the impact of globalization on education was relevant to this research. Consequently, the impact of globalization in its current form on all aspects of life for the next generation of workers, and the instructor’s ability to translate this
understanding into learning tools in the classroom were an essential component to explore.

Accordingly, the instructors were asked to provide an explanation of their understanding of globalization in the context of its impact on economy, jobs, and other factors with global implications. The investigator was interested in understanding globalization from the perspective of participating faculty at the college. Similar questions were asked of student participants enrolled in these faculty members’ classes. Seeking a response from the faculty provided a valuable contrast to the responses provided by the student participants. It was important to extrapolate through interview questions what the faculty thought about globalization, what it is, how and why it happens, and what factor may influence its rapid global spread. Faculty were asked a main question regarding globalization and follow up questions were utilized as needed to develop a better understanding of the explanations provided. It is also important to express that this study did not assume that the three faculty members participating in this study were a representative sample of the faulty at large at this college. As stated by Bailey (1992) an attempt to focus on and understand the participants’ full experiences as a perspective, there was no attempt to claim an ability to generalize to a specific population, but instead, the findings are relevant from the perspective of user of the findings. (p. 30)

**Defining Globalization**

Globalization these days is a term associated with all types of activities with differing consequences for people and governments around the globe. Globalization is referred to in discussions of economy, technology, jobs, education, environmental issues,
outsourcing of jobs, global financial integration, job losses, disappearance of middle class income earners, and other similar issues. From the President of the United States to the pundits of all sorts, globalization is discussed in context of global competition, education, innovation and planning for a future mired with uncertainty. The purpose of this interview question was to elicit a response from the faculty regarding globalization.

Responding to the globalization question FP-1 replied that:

“Globalization is the fact that we are a world-wide economy. People used to work locally, statewide, and then nationally. Today, students are just as likely to work in France or Germany as they are to work here in Lansing or Kalamazoo or Detroit. And so that’s what it is to me. People are working all over the world.”

FP-2 explained:

“I think globalization is more or less a joining of remote portions of the world into a much more unified operating economic and social system. Particularly in our area, we’re mostly interested in the industrial implications of it in which you find that remote, low-cost labor units can be used to provide services that are much more expensive here.”

FP-3 provided a different perspective to the question of globalization. He explained that

“I guess my view of globalization is more from a human perspective. I know for a fact that we’re all the same and the only thing that really separates us is some very small differences. He contributed the advancement in technology development and use as one factor helping to shrink the distances between cultures and has allowed the people to get to know each other better and faster. This helps people to get know other culture and learn thing that did not know before. I think that globalization in a way is bringing us inevitably closer together and allowing us to work together to be more productive, definitely more innovative and more effective in whatever we decide to do as a race of people.”

The impact of globalization on different cultures was also explored in the context of changes brought about due to varying influences in a global economy. All three participants believed that to some extent a leveling-off of globalization will take place in
the future. They observed that changes ranging from transformation of quality of life to a leveling-off far in the future to a better cooperative society will be inevitable. FP-1 elaborated: “To me, it’s starting to level off the standards of living across the world. In China, for a fact, right now they’re becoming unionized. They want paid health insurance, a higher standard of living and all that good stuff, and it’s moving on into other countries also.”

FP-2 viewed the impact of globalization from two different perspectives. He stated:

“I think in the extremely long term, that there will be a vast leveling worldwide. But that could be literally hundreds of years from now. I don’t know but, you can already see the beginning of various outsourcing projects to third-world countries where wages are very low, and immediately the wages start to go up, the standard of living goes up. At the same time, the jobs that are displaced here cause our standard of living to go down. I think eventually it will level out on a worldwide basis unless we discover another planet with a cheap labor source.”

FP-3 saw the cultural impact of globalization as a positive in development of best practices benefitting every one. He further explained:

“In the long term by interacting with one another and collaborating, we’re going to develop best human practices in every area that affects us as a race. So I think from each culture, each economy, each education system that we work with globally, will develop strong best practices that I feel will continue to elevate us as a race and evolve us as a people. In term of other cultures some that might not have had the opportunity to have the same resources as some of the other places whether that’s technology, or education or whether that’s actual resource in terms of food or even water. I think that will allow them to hopefully to develop and grow in those areas that they are lacking and I think that globalization will help bring those resources to people that desperately need them.”

**Factors Influencing Globalization**

Globalization is not a new phenomenon; however, at no time in the history has there been such a rapid pace of change impacting multiple aspects of social and global interaction. Therefore, the prevailing question was why this era is so different from any
other historical period. What factors contributed to its rapid evolution with such unprecedented worldwide implications? Faculty agreed on the role of information transfer, the internet, and more advanced computer technologies.

FP-1 attributed the rapid pace of globalization as he put it to “faster and bigger computers, the internet. Being able to transfer data world-wide, now. Everything is needed now, not in two weeks or three weeks like it used to be.” He further stated that “back in the days when we sent things through the mail, you had time to sit back and think about what you sent in the mail and changes took longer. Today, changes go out, but changes, if they’re bad, quite often are implemented before somebody sits down to think about it and in a lot of ways, it’s bad as well as it is good.”

FP-2 credited the impact of globalization in its current context to a couple of factors. He explained:

“I think there are two major factors: first, the ease of information transfer, Internet, electronic mail of various types has provided near instant access to any part of the world, and in parallel with that is, I believe, that the worldwide transportation system has developed to the point that it can support globalization now.”

FP-3 saw the advancement of technology to the extent that the dissemination of information takes place on demand and also making it possible to connect with people around the world as two major factors. He explained that in his view a couple of things have happened:

“One, in the past we really didn’t have an opportunity to on daily basis see what’s happening around the world and now we can receive news from around the world nearly instantaneously. We no longer have to wait for the news to come to us on a TV or the radio. People have access to information as they need it, when they need it, on demand. I think the second part is due to the fact that we have that ability and we have so much contact with the rest of the world, I think it’s made us more aware and I don’t want to say tolerant, because that’s the exact word, but I think it has made us more appreciative of other circumstances and other people
and so, I think that it has allowed us to be more empathetic and more supportive and giving to other people.”

The Impact of Globalization on Employment

It was the assertion of this study based on recent literature reviews and global events that have occurred around the world that globalization has caused major changes in employment opportunities brought about as a consequence of a very globally competitive environment. CTE programs around the country in general and at this college as a major participant in the state in particular, have a role in preparing the students enrolled in technology fields for entry into the global market seeking highly skilled and technologically adept individuals.

Consequently, it was fitting to ask if globalization has had any impact or may impact individuals in the engineering fields. How might this have affected the schools offering CTE program and what was their responses in face of inevitable challenges yet to come? And accordingly, as the consequence of globalization, was there any evidence reflecting a change in decision making at the institutional or college level to demonstrate a change in focus as the result of globalization in technical career fields?

In response to the proposed questions, FP-1 shared his concern about a much talked-about topic, the shrinking of the middle class. Hence he replied:

“I’ve said for years we’re losing the middle class and there are no longer jobs—many jobs for the uneducated, you might say, somebody with just a high school diploma. There aren’t the number of jobs that my parents had, so you’ve got real low level jobs and then you’re going to have the higher level jobs that are paying a little bit better. You’re not going to have the middle of the road, unfortunately.”

FP-2 saw firsthand the result of movement of jobs from one country to another. He explained:
“There are number of students who have been in the program who had been displaced when their production facilities have relocated to other countries—Mexico, China and the like—or their activities have relocated to other countries. Even though those particular individuals are not production workers, per se, they are manufacturing support workers and when the manufacturing operation moved, they were displaced as well as the actual assembly workers.”

The evolution of the personal computer (PC) ushered a new form of software engineering as opposed to small entities working in small groups and producing software. That has changed according to FP-3 because as he explained: “I guess I’ve been really involved with software about 30 years. So, I saw it come in to the homes on that level with PC’s. At that time it was really easy for four or five people to crank out some software that could make some money. Now you need very large teams. You need a large intellectual base. You need to have a well planned out strategy, not just a short terminate path. The short-term strategy worked, but now you need long- and short-term. I think the competition that we’re seeing from other countries, that now are able to have the resources, and you also have the intellectual capital and the planning in place to continue growing strong in those areas.”

He further explained: “I think competition is going to be good. Well, competition is always good as long as it’s constructive, and I think that initially there’s going to be some growing pains because it’s the same scenario where as for example, two brothers that are two years apart and at some point in time. They’re really far apart in terms of skill set. The younger one is growing so much faster because the other brother has stopped growing adequately. So, I think right now we’re pretty much twins. I think this is us, and the rest of the world is really right there, and it’s happening so quickly. I think that type of competition is good and I think that type of escalation is going to continue to occur until we all max out.”
Theme Three: Globalization and CTE Programs

One aspect of this study was to learn from the participants about possible implications of globalization for CTE programs, possible institutional responses, and changes in focus as the result of globalization in technical careers fields. Various studies pointed out that globalization did not affect only the outsourcing of low skill jobs but indeed it had a profound effect on off shoring of technical-engineering jobs as well. These are the kind of jobs that their loss has an implication for various aspects of the U.S. economy, as well as the standard of living, while creating a whole host of other concerns.

In order to examine this inquiry, it was necessary to explore it from the perspective of what kind of impact if any: globalization might have on CTE programs of study. And as a result, the faculty and institution’s understanding of the phenomenon and their responses accordingly would be worthy of exploration.

Impact of Globalization on CTE Programs

As a relevant issue in this study, discussing and exploring the role of globalization at the college level and its impact on CTE programs, and how globalization may impact the programs offered, the faculty were asked to discuss their understanding of the dominant issues impacting their programs.

FP-1 saw the shortage of CTE instructors in the field as a major concern. He explained:

“The biggest problem they have right now is getting qualified instructors. Technology has moved forward so rapidly that many of the career centers are still 10 or 15 years behind the times like many of the industrial companies in the United States.”

FP-2 considered CTE programs as a logical choice for people to turn to when the labor market is stressed. He stated:
“I think the short-term result is, as you have displaced workers, CTE programs are a very ready and logical choice for people to turn to in order to improve their education. So the first difference that you’ll see, I think, is an actual increase in enrollment in such programs.”

FP-3 saw the diversity of ideas as a way to combat the effects of globalization as he stated:

“My hopes are that we have a more diverse base of instructors, staff and students because they have ideas. They have insights that we don’t have that we desperately need. In order to prepare our students to go into a world that’s globalized, that’s flattened, if you will, they need to talk to and they need to interact with people that they’re going to see out there and that have those ideas.”

**Decision-making in Response to Globalization**

The impact of globalization on colleges’ decision-making process in response to real time changes was recognized as a step in an adaptable worker preparation process. Faculty members were asked to discuss their understanding of this process and how the college or the university was planning to meet those needs. FP-1 mentioned that: “It doesn’t create a competition for the career centers, but what it does mean is that those students coming out are behind the times already and could have difficulty finding jobs. One thing that should probably be required even at the career centers is foreign languages. Today we communicate with people all over the world. I’m lucky to speak English. I see that as an important issue in the industry to be able to communicate with others. I deal world-wide and while I can communicate, sometimes it’s by sign language.” In response to changes in decision-making at the college level dealing with the impact of globalization FP-1 commented:

“The only way it’s affected us at this University is they’re now trying to market in foreign countries to get students to come to our college. In essence, it’s an untapped number of students that could possibly come to our facility.”
“I think the nature and the variety of CTE programs will change as impacted by globalization,” explained FP-2. He further elaborated:

“As more and more students, more and more people are returning to school looking for something that cannot be relocated, most notably, medical careers where your product is created and used here on site. That is not as easy to avoid in some of the other technical areas such as mechanical design.”

In regards to institutional responses to globalization, FP-2 replied:

“Oddly enough, I don’t see any evidence that my institution is making any significant changes in terms of the affects of globalization. Perhaps they should have but I don’t see any evidence that they are.”

The discussion was followed by, what do you attribute this understanding to? FP-2 stated: “I think lack of foresight, lack of a global overview of what the workplace requires and the way the workplace is going.”

FP-3 had a different perspective as he stated: “Travel. I really think that we need to have a strong exchange program and very few schools are doing it to the level that I feel that in the software engineering area, technical area. We really need it. And it’s largely due to finance and bureaucracy. Yes. We actually have a position here that’s an international position and it’s that individual’s job to look at other institutions around the world, at other universities and establish relationships with them and also companies.” A follow up question was asked of FP-3 to learn about the kinds of information the college was looking for in that setting. He replied: “Actually studio level, where we can work with them to develop products that are non-profit, but it gives their students an opportunity to do internship-like things and allow our students to collaborate with them.”

**Theme Four: Technology**

The advancements made in the development of new technologies in general and the internet communications technologies in particular was viewed as the catalyst to
expedite an unprecedented era of global interaction contributing to the spread of globalization. Schumpeter (1934) defined innovations as new, creative combinations that upset the equilibrium state of the economy (NAP, 2008, p. 54). Technology has always played a role in global interconnections depending on its level of complexities and influencing national and global economy to a certain degree. The faculty participants’ view of technology, its influence on performance of their daily duties, curriculum design and delivery was important to explore. The role of technology in development of technical skills sets highly sought in the new global economy, and the technologies used in the classroom in context of training and preparation for entry into the global labor market were all issues of consequence to this study. The faculty participants were offered an opportunity to share their perceptions and explain how all of these issues may be of importance to their educational institution.

**Defining Technology and its Role in a Modern Labor Market**

In the process of designing interview questions germane to the premise of research questions in the study, the role and impact of technology was a central topic for discussion. Whether the technology was seen as a contributing factor to the spread of globalization or used as a tool in the curriculum design with classroom applications, it was important to define it for the purpose of this case study. Although a computer is the epitome of the technological revolution, a concerted effort was made to separate the term “computer” from the general meaning of the word “technology” in the context of work environment and everyday life applications of various tools. A machine in the lab had computer-related function, but at its core it was much more than just a computing device. To contrast the term computer with technology, the faculty was asked to define the word
technology, and examine the role of technology in an era of intensified global competition for skilled labor. Additionally, the faculty was asked to provide a description of the types of technologies that the students were exposed to in the course of their learning, and whether these technologies were similar to what was used in the industry.

“The technology is using the latest information and machinery or tools at your disposal”, responded FP-1 in defining technology. Regarding the role of technology in labor development, FP-1 shared his concern about the students’ ability to follow direction, as he put it:

“Technology can be used to help aid our workers in that they can be taught on the job by video, by reading, more video than anything else, because so many of our population today cannot read. In one of my classes, I use videos. I’ve tried paper handouts. It just says, Click here. Click here. They cannot follow it. They can’t read it. I create a video doing the same thing, they’ll put it up there in the left-hand corner of their screen, they’ll follow through it and they understand it. They cannot read it, but they can watch it.”

In a follow up question FP-1 was asked, does this affect the students ability to compete in a global labor market? To paraphrase, FP-1 commented, “I think it hurts it. I read—well. I used to read at a high level but I am getting slower due to aging. In the past I had a job because I could read. I would read 20 to 30 magazines a month. It was my job to stay up-to-date doing research. When we got in new products, new processes, I learned them first, and then I wrote the training materials for our own guys. I created a great job just because I could read, and very few people today can do that.”

FP-2 asserted that “technology is, I think, just another word for tool.” He further explained that “the technological aspect of it usually reflects some type of tool with a relatively recent or contemporary nature to it. At one time, I think probably a metal ax was technology. These days it’s no longer the case. The term has been moved towards
computers and other similar items. But technology at its most basic level is just a tool.”

Explaining the role of technology in development of globally competitive labor force,

FP-2 noted:

“In many different ways; first of all, you find that, technology invariably costs money. And so unless people are willing to make an investment, unless the money is available to make the investment, they’re not going to be able to maintain any technological advantage. Without a technological advantage, then you’re reduced to simply a labor force. And it’s very difficult for a developed region to compete against less developed parts of the world or for developed countries to compete against less-developed countries on the basis of just being a labor force. Also, I should add, that the technology also provides access to students who normally would have difficulty in accessing programs that can improve their employability. At the same time, it also offers access to the skilled work done in other countries. Here in the United States, for example, outsourcing of service call centers, outsourcing of IT services, outsourcing of CAD, outsourcing of dictation, things that today you can now procure overseas by means of electronic communication systems that would be otherwise unavailable.”

The explanation provide by FP-2 warranted a follow up question emphasizing the inevitability of competition from developed and undeveloped nations and therefore how would that impact various aspect of economic development as well as its social implication for a developed country such as the United States?

FP-2 commented:

“I think it’s going to continue to be very difficult. I think that another aspect of technological development is it enables fewer people to do more and so a lot of the tasks that have been improved by technology now can be done by much fewer people, which means, I think, in the long term that a developed country in order to maintain a high standard of living will necessarily have fewer people with more developed skills and more technologically-advanced tools. And most of what used to be the middle class involving manufacturing and assembly will continue to be displaced.”

For FP-3 technology meant utilizing information to the benefit of the society. He stated that “I would say that currently technology would be an effective use of information in the sense to better our society. I believe technology is synonymous with
information on demand, be it video, words, audio, or data-on-demand, which is our information. People have realized that information means power. I want my data, whatever it is, wherever I am, how I want it, when I want it, served up exactly the way I like it.” His comment was followed up by asking, what is the role of technology in development of labor force in global competition for skilled and educated workers. FP-3 pointed out: “One of the areas I think we have been sort of derelict in America is pushing information and technology in a direction that it should be going in faster. We’ve allowed private sector to dictate the pace, instead of really looking at what our society really needs. We’ve allowed money to dictate how we should share knowledge, how we should share technology.”

FP-3 shared his concern about the danger of using technology solely to accumulate wealth. “I think when your society is running on a cash machine as its focus; you’re going to have problems long-term. Although money and resources are essential in this process we must remember that people need to benefit from technology. I think if we would have 20 years ago done what we said we were going to do, we wouldn’t be where we are right now. We said we were going to be efficient, we said we were going to be eco-focused, that we were going to look at alternative energies in a very serious way but we did not follow through.”

**Technology in the Classroom and Real World Applications**

As explained in the preceding segment, the role of technology in classroom learning and its real world applications were important to this study. As experts in their respective fields the faculty must be aware of the types of technologies utilized in the industry. This would be important in the process of teaching their students relevant
technology. Therefore the faculty was asked to comment on the types of technologies used in the classroom and to discuss the similarities and or differences between what they teach and what is used by the industry. Also, in their view, how would students benefit from these similarities and or differences?

FP-1 in response to the question of what types of technologies are students exposed to in the courses taught within this program, commented: “They are exposed to new cutting materials, new software, how to learn software, controllers for different pieces of equipment. They’re taught how to learn a controller, what to look for in a wide variety of areas.”

To the technology types used in the field, FP-1 replied: “At this university, they’re using the same level but most schools are way behind in that regard.” FP-1 considered this to be “a huge advantage since they raised the technology level—the computer levels, the software levels close to what industry had—it’s opened up our job placement tremendously.”

Responding to the same questions related to use of technology and its relevance to the industry, FP-2 commented:

“It’s as close to being the same as we can possibly make it. We use all standard software packages as used in industry. We have an Industrial Advisory Board that keeps us reasonably current with what industry is using. We have the same laboratory equipment, except in the cases of the most highly-specialized machines. And generally speaking, have a pretty good relationship between our equipment and what is used in industry.”

At the university level, FP-2 explained that” we use solid modeling software by PTC Corporation, SolidWorks, Solid Edge and CATIA. All these packages have both CAD-capability as well as manufacturing interface capability. We also use programs, specific to certain industries like Moldflow for plastic and injection molding as a popular
software package that we use. We use MathCad and various math-based programs to do
analysis similar to what is done in the industry.”

FP-3 pointed out: “I’ll go middle of the road with this because I have students that
are freshmen and seniors, but typically when they’re done with the curriculum they have
been introduced to all the major toolsets that Fortune 500 companies are using:
Microsoft products, Java, in terms of software, we have a class where there is like a
survey of technology, survey of languages, so they have an opportunity to work with
eight different programming languages. I mean, they actually have to write code for
them. They have to learn the basic fundamentals, and then they also have to produce a
working application. It’s a pretty intense class.”

FP-3 further explained: “Again, technology is information, so they have to do
every one of their projects. They have a lot of documentation, meaning that they have to
have a design and requirement specification. They have to have a maintenance plan, a
configuration plan. And that’s on every project, so that’s the type of technology, even
though it’s not electronic, but it is best practices. I think the written words are best
technology ever. In terms of hardware, they work on PCs, and on Macs. They work on
operating systems in terms of Mac OS, Linux and Windows. They write software for
game systems: the Xbox 360, the iPod and Android. So they get a wealth of what’s out
there. They get all the current stuff but then I make sure that they get some of the
traditional stuff. They do have to write some COBOL applications.”

He also stated that the best part is when I go into organizations that I have scouted
ahead of time, and because I’ve picked technologies that’s in 80 to 90% of these
companies, when I go in I can say, ‘These students are fluent in the following
technologies.’ And it correlates directly, or corresponds directly to what that company is using, and then I can also say, “In addition to that, we’re also using the latest and greatest thing in terms of best practices, in terms of tools, in terms of design patterns and so on. I want to make sure that students leave here not as entry level software engineers but as third and fourth year level current software engineers. And when they leave here, skill-wise, they have had at least two years of in-internships. And they leave also with a portfolio that they take with them that they can show off in their interview.”

Theme Five: Industry Requirements and Skilled Labor

Up to this point the focus of the study was on the faculty’s perception of globalization, role of technology and use of technology in the classroom. In a globally competitive labor market, the skills required by the employers from the new entries into the labor pool were also a critical factor when examining labor preparation. Globalization of the economy to a large extent and the shift of American economy from a largely manufacturing base to a high-tech, knowledge-based endeavor were inevitable. In such a climate what are the relevant skill sets for students graduating from a technical program? It was also important to distinguish between general skills and essential skill that new workers must possess in order to be able to continue to develop their careers and benefit their employers. These were the types of skills that are in demand in a global competitive labor market where the employers seek the best and the brightest to hedge their success.

Employability Skills and Content Knowledge

Education for the purpose of occupation inherently was viewed as the teaching of the kind of skills and tools that the students will need to know in order to be able to get a job, keep that job, and consequently benefit self and the community. From the faculty
view, what kind of skills were deemed basic and what were the skills that a new highly trained and technically competent individual could not do without? Various studies had shown that the new generation of Americans workers entering the job market lacked the basic skills needed to be of a value to their employers. Therefore, it was a fundamental question to inquire of the faculty considering their role in this process. This assertion was emphasized by consulting a study titled “Developing Career and Employability Skills: A U.S. Case Study” by Zinser (2003). “At the university level, Fallows and Steven (2000), describing the implementation of employability skills in the academic curricula across all disciplines, ensuring that all students graduate with skills in information retrieval and handling; communication and presentation, planning and problem solving; and social development and interaction” (Zinser, 2003, p. 402-410).

The faculty was asked to describe the employability skills that they saw as an essential skill for the students to have in addition to their theoretical knowledge of their field. In response to this inquiry, FP-1 noted:

“They need to be able to communicate with each other. They need to be able to speak. They need to be able to write, which most of them have great difficulty doing. They need to be able to exercise common-sense.”

FP-1 pointed out that “the students lacked the hands-on skill prior to getting to college and that many had difficulty in recognizing common house hold ordinary tools.”

In a follow up question FP-1 was asked in your opinion, in addition to course work, what are some of the things that students are doing or need to do to prepare for future employment? FP-1 explained:

“They need to do more community service work. They need to get involved with their community and get help from the community and family. One important aspect of this process is effective and respectful communication with peers and co-workers that students need to improve on.”
FP-2 viewed the question of globalization and employability skills as having multiple components. He pointed out “it’s actually kind of a twofold answer; first, most employers require—prefer a new employee to be familiar or competent on the tools that they currently use, such as they want them to be familiar with solid modeling software packages, mold analysis packages. They expect the new hire to be familiar with these things. In addition, they also expect the new student to have a broad enough background in basic science to be flexible enough to adapt to the changes that inevitably will occur. So they want specific knowledge but they also want people with a general enough background that they can adapt to future change. And the last thing that they constantly talk about is the need for communication skills both written and verbal.”

To follow up with what was stated, FP-2 was asked, what are some things that the students should do to prepare for work environment? He commented:

“I think they have to seek out opportunities to be involved in activities that relate to their chosen profession. Be it in clubs or hobbies or internships or co-op opportunities. They have to make an effort to include that in their school.”

FP-3 was also asked about skills sets required of students in a global labor market. To this he replied that “they have to know the technology. They have to be fluent with different paradigms that the company may use, the tools of course. But the things that stand out the most and I really encourage the students to work on are their team-building skills, not being afraid to voice your opinion in a respectful manner, being open to sharing and working with people, also being tolerant as well as appreciative of other people’s ideas. Sometimes we get students in that are somewhat arrogant and somewhat feeling entitled. I remind my students that you need to address others with respect. Your
idea may be great, but show some understanding with theirs. Learn to collaborate and share your knowledge because you will be in a lot of meetings.”

The previous comment was followed up with this question: in your opinion, in addition to course work, what are some of the things that students are doing or need to be doing to prepare them for future employment? FP-3 replied:

“Reading. They have to stay on top of their craft. This is—I explain to them, on day one you’re going to be perceived as a doctor, a digital doctor. You’re working in an inorganic world, but you’re a problem solver and you’re going to be a go-to person. Because you have that title engineer, they’re going to think you can do anything.”

In the context of global competition and employability skills, to what extent such skills as basic skills, critical thinking skills, and problem solving skills play a role in the students’ ability to enter the job market and be able to work and succeed? To some extent it would be unrealistic to assume that all these type of skills can be readily and easily taught, yet these skills are critical components of the skills required of the new generation of skilled workers. Therefore, faculty’ responses could shed some light on this question to explore if and how they could impart this type of skills to their students. FP-2 remarked:

“We have quite a high level of integration of writing reports and technical communications within the program. We have an extensive communication and presentation content in the program, both as individuals and as teams. Also, the nature of their classes allows us to present students with open-ended design decision based questions so that they’re not simply following some type of a prefabricated formula to create a product or to complete a design. This particular part really is geared to help the student become more versatile, to be able to take general principles and to apply them to a wide variety of specific cases. And they do that in teams and individually to develop troubleshooting skills.”

FP-3 also noted: “I would say the one skill that I didn’t have leaving college, which is the ability to close a project. Because academically, you’re giving a homework
assignment and it’s pretty straightforward, you get this thing done. But in the real world, you get that thing done and there are a lot of other things around it that you have to complete. You have to tie up all those loose ends and you don’t have to worry about that in school. If you don’t tie up a few loose ends, it’s not that big of a deal because you’re done with that class and it doesn’t impact anybody but yourself, but in the real world, it impacts your employer, it impacts you and your customers. And so I impress upon them that they have to close everything. They can’t just look at the software, the actual software product as it. That’s not it. It is part of the entire package, and so I impress upon them that they have to be a good closer.”

**Job Site Visits: A Learning Tool**

One aspect of learning about jobs, employer requirements and skills, use of current tools and technology, and job trends was to visit job sites. Such opportunities often provided students with a firsthand look at what the job setting was like and whether or not they felt they could fit in that environment and of course have the opportunity to speak with employers and learn about various topics. The faculty were asked if they were able to visit job-sites and how often, to talk with employers in the field to learn about their needs and the latest trends. FP-1 explained it this way:

“It’s really up to the instructor. Presently, we try and get students out at least once a semester, on a field trip some place, but it’s really up to the instructor to make the phone calls, set up the field trips and do it. This investigator wanted to learn what kind of information was obtained from these visits, and if this type of information was of a value to the program and could be taken into account when developing the curriculum.”

FP-1 remarked that it would almost take a full-time person in each department.

“It’s a full-time job. Each of our instructors is carrying a full load. We’re trying to market to students in high school. We’re trying to get out to businesses on top of that, and there
are just not enough hours in the day. What is learned is useable information as he further pointed out, oh, yeah. Definitely, at this point, we like to feel that we’re actually ahead of a lot of the plants around here and it makes for a good discussion when we come back. We can point out a lot of things that we’re doing that are at a higher level and that to me, is where education should be. They should be the leaders, not the followers.”

Responding to the same questions about the job site visits and the value of the gained information, FP-2 stated, “Yes. In general, almost all programs have various tours and visits. Sometimes the companies will come in and present on campus and sometimes we’ll actually have an excursion to a certain facility to see something. That’s commonly done, plus, most of the students in our areas will have some type of internship activity or summer employment where they actually work in the industry that they’ve selected for a career.” FP-2 further explained:

“The job-site visit for the student gives them in many cases reinforcement that what their learning actually has application. The programs themselves do not use job-site visits as a vehicle for program change that much. They primarily rely on their advisory board, which is made up of industry people, rather than, visiting various companies.”

He stated also that such visits help to “motivate the students because they believe that what they’re learning has value.”

FP-3 stated: “I let them know about conferences that are local so they can show up and network in that way, and learn also about some new things that are happening there but we also go on fields trips. I share with the organization that what they are working on is something that our students would be really interested in learning about. So I ask if I could bring three or four students in and could you talk to them about what it’s
like at your company and what you’re working on? Of course that is important to build a rapport with them so that I can establish a relationship and an internship.”

**Theme Six: Institutional Responses to Globalization**

The university’s response to globalization was discussed in the context of implications of globalization, if any, on existing programs due to changes in necessary skill-set required of the new workers planning on entering a highly competitive work environment. As some of the studies cited in this research have indicated, at the university level a preparation and planning process needs to be considered to prepare students for challenges they will face. These new workers must enter the job market as good communicators and presenters of ideas, informed consumers of information and technology; with the ability to interact with others utilizing well developed social skills as prerequisite employability skills implemented through academic curricula and multiple disciplines.

The articulation of the role of the university in general, as described above, and at the program level in particular, was a proper way to explore the role of the university as represented by its satellite campus. It was necessary to explore what actions if any are taken at the college or program level to address the issues raised due to globalization of the workforce. It was expected that this future planning would be considered in context of making changes to curriculum reflecting an alignment to industry needs as they are forced to compete at the global level.

Since many of the faculty have worked for this university for many years. It was important to ask them to explain how their programs have changed over the years. It was also necessary to explore whether the changes to these programs occurred in response to
a shift in labor market needs and trends due to globalization of the workforce or there were other factors playing a role. The dynamics of workforce development has changed globally quite dramatically therefore, what kinds of changes or modifications or re-alignments were made to the curriculum in these programs to meet the current skill needs of the industry?

The role of integrated technology in teaching and learning in career and technical education was examined to learn about the resources available to the students and its relationship with technology used in the classroom. Many sources have cited the role of public private partnerships as a positive when developing skilled and trained individuals ready to enter the job market. This principle was recognized as a way to train individual for the jobs that are in demand and provide a solid base for individuals to begin their careers.

Globalization, Curriculum, and Planning for the Future

Considering the faculty’s authority of expertise and years of experiences at this college, they were asked to reflect on changes they have witnessed taking place within their programs demonstrating change in response to a shift in the labor market needs in reply to globalization of the workforce. In tandem with curriculum changes, faculty explanation of the college’s plan, if any, either at the department or program level to address the challenges created by the reality of globalization, with possible implications for their students and the employers was essential to explore. Responding to the question of change FP-1 replied: “Instructors have been willing to update themselves and upgrade themselves, in the field of manufacturing. At this university, we have over 100 years of actual hands-on experience in our manufacturing staff and some of that as old as 15 and
20 years ago, and these people have been willing to learn once they see the new-newer technology, newer software, newer methods and they’re stepping up to the plate and learning them.” FP-2 reflected on the changes he had witnessed. He noted: “The curriculum has become much more computer-based. Laptops and PCs, which were integrated into my program about 1999-2000, are now involved in nearly every class in one way or another.” Regarding availability of online courses, he stated:

“We do not have an extensive online offering at this time simply because we haven’t found a method suitable to deliver what we need to teach online. But that is what the workplace requires these days, that workers know how to access sources in order to be able to solve problems. Students need to have access to tools and resources in the same manner that they will in industry.”

Regarding the role of the school in dealing with globalization influences FP-2 replied:

“At the university and college level there’s definitely a lack of any real fundamental changes. At the program level, we try to maintain a high level of currency in whatever technology is present, whatever’s being used in industry, so, by staying on the leading edge, we hope to prevent our obsolescence.”

Responding to the same questions FP-3 replied: “I just try to keep them up-to-date on technology that’s here and that people are working on globally. And outside of that, nothing really other than, like I said, we do have this individual that’s out there promoting the program and other programs globally.” (It is important to mention that this investigator was familiar with the idea of introducing this college to students from Asia, Middle East, and Europe as part of the university’s international recruitment efforts). Regarding changes at the college-program levels in general FP-3 responded that “you know, the way I have the program structured, it’s that way for now—you know, from the
very beginning, so that it is already in place.” Additionally, FP-3 commented on getting students involved with activities such as competing with students from other countries.

**Role of Technology in Teaching and Learning in CTE Classroom**

Career and technical education and utilization of technology in POS and curriculum delivery were pretty much in synch with what was expected to lead students into their selected fields of study. Faculty was asked to share their experiences regarding the use of high-end technology in today’s CTE classroom.

FP-1 was very positive in his response to the role of technology in a modern CTE classroom. He pointed out that “we’re using a higher level of technology in most of our classes. In doing so, we’ve been able to cut credits to save students money. We’ve cut hours out of lab times because of the technology. More engineering up front, less work out back and we’re actually doing more projects than we have in the past in less time.”

FP-2 was also up-beat in his assessment of role of technology as he explained: “As I said, we have included extensive use of online resources in terms of access to databases and information using the internet, in almost every class. We also have increased the amount of writing and the level of writing competence in all our classes using word processing programs and improvements in it. We have also incorporated progressively more demanding computer-aided drafting programs. We’ve also included computer-aided engineering programs such as the Mold-Flow as I mentioned earlier, into the program.”

All three faculty participants explained what technologies they utilized in their classes, including the use of online resources. FP-3 also shared his experiences with regards to use of technology in the classroom as a positive. He explained: “Right now,
everything’s online. I teach the class but all the material is online so I get them comfortable with being part of a digital environment, also reducing the paper transfer and things like that. Currently, whatever the latest technology is that comes out; I receive a number of periodicals, journals and things like that on them. And we have current events so I go and talk to them about it. We discuss it. And that keeps them up-to-date on whatever’s going on from IEEE (Institute of Electrical and Electronic Engineering). So I keep them up to date because my undergrad is electrical engineering. So I keep them up to date with microcontrollers, software and how that plays into today and what it’s going to mean tomorrow.”

**Role of Business, Public-Private Partnerships/Collaborations**

As it was stated in the theme section of this segment, various organizations had endorsed the idea of the public institution working in partnerships and collaboration with private sector as a positive development. It’s believed that such collaborations with industry will help colleges to recognize the needs of the industry related to the labor market and product design and development as positive undertaking. This college is known for offering variety of CTE programs of study in the state therefore, faculty could explain such programs, whether they were of a value to the college and whether such partnerships were in place at this university?

In response to the question of collaborative efforts between college and private sector, FP-1 replied:

“To me, there’s got to be a good co-existence between colleges and the industry. Colleges can help out business and business can help colleges. The biggest thing is they have to communicate with one another. Most businesses are willing to help
colleges but colleges have to get off their high horse and work with the businesses and say, ‘Hey, this is what we need,’ or, ‘can we work together on this?’ Business has been, from my experience, more than willing to help out, but we have to go out there and help them because they’re busy just trying to stay afloat. Whereas we’re government funded, you might say, so we’re kind of on the light end and we need to find ways to work together.”

A follow-up question was asked of FP-1 to learn if there were any collaborative and partnership initiatives between the university and private sectors, he replied “very little.” When asked should such a collaborative effort exist and how would students benefit from it? He replied: “Definitely, it should exist and it would definitely help students by creating more internship, more summer jobs. Many of these plants don’t realize they can bring on a summer student, pay them $12 an hour and come out ahead. They just give the student a little project and some valuable experience. A lot of companies don’t realize the value in that. There should be a joint effort. I worked with a company in [city]. They gave a 100% paid scholarship to a student. They picked up the cost of tuition and the books. All the student had to do was to work for them over the summer and if they did not have a job or did not have school on Fridays, they went down on Fridays. Sometimes they work over the break a little bit and get a wage. The cost to the employer was very little in terms of actual cost because students worked for less and gained experience.”

FP-2 believed as he explained:

“The industry or the private sectors are responsible for keeping us briefed in terms of what they see as new trends and what new requirements are. They’re usually not reluctant to do this but unfortunately they typically lack any significant long-term vision. When they make a recommendation, usually it’s a recommendation
for a shortage they have today, and many times we’ve had recommendations from our advisory board or from industry in general to start a certain program or a certain skill, only to find out that by the time we had integrated that into our curriculum that they no longer wanted it and they’ve moved on to something else.”

Adaptability of the new workers to the new and fast moving work environment has been discussed in various studies. In a follow up question FP-2 was asked to reflect on the issue of the workers adaptability in a changing work environment. He replied:

“Oh, very adaptable. Yes, yes. It also means that although it’s important to stay current and on the leading edge, it is inadvisable to follow the leading edge too closely because it tends to produce a lot of a ‘boxcar effect’ where you’re starting to make significant changes with little basis one way or the other. And if you spend significant time and effort acting on an impulse, you detract from your efforts in the long term for a better strategy.”

In response to the question of collaborative and partnership initiatives between the university and the private sector FP-2 explained: “At the university level, I’m not sure. I could be just unaware of them but at the college level there’s a number of programs where industry will provide projects for students to work on, will provide internships for students, will provide support for visits and even hands-on demonstrations of their products and their procedures. So there’s a fair amount of private industry integration with the programs within the college.”

Commenting on the same questions asked of other faculty participants, FP-3 noted: “I think they have a huge responsibility because we’re factory for them. For me, I have to go to them and I receive tremendous push-back or just pure rejection or no response from industry. You have to know someone at the organization to get in and that shouldn’t be the case. They should come here and be basically begging for these students because these students are begging for them and I think if they establish a relationship
early on we would have something. We’d have much stronger software engineering
program and a stronger representation in the world.”

A follow-up question was asked seeking clarification about the reasons why the
industry would not want to work with college students? FP-3 explained that “I think that
it has to do with two things: one, that’s not something they focus on. They are focused on
getting people with experience. Get them in here; throw them on a desk so they can start
working now. We’ve got to make money now. And our culture is so set up now that
we’re in a greater immediacy of almost everything and you can’t do it. I mean,
remember, before there were apprenticeship and all this stuff, and now, what’s
happening? I tell the students, I say, “Every job I ever had, even the day I started, they
always had this binder and they’d say, you’re going to go through training for three
months. You know what the training is today? Here’s your desk. Here’s the software.
Load it on. We’ll have a project for you tomorrow. That’s not enough.”

He also stated that he was not aware of any collaborative activities between the
college and the private sector. He stated:

“To my knowledge, at least in my department, there isn’t. The relationships that
I’ve established with companies have just been, “Oh, hey. I’ve got this great
student, and you have a need. Let’s take care of that.” I think that there should
definitely be conversations in place so that we have a really smooth transition, a
nice conduit from here to there, but I think it gets down to companies just have
never really taken it seriously to the level that they should have.”

**Theme Seven: Academic Program Review (APR)**

As stated previously this university at the technical college levels has been
utilizing a program assessment tool since 1998 called academic program review (APR).
The APR process helped the college to utilize established guidelines and expectations for
program evaluation. Academic program review was briefly discussed and will be
discussed in greater detail in the Findings chapter. The APRs were included in this study for the purpose of triangulation to compare and contrast the student and faculty participants’ perceptions of the purpose and the value of the APRs as an assessment tool to their programs. The APRs are utilized by the college as a tool to explain the stated mission and the vision of the school while seeking to clarify the programs’ alignment to the labor market needs. APRs were put together by collecting data from various participants associated with these programs as a valuable source in the discussion of the program effectiveness, relevance and resource allocation depending on the program needs.

Another aspect of APR was the makeup of the committees that made decisions and or recommendation about programs at the college. The reason this was mentioned here again was to provide a link between the role of various interested parties including; the college, the faculty, its leadership at the department-program levels, and partnership between private sector representatives serving in advisory capacity. More importantly, the value of the data and the feedback received from students present and past given their firsthand knowledge of these programs. The discussions stated in previous section The Role f Business in Form of Public-Private Partnerships and Collaborative Efforts failed to take into account the role and relevance of the business community to public sector success.

Due to the role of the faculty at the college level, the investigator was concerned more so with the purpose and the value of APRs from the faculty’s perspectives and its usefulness to the college, to the programs, and ultimately to the students. Therefore the faculty was asked to share their understanding of the APRs associated with their
programs, including data collection and dissemination. To what extent if any the collected data was used in the decision-making process at the program and or college level and how was this data helpful to the all stakeholders including current students and the college itself?

**APRs’ Role from the College’s Perspective**

To further explore the relevance of the faculty’s role to student development and understanding of the current issues impacting their world and their work, the APR for DAGD program was utilized to seek further explanation and explore the issue from a program perspective. The Digital Animation and Game Design (DADG) program academic program review (APR) explained their point of view as:

As faculty we work on developing and maintaining industry relationships. Faculty are encouraged and supported to attend industry events such as SIGGRAPH and the Game Developer’s conference in San Francisco. Faculty respond by attending week long events sometimes on their own time during the summer or when the conference falls during spring break, otherwise release time is provided to faculty members. We also encourage students to attend the same conferences and support them as they present portfolios at career fairs. (p. 11)

DADG program APR (2010), “Preparing Students for the Workplace” asked “How do the goals apply to preparing students for careers in and meeting employers needs in the community/ region/marketplace?” while preparing students for careers in animation and game design fields. It therefore stated, “This pursuit is a major focus and we actively develop strong relationships with people and companies in the industry. As curricular designers, and professionals working in the field, we looked at what we learned in the field and asked ourselves; If we could have done it all over, we would…”
This is the foundation of our goals. “Focused, real world skills that are needed in industry supported by a liberal approach to learning that accommodates how students learn.” (pp, 10-11)

The DAGD program APR explained the goal of the program built on the foundation of some core concepts derived from the “edutopia” an educational foundation set up by the famous producer George Lucas, emphasizing “Integrated studies, Project Learning, Social and Emotional Learning, Technology Integration, Comprehensive Assessment and Teacher Development” (p. 11). These points were an essential component of this case study as outlined in the literature review to explore the relative influence of such topics to student success and career preparation.

**APR, Data Collection, Relevance, and Effectiveness**

Drawing on faculty’s firsthand knowledge of the APR as a process built around their programs to measure program effectiveness and relevance, they were well-suited to provide an insight on how they viewed the APR as an evaluation tool. To the above questions FP-1 responded:

“To me, it generates a job for somebody. The academic program review supposed to be a program’s justification their existence on campus. From what I have seen and been told, there is no value to it.”

In response to the FP-1 comment, it was appropriate to follow up and seek clarification by asking if there is no value to this evaluation method, then why do it. To this FP-1 replied:

“We’ve asked the same question. It’s to generate work so that somebody has a job. Take a look around, you do not see many people except the instructors and
students but there are many people associated with and work within these
departments that have very little to do with what we do here. We’re talking about
cutting costs but we spend time and money on things that add little value to our
educational setting.”

FP-2 also relied: “Well, in concept, the APR is designed for each program to do a
self-study of their current performance. It consists of elements done by their advisory
board, by their graduates, by their current students and by the faculty. And collectively it
presents an overview of the program to identify areas that need to be improved or areas
that are doing well.” In response to how is the collected data is utilized in regard to the
programs that are reviewed, FP-2 commented: “It depends. In concept, the APR is
reviewed by a committee. The committee has the ability to recommend programs to be
just simply continued as they are. It has the ability to recommend that a program be
enhanced and there is, in general, money apportioned to provide those programs
additional cash for specific purposes. For example, my program in 2000 received an
enhancement recommendation and we used that to retrofit our major classrooms with
seating and audiovisual equipment that we use to this day, suitable for laptop computer-
based instruction. And on the opposite end, an unsatisfactory review by the APR
committee can result in a recommendation that a program be either placed on probation
or even discontinued.” To follow up the last comment, FP-2 was asked if there was a
value in the APR process. FP-2 replied: “Oh, yes. Yes, it is. I don’t think it is as effective
as it could be but it’s infinitely better than having no such review process.”

FP-3 replied to the APR-related questions, explaining: “We look at a number of
things, for one, the evaluations that come back from students. We look at other
instructors and what they’re doing and their feedback from them, and how we can improve the program. And then this is all online—and then we just really use that so that we can track year to year and say, ‘Okay, this worked, this did not work. Why didn’t it?’ and then we make adjustments.” He stated that the participants “were, just kind of like our department, our off campus people that are here. So like my supervisor from DAGD (Digital Animation and Game Design), the assistant dean, and then we also have someone from the main Campus that comes down and helps us to formulate some questions. So there’s various people that become part of that, you know, meeting.”

FP-3 was asked to explain how this process benefitted students. He replied: “It’s all student focused; everything we’re looking at, are the students meeting the outcomes for that course? You know, prove it. Show me how. What are the grades? And then we can also look at what the students are saying because they’re very candid with how they really feel. So it really goes both ways. It shows the relevancy, you know, or the timeliness of the course in the current environment. And we’ve received some very strong feedback. And also when—like, for instance, this semester I had a certification class and I had really high expectations for how much material we were going to cover and it was my first time teaching that course, and we just couldn’t do it. It was too much. It was like 2,000 pages of reading, and that’s a little much, so I had to scale it back to 1,200 pages to make it work and it’s really listening to the students.”

Theme Eight: Role of Education in Global Competition

It was difficult to assert with a clear degree of confidence that education has changed. The technology of teaching and learning has changed. It was important to this investigator to explore from the perspective of the highly educated faculty whether the
changes that seem to dominate every conversation had some impact on their students ability to compete in a very competitive global economy. The research indicated that America’s future success hinged on its ability to produce more technologically educated individuals that are able to meet the challenges posed by the global competitors. To further explore this topic the faculty was asked to share their thoughts, perceptions, and or concerns about education in general. As practitioners of a highly complicated craft as educators, it was important to explore the faculty’s perception of change. To ask what had changed in the educational process or is changing in a globalized teaching and learning environment, given the current state of jobs and global competition for skilled individuals.

Another essential component of CTE programs in the United States was the role of Perkins Acts for the last three decades culminating with latest reauthorized Perkins Act IV of 2006. In addition to stressing strong POS, the Perkins Act was also responsible for creating an era of accountability that precipitated an overhaul of various existing CTE guidelines and procedures in order to create a better opportunity for students to learn and compete on the job. The Perkins Act of 2006 in addition to concentrating on academic integration also focused on strengthening the workforce preparation process by creating an alliance between education and the workforce. These statements offered here were not meant to explain Perkins’ extensive reach and scope but to point out that creating partnerships between schools and private sectors could prove to be one way to develop a workforce that can understand the business environment and be ready to enter the job market.
FP-1 in response to the role of education in workforce preparation offered this explanation:

“We have to change our methodology and it’s got to start back in the lower grades. Students have to be made to be held accountable for their own work. Right now, they’re not. When we get them as freshmen, they don’t know how to meet timelines. They don’t know how to study. They don’t know how to take notes and these are honor students in honor’s college and they’re used to retaking tests. They’re used to having their hand held, and I could go on and on. Simply put we need to do a better job at lower grades in order to have students ready for college workload.”

FP-1 was asked in a follow-up to his earlier statement. In your opinion, what do you attribute these shortfalls to? He replied: “We have too many labels for students. I’m going to give you a hypothetical example.” FP-1 explained that “if you had a student that was working well below his/her potential, you find it necessary to have a conversation with the student to remind the student that his/her previous test scores show that this student could do very well. The student in turn attributes this shortcoming to his/her high school experiences where the student was allowed not to work to his/her potential. Such students when in college are forced to make a choice; change their ways, work harder or the prospect of college education goes out the door.”

The role of education and current job losses in the industry brought this comment from FP-2 as he explained: “Well, you find a lot of people that have been displaced are not university and program graduates. Typically they’re people with high school-level education that have assumed a position at some employer, and had that position go away.
So then, they typically will come to seek higher education as a means to improve their current situation, but also providing a more secure future. But unfortunately they’re not particularly selective in terms of what they pick for higher education. And there is a prevailing thought among both students and university/college leadership that the key to it is a college degree. That is not true. There are college degrees that have very little actual value to a student in today’s marketplace. By the same token there is other college degrees that are critical and of extreme value in today’s marketplace. But simply just to label getting a bachelor’s degree as a touchstone to success, is grossly misleading in my opinion.”

FT-2 in response to the role of obtaining a relevant degree for the purpose of specific skilled trade was: “That’s true. There are many things that you can study that have very little application in anything approaching the workplace. There are schools that are less scrupulous, that will allow a student to, given that they pay their tuition, to graduate without any real skills. And eventually you’ll see as education becomes more and more common, that there will be a progressive differentiation between, different programs within schools and you will see, I think, that programs that place students in employment will command a higher value than schools that don’t or programs that don’t. The next thing to watch for, I think, is higher education particularly, rather than fundamentally differentiating the degrees they offer, will assume that what’s needed is more education. And so you’ll see today’s bachelor’s degree as an entry requirement will become a master’s degree in the future. It will not solve the problem. It will not address the fundamental problem of subject areas and programs that really contribute precious little to a student’s real intellectual development. You see it all the time.”
In a follow-up question, FP-2 was given an opportunity to explain what the differences may be between the educational system in the U.S. with countries like China and India, as these students are willing to work harder, are highly educated and extremely motivated to get into the job market. He pointed out: “I think it’s a complex problem and also a complex solution. All degrees, all engineering degrees, all technical degrees are not created equal. Just for someone to earn a degree doesn’t necessarily imply that they have a certain skill set. I would think that it is important as to assuming that graduates everywhere and say in engineering field, have a basic set of skills.” He further elaborated:

“Beyond that, I think that thing that makes competition much more difficult for a student in the United States is the fact that graduates of foreign schools and even foreign students typically are much more competitive than students here in the United States. They grow up and are educated in systems where there is no accommodations made to make anything easier for them. If it’s difficult, it is simply difficult and either you measure up or you find a new field. Whereas, in the United States, we make continuing efforts to try to open things up to people with more marginalized skills, and then when they graduate they expect some kind of continued support system. Further, in many cases engineers that I’ve known from educated and foreign countries will work much harder with much lower levels of economic rewards and in reduced working conditions than U.S. graduates will.”

The comment made by FP-2 was followed up with an observation asking how American educational institutions can change this understanding into a situation where a U.S. college graduate can compete with the rest of the world. FP-2 responded: “This it
starts all the way back… All the way back…Yes. I think that the only way that it will change is I think the social environment will have to change it for people. When it becomes obvious that the only way that you will in fact succeed is by making these sacrifices, and being flexible enough to work under all conditions, and when it gets to the point where if you do not do this you do not have a job, not that you can fall back on some kind of support system, then people will adjust.” FP-2 further explained:

“In many foreign countries, for example, I went to school with many people from China and Thailand and the Philippines, people from these cultures are willing to work extremely hard, much harder than a typical student here in the United States. They will, if given an unreasonable requirement, simply work 24 hours a day to do the unreasonable requirement, whereas a typical student here will find a way to go to the dean’s office and complain about the unreasonable requirement and get it changed.”

FP-3 saw this disparity between what is needed and what students are willing to do as a systemic failure were the students perception of certain subjects keep them way from what they actually could learn to do. He described his point by stating that the shortfall is attributed to a couple of things.” One, we have always had a basic fear of math and science in America, for whatever reason. It’s been accepted a lot more in past years. And the reason why it’s been accepted more—it hasn’t been pushed to the point where it’s like; hey, you might be afraid of it, but don’t worry about it. It’s just step-by-step. It’s really easy, but instead of saying that, what we’ve said to America is, hey, if you want to make a lot of money, you need to go into business. And so, students that may have had a tiny bit of interest, that it could have been a tiny sparks that would have turned
into a flame. And of course, in America, everybody wants to make lots of money, because that’s why you’re born, to make lots of money. No other reason. So, people have followed what I call the money trail and it hurt us significantly. We’ve had significant drop offs in computer-type technology programs for years now.”

The follow-up question asked, what do you recommend? How do you overcome it? To this the FP-3 responded: “The only way that I recommend overcoming it is to start really early with the students and showing them how fun technology is.” He believed that if math and science were taught as a fun, step-by-step process, and if the benefits of these subjects were explained to the students, it would be much easier to get them interested in these subjects. The relevance of these subjects could be related to the games they play, the TV they watch and the toys they play with. That’s all software and related technologies. We need to find ways to make science cool. You look at TV programs such as Law and Order and discover that being a lawyer is cool all of a sudden. They watch shows and movies like “Greed” with actor Michael Douglas where making money and lots of it is cool, so business is always cool where life becomes party after party. Well, CSI’s cool too for some of us.”

The role of Perkins Acts from their inceptions was to enhance the quality of vocational education as it was called (Now called CTE) so the students were able to acquire the necessary skills to find a job. The reauthorized Perkins Act IV of 2006 emphasized accountability, integrated teaching and creating a connection between school and work. Emphasizing on one aspect of Perkins Act of IV 2006, creating a link between the private sector and public educational institutions such as this university was explored
in this context to learn if and or how the cooperative efforts and partnerships between these entities can be formed to benefit workforce development.

FP-1 was asked how these cooperative efforts can be forged to help develop a well prepared workforce. He explained: “What I would like to see is businesses pay an extremely high amount of taxes. To me, a certain percentage of that ought to be earmarked to go back and to colleges to help with workforce development, such as our program. It’s extremely costly. There’s no way the college can afford $100,000 machines, software packages like we’ve got and make money. There’s no way in the world that our program will ever make money for the college. Therefore, we are, every year, on the chopping block. Even though we turn out a lot of workers, manufacturing is where a majority of people work, but we’re on the chopping block because we can’t—the program costs so much. If they would take some of that tax-base and help us out, reimburse the college for some of that, to me it’d be a great relationship and then also, we could work back and forth more.”

FP-2 stated that, “well, I think, the question in a way is kind of misleading because what you’re talking about in the case of Perkins is government funding that’s targeted at specific areas of industry and so it is an industrial need as interpreted by the government to return funding to the university to meet that need as opposed to directly where you’re dealing with an actual employer and he’s telling you what he needs to have and staying current. It’s an indirect process and from what I have currently observed the fallacy in that system is that the people that operate the government link are not experienced in the workforce. They are by nature professional government employees and bureaucrats who are trying to interpret something they have no direct knowledge of.
And so when they are making the determination as far as what an industry needs and how it should be met, in many cases they fall far short of being effective.”

In response to the role of Perkins Act of 2006 and how it might be possible to create a link between public and private sector, FP-3 commented: “I think that it’s all so intertwined, that it is necessary. I think that we need to remember that the product that our educational system was created to produce is not necessary anymore. We need to say, ‘Hey, look, that we were making people that could survive in a workplace. Now, we need to make people that can thrive in a workplace.’ Not only survive, but to be able to compete. They need to be able to thrive. You know, just getting out there and barely making it will kill you now. It’s not enough and on some levels, that’s unfortunate. But I tell my daughter, I say, ‘You know what? The demands that are placed on you guys are higher than the ones that were placed on us,’ and I can keep doing that all the way back to whomever, but that’s what’s happening in our society. We keep pushing those boundaries. Keep pushing it and pushing it and I’ve got a six-year-old who’s in the first grade, and when I talk to her teacher and her teacher’s been doing it for years, she’s like, ‘Things have changed so much. The amount of information,’ and she said it’s the pressure that we’re putting on these little kids is really too much but that’s what the state is demanding in order for us to compete globally, and so, I think, we need to really look at what is the product our education system should be producing.”

**Faculty Closing Comments**

The faculty was asked to share any parting comment on an issue of their choice. FP-1 said, “I think that we’ve pretty much covered it all. I do feel that our whole education system has to change, and get some backbone in it again, starting right with
kindergarten, right on the way up and grade inflation has to quit in the lower grades. Kids in high school and elementary schools should make an effort to learn and raise their grades. There are many issues involved from grading, to role of parents and school boards to the state, all impacting the outcome. There are some outstanding students, but it’s amazing how many of those students get their socks kicked off once they get to college because they just weren’t held accountable early on. This idea that somebody can’t fail is ridiculous because we all fail, right?”

FP-1 was asked how schools in the U.S. should prepare their students to be able to compete with the students from China, India, and the rest of the world. To that FP-1 responded:

“But they’re starting in the lower grades and bringing them forth. XY University brings in 1,200 freshmen into their engineering program each year. Basically, it’s a headcount thing. All we want is headcount. In the United States, we’ve turned into a headcount thing. We want to turn out so many people. Nobody said anything about quality. Yeah, okay, I’m going to have them take some standard tests, da da, da da, It still doesn’t give you an idea how they’re going to do when they’re held accountable.”

FP-2 shared some final thoughts on globalization as he pointed out: “I think that globalization is a fact and I think that the United States as a whole is currently undergoing an education of its own in terms of the impact of globalization, some which really can be foreseen, and some which cannot. I think that we run a very real risk of having a small number of highly-educated, technologically-capable people that make a very good living and below that an entire economy of service workers that lie below—far
below. So I think that one of the affects of globalization in the United States will be a progressive separation between the middle and the top part of the middle class will split and move upward and the lower part of what we used to consider the middle class will go downward. And you’re going to wind up with a great disparity between income levels. We’re going to turn into, more or less, a bipolar society with more numbers on the low end than on the upper end.”

In a follow up to the last statement, it was asked what was the importance of this issue to the U.S. global standing and its consequences, where FP-2 replied: “I think that what you’re going to find is the country as a whole having a progressively weaker and weaker international position, both in terms of financial or economic position, but invariably the manufacturing base and the technological base of a country is also directly related to its ability to defend itself. And that if it’s allowed to atrophy too far, we will, wind up creating some severe security problems in the longer run, I think. I believe that you can find a precedent for this type of thing if you look back towards countries, for example, Spain, which at one time was a very significant military power but lost economic power and also military power and by the start of the century has become almost peripheral as a world power. I don’t believe that there’s anyone in our current government that would deny that the globalization is a real affect. I don’t believe that anyone thinks it’s really just temporary. I think that although most people have a very limited understanding of what to do about it. And I’m not sure that there are any easy solutions as far as what to do about it. There’s nothing that you can do, I think today and see a result by tomorrow, even though the socio-economic and technological factors are
moving faster now than they ever have before. What used to happen in centuries now happens in decades and I think that that’s going to continue.”

And finally, FP-3 stated in his closing comments that: “I would say in closing, the transition that we’re going through right now, this globalization transition, in so many year—I don’t know how many—the term globalization will not even be used anymore. It just won’t be. It’s just going to be the state we’re in and I think that’s going to be a great time because I think people will see the barriers will drop across many, many countries because of the level of collaboration that we have to have in order to thrive as a race and I think, that will be good but right now and during any time when you’re going through a transition, a little bumpy, but with the right attitude and solid leadership, which we desperately need, you know, we’ll be okay. We’ll be okay.”

Summary

As stated this case study had 4 groups of participants; 3 student participant groups from 3 distinct programs and a faculty group with one faculty representing each program. Gathering and analysis of data from transcribed interview contents as narrated in chapter 4 highlighted 7 themes which contained related categories as topics of discussion on the student participants reflections and understandings. The same procedures were adhered to regarding data collected from faculty participants that yielded 8 distinct themes with relevant categories. Since the students and faculty were selected from different programs, it would not be wise to draw a conclusion as to what the investigator may have uncovered thus far specially since the student and faculty data were kept separate to allow for better comparison of their understanding of issues as desired by research questions. Those
observations and understandings are reported as findings in the Findings chapter of this study.

The departmental academic program reviews were mentioned in this chapter but are incorporated further into the discussion chapter of this study in more detail as an external source adding value to the findings of this work. The interview questions asked of faculty and student participants reflected on their perceptions and understanding of the topics and also pointed to some similarities and differences among the participants pertaining to the question of globalization and its possible impact on student participants’ choices. The faculty role and their perception of globalization and the institutional remedies and guidelines as stated in the departmental APRs were also considered worthy of exploration. Chapter Four in its totality was focused on providing a manageable narrative of all topics of interest in this study, which is reported on in great detail and commented on further in the discussion chapter to conclude this study.
CHAPTER V
DISCUSSION AND RECOMMENDATIONS

Summary of Findings

A case study as a qualitative method of inquiry follows to some degree the assumption that methodology evolves strictly from practice and although to some extent this may be true, it is also considerably influenced by worldview, or the beliefs and attitudes about the world we live in (Corbin and Strauss, 2008, p. 5). A case study deals with research on specific organization, program, or process and relies on interviews, historical documents and data analysis and some observation for data collection as a means of providing a deep, rich context in evaluation and exploration of specific instances of a phenomenon through the personal perspective of participants and their experiences (Yin, 2003; Creswell, 2006; Patton, 2002).

One objective of the case study methodology is to take the reader into a setting with vividness and detail not typically present in more analytic reporting formats (Creswell, 2006, Yin, 1994). This study aimed to seek out answers from participants to five research questions by utilizing an open-ended interview protocol. The responses offered by the participants as it was reported in the findings of this study highlighted the complexities of the phenomenon under investigation and participants’ perceptions according to their world views.

This study intended to learn about the participants’ perception and understanding of globalization, and to explore the implications of globalization on career planning and
course selection from the perspective of faculty and student participants. Faculty understanding of globalization and its possible implication for their programs, and to what extent the faculty was able to transfer their knowledge into the classroom was an integral part this inquiry. CTE as a workforce development mechanism was part of the study in order to explain the extent by which the design of CTE programs and courses reflected workforce preparation in response to globalization. It was to be anticipated that the discussion of such a complex topic would not yield cohesion of beliefs, thoughts, and ideas among all participants. Therefore it was important to explore those similarities and differences as emergent views according to the findings as outlined previously.

Corbin and Strauss (2008) stated that our assumptions about the inevitability of contingencies, the significance of process, and the complexity of a phenomenon direct us to examine problematic as well as routine situations and events. (p. 6). The views offered by participants and reported, as descriptively as possible, provided a lens which allowed the investigator to rely on the utilization of tacit knowledge (Lincoln & Guba, 1985) on participants multiple realities. Such realities highlighted stark differences of views and understandings. The results led to divergences of strong beliefs that only could be arrived at by acquiring a wealth of data to provide snapshots of individual experiences and utilization of a method to describe them to arrive at some conclusions.

**Emergent Themes and Divergent Views**

The student participants had high regard for their learning opportunities. Many participants found this combination of program choice and location to be a perfect fit to their current plans. Depending on their world view, some participants considered the implication of globalization for their field as real, while others felt that their programs
had a global audience and hence globalization was not a factor in their future plans. This Midwestern university is a leader in the field of career and technical education in the state and the college that participated in this study is a strategically located satellite campus that has made it possible for the college to maintain its leadership position in the state. The APRs compiled by the college considered the points expressed by the participants to be a factor in the college’s visibility and relevance to the local industries.

The academic program review (APR) is a program guide intended to serve as a link between the business community and the college to maintain the programs’ relevance to workforce development and alignment of those programs to industry needs. Faculty participants were certain of their personal abilities and their teaching methods by integrating relevant tools and technologies to prepare their students for future opportunities. Student participants were secure in their beliefs that what they had learned was the right stuff for the future and they had gained confidence that they were prepared to enter the job market. Faculty and student participants were confident that this college and the resources available to them was the best setting to teach and learn.

Those preparing for graduation had confidence in the institution’s reputation for producing high-skilled workers. These Participants had a strong sense that they were educated with the latest technologies in strong programs with robust core curricula that included various learning tools and features including various top brand-name hardware and software. This investigator was reminded by a faculty that during the tough economic times the CTE programs were viewed as the only logical place where people could turn to update their education and gain new skills.
The findings of the study also revealed some topics that were considered weaknesses of the programs. PDET program participants felt they did not have access to the same resources as the main campus. DAGD student participants were concerned that their program did not include an animation feature, yet it was titled Digital Animation and Game Design. The findings ranked satisfaction with the faculty’s expertise and education generally high. Simultaneously, there were those student participants that felt that some of the faculty did not have the skills and the expertise to teach in their programs. Most participants saw a lack of elective courses as a problem. They wanted to see courses offered that were reflective of current events pertinent to their personal and professional growth, such as learning about cultures and global issues which might have an implication for their field. Some participants saw the need for the college to offer courses that are complimentary to their current courses and program in order to bridge the gap between programs that could benefit from such multifaceted connection.

Overall, student participants reflected a more positive view of their college, their instructors, and the courses they were taking. They felt prepared to take the next step with skills, confidence, and enthusiasm. The participants saw their education to be aligned with required skills needed for the work environment, although some considered lack of adequate resources and complimentary elective courses as an issue for the college to consider.

**Purpose of the Study**

The purpose of this descriptive case study was to explore the impact of globalization on students’ career planning and program of study choices enrolled in career and technical education (CTE) programs at Midwestern state university. The goal
of the study was to explore the critical factors influencing student participants’ and faculty’s perception of globalization and translation of those understandings into career planning and teaching. The study also sought to explore the factors contributing to the spread of globalization and understand the role of the university in a global labor market, in regards to student preparation to meet the challenges posed by globalization of education and competition for skilled workers.

This case study’s aim was to explore the impact of the phenomenon of globalization by gaining a deeper understanding of the nature or meaning of participants’ everyday experiences and more precisely, what was the meaning, structure, and essence of lived experiences of the phenomenon of globalization for these groups of people (Patton, 2000; Creswell, 2003, Marshall & Rossman, 2006). Narrative of data collected from participants (N=15) as reported in Chapter Four, revealed that depending on the program of study, responses gathered reflected many similarities of understanding of the impact of globalization and differences among the participants emphasizing an innate and expected divergence of views reflective of their experienced and or lived realities (Burke & Christensen, 2004).

Review and utilization of data in addition to findings from the interviews as previously reported, and university’s academic program review (APR) as a guideline to assess and evaluate the effectiveness of the programs offered at this university reflected both the positives and the shortcomings of this process. Secondary data used in the study was offered to create relevance for the reader while capturing useful information (Creswell, 2003). The program plans offered here corroborated the intent of introductory questions asked of participants and faculty during the interviews. The data review and
analysis gained from APRs for all three program plans; Digital Animation and Game Design Program (DAGD), Manufacturing Engineering Technology Program (MET), and Product Design Engineering Technology Program (PDET) were incorporated in this chapter to enhance and strengthen the findings of this study and or allow for comparison of various divergent views.

The findings of this study were gained by interviewing three faculty members and 12 student participants. This represented a very small sample of the population at this college, and the results were not viewed as a representative sample of the population at large. No attempts were made to consider this a full perspective of participants’ experiences and or to generalize these findings to this specific population, but that these findings were considered relevant from the perspective of the consumer of these findings.

Research Questions

Background Information

The two initial background-type interview questions were designed to learn from student participants as to why they chose this university. The faculty was also asked to share some information about their educational and work experiences. Student participants cited the college’s location, program offerings, and family ties with the university as three primary reasons among others, such as teaching methodology (contextual learning), for selecting this college.

The finding of this study also explained some of the reasons that student participants chose this college and the programs it offers. Among the considerations cited were the location of the college, ease of access, class sizes and hands-on learning. Participants valued contextual learning as opposed to just learning about theories as an
important element for selecting this school. One important characteristic of student participants’ rationale for selecting this site was that the college was offering the various engineering CTE-related programs and courses that the participants were interested in taking. Another major advantage for the participants was that these programs were offered in their local communities, and that helped students to save time and money while being able to take classes in the evenings. Students believed that the practical, hands-on features of many of these programs lend themselves well to the strong industrial and the manufacturing base in the state. This was a plus for students in order to remain in contact with the local industries involved in product design and manufacturing.

According to student participants from the Digital Animation and Game Design program, the program was considered to be the first of its kind in the state. Because of the strong CTE programs at the university level, students from outside the state and even other programs from within the university transferred to this college to better prepare themselves for a future in technical fields. The APRs also stated that one positive feature of various programs at the college was that students could transfer to programs that best appealed to them and their future goals. Due to the location of the college and a strong industrial/manufacturing base in the state, many student and faculty participants, and data contained within the APRs, believed that existences of such local programs helped to open doors and create multiple opportunities for the graduates of these programs in various manufacturing settings. Regardless of the courses they were teaching, student participants saw a value in their teaching faculty coming from the industry, such as DAGD instructors. These faculty brought knowledge of animation and game design and software development backgrounds to their classrooms.
Many of the instructors also maintained ties with their entrepreneurial activities which was a valuable prospect for students to emulate. This in turn provided an access point to the local studio level experiences for digital animation and game design students especially since the state is not a well-known place for such programs. Project-based learning was considered a strong feature of these programs whereby students felt they gained the necessary skills to be prepared for employment.

Transferability of earned credits to other programs or schools was an important consideration for the participants. They believed that their programs were advanced and fairly evolved, highlighting the depth of teaching when coupled with hands-on learning, and faculty knowledge and experience. One participant shared his confidence and enthusiasm for his field of study as he stated, “They always say service spreads wealth where as manufacturing creates wealth. I see that the country needs more manufacturing and I feel that I can help.” The sense of confidence by the participants suggested that they were convinced of their learning and the skills gained, and were certain that they had the technical abilities necessary to compete and succeed.

In faculty members view students were attaining the necessary technical skills as an essential skill set that was complimented with the utilization of various well known applications readily used in product design and manufacturing plants, and software-intensive industries. Most participants had been exposed to and had gained a variety of skills through working with specific software used in their fields of study such as CNC, CATIA, Pro-Engineer (Pro-E), and other well-known engineering specific software. Digital animation and game design program participants had the opportunity to pursue a variety of options in their field due to skills they had gained. These students utilized a
number of multimedia software such as Adobe Photoshop Suite, 2D and 3D applications, and learned about programming to create a link between their fields of interest. Although there are varieties of these software on the market, one cannot learn them all or buy them all as one faculty stated, because they are very cost prohibitive, but the students will end up with a good start.

Many of the students stated that they chose to attend this college because of their family ties to the school. The university had created the opportunity for alumni’s children to attend the university on scholarship. This was one of the reasons that some of the participants were enrolled at this technical college. Some had scholarships because their father or a member of their family had graduated from the university (especially a technology program). For others it was the role of a member of the family, mainly a father, that was an engineer and yet for others it was their personal love of designing and creating new things. One participant reflected “my father was a big push. He has always dealt with manufacturing in one form or another and I knew that I wanted to get into that type of industry.” Money (income-earnings) as an incentive was not given a high priority in their decision to become an engineer.

One important aspect mentioned earlier by students and especially faculty was that this university was in a unique position to offer both its current students presently employed and those in need of returning to school to retool and relearn more about new technologies; the opportunity to update their skills, and to get a degree that was relevant in the marketplace. This was a strong motivating factor as to why many participants chose this technical college as the most logical choice to get trained. Many participants viewed the location of the school and the program offering as a way to enhance their
education and skills while remaining close to their homes and to their work. The colleges’ location provided a strategic advantage to the students to be in close proximity of some of the largest and well-known design and manufacturing centers in the country. This offered the students a better chance to compete for jobs statewide in general, and local jobs in particular, at any level. This explanation was also backed up by faculty as they viewed CTE programs as one viable source of retooling and getting an education that would help their students and returning students to remain competitive.

The student participants’ view of their faculty member’s education and experiences was a plus to these programs. Many had brought years of private sector and academic experiences to their classroom. The faculty members experience seemed to serve the college, the programs, and program participants well because students’ perceptions often restated this view. As part of academic program review in a report from a 2006 graduating class, made available by the university to this investigator, a general open-ended question asked PDET students to share their comments about their instructors and the program. Some of those comments are offered here: “Thanks for a great education. I am proud of my degree from the college; Professor’s (name) cannot be surpassed in his ability to instruct difficult topics, enjoyed classes and instructors. I recommend the program to anyone who was interested in product design.” Sample comments offered here highlight the overall satisfaction of the student participants with their program of choice. These comments juxtaposed to current student participants’ perception of the teaching faculty were in line with what the findings of this study revealed. It is relevant to state that there were differing comments and opinions, but they
were in the minority and mostly directed at the structural (leadership issue) more so than to the faculty or a teaching dissatisfaction.

**Summary**

The findings reflected the student participants’ choice of this college for various reasons; location, evening classes, scholarships to alumni children, and most importantly program choices. Students were confident of the skills they had gained. Faculty felt that they were teaching high-end classes, as did the students. Students thought highly of their instructors. Both the students and faculty believed that they were using the latest technology in the classroom. Student and faculty believed that this was the only college offering courses relevant in the current labor market. Both the faculty and the student participants felt that getting a degree in just any program was not going to be helpful to the employment setting. DADG was the first program of its kind and students believed that the transferability of credit earned both within the university and outside the college was an important factor to attend this college.

**Research Question One**

What do students enrolled in CTE programs know about globalization? This research question set the tone for the rest of this study. A stated goal of this study was to explore what the student and faculty participants knew about globalization. All participants to varying degrees had an understanding of a working definition of globalization. Various understandings offered by the faculty and students included the interconnectedness of the world in many aspects such as global economies, impact on jobs (U.S. jobs), immense advances in relevant technologies, international transportation systems, collaboration between U.S. firms and foreign companies, outsourcing of jobs,
and increased competitiveness. Globalization from the perspective of participants was the removal of traditional barriers erected around the societies, opening the door to more cultural exchanges, and better understanding of people from around the globe. The majority of student participants believed that globalization has an impact on every aspect of their lives; not just jobs or money, but everything. Faculty participants saw the role of globalization impacting current and past students due to competition and job losses.

Another feature of globalization as stated by the participants was that the advancements in communication technologies allowed for easy flow of information between countries whereby people from all over the world took part in global exchange of ideas and products. One participant compared the globalization to the “urban sprawl of the industrial age.” The implication of globalization was offered more so from the perspective of global effects; participants and faculty from manufacturing and the design field viewed globalization as a net loss of jobs, while software engineering faculty and students viewed globalization as “a good thing” relative to the development of their field globally. For DADG students, their products have a global consumer, but for MET students and faculty, it means outsourcing of plants, and therefore, jobs, to other parts of the world where cheaper labor is the key.

The implication of globalization as perceived by some manufacturing students meant that America was losing its focus as a center of globally well-known quality product manufacturer by importation of lesser quality goods from other countries. Participants stated that investment in manufacturing was one way to reduce this effect, because to them this meant a serious decrease in self-sufficiency to produce goods for internal consumption and for export. From students working either in manufacturing or as
interns, their first-hand experiences reflected the view that many countries globally reaped immense benefits from this imbalance of internal production to import of foreign goods impacting the U.S. economy and jobs, such as Caterpillar building factories in Russia and India. China and India were especially seen as the major beneficiaries of outsourcing of American jobs to their countries.

The student and faculty participants believed that such drastic shift in the manufacturing environment has far-reaching implications for the U.S. economy and its ability to compete globally. Globalization also was considered as a vehicle for manufacturers to be able to design a product in one place, produce it yet in another, and market it in multiple locations. This feature of globalization was considered as an influence on cultures and various economic structures with global implications.

Participants believed that globalization had a positive effect on some underdeveloped countries due to major advancements in technology and the changing role of education. Globalization, despite cultural differences and language barriers, persisted and spread faster than previous historical events due to the effectiveness of modern communication technologies. Participants generally felt that globalization encompasses many things influenced by technology and computers. For example, the local, national, and global business environment, its impact on people’s lives and lifestyles, tolerance of other religions and cultures present in modern work environments, and society at large. As one participant reflected, these are now normal occurrences as we see people from other cultures in our schools, factories, colleges and so on. There was a belief on participants’ part that basically everything was representative of an idea that things are changing on a
worldwide scale, connected together, and evolving with time. This idea underscored the notion of global interconnectedness.

Results reported thus far highlighted the student participants’ understanding of globalization which to some extent shared several similarities with those of the faculty. Faculty perception of globalization was an important aspect of this study. The faculty views, perceptions, and understanding of globalization coupled with or resulting from their education and lived experiences had a bearing on how they translated their understanding and the implications of globalization into the existing programs in their classrooms. Faculty participants considered globalization as a fact that we are now connected as part of a global economy. People used to work locally, where as today, they are inclined to travel to where the jobs are, locally or internationally.

“Globalization means the joining of remote portions of the world into a much more unified operating economic and social system: stated one faculty member. We’re mostly interested in the industrial implications of this process, whereas these remote locations provided low-cost labor units and used to provide services that are more expensive here. Globalization has helped to shorten the distances between physical geographic locations due to major advancements in technology, and has removed many of the restricting governmental and social barriers. All three faculty participants, to some extent, believed that globalization will level-off in the future, due to changes ranging from the transformation of quality of life to cooperation among societies. Some examples of these changes are evident in improvements in quality of life in countries like China and India, where Chinese workers are seeking unionization of the labor force, demands for healthcare, and higher standards of living. This leveling off will take time. While this
situation is working itself out, the quality of life for displaced American workers in general, and the middle class in particular, begins to decline, reported from the faculty perspectives.

The preceding statements elaborated on the similarities of understanding and perceptions of faculty and student participants, as it related to the discussion of globalization, as derived from their experiences. To reiterate, manufacturing faculty’s view of implications of globalization to some extent mirrored that of their students. That was also true of software engineering faculty participant’s view of globalization as a positive development for their field and the diversity of ideas and development of best practices.

Relevant to research question one, the student and faculty provided adequate examples of their understanding of globalization. They mentioned various points often cited in the literature related to this topic such as removal of traditional barriers and irrelevance (death) of distance to conduct business on an international scale. The influence of technology and advancements in global communication technologies, and improvements in transportations infrastructures, were viewed as a contributing factor to the spread of globalization and the intensification of competition. The findings as stated from the perspective of student and faculty participants highlighted the nature of the competition associated with the job, as skilled workers must go where the jobs are. Globalization posed serious challenges for some participants highlighting negative influences of this phenomenon, while providing room for a positive view of this event, such as in development of cultural links, diversification of ideas to benefit the global
community, and development of best practice to ensure better use of human capital and natural resources.

**Research Question Two**

How do students enrolled in CTE programs understand the implications of globalization for career planning, course selection, and the desired degree in their field of study, and what is the teaching faculty’s understanding of this process? This research question brought into focus two topics as distinct categories to further discuss participants’ views, understandings, and perceptions regarding the factors contributing to the increased global competition: (1) reporting on the impact of globalization on careers and programs of study chosen by the participants; and (2) faculty’s role in providing a path forward cognizant of global changes in skilled workforce development.

**Contributing Factors to Increased Global Competition**

Current literature reflects a view that globalization spurred on an era of unprecedented global competition for cheaper labor and resources, contributed to the emergence of new economies and markets, and inclusion of global cultures into a mix of a new economic model. Views on this issue as expressed by faculty and student participants highlighted a shift in paradigm, where manufactures in search of cheaper resources and cheaper labor, both skilled and unskilled, moved their operations to where they could best maximize their chance of competing globally. The example used before was a company like Caterpillar building plants overseas. This to participants meant less jobs for them. Participants’ perceptions reflected an understanding of one aspect of globalization that was directly related to a global job market. The issue of jobs and search for skilled workers in some markets with adverse consequences for other countries like
the United States was understood as countries go where they can be profitable. As one faculty stated, consequently, some support jobs (such as engineers and product designers) are lost when plants close.

The competition for global markets, in participants view, had evolved differently than the traditional search for markets. Student participants’ understanding was expressed as: in today’s global market the manufacturers go where the customers are located. John Deere building a plant in Russia and many other major American manufacturers looking outward to produce many of their products was a good example offered.

Participants generally felt anxious about such development where their jobs were being moved to another part of the world. The outsourcing of jobs was viewed as a serious barrier to finding good paying jobs in their local communities. Student participants’ believed that due to these developments they had to consider moving to where the jobs were, anywhere in the world. The student participants saw today’s labor force trained and mobile with little ties to their small communities. Students saw the cost of goods produced in the U.S., (as one participant reflected) due to a higher labor and material cost, to be one reason as to why American manufacturers look outward. This outward (outside the U.S) spread of American financial and technical know-how is helpful to the people of the countries that are the beneficiaries of these moves, while the American skilled workers find it hard to maintain a decent life style. As one faculty reflected, today in China they are demanding better wages and benefits and one student participant reflected that they are driving “Cadillac Escalades and living the good life.”

The competition for finding and keeping a job, and the decrease in their income potential,
in participants’ views, were sources of concern while their competitors were gaining more benefits from these exchanges.

To CTE students in MET and PDET, manufacturing was very important to the nations’ economy and jobs that are related to it. As one participant echoed: we deal with manufacturing and engineering and when our jobs are sent overseas, that is going to definitely impact how many jobs are going to be here, as manufacturing creates jobs. Some participants saw the competition from China and India as a source of concern because their entry into the labor market impacted their careers. As one participant put it, “I am competing with some sharp people from China and India. That’s who I am competing with.” As the older generation of engineers get ready to leave the job market, this should make it easier for the new generation of engineers to take their place. In participants view this reasonable assumption in today’s labor market had a negative effect as the job losses have continued.

Participants attributed this to cooperation between different manufacturing facilities and their counterparts, more automation, and bringing people from all corners of the world to manage their product development and production. Participants in manufacturing stated that Caterpillar uses a process that allows their Indian workers to come to the U.S., get trained, and go back and produce the product there. Both the student participants and faculty believed that the education that foreign competitors were receiving in their home country made them more prone to compete with U.S. skilled workers. The skilled workers in China or India do the same job, for much less, and are more apt to do a better job. “We have to be more versatile because competition is greater now,” echoed one participant.
Faculty believed that competition from workers from around the globe made it harder for their students to compete. Some contributed this to cultural differences, work ethics, a new found zeal, and the opportunity to improve the quality of their lives by the skilled workers in the new economies.

Despite the stated understanding of most participants relevant to the impact of globalization on the job market in a global setting, there were those who believed that all was not lost: We are a technical school, said some of the participants. We focus on a lot of computer-related technologies and programs. Because of this, they did not see much downside to what they were doing. They explained that the literature they read states that their specific industries are constantly growing and sales show it as well.

**Impact of Globalization on Careers and POS**

Technical requirements of today’s jobs are markedly different from those of the past generations. As stated previously, the National Research Council (NRC) report, *Research on Future Skilled Demands: A Workshop Summary* (2011) highlighted the changes in skill demand requirements of the current technical workforce due to rapid technological transformation and increased global competition. As the study by NRC (2011) indicated, the participants in this case study were not immune from this assertion. Although the majority of participants in this case study felt good about their future and confident in their preparation, these participants were also cognizant of the current realities of shrinking job markets, outsourcing of jobs from their hometowns to foreign lands, and stiff competition from highly educated and well-motivated competitors from around the globe.

The confidence and/or doubts in participants’ ability to succeed in relation to the
implications of globalization were dependent on the program of study or an employment field. This meant that the impact of globalization was varied from program to program or career opportunities. Participants from PDET and DAGD did not see their programs being as affected as did MET Participants, due to the nature of they were doing and the products they were producing. Some did not feel threatened about their job(s) per-se; because globalization was perceived to have more implications for manufacturing than designing a product or developing software.

The issue of globalization and competition seemed to have added a sense of awareness and heightened urgency to participants’ thinking, because they felt they had to be responsive and proactive in dealing with a work environment which was in constant flux. In order to be prepared, participants found it necessary to examine and learn about other competitors, their products, and to be aware of the changes by monitoring trends in the industry. They were mostly confident of their knowledge as they believed that their programs had prepared them well. They considered their programs as nothing but high-skill. A degree alone would not be enough to get a job and the technical level of knowledge was essential to employment due to rapid changes in skill set important for success in a very competitive labor market. This led to the conclusion that the employers have too many choices these days and they did not have to hire people because they were Americans. They had a large pool of skilled workers to choose from globally to do the job.

Confidence in their abilities, skills, and programs expressed by the participants was an important aspect of the discovery of how these experiences shaped their world view and how they assessed their chances. Participants with work experience were
concerned about the impact of globalization on their jobs, but also felt that the combination of their current education and acquired skills both on the job and being in school gave them an edge over younger workers. They had the confidence to effectively make a presentation to a large audience, to be better communicators and team workers. They found it easier to be part of an organization and a valuable employee with a voice. They were certain of skills they were gaining to improve their chances to keep their job and even go higher. One participant explained: the competition may be there but it is up to the individual to take action, learn to adapt and make you competitive and valuable to the company. You have to learn to be a project manager when asked, a troubleshooter when needed, whatever it takes.

Globalization to some student participants had an added value where by diversity of ideas from around the globe were considered a good thing for their field, where they got to work with people from around the world and exchange ideas and learn from each other. This seemed to validate one of the faculty’s ideas of global exchange leading to the development of best practices to the benefit of all. Meanwhile, one participant explained that our leadership on the global stage is dependent on our ability to train our people to do those high-skilled jobs or to produce high-end technical parts. Student participants clearly articulated that we are not just competing with our friends and neighbors; our failure to prepare for this eventuality will hurt us more. America has always been viewed (at least by the American people) as superior to other countries in many areas. As one participant reflected: this is what drives America, the desire to be better than the rest, and this drives us to keep improving.

Faculty responding to consequences of globalization and its impact on CTE
programs of study drew varied responses. A consequence of globalization may be the income disparity between skilled and unskilled workers to the disappearance of historically relevant middle class workers to the U.S. economy. Globalization also had an unintended influence on graduate students from these programs working in the industry, as they were the victim of outsourcing of the lower paying manufacturing jobs to other countries because their jobs were tied to those manufacturing plants. Even though their jobs and skills were relevant, and they were not production workers per-se, moving the production facilities elsewhere meant loss of jobs for those in support positions in a manufacturing facilities. Therefore, as stated by a faculty it can be concluded that as assembly jobs move to cheaper labor markets, displacement of trained, skilled workers tied to those industries may result in loss of employment not only for the production line workers, but those in product design and engineering fields leading to further competition for jobs at home with differing consequences for workers and the national economy at large.

As stated previously, due to these unforeseen fluctuations in the work environment, faculty in MET and PDET believed that more and more students and people return to school looking for something that cannot be relocated, notably medical careers, where the product is created and used here on site. This would not be as easy to avoid in some other technical areas such as mechanical engineering. Consequently, it was relevant to explore if this was something that the university should plan for, or modify its approach to program design, with an awareness of the impact of globalization. It was also relevant to explore to what extent if any this may impact graduated and current students. Most of the faculty participants’ responses seemed to suggest that they did not see any
evidence that their institution was making any significant changes in terms of the effects of globalization. It was understood that perhaps it should be the case, but they did not see any evidence of that.

Due to the changing nature of jobs as a consequence of global technological revolution, in concert with the National Research Council report’s findings, the faculty in the software engineering program reflected that the software design, game design, and animation planning, process, development and marketing of ideas have changed dramatically from individual perspective to larger, more resource- and skill-intensive domains. This faculty indicated that software development was handled in small teams and groups just to make a living, but in today’s market, to reach your audience around the globe the game has changed. Such a fluctuation in the field requires short-term as well as long-term planning in order to be able to compete on a global scale. As competition levels intensified and the level of technical competence of the competitors from all parts of the world increased, it placed a greater importance on developing resources needed to compete with others. However, faculty—just as some of the student participants in DAGD—saw a value in competition among nations to the inclusion of diversity of ideas and development of more standards and practices beneficial to the global community.

As outlined thus far, globalization has managed to directly or indirectly have an impact on various issues relevant to the premise of this study. One issue important to preparation and training of a technically skilled work force in a global economy was to understand and explain the role of faculty in institutions teaching CTE programs, and how globalization may impact this process. Faculty responses centered on a shortage of qualified and trained faculty and the essential role of CTE in training of the workforce
considering the influence of global competition. Responses ranged from getting qualified instructors that are current in the relevant technologies and the limited role of career centers that are far behind in the training of students interested in a technical education. Both the student and faculty participants viewed acquisition of a foreign language as an essential component of preparation to compete for jobs in a global economy.

**Research Question Three**

In order to obtain a job in a globally competitive labor market, some pre-requisite skills have been deemed essential as outlined by SCAN’s report (1991), Career and Employability Skills (also called basic skills) by Zinser (2003) citing (Hollenbeck, 1994), and also the previously cited by National Research council Report authored by Anderson-Koenig-Rapporteur (2011), and numerous other employability skills reports, all of which are predicated on the fact the educational institutions and their teaching faculty must be cognizant of these required skills. The 3rd research question, How do faculty, teaching students enrolled in CTE programs, translate their understanding of globalization into the programs offered to students and what is the students understanding of this process, was offered to explore responses to this question as an essential component of this study. The literature on the topic and faculty views clearly state that the employers today have a vast pool of skilled workers from around the globe to choose from and hence, imposing more impetus on skilled labor developers to anticipate, prepare and adapt teaching strategies and skills that are essential to their products’ success as outlined in university APRs.

Globalization of the economies around the world especially in developed and emerging economies from mostly a manufacturing base to a highly technical knowledge-based structure demands skills that are specific. Today’s workers must possess a highly
developed set of skills designed to not only meet the markets need but also to be able to evolve as dictated by market demands. What are some of these skills? Can they be taught in a college setting? How do students learn them and how does faculty understand these needs and are they able to transfer their understanding to the classroom environment? As stated previously in this study, Zinser (2003) referred to the understanding outlined by Fallows and Steven (2000) as they described the role of the faculty at the university level in implementing employability skills across all curricula and all disciplines to ensure that students will graduate with skills in information retrieval and handling, communication and presentation, planning and problem solving; and social development and interaction.

The study revealed that both the faculty and the student participants generally agreed on the kinds of skills that were important on the job. Skills such as good communication, (both written and verbal), public speaking (making presentations), being able to read and write effectively, exercising common sense, community involvement, respect for self and their peers (co-workers), and active involvement in actions related to their field, are all seen as essential parts of the required skill set. Additionally, faculty participants due to their experiences in the private sector were more inclined to include what employers require (prefer) in a new employee. A new employee must be familiar or competent on the tools that they currently use. These employers also want the new hires to have a broad enough knowledge and background in basic science, to be flexible enough to adapt to the changes that inevitably will occur. It seemed that faculty shared in their belief that students must know the relevant technology in their field, be fluent with different paradigms used in the industry and acquire various skills to include team building; the ability to work on projects originated in a different discipline; for example,
a programmer working with a 3D artist, as an integral part of tool and skills set required for their success.

In the context of skills required in a globalized workforce, programs offered at this location were considered to have a quite high level of technology integration, writing reports and technical communications, and presentations both as individuals and as team members in various courses. In order to offer a way for students to learn these skills, this study indicated that students often receive an open-ended design decision-based problem in order to utilize decision making and versatility in their approach to troubleshooting and solving the given problem, demonstrating relevant skills. Students were being trained to see themselves as experts in their field and be able to manage a project to its conclusion.

It was important to learn about the relevance of classroom teaching with real world applications, and the utility of skills learned by the students. The finding of this study indicated that the faculty participated and encouraged their students to explore various opportunities that were presented in the form of job shadowing, internships, job site visits, and encouraging and allowing students to attend job fairs and trade organization shows. Although this practice was not universally employed by instructors, most believed a form of these opportunities would be useful to them and their students. One of the problems cited by the participating faculty was the time constraint placed on them by their teaching schedules, activities, and related duties. This limited their ability to utilize such options more often. However, they utilized trade group representatives to come and speak to their classes.

The APRs also explained the relevance of faculty’s role to their own professional development, as well as their students’ development and understanding of the current
issues impacting their world and their work. The APR from DADG program reported the role of the faculty as working on developing and maintaining industry relationships. The faculty were encouraged and supported to attend industry events, such as the Game Developer’s Conference in San Francisco. By doing so, faculty often attended this week-long event on their own time, because such activities helped them to learn about the latest in their field. The college also encouraged students to attend the same conferences and supported them as they presented portfolios at career fairs.

The DAGD program APR (2010) explained the goal of the program built on the foundation of core concepts derived from the “edutopia,” an educational foundation created by the famous producer, George Lucas, emphasizing “Integrated Studies, Project Learning, Social and Emotional Learning, Technology Integration, Comprehensive Assessment and Teacher Development” (p. 11). These points were an essential component of this case study as well as outlined in the literature review to explore the relative influence of such topics to student success and career preparation.

The DAGD program APR for the most part verified many of the observations and comments made by the faculty and the student participants. Areas discussed included immersion of the students in the “real world” challenges, and building skills to meet those challenges through building animations and games much like what they are supposed to do in the real world of work. Additionally, the DAGD program APR stated that although students search skills and the use of the internet is good, this is to the detriment of developing acceptable social skills essential to the work environment. Therefore they worked to build students’ people-skills, continuously worked to develop their teamwork skills, and critique their peer interaction in a supportive environment.
All of these steps were certainly deemed appropriate where students could see firsthand whether their skills and what they had learned were relevant and timely in pursuit of their careers. The findings stated that although there were financial restrictions and limitations hindering the faculty’s ability to be more up to date with technology, after returning from a field trip they would have a lot to discuss. To a certain degree, students’ exposure to technology was at the same level or in some respects ahead of some manufacturing plants. Faculty did not see their observations from tours and job-site-visits as an agent of change; instead, they relied on their advisory committees’ recommendations as outlined in the departmental APRs regarding program evaluations.

The study’s finding found multiple points of agreement among student participants and their faculty regarding skills acquisition, teaching methodology, and student learning. Student participants overwhelmingly gave their instructors high marks for their knowledge of industry, for their work experiences in the industry, and translation of their knowledge of the work environment into their teaching as a positive, in their teaching styles. Student participants also deemed teamwork, good communication skills, and using common sense coupled with their technical knowledge as essential to their success. The majority believed that their classroom work and the types of activities they were doing such as researching and writing technical reports, working individually and in teams to make class presentation, and problem solving by using an open-ended case analysis method to arrive at a solution was credited to their instructors’ knowledge of skills necessary to succeed on the job.

An important aspect of this study was that it revealed that student participants, just as outlined in the cited literature in this chapter, saw the value of linkage between
multidisciplinary approaches to teaching. This meant that a software designer and a programmer would come together from two different backgrounds and find it necessary to work together to develop a better product. They must be able to communicate their differing perspectives on a job, lending credence to teamwork, adaptability, and blending of various technical components of a project. The attempt to teach the value of collaboration between programs advocated by the faculty was helpful to get the students to see the problem from another perspective by learning about that field (e.g., programming) to widen the scope of the possibilities.

It appeared that although most students participants were clearly impressed with their instructors knowledge and what they strived to achieve, that this was not a commonly shared view among the participants. The review of collected data revealed that some programs were more dependent on individual work than team work. Data pointed out that in some programs, communication and group work was missing from the course work, but it must be reiterated that in the last year such programs have started to integrate more group activities into the coursework.

To summarize, various issues of interest were reported on from student and faculty participants, and inclusion of data from APRs in an attempt to understand the role of the faculty in workforce development activities in a global environments with an implications for the CTE programs offered at this college. Students were satisfied with their instructors’ knowledge and teaching abilities, utilization of their experiences into relevant skills development, and participation in professional development to learn about trends and update their understanding of changes taking place in their fields.
Faculty encouraged and offered their students time to participate in career fairs and conferences, attend job site visits, participate in internship opportunities, and utilized industry representatives as speakers to benefit their students. APRs, reflective of the views and perceptions of the advisory committee members, viewed the role of the faculty as an essential component of relevant training cognizant of employers needs.

**Career Outlook**

Career outlook in the local, national, and global economy, tied to the needs of the employers was pertinent to the preparation process by career developer and skilled job seekers. As stated previously, colleges and universities in the business of offering CTE courses must have an understanding of the factors influencing their decision-making related to courses offered in the context of global economy. The faculty and the student participants’ view of this preparation process and their confidence in skills taught and skills sought in anticipation of meeting a perceived or real need was important to explore from their perspectives. To state it clearly, what are the jobs that are in demand, and to what extent does faculty translate their knowledge and experiences into marketable relevant skills that students in CTE program can utilize to gain employment in skilled fields?

In view of faculty and some student participants, it was important to point out that workforce development process was facing difficulties that were further complicated by the global trends. For example, outsourcing of jobs, plant relocations to other parts of the world in search of cheaper labor, willing to work for much less, and cheaper material and resources, created more uncertainty for students in engineering programs. An understanding was expressed by the students and faculty that in order to improve this
situation, colleges involved in CTE programs needed more financial resource to be able
to be effective in what they were trying to accomplish. This meant that the colleges alone
would not be able to fix all that ails CTE system of career development. To overcome
these difficulties, the faculty and student participants’ expressed that without major
investments from other sources such as business and industry, and a long term plan to
address these issues by the federal government, these issues will persist. Some student
participants viewed this as a choice that the country had to make addressing the issue of
education in general and CTE programs in particular as a major component of the
educational system in the U.S.

It is also important to mention that the days where companies such as Ford, GM,
or Chrysler or any other national manufacturing plant can have thousands and thousands
of workers at various levels are a thing of the past. Downsizing, corporate restructuring,
global competition, outsourcing, and technological revolutions in manufacturing and
production offer manufacturers other options to remain competitive with less works and
more automation.

The findings indicated the instructional setting had become much more
technology intensive. Faculty worked to keep their repertoire of knowledge current and
sought diversity in their ranks for both the students and faculty to better face these new
challenges. For some student participants it was difficult to elaborate on their career
outlook. Some found it to be a tough question even if they had the skills and the
experience and were often on the lookout for a better company or a position to work to
gain employment. They utilized job search websites, talked to people they knew, but they
saw their instructors’ knowledge, experience, the connection with the industry, and their input as the most relevant tools.

Due to the uncertainty of the labor market and a perceived shortage of engineers, especially in the manufacturing field, and fluctuations for skilled labor needs of the employers, the findings pointed out that companies were hiring mechanical engineers and training them to do the job of a manufacturing engineer. The job fairs, visiting worksites, and perusing through trade publications to learn about the job trends in the market offered some insight on prevailing trends for some student participants. The university collected data through a survey of the job market as it was also reflected in the departmental APRs where students could learn about their careers. The data revealed a variety of approaches to learning about jobs, trends, and career outlook. This included word of mouth, to attending industry-specific conferences, and joining in-school clubs and activities. Despite these varied offering of ideas, it was difficult to get a feel for the true nature of the job market for these future graduates preparing to enter the job market.

The findings, while explaining the difficulties of the situation, also highlighted what the faculty and student participants viewed as a positive trend in their field. MET-APR view of the program expressed its visibility and distinctiveness due to its unique, diverse and project-based experiences that this program offered as a positive. It also allowed the integration of articulation agreements between the secondary and postsecondary schools to be utilized to make it possible for students to continue their education in the field of their choice. The MET-APR additionally offered students more choices of concentration in multiple fields. In addition to utilization of world-class technology course offerings, the MET-APR also stated that communicating with industry
standard process documentation—meaning that the students were able to learn to utilize various tools to keep track of their progress such as flow charts, Gantt charts, process sheets, operation sheets, and other similar tools.

Students believed that they were skilled and were prepared for joining the job market. This was illustrated by examples offered by both the faculty and the student participants that major industries were taking these graduates seriously, and many had already obtained a job while doing internship to join some of these companies after they graduated. Faculty viewed their program as strong and relevant to the job market where the students had multiple opportunities to work in various fields. Many students felt that they will be able to get jobs in their field and cited the recent increase in hiring as an example of that. Additionally many students believed that they had a strategic advantage because they attended a school that was offering engineering programs in a state with a strong technical manufacturing base.

Students, particularly from PDET and DAGD, viewed their chances as optimistic because they were not in manufacturing, but involved in the design side of the product development. DAGD students felt more optimistic because their field had a global presence and was not bound by geography. Student participants from all three programs believed that the trends in their fields were looking better each day. Faculty members were more cautious due to a long-term view of global development; nonetheless, they felt that use of cutting-edge technology, development of internship, and industry presence was all positive for their programs. Another perspective was expressed by the student participants that were already employed. Although in college, because they had jobs, they viewed that as a positive due to the skills they had gained from working, and the skills
they gained by attending school, updating both their education and technical know-how. Their understandings painted a wider, more confident view of their prospect not only to keep their jobs but to grow with it. Their understanding of work environment due to their daily interactions in the work setting, and the responsibilities and requirements that came with having a job, gave them an edge when compared with younger, less experienced student participants.

**Research Question Four**

This research question was designed to explore how and to what extent does the design of CTE programs and courses reflect workforce preparation in response to globalization? The discussion of this topic with faculty, student participants, and the review of the academic program reviews (APR) data collected at various stages, highlighted some topics for consideration. Among the issues of interest were the faculty role, curriculum design, instructional methodologies, technology integration, skills development, and assessment pertaining to the development of CTE programs.

CTE for the purpose of this study was referred to by faculty and the literature reviews as a major component of career development. Many of the topics under investigation had in some form been discussed in previous questions such as the use of technology, hands-on problem solving, integration of technology in various forms to aid student learning, critical skills development, job site visits, internships, and use of online resources, to mention only a few. Each program sought to a varying degree to establish program practices that rivaled those of the industry. Generally, APRs all reflected on the needs of the industry while attempting to meet those needs.
One dimension of the collected data as referred to in the APRs was the collaboration between university and private industry, and what was needed for this partnership to be mutually beneficial. The role of the colleges was viewed as producing a product (their students) that was willing and able to meet various challenges posed by the work environment. That meant conducting surveys to collect data from past and present students, employers and the advisory committees charged with being a link between the employer and school. The use of this data was deemed a valuable tool in assessing, evaluating, and creating courses that had an outcome in mind.

MET-APR credited the visibility and the uniqueness of their program to the reputation that CTE programs enjoyed at this university. The faculty, and also as stated in MET-APR, believed that their programs were able to attract quality students as evidenced by higher enrollment rates, although they saw recruitment as an area of concern which was also alluded to by the student participants. All programs as reported in their respective APRs were focused on providing good education while utilizing the latest technologies available, such as the latest applications of CAD/CAM technology in response to the industry’s skill requirements and needs. DADG program APR was also clear about the role of the current software and technology used in their classroom and its currency to the present industry needs.

Faculty explained their positions, their responsibilities, and the various roles they played in their respective programs. They also acknowledged the needs of their programs seeking various alternatives to improve on their current situations especially in regards to the adequate funding of their programs. One faculty expressed concern that in order to avoid obsolescence, not only at this university but nationally, it would be essential to
take the role of programs like this seriously so as not to fall short of producing the best skilled workers ready to compete. The collective experience of the faculty in this academic field and their knowledge and background of the industry was a plus for these programs. Faculty experiences when assessing employers’ needs and their ability to meet those needs was a key factor. Faculty tried to remain up-to-date with their own skills and worked to keep their students and courses they teach up-to-date as well, while remaining abreast of the changes in the industry in order to better prepare their students. The findings reflected the faculty’s view that their courses were designed to use the best tools and technologies to keep their programs relevant.

Faculty and student participants both believed, as it was also reflected in the college APRs, that public-private partnership was essential to workforce development. An issue of importance in this process was the role of the private sector in helping to develop a method of collaboration that was helpful to both the colleges and the employers. Data from faculty perspective revealed that the faculty and the college were counting on the private sector/industry to keep them informed of the trends and the requirements for the new jobs or skills that are in demand. From the faculty member’s perspectives, the private sector was not usually reluctant to do this, but such collaborations as indicated through the findings typically lacked any significant long-term vision. The proposals that were made by the industry were usually for a recommendation for a shortage that the employers had today. These recommendations often come from the advisory board or from industry in general, to start a certain program or a certain skill. Consequently, by the time these requests were put in place and integrated into the current curriculum, these programs would come to find out that the employers no longer wanted
it and had moved on to something else. This pointed out the difficulty of developing a meaningful working relationship between these stakeholders.

All recent and relevant literature to workforce development for a global economy indicated a certain level of prerequisite academic and technical skills of the new workers. As explained above the faculty were concerned that, given the hierarchical decision making structure of education, what was expected of them by the time they got to implement what was recommended, it was too late and the company had moved on. This was a serious challenge and impediment in the process of developing a highly skilled workforce that was adaptable to fast changes in the work environment. However, today skilled workers are expected to possess those skills and abilities as advocated by faculty and the college APRs. As one faculty appropriately pointed out; “It’s important to stay current and on the leading edge, it is inadvisable to follow the leading edge too closely because it tends to produce a lot of ‘boxcar effects’ where you’re starting to make significant changes with little basis one way or the other. And if you spend significant time and effort acting on an impulse, you detract from your efforts in the long term for a better strategy.”

Faculty agreed that the departmental APRs are a good tool if used for their intended purpose, which was to listen to all pertinent ideas offered, and to make the programs more efficient and effective. Through APR recommendations, resources are invested in various ways; programs are placed on probation, modified, dropped or dramatically improved. Most faculty agreed that APRs were important tools in gauging student perception about their programs, how to improve instruction; review the collected data from various stakeholders such as faculty, advisory committee, and the alumni, to
implement change. The findings pointed out that the collected data was not used to that end. Adequate program funding was a key determinant of program effectiveness and success. However, CTE programs often saw a fluctuation in funding year to year due to the current economic trends, especially in the state.

By evaluating the data gained from the results of the study, in relation to use of collected data available in APRs’ it was learned that this data could impact program effectiveness if utilized as students and faculty believed it could. The review of data in this study revealed that the majority of the student participants were not aware of the academic program review as a process designed to steer the curriculum towards their stated objectives linked to their programs. It was also important to state that the faculty had a mixed opinion of APR and its purpose and use, and how it could help their programs if reviewed and considered carefully.

The majority of students and faculty, however, believed that access to such data will be helpful in the planning stages for the students as they plan to enroll in a program. As an example, DAGD student participants expressed their dissatisfaction with their program being called “Digital Animation and Game Design” while it did not offer animation as part of the course. PDET students expressed their concern about lack of adequate resources in one location as opposed to the main campus. Faculty also viewed lack of online courses and resources directly relevant to their program as a shortcoming of their program because they believed that these are the tools used in the industry for research and troubleshooting and their students need to learn how to use them while in school.
From faculty and student participants’ perspective, the available data contained within each APR was deemed useful information for decision-making, for students to learn about program perception from past graduates, program relevance to their career objectives, and program selection, including saving time and money. For the college, as a stated goal, this was viewed as a tool to align its program offerings and training to meet the employers’ needs.

The findings of this study clearly highlighted the importance of CTE programs to the college, and the state. CTE programs as expressed by the faculty and understood by the student participants were clearly the best choices available to train and prepare workers in need of relevant, technical skills. Some faculty believed that the structure and the visibility of the programs they offered at this college made it an obvious choice for people to return to school to get a skill set relevant to the job market, and an education to match that expectation.

The APRs provided a wealth of data on various topics gathered through surveys from faculty, alumni, present students (enrolled at the time of data collection) advisory committees, and the employers, all offering various levels of advice and feedback to the program directors at the college.

To summarize, programs offered at this university, enjoyed the recognition of the name and the visibility and the relevance of their CTE programs to the state workforce development efforts. CTE was viewed as a viable place to get the necessary skills in demand in the job market and a degree with relevance to future employment. Although these programs enjoyed some successes, faculty were concerned about their budgets and the possible cuts to an already difficult situation. Faculty’ believed that CTE programs,
due to the nature of the product that they produce, are very expensive to run because of the high cost of technology, software, machinery and the related equipment and supplies. This creates uncertainty in their programs and its future.

**Research Question Five**

This question was asked to seek out and explain some of the similarities and the differences of understanding of the issues relevant to this study as expressed by the faculty and student participants. The findings as reported thus far highlighted more agreements than disagreements among participants on issues discussed.

Most student participants believed that their faculty was well-educated and possessed adequate experience and the knowledge of the industry to guide them through their program. The faculty believed that their programs offered the latest technologies coupled with hands on experience to meet the needs of their students. Student participants were in agreement with those assertions. Student participants did have a good knowledge of globalization and the role it was playing in their quest for education and the necessary skills to obtain a job. Faculty members were similarly apt at transferring their knowledge of globalization and its implications for the new generation of skilled workers into their classrooms.

The faculty and student participants viewed globalization as a major influence in loss of jobs, due to global competition and outsourcing or off shoring of the manufacturing plants to the other parts of the world. Student participants and their faculty clearly understood that today’s job market demands skilled workers that must be prepared to go where the jobs were. Despite these challenges students were confident that they were prepared to compete but for some faculty this presented a point of disagreement.
Some faculty believed that some of their students lacked proper social interaction skills, and good work ethics as compared to those of their global counterparts. Some students, due to factors in their pre-college experiences did not have the organizational ability to manage their course load. Some of these difficulties were manifested in students’ ability to read and write well, and be effective communicators. This was also linked to the college students’ ability to take charge of their own environments. This must be reiterated that the findings stated that the older, employed students were much more aware of their realities.

Faculty and students as also explained in the PDET-APR, agreed on expending recruitment efforts not just limited to the current inter-technology courses but to eliminate the 2+2 approach and of a 0-4 BSMET degree program. Faculty and students saw the current administrative structure of the college of technology as having a negative effect on the PDET program, and agreed that every program needs to have an adequate opportunity to participate in administrative and recruitment activities. As explained by students previously, facility improvements could significantly improve program’s image including; climate control and offering each senior PDET student individually assigned studio space allowing them to complete their capstone project activities.

The role of technology was viewed as an important counter-balance in the education of the participants and the teachings of the faculty to offset the implications of globalization. Students and faculty participants believed that utilization of high-end and relevant technologies in the form of software, hardware, and other related equipment was the essential ingredient of acquiring skills deemed necessary for technologically savvy workers and their ability to compete in a global labor market. Both group of participants
viewed APRs as a valuable tool in sharing of information and the alignment of university’s objectives to meet the labor market needs.

Role of Secondary Data

Secondary Data

This study was conceived to seek answers to the research questions through various sources, and for this purpose, a brief overview of what other sources see as a labor market issues was presented. This data will corroborate, reject, or offer an alternative set of facts to further explain the relevance of CTE, the findings of this case study and the views presented from the students, faculty, and university’s perspective. The three sources utilized are APRs, Boiling Point? The Skills Gap in U.S. Manufacturing, sponsored by Deloitte on behalf of Manufacturing Institute (2011), and Bridging the Skills Gap (2010) report by ASTD (Galagan, 2010).

A skills gap is defined as (Galagan, 2010; Skills Gap, 2005; Skills Gap, 2010) a significant gap between an organization’s current capabilities and skills needs to achieve its goal, threatening an organization’s ability to compete, and threatening the effectiveness of an industry and ultimately a nation’s economy. The challenge then is to provide a mechanism that will prevent such an event from taking place.

A question was asked of the employers participating in PDET program survey; indicating any difficulty in hiring qualified mechanical/designers during the last year (2006). Table 2 and Figure 3 show the results:
Table 2

*Hiring*

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<tr>
<td>Total</td>
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<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3.* Hiring Experiences over the Last Year

*Figure 3.* Hiring Experiences over the Last Year
According to Morrison et al., (2011) the employers were asked: In which of the following operational areas has your company experienced the most difficulty due to workforce shortage or skill competencies? See Figure 4.

![Bar chart](image)

Figure 4. In Which of the Following Operational Areas Has Your Company Experienced the Most Difficulty Due to Workforce Shortage or Skill Competencies?
*Source Deloitte Development LLC and The Manufacturing Institute

Galagan (2010) citing American Society for Training Development report, *Bridging the Gap*, employers were asked: What are the specific skills gaps that your organization is experiencing now? See Figure 5.
**Figure 5.** What Are the Specific Skills Gaps that Your Organization Is Experiencing Now?
*Source of data: [www.astd.org](http://www.astd.org)*

One of the challenges for the workforce preparation in a globally competitive work environment is to find the right talent, and achieving this objective leads to an organization’s ability to meet both its short and long-term strategic objectives. The challenge is to train or find trained employees according to Skills Gap Report (Morrison et al., 2011) that is the hardest to find in the workforce which represent operational
impact for businesses (p. 9). Figure 6 is the result of a question asked of employers of what workforce-related factors do you consider when setting your corporate strategy:

![Bar chart showing workforce-related factors considered by employers when setting corporate strategy](chart.png)

**Note:** This is a multiple selection question, percentages may not add to 100%. Base used is 1123.

**Figure 6:** What Workforce-related Factors Do You Consider When Setting Your Corporate Strategy?  
*Source Deloitte Development LLC and the Manufacturing Institute*

Presentation of such data has an implication for CTE programs and workforce development planning. It is important to state that majority of the data collected in two of the APRs’ represented a very small sample that was too inclusive to consider in this part of the study. All data and figures presented here vividly pointed out to a dramatic need for improvements in the nations’ workforce development strategies with CTE as a primary component of that approach. The secondary data sources utilized here clearly explained the pointes that that findings articulated.

**Implications of the Study**

This qualitative case study, focused on learning about the impact of globalization on various aspects of educational opportunities of students enrolled in CTE programs at a Midwestern state university, providing a wealth of understanding about the topic under
investigation. The responses provided by the participants were thoughtful, relevant and reflective of their experiences. This study to a great extent provided valuable data provided by the participants on viability and relevance of CTE programs to workforce development. The finding expressed participants’ convictions, confidence, and an enthusiastic view of their education, acquired technical skills, and certainty of success.

Career and technical education (CTE) has a long history relevant to workforce development with a focus on education for jobs coming from the perspective of such well-known advocates as John Dewey. Coupled with federal legislation (Stone, 2002) and the requirements to measure and create an accountability system of such academic performance (Levesque et al., 2000) CTE offers opportunities in creating a link between the general education and vocational education not viewing one inferior to the other, but complimentary in purpose. CTE’s focus through program development has been to meet the employers’ needs by developing a workforce that is technologically well adapted.

Student participants from the three programs taking part in this study revealed their confidence in their knowledge and skills and preparedness to enter the global competition for job. Historically, the CTE has not been viewed as an integral part of education, but it has been perceived that students in these programs are not academically prepared; that is a falsehood from the perspective of college faculty, student participants, and colleges offering CTE program. The finding of this study reiterated the role of CTE in the stressed economic times where more people enroll in CTE programs not just to get a degree but to update their skills and to be able to compete.

The findings of this study expressed how much CTE has changed and how faculty have attempted to integrate various tools and skills in their teaching to prepare their
students. Much has been done to recognize the integration of general education outcomes across all curricula including CTE, as stated by Feutz (2010) (citing Humphreys, 2009; Meeder, 2008). Although various multidiscipline approaches have been at the minimum advocated, the total outcome integration has not been the norm. Although, this is what majority of the students participants saw as a valuable outcome, there is more work to be done.

An in-depth and thorough understanding of the role of CTE in U.S. economy is essential, especially in a state with such a strong manufacturing base. This university is among the top universities in the state offering career and technical education courses to state-wide and national clients. Given the current state of the economy, especially in this state, and because of impact of globalization due to competition, loss of jobs due to outsourcing and off shoring, consequently, with the growing presence of globalization many Michigan-based manufacturing businesses have shut down. Therefore, a finding of this study was that in tough economic times, CTE programs are the only place where people can return to update their education in order to get a job. It is essential not only to provide workers with the opportunity to get educated, but it is equally important to spend their resources to get a degree in an area that can get them a job. A degree alone does not equate to guaranteed jobs.

According to Harrison (2008), new initiatives have been created in Michigan that focus on education and training technologies (citing Chalofsky, 2003; Cherry, 2004; Fortune, Shafflett & Sibley, 2006; Danger, 1997; Michigan Center for Career and Technical Education, 2007; Petrova & Claxton, 2005). The question here is whether these initiatives address the problems or deal with the symptoms. The colleges and universities
alone cannot address these issues. This study indicated that funding level fluctuations from year to year weights heavily on CTE program planners (college) and their faculty, to plan adequately, based on the industries’ needs. As it was also indicated through research, such efforts require a vision at the state level and a national commitment to invest in workforce development. As one faculty participant stated, the policy makers and leadership at various levels recognize the problem. They do. But often they lack the vision and the foresight to plan for the future. The consequences of such inaction could lead to further deterioration of America’s global standing.

Even though the organizations may have skills gaps, they will not be filling them from the rank of unemployed stated Galagan (2010, p.4). According to Galagan (2010) editor at large for American Society for Training and Development (ASTD), citing Anthony Carnevale (1991), director of the Center on Education and the Workforce at Georgetown University, “Recessions accelerate the trend to eliminate low-wage, low-skills jobs,” notes Carnevale, “and those jobs don’t come back.” Instead, companies create jobs requiring more education and skill (p. 4). The nature of the work and the required skilled has changed requiring a new way of assessing future workforce development strategies. In an ASTD report Galagan (2010) stated:

In a 2009 ASTD Skills Gap poll taken by 1,179 organizations, 79 percent said there is a skills gap in their organization now. Fifty-one percent said that the number one reason for a skills gap in their organization was that the skills of the organization’s current workforce did not match changes in strategy (p. 8).

Such statements have serious implications for education and educated and technologically trained workers. This also represents a serious impediment to a nation’s ability to compete on global scale. Galagan (2010) cited Martin Scaglione, President and
Chief Operating Officer of ACT’s Workforce Development Division stating “these skills are necessary for the United States to compete in a global economy” (p. 10).

**Recommendations for Future Research**

The findings of this study provided a large amount of useful data relevant to the issue of globalization and its implications on various facets of education and training of students enrolled in CTE programs at this college. Among many of the insights gained from this study, the issue of consistency in funding of CTE programs weighed heavily on the future role of CTE as part of the educational system in the United State and its future role in workforce development.

Faculty’s expression of uncertainty from year to year, especially in stressed economic times, pointed out the need to explore ways to learn about what CTE is, what it does, what its role in training and educating technologically skilled individuals is that can help U.S. workers compete with the rest of the world in the future. Recently, the President of the United States, Barack Obama, in an address to the joint session of Congress stated: “The United States must out-educate, out-innovate, and out-build the rest of the world” (From the excerpt of the text released by The White House, February 10, 2011). This is a noble goal, but how do we get there?

The findings of this study clearly established the relevance of CTE programs to a viable workforce development strategy. It is, therefore, the stated recommendation of this study regarding a need to explore alternative approaches essential to re-tooling of CTE programs in the form of addressing alternatives and workable solutions to the funding of CTE programs. Because the findings of this study clearly stated the concerns expressed by both the student and the faculty participants in recognition of cost of developing,
sourcing, and implementing CTE programs responsive to the needs of national labor market.

This study utilized data from the student and faculty participants’ perspective while utilizing other artifacts such as program APRs. There was a wealth of data to review and translate into an understanding. Chief among those were that the student participants believed they were getting a good education while understanding that due to competition for jobs lurking in every corner, they may have to go where the jobs are. They perhaps recognized that they too must be proactive in taking steps to further their learning and their skills. Many of the student participants were satisfied with their instructors’ performance and the experiences they brought to the classroom.

Faculty believed that integration of various technologies in their classroom was important in educating their students. They understood what the employers were looking for related to the skills essential to their students success. Skills such as teamwork, reading and writing well, good communication skills, planning, punctuality, respect for self and their peers, possessing the ability to troubleshoot problems, and good decision-making and critical thinking skills. It is important, as stated in one APR, that although the students were good at utilizing internet technology, this did not necessarily translate into good social skills. There are many things the educational institutions can do, and teaching workplace etiquette may be a timely intervention.

Conclusions

President Barack Obama during a weekly radio address to the nation from The White House on February 5, 2011 stated:

To get there, we have to realize that in today’s global, competitive economy, the best jobs and newest industries will take root in the countries with the most skilled
workers, the strongest commitment to research and technology, and the fastest ways to move people, goods, and information. To win the future, America needs to out-educate, out-innovate, and out-build the rest of the world.

This quotation captures the essence of what this qualitative case study was about. This study sought answers to the proposed research questions from the participants’ perspectives. Many conclusions were derived including the view of the CTE programs as a viable alternative in tough economic times, offering a logical choice for people to turn to when the labor market is stressed, where displaced workers could improve their education and upgrade their skills. One short-term result of this event was higher enrollment in CTE programs. Globalization not only was responsible for the removal of many traditional barriers from a business perspective, but it was also viewed as a contributing factor in recognition of diversity of ideas, diversity in faculty selection, and student recruitment. The findings, from the participants’ perspectives, indicated that diversity meant infusion of new ideas, leading to better programs, products and development of best practices to benefit everyone.

Faculty understanding of the corporate culture and prevalent norms and values were essential to individual success, and student participants seemed to share in their understanding. Many traits were considered important in what employers valued most such as: loyalty, problem solving skills, getting the job done, confidence in self, the team, the organization, decision making, promptness, and going above and beyond what was required, and being adaptable. Another finding emphasized not only the skilled gained by the participants but also their academic knowledge of the core sciences, coupled with project management, and thinking outside the box. These were just a few of the characteristics mentioned by the faculty and the student participants. The student
participants mostly were cognizant of the reality of globalization, strong competition, and outsourcing of jobs, but they were also confident of their ability to compete. They were aware of to the fact that they must be proactive, prepare well and may have to go where the jobs were, anywhere in the world. Faculty members were much more in tune with these new realities. Their knowledge of the industry and understanding the requirements for the new work environment offered a positive look into how they were helping their students and developing their programs.

Based on the findings of this study, the implications of globalization and competition for jobs, as stated thus far, seemed to be more programs, or field of work-oriented phenomenon. The Digital Animation and Game Design students did not see these implications as restrictive as it was viewed by the manufacturing and product design students. Even the PDET students saw the impact of globalization to have more impact for manufacturing program than product design. This was because DAGD students viewed their product as needing a global exposure to develop and mature and they were fully prepared to move if needed, whereas manufacturing students were tied to their local facilities. When a plant closed, the support personal like MET engineers although skilled, were left behind.

This study also revealed that students were confident of their abilities more so if they were already employed. They felt that their education and experiences was a plus. However, the insight gained from this study indicated that multidisciplinary approach to curriculum design may be a valuable consideration. The students wanted courses such as “A study of globalization” or a current-event course, relevant to their studies, added to
their course-work so that they had a better perspective and understanding of the issues affecting their lives.

Academic program reviews utilized as part of this study added a new perspective from the policy- and decision-making side of this issue. The students and faculty participants expressed many of the positives highlighted in these documents to explain their programs’ values, relevance, and visibility with a stated objective of being responsive to the industry needs. But the participants also expressed that the use of data available in departmental APRs could be utilized to a greater extent, and made available to the students. Participants saw a value in APR data for purpose of decision making and course selection. The long-term view of career development opportunities, offered through CTE courses at this university included partnerships between private and public institution as a positive approach to improve workforce development.

The review of the findings revealed that some of the confusion in the manufacturing and product design fields may be due to lack of action and/or a global overview of the prevalent issues clarifying what the workplace requires and the way the workplace is going. The new workforce as stated through research and expressed by this study required a new skills-set for success. This success can be achieved through integration of CTE into the educational process as a relevant and necessary component of balancing academic with the technical knowledge of the next generation of skilled workers. The findings of this study reflected the eagerness of the student participants in joining the world of work with confidence and the necessary skills. This study highlighted the experience gained by the student participants, their confidence in their education and hands-on skills earned in the classrooms, labs, and internship
opportunities. From a faculty’s perspective globalization was a fact, and that the United States as a whole was currently undergoing an education of its own in terms of the impact of globalization.

The findings reported thus far were indicative of the fact that in a global economy everyone can be a competitor. The changes that used to take place in centuries now happen in decades. CTE programs such as the programs investigated for the purpose of this study were in the forefront of the impending changes yet to come.
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Appendix A

Consent Form, Faculty Participants
You are invited to participate in a study titled “A case study of how postsecondary students enrolled in CTE programs and faculty understand and assess the implications of globalization on career preparation.” The study will explore the experiences of postsecondary students enrolled in Career and Technical Education (CTE) programs and the impact of globalization on their education and career plan in a global economy. It will also explore institutional responses to globalization, role of technology in teaching, learning and student preparation towards entry into the labor market. This will serve as Mohammad Moradi’s dissertation project.

Participation in the study is voluntary and will include a onetime only, one hour in-depth-interview session. As student investigator, I have your permission to ask questions; use digital audio tape device(s) during the session and take notes. There are no known risks associated with participation in this study. You may not gain any direct benefits as a result of participation in this study, although greater self-awareness and or an enhanced sense of altruism may apply.

In order to protect your identity, the information collected from you will be kept in strictest confidentiality. I will create a master sheet of administrators and faculty participants’ names and will assign a pseudonym for you, and the program you teach. All recorded data will be destroyed after it is transcribed and coded. Neither your name nor any other identifying information will be recorded on the transcripts or in any published reports. The transcripts will be stored in Western Michigan University Archives for at least three years after the study closes.

This project has been registered as an expedited study with the Human Subject Institution Review Board at Western Michigan University in Kalamazoo, Michigan. I will destroy the data recorded using a digital audio recording device after data transcription is complete. At the conclusion of the study, all transcribed data will be forwarded to Principle Investigator to be kept...
in a locked safe or achieved at Western Michigan University Achieves for minimum of at least 3 years.

This study will be shared with my dissertation committee and other appropriate members of the Western Michigan University. You may refuse to answer a question or to participate, you may quit at any point during the study without penalty or prejudice. You can contact Dr. Richard Zinser at (269) 387-3007 or Mr. Moradi at (616) 570-1662 if you have any concern or question. You may also contact the Chair, Human Subject Institutional Review Board at (269) 387-8293 or the Vice President of Research at (269) 387-8298 if questions or problems arise during the course of the study.

This consent document has been approved for use for one year by the Human Subject Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

Your signature below indicates that you have read and/or the purpose and requirements of the study have been explained to you. You agree to participate voluntarily and you will not receive any compensation for your participation in this study.

_______________________________________  ______________________
Participant Signature                     Date
Consent Obtained by: ______________________
                                      ______________________
Initials of researcher                   Date
Appendix B

Interview Protocol Form Faculty
Study Title: 
A Case Study of How Post-Secondary Students Enrolled in CTE Programs and Faculty Understand and Assess the Implications of Globalization on Career Preparation

Please note: To save space, the other interviews will not include this introductory component.

Introductory Protocol

In order for me to be able to listen to your comments very carefully and facilitate -taking notes (if needed) during the interview, I would like to audio tape our conversation today. Please remember that I supplied you with a consent form during our initial meeting which you signed on to allow me the opportunity to audio tape our interview session. For your information, only researchers on the project will be privy to the tapes content which will be destroyed after they are transcribed. In addition, the consent form signed by you meets the requirements of the Human Subject Institutional Review Board Office at Western Michigan University. Essentially, this document states that: (1) all information supplied by you will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) that there are no known risks associated with taking part in this study.

May I continue?

This interview is planned to last no longer than one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary for me to interrupt you in order to push ahead and complete the rest of my questions planned for this session.

Introduction

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about globalization and its impact on students enrolled in CTE programs, their perceptions and the institutional responses on this campus to this issue. As a teacher/instructor in one of the three programs selected for this study, you role as a highly qualified individual is essential to my study. Your experiences about teaching and learning on this campus and improvements made to your programs over the years are important in this process. I am using a qualitative case study format with its primary focus on the issue of globalization, its impact on CTE students enrolled in technical programs and the institutional responses to the issues such as: course design, planning, implementation, Program evaluation and Academic Program review (APR), technology use, competition and workforce development just to name a few in responses to a globalized economy.
Current literature defines globalization as; the increased interconnectedness and interdependence of people and countries, is generally understood to include two interrelated elements: the opening of borders to increasingly fast flows of goods, services, finance, people and ideas across international borders; and the changes in institutional and policy regimes at the international and national levels that facilitate or promote such flows (World Health Organization). There are five converging concepts that include; technology, competition, emergence of new economies, demographic shifts, and political changes intensifying the rapid progression and impact of this phenomenon on global scale affecting all facets of our life.

There are four proposed research question and a conceptual framework that guide this study and are the focus of this interview. My study does not aim to evaluate you as a participant, but I am interested in learning about your experiences, perceptions, and plans as you lead the next generation of technologically advanced individuals toward careers of 21st century. I am trying to learn more about this institution and the opportunities created here in context of a global labor market where competition is intensifying at a much faster pace than ever before, and hopefully I will learn about the role of this campus and the educational practices that help improve student learning at this university.

Interviewee Background information on programs overview

“Probe” indicates a possible follow up question.
I will use the pseudonym (FP3-DMSE) that was assigned to you for purpose of this study to be used during this interview.
Q1: Please briefly share with me what course(s) you teach at this college?
Probes: Do you have any other roles and responsibilities and or serve in other capacities in course of your duties (such as committee, classroom, adjunct, etc.) on this campus?
Q2: can you please briefly provide a general overview the program(s) of study you teach and please explain how this program (s) is helping to prepare students for the employment after graduation?

Globalization
Recalling the working definition of “globalization”; competition, technology, new economy, demographic shift and political change, and consequently the interconnectedness of ideas and resources created on a global scale.

Q1: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of its impact on global economy. I am interested in your understanding of globalization. Therefore, in your opinion what is globalization and how and why it happens?
Probe: What is the long term impact of globalization on people, cultures, education, and job opportunities, and the global economy around the world?

Q2: Globalization is not a new phenomenon however, its impact has been much more pronounced and its pace much faster than in the 1st decade of the 21st century than any other time in history. In your view what factor(s) have contributed to the fast paced spread of globalization in the past decade?

Probe: It is widely believed that globalization is causing major changes in employment opportunities in a very competitive global environment. In what ways in your view globalization may impact or has impacted the field of Manufacturing Engineering Technology?

Q3: In your opinion to what extent schools offering CTE courses may be impacted by globalization and how?

Probe: If we assume that schools offering CTE courses are affected as a consequence of globalization, what their responses should be in taking steps in preparing students and combating the impact of globalization on their programs?

Q4: In your opinion, has globalization influenced or altered decision making at the institutional level in any way to reflect a response to change in focus as a result of globalization in technical and scientific career fields?

Influence of Technology:

Q5: In order to avoid using the terms “Computer” and “Technology” interchangeably, how would you define the term “technology” and what words would you incorporate in your definition? (I.e. Innovation, creativity, standard of living, advancement, concept to physical manifestation etc…)

Probe: In your view what is the role of technology in development of labor force as a factor intensifying fierce global competition for skilled and educated workers?

Q6: What type(s) of technology(s) are students exposed to in course a semester or a year within this program? Is the technology used by students in course of their learning different or the same as the technology used by business and industry? Please explain. (Trade specific or others). How might this be helpful to the students?

B. Individual Perceptions:

Statement: Globalization of the economy to a large extent and the shift of American economy from a largely manufacturing base to a more high-tech knowledge-based (information economy) are inevitable. Based on this assumption:

Q7: In your opinion, what kinds of employability skills are required of students graduating from technology based programs? What skills are considered essential by employers?

Probe: In your opinion, In addition to course work, what are some of the things that
students are doing or need to do to prepare for future employment?

It is understood that the highly educated and trained workers of tomorrow must possess three sets of skills. These skills are: basic skills, critical thinking skills and very distinct personal attributes/traits.

Q8: To what extent skills such as problem-solving, decision-making good communication and customer service skills are taught as part of the courses offered, in anticipation of preparing students for entry into the workforce?

C. Institutional responses

Q9: Considering your knowledge and experience working in this institution, over time, what changes have you witnessed taking place within this program to reflect change in response to shifts in labor market needs and demands or in response to changes brought about by globalization of workforce? I.e. has instruction delivery methods changed, curriculum, technology integration, etc…(more or less of it)

Probe: What kind of planning or change is taking place at the Program/department level currently at this institution to meet the challenges posed by globalization regarding the labor needs locally? And how do these changes impact student readiness for workforce entry?

E: Integrated Curriculum/ Program Evaluation/ Assessment

Q10: What is the role of technology in the current teaching and learning environment at this institution? In another word, how is technology integrated in the curriculum planning and content delivery?

Q11: It is my understanding that a process of program evaluation called “Academic Program Review” is utilized at this college with technology based programs. What is APR? Why is it used? How does it affect the programs offered and How does it benefit students?

Public-Private Collaboration:

Q12: In your opinion what role business and industry/public-private partnerships should have in helping to prepare students for future jobs? Please elaborate.

Probe: Are there any collaborative and partnership initiatives between public-private sectors and the university (business community) related to workforce development? If so please briefly explain how it works. If not, in your opinion should such collaborative efforts take place and how might this benefit both sides?

Q13PPC: Are faculty and students able to visit job-sites (how often) and talk with employers in the field to learn about their needs and latest trends? If yes, how is the information obtained incorporated into the curriculum planning? If not, what would you recommend to stay in communication with businesses and industry to learn about their needs?

Q14: What has changed or is changing in a globalized teaching and learning
environment, given the current state of jobs and global competition for skilled employees?

Research indicates that countries like China, India, and Russia are producing more graduates in science and engineering fields (although this assertion is open to debate). These graduates in return work hard, are innovative, therefore creating serious competition for U.S. graduates. It is believed that we are losing our edge in this area. If this assertion was true:

Q15: In your opinion what do you attribute this shortfall to and what needs to be done to overcome it?

Federal legislations (such as Perkins Act of 2006) or state and local initiatives have always played a strong role in development of CTE programs and consequently have impacted workforce development strategies.

Q16: In your view what needs to be done to improve the level of collaboration, cooperation, and communication between private industry and educational institutions to impact development of a highly skilled workforce to be able to compete in a global economy? Is this relationship necessary?

Final Comments: Closing

At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me
Appendix C

Consent Form, Student Participants
You are invited to participate in a study titled “A case study of how postsecondary students enrolled in CTE programs and faculty understand and assess the implications of globalization on career preparation.” The study will explore the experiences of postsecondary students enrolled in Career and Technical Education (CTE) programs and the impact of globalization on their education and career plan in a global economy. This will serve as Mohammad Moradi’s dissertation project.

Participation in the study is voluntary and will include a one-time only, one hour in-depth interview session. As student investigator, I have your permission to asked questions; use digital audio tape device(s) during the session and take notes. There are no known risks associated with participation in this study. You may not gain any direct benefits as a result of participation in this study, although greater self-awareness and or an enhanced sense of altruism may apply.

In order to protect your identity, the information collected from you will be kept in strictest confidentiality. I will create a master sheet of participants’ names and will assign a pseudonym for you, and the program you attend. All recorded data will be destroyed after it is transcribed and coded. Neither your name nor any other identifying information will be recorded on the transcripts or in any published reports. The transcripts will be stored in Western Michigan University Archives for at least three years after the study closes.

This project has been registered as an expedited study with the Human Subject Institution Review Board at Western Michigan University in Kalamazoo, Michigan. I will destroy the data recorded using a digital audio recording device after data transcription is complete. At the conclusion of the study, all transcribed data will be forwarded to Principle Investigator to be kept in a locked safe or archived at Western Michigan University Archives for minimum of at least 3 years.
This study will be shared with my dissertation committee and other appropriate members of the Western Michigan University. You may refuse to answer a question or to participate, you may quit at any point during the study without penalty or prejudice. You can contact Dr. Richard Zinser at (269) 387-3007 or Mr. Moradi at (616) 570-1662 if you have any concern or question. You may also contact the Chair, Human Subject Institutional Review Board at (269) 387-8293 or the Vice President of Research at (269) 387-8298 if questions or problems arise during the course of the study.

This consent document has been approved for use for one year by the Human Subject Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

Your signature below indicates that you have read and/or the purpose and requirements of the study have been explained to you. You agree to participate voluntarily and you will not receive any compensation for your participation in this study.

_______________________________________
Participant Signature
Date

Consent Obtained by: ______________________
Initials of researcher Date
Appendix D

Student Participant Interview Questions
Interviewee Background

I will use the pseudonym (i.e. **SP2-PDET**) that was assigned to you for purpose of this study to be used during this interview.

1. Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?
2. Please explain some of the key features of this program of study that got you interested in becoming a Product Design engineer.

**Probe:** What does a Product design Engineer do? Please share some of the reasons that you consider important in choosing this filed as a career for your future?

**A. Globalization**

1. The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?

**Probe:** It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor(s) is causing such a rapid pace in spread of globalization? It is believed that globalization has a far reaching affect on the life of people specially the developing world and the emerging economies. How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development? Can you further elaborate on some of the key features or components of globalization?

2. Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?

**Probe:** Have you experienced or noticed trends and or changes in the job market or more competition for jobs in your field? What does the future career outlook in context of globalized labor market looks like in your field of study? As a result of globalization, in your view, what are some of the reasons if any that are causing changes in the labor market demand?

Let’s for a moment talk about the technology and competition as two components of globalization:

3. In your opinion, how does globalization contribute to or intensifies competition for jobs, markets, resources and skilled and educated workforce?

**Probe:** Can you think about some other things impacted by globalization?
4. Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for high skill jobs? how do you feel about that?

Probe: Do you think globalization may impact or has already impacted your field and in what ways? What type of changes if any do you foresee as a result of globalization of labor market in employment opportunities given the very competitive global environment?

5. Could you tell me a little about some of the courses you are taking or have taken during the course of your studies?

Probe: Research conducted on behalf of the manufacturing industries tells us that In addition to the course-work as part of higher education, some other skills are considered relevant to the job market. In addition to the course-work while in school, In your opinion, what are some of the skills that are valued by employers? Are these skills taught as part of your education for workforce preparation? Do you think these skills are needed? How do you prepare for such skills?

6. Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view, how do we find out what kinds of high skilled jobs are in demand in the local and national labor market?

Probe: How do we know what employers are looking for? In order to meet the needs of the domestic industry seeking highly skilled workers, in your view, what are some steps or measures that can be taken to meet those needs? How do we go about learning what kind of skilled workers are needed in the industry and prepare accordingly? In your opinion what kinds of information may be helpful to students when selecting a POS towards a future career?

7. What factors influenced your decision to pursue your education in this program to become Product Design engineering?

Probe: What other factors other than the career itself, in your view, influenced your decision to choose engineering? Was your decision influenced by other considerations and how?

8. How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

Probe: Please explain few of the things you learn here. What methods are used by faculty teaching courses? Because of the advances in technical innovations careers of tomorrow are in constant flux. In your view, is this program going to meet the current and future demands of the labor market? is there a demand for the kind of skills you are learning? What does the competition for jobs in this field looks like?

9. In order to avoid using the terms “Computers” and “Technology” interchangeably, what does technology mean to you?
Probe: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

10. Is the technology (ies) use in the class the same as the technology used by business and industry? If different, how is it different? Please explain if these differences are helpful or a hindrance to student success? In your opinion, what would be the best way to prepare students to meet the employers skilled labor needs?

B. Individual Responses:
In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment.

11. I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market?

Probe: In addition to school work, can you share with me, what other activities do you undertake to improve your chances for employment and to learn about the world of work?

12. In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers?

Probe: In your opinion, what other opportunities offered by schools such as this can be helpful to students preparing to enter the job market? In addition to what you do, what can your school do to help you to get ready for work in a globally competitive environment?

C. Institutional responses

13. As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?

Probe: The labor market is changing, jobs and demands for jobs and skilled workers are in constant state of change. As the result of these external changes how this program has changed? In your view, have there been changes that reflect the need of the industry as a consequence of globalized completion, training for current jobs?

14. Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?

Probe: in your opinion does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching? How do they transfer that knowledge to the classroom? In your view does this transfer of knowledge about globalization beneficial to students and in what ways?

15. Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends?

Probe: In what way could this be helpful to the students and faculty? What is your understanding of those needs and trends? What characteristic are employers looking for in their skilled worker entering the job market?
16. To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce? What other ways you can employee to learn these skills essential to your career success? In your view, do employers value these skills and why?

Assessment:

This University, at least with Career and Technical Education (CTE) courses, utilizes a process called Academic Program Review. APR is completed every five years as an evaluation of the programs within the colleges. This process collects data from past students, alumni, employers, and other interested stakeholders in order to learn about the effectiveness of the programs and where to make improvement or change a program completely.

17. Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the students’ future educational and career planning efforts? In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

Final Comments: Closing

At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know. Thank you again for your time and I wish you the best.

Post Interview Comments and/or Observations:
Appendix E

Faculty Participant Interviews
Faculty Participant Interview #1

ID #

Date of Interview: 

Transcriber Name: Al Moradi

Length of Interview: 35 minutes, 14 seconds

Length of transcription: 8 pages

Opening Statement: Today is starting an interview session with Are you ready?

Q: Please, briefly share with me what course or courses you teach at this college.

ANS: I teach, well, on the freshman level, the sophomore level and senior level classes—junior level—I guess I teach at all four levels. As freshmen, I teach introduction to CNC and CAM. As sophomores, I teach the more advanced CNC/CAM. Juniors, I teach a CNC/CAM class to transfer students coming in. I also have a Productions Processes Two—or one class, which is an intro to the—kind of the senior Project class. I teach a Tolerance Charting class that most colleges don’t have. And then as seniors, I have the senior Project class.

Q: Can you please briefly provide a general overview describing the program or programs of study you teach and the purpose of these programs.

ANS: The purpose—uh, my main background is bringing students up to a higher level of technology that they’ll need once they get out in industry. That was one reason I was hired was for my level of technology and most of my classes I teach are along that same line.

Q: As you know, the term technology is often mentioned in conversations, newscasts, published articles and so on in the context of its impact on a global economy. I’m interested in your understanding of globalization. In your opinion, what is globalization and how and why it happens?

ANS: Globalization is the fact that—we are a world-wide economy anymore and it used to be when I was younger, people stayed in the state of Michigan when they worked. Then it went to the United States. Today, students are just as likely to work in France or Germany as they are to work here in Grand Rapids or Kalamazoo or Big Rapids. And so that’s what it is to me. People are working all over the world.

Q: According to your definition, what is the impact of globalization on cultures, people, jobs, education, and competition? How does that affect people’s life?

ANS: It—to me, it’s starting to level off the standards of living across the country or across the world I should say. Uh, in China, for a fact right now, they're
becoming union. They want paid health insurance, a higher standard of living and all that good stuff, and it’s moving on into other countries also.

Q: Now, globalization is not a new phenomenon. However, its impact has been much more pronounced and it’s pace much faster than in the first decade of the 21st century than any other time in history. In your view, what factor or factors may contribute to the face-paced spread of globalization in the past decade?

ANS: I’m going to say faster and bigger computers. The Internet, being able to transfer data worldwide now. Everything is needed now, not in two weeks or three weeks like it used to be.

Q: So in your opinion, it is the Internet communication technologies that’s really making that process possible?

ANS: Right. Back in the days when we sent things through the mail, you had time to set back and think about what you sent in the mail and changes took longer. Today, changes go out, but changes, if they’re bad, quite often are implemented before somebody sits down to think about it and in-in a lot of ways, it’s bad as well as it is good.

Q: It is widely believed that globalization is causing major changes in employment opportunities in a very competitive global environment. In what ways, in your view, globalization may impact or has impacted the field of manufacturing engineering technology?

ANS: I’ve said for years we’re losing the middle class and the—you—there are no longer jobs—many jobs for the uneducated, you might say, somebody with just a high school diploma. There—there aren’t the number of jobs that my parents had, so you’ve got real low level jobs and then you’re going to have the higher level jobs that are paying a little bit better. You’re not going to have the middle of the road, unfortunately.

Q: In your opinion, to what extent are schools offering CTE courses, Career and Technical Education Courses maybe impacted by globalization and how? (Career and Technical Education Courses, what you are teaching—what you are offering, like manufacturing, product design, software engineering, etc.)

ANS: The biggest problem they have right now is getting qualified instructors. Technology has moved forward so rapidly that many of the career centers are still 10 or 15 years behind the times like many of the industrial companies in the United States.

Q: What kind of competition does that create from a global perspective? What does it have to do with us not having—?

ANS: It doesn’t create a competition for the career centers, but what it does mean is those students coming out are behind the times already and could have difficulty finding jobs.
Q: If we are certain that schools offering career and technical education courses are affected as a consequence of globalization, what their responses (students’ responses) should be in taking steps in preparing students and combating the impact of globalization on these programs?

ANS: One thing that should probably be required even at the career centers is foreign languages. Uh, today’s world we communicate all over the world. I’m lucky to speak English. My son speaks Spanish and he took four years of Spanish in high school, a couple years on his bachelor’s program. Really hadn’t planned on using it, He’s in a physical therapy program right now and he’s had numerous occasions when he’s had to use it and I see that in industry also. I deal world-wide and while I can communicate, sometimes it’s by sign language.

Q: In your opinion, has globalization influenced or altered decision making at the institutional level in any way to reflect a response to change in focus as a result of globalization in technical and scientific career fields?

ANS: The only way it’s affected us at Ferris is they’re now trying to market to foreign countries to get students to come to our college. In essence, it’s an untapped, uh, number of students that could possibly come to our facility.

Q: In order to avoid using the terms computer and technology interchangeably, how would you define the term technology and what word would you incorporate in your definition?

ANS: Technology is using the latest information and machinery or tools at your disposal.

Q: In your view, what is the role of technology in development of labor force as a factor intensifying fierce global competition for skilled and educated workers?

ANS: Technology can be used, uh, to help aid our workers in that they can be taught a job on the job by video, by reading, umm, more video than anything else because so many of our population today cannot read. In my freshman class, I use videos. I’ve tried paper handouts. It just says, “Click here. Click here. Click here.” They cannot follow it. They can’t read it. I create a video doing the same thing, they’ll put it up there in the left-hand corner of their screen, they’ll follow through it and they understand it. They cannot read it, but they can watch it.

Q: How does, in your opinion, based on what you just said, how does that affect their future prospect of competing?

ANS: I think it hurts it. I read—well, I’m slow anymore. I’m down to twelve to fifteen hundred words a minute. I used to be up over 2000 words a minute but I’m getting old and my job that I had at the shop where I was at was because I could read and I would read 20 to 30 magazines a month. It was my job to stay up to date doing research. When we got in new products, new processes, I learned them
first, then I-I wrote the training materials for our own guys. I created a great job just because I could read, and very few people today can do that.

Q: What type of technology or technologies are students exposed to in the course of a semester or a year within this program?

ANS: They are exposed to new cutting materials, new software, how to learn software, uh, and controllers for different pieces of equipment. They’re taught how to learn a controller, what to look for a wide variety of areas.

Q: Now is the technology used by students in the course of their learning different or the same as the technology used by business and industry?

ANS: At [BLANK], they’re using the same level. At most schools, most schools are way behind.

Q: Is that an advantage for students?

ANS: It’s a huge advantage. Since we raised the technology—the computer levels, the software levels and became with what industry had—it’s opened up our job placement just tremendously.

Q: In your opinion, what kind of employability skills are required of the students graduating from technology-based programs? In another word, what skills are considered essential in addition to school work by students?

ANS: They need to be able to communicate with each other. They need to be able to speak. They need to be able to write, which most of them have great difficulty doing. Uh, this—they don’t know what a sentence is and, uh, have difficulty writing them. Uh, they-they need to be able to communicate, of course. Uh, common-sense. Uh, I use the farm boy, uh, picture. Back years ago, a lot of farm boys up, we grew up working with our hands. We knew how to work with them and grew up that way. We knew what a wrench is. I have juniors and seniors who do not know what a drill is. They’ve never used a wrench. They don’t know what a hammer is.

Q: In your opinion, in addition to course work, what are some of the things that students are doing or need to do to prepare for future employment?

ANS: They need to do more community service work. Most students are afraid to volunteer. [BLANK], [BLANK], [BLANK], [BLANK]

Q: Question eight: To what extent are skills such as problem solving, decision making and good communication and customer service skills are taught as part of the courses offered in anticipation of preparing students for entry into the workforce? You mentioned a lot of them, but at what—I—the question really is are you teaching that as part of their learning process in separate formats or is this part of their learning as they go?
ANS: We try and get it in their learning as they go right down to like today, I had to talk with a young lady. but your language is getting awful course, and the four-letter words just don’t cut it. Break yourself of the habit now because otherwise, you’ll use them when you don’t want to. You may blow that job interview because of it.”

Q: Question nine, considering your knowledge and experience working at this institution, over time, what changes have you witnessed taking place within this program to reflect change in response to shift in labor market needs and/or demands in a globalized—

ANS: Instructors that have been willing to update themselves and upgrade themselves, uh, in the field of manufacturing. At , we have over 100 years of actual hands-on experience on our manufacturing staff and some of that as old as 15 and 20 years ago, and these people have been willing to learn once they see the newer technology, newer software, newer methods and they’re stepping up to the plate and learning them.

Q: Question Ten. What is the role of technology in the current teaching and learning environment at this institution? In another word, how is technology integrated in the curriculum-curriculum planning and content delivery?

ANS: We’re using a higher level technology in most of our classes. Uh, in doing so, we’ve been able to cut credits to save students money. We’ve cut, uh, hours out of lab times because of the technology. More engineering up front, less work out back and we’re actually doing more projects than we have in the past in less time.

Q: It is my understanding that a process of program evaluation called Academic Program Review is utilized at this college with technology-based programs. What is APR? Why is it used and how does it affect the programs offered, and how does it benefit students?

ANS: To me, it generates a job for somebody. The academic program review supposed to be the program justifying their existence on campus.

Q: There is no value to it?

ANS: From what I have seen and been told, there is no value to it.

Q: Then why do it?

ANS: We’ve asked the same question. . Take a look at our manufacturing technology office, how many people are in that office and most of them are sitting around, and we’re talking about cutting costs, and our offices went from office.

Q: In your opinion, what role business and industry/public-private partnerships should have in helping to prepare students for future jobs?

ANS: To me, there’s got to be a good co-existence. Colleges can help out business. Business can help colleges. The biggest thing is they have to communicate. Most businesses are willing to help colleges. Colleges have to get off their high horse
and work with the businesses and say, “Hey, this is what we need,” or, “Can we work together on this?” Business has been, from my experience, more than willing to help out, but we have to go out there and help them because they’re busy just trying to stay afloat, whereas we’re government funded, you might say, so we’re kind of on the light end and, but businesses are willing to help out, provided the colleges will get off their dead but and go out there and go after it.

Q: Are there any collaborative and partnership initiatives between public-private sector and the university related to workers development that you’re aware of?

ANS: Very little.

Q: In your opinion, should such a collaborative effort exist and how that might benefit the students?

ANS: Definitely it should exist and it would definitely help students by creating more internship, more summer jobs. Uh, many of these plants don’t realize they can bring on a summer student, pay them $12 an hour and come out ahead. Just give them a little project, giving them experience and a lot of companies don’t realize the value in that. There should be a joint effort. I worked for a company in [redacted]. They give a 100% paid scholarship to a student. They’ll pick up the tuition, the books. All the student has to do is work for them over the summer and if they don’t work on or have school on Fridays, they come down on Fridays. Work over the break a little bit. They get a wage. They get their tuition and like Greenville says, it’s not costing them a nickel.

Q: Question 13. Are faculty and students able to visit jobsites and how often, and talk with employers in the field to learn about their needs and the latest trends?

ANS: It’s really up to the instructor. Presently, uh, we try and get students out at least once a semester, uh, on a field trip some place, but it’s really up to the instructor to make the phone calls, set up the field trips and do it.

Q: According to what you just said, how is—the information obtained, incorporated into the curriculum planning and what would you recommend to stay in communication with businesses and industry to learn about their needs?

ANS: It would almost take a full-time person in each department. It’s a full-time job. We’ve got—each of us instructors are carrying a full load. We’re trying to market to students in high school. We’re trying to get out to businesses on top of that, and there’s just not enough hours in the day.

Q: But anything learned, could it be translated into usable information in curriculum design?

ANS: Oh, yeah. Definitely. Definitely. Uh, at this point, we like to feel that we’re actually ahead of a lot of the plants around here and it makes for a good discussion when we come back. We can point out a lot of things that we’re doing that are at a higher level and that, to me, is where education should be. They should be the leaders, not the followers.
Q: What has changed or is changing in the globalized teaching and learning environment, given the current state of jobs and global competition for skilled employees? In another word, we are under pressure from around the world. (Clarification) Our education system really needs to be higher than what the industries really need. We’re the ones that are in the forefront of developing the workforce that can compete with the rest of the world. So do you see any changes in us teaching our methodology in order to be able to sort of, you know, prepare for that?

ANS: We have to change our methodology and it’s got to start back in the lower grades. Students have to be made to be held accountable for their own work. Right now, they’re not. When we get them as freshmen, they don’t know how to meet timelines. They don’t know how to study. They don’t know how to take notes and these are honor students in honor’s college and they’re used to retaking tests. They’re used to having their hand held, uh, and I could go on and on. Simply put we need to do a better job at lower grades in order to have students ready for college work load.

Q: Question 15, in your opinion, what do you attribute this shortfall to, and what needs to be done to overcome it?

ANS: Parents—it’s just—we’ve got—I-I forgot the question. What was the question again?

Q: Well, you are on the right track.

ANS: Yeah.

Q: Because we talked about, uh, education being really the primary focus and if we are falling behind and our students are—presumably are not able to compete with the others, and they have a problem with reading and writing and communicating and all of that, if all of that is happening, then there are some factors, and as you mentioned, parents being one of them, or parenting style being one of them and..

ANS: We have too many labels for students. I’m going to give you an example. I have a student right now, all through high school, he
Statement: I’m going to read a short statement and a final question. Federal legislation such as Perk-Perkins Act of 2006 or state and local initiatives have always played a strong role in development of career and technical education programs and consequently have impacted work-workforce development strategies. In your view, what needs to be done to improve the level of cooperation-cooperation, communication between private industry and educational institution to impact development of a highly skilled workforce to be able to compete in a global economy and is this relationship necessary?

ANS: What I would like to see is businesses pay an extremely high amount of taxes. To me, a certain percentage of that ought to be labeled to go back and to colleges to help with workforce development, such as our program. It—it’s extremely costly. There’s no way the college can afford $100,000 machines, uh, software packages like we’ve got and make money. There’s no way in the world that our program will ever make money for the college. Therefore, we are, every year, on the chopping block. Even though we turn out a lot of workers, manufacturing is where a majority of people work, but we’re on the chopping block because we can’t—the program costs so much. If they would take some of that tax database and help us out, reimburse the college for some of that, to me it’d be a—a great relationship and then also, we could work back and forth more.

Q: Well, at this moment, we have reached the end of our interview. I want to thank you for your—for you giving time to this study, but before I close, I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me.

ANS: No, I think that we’ve pretty much covered it all. I-I do feel that our whole education system has to change, and get some backbone in it again, starting right with kindergarten, right on the way up and grade inflation has to quit in the lower grades. There are some outstanding students, but it’s amazing how many of those students get once they get to college because they—they just weren’t held accountable early on. This idea that somebody can’t fail is ridiculous because we all fail, right?

Q: Well, then I’m going to make a comment and let you respond to that because this is why precisely I asked you. If this—if India and China—for example, India has
more honor roll students—this is based on statistics—than we have—or China has more honor roll students than we have students in all of our education, from kindergarten, you know, to doctoral level students in all of United States.

ANS: Yeah.

Q: Granted they have a larger population, but at the same time, that many highly educated students, it really poses a serious challenge to our de facto, you know, super power status.

ANS: But they’re starting in the lower grades and bringing them forth. Purdue University brings in 1,200 freshmen into their engineering program each year. Basically, it’s a headcount thing. All we want is headcount. We—we need to—in-in the United States, we’ve turned into a headcount thing. We want to turn out so many people. Nobody said anything about quality. Yeah, okay, I’m going to have them take some standard tests, da da, da da, da da. It still doesn’t give you an idea how they’re going to be held when they’re held accountable.

Q: Well, I want to thank you. I appreciate it.

ANS: Yeah.

End of Interview
Q: Today is November 23rd, 2010. Time is 6:00 and I’m meeting Are you ready, sir?
ANS: Yes.
Q: Please briefly share with me what courses you teach at this college.
ANS: I teach an assortment of Engineering Sciences, Statics, Dynamics, Thermodynamics, plus, numerous orientation and project-based courses.
Q: Do you have any other roles and responsibilities and/or serve in other capacities in the course of your duties at this university?
ANS: Yes, I’m a program coordinator for, two programs, and I previously have
Q: Could you please briefly elaborate on a general overview of the courses that you teach and how do they help students to prepare for labor market?
ANS: The objective of the program and the courses I teach is to prepare the students to assume a design role, mechanical design role, in a variety of industries, common to Michigan.
Q: Can you give me some examples of what’s out there in Michigan?
ANS: They might design furniture, they might design medical prosthetics. They might design containers such as we’ve had students that design Styrofoam products, for example. We’ve had students that design floor sweepers for commercial and for residential use.
Q: Recalling the working definition of globalization meaning; competition, technology, newer economies, demographic shift and political changes, and consequently the interconnectedness of the idea that resources on a global scale, the term globalization is often mentioned in conversations, newscasts, published articles and so on, in the context of its impact on a global economy, I am interested in your understanding of globalization. Therefore, in your opinion, what is globalization, and how and why does it happen?
ANS: I think globalization is more or less a joining of remote portions of the world into a much more unified operating economic and social system. Particularly in our area, we’re mostly interested in the industrial implications of it in which you find,
that remote, low-cost labor units can be used to provide services that are much more expensive here.

Q: How does globalization impact people, education, cultures, jobs, global economy, in the long term? What’s its influence?

ANS: I think in the extremely long term, that there will be a vast leveling worldwide. But that could be literally hundreds of years from now. I don’t know but, you can already see the beginning of various outsourcing projects to third-world countries where wages are very low, and immediately the wages start to go up, the standard of living goes up. At the same time, the jobs that are displaced here cause our standard of living to go down. I think eventually it will level out on a worldwide basis unless we discover another planet with a cheap labor source.

Q: Globalization is not a new phenomenon; however, its impact has been much more pronounced and its pace much faster in the first decade of the 21st Century than any other period in history. In your view, what factors have contributed to the fast-paced spread of globalization in the past decade?

ANS: I think there are two major factors: first, the ease of information transfer, Internet, electronic mail of various types have provided near instant access to any part of the world, and in parallel with that is, I believe that the worldwide transportation system has developed to the point that it can support globalization now.

Q: It is widely believed that globalization is causing major changes in employment opportunities in a very competitive global environment. In what ways, in your view, globalization may impact or has impacted the field of product design engineering technology?

ANS: There are number of students who have been in the program who had been displaced when their production facilities have relocated to, other countries—Mexico, China and the like—or their activities have relocated to other countries. Even though those particular individuals are not production workers, per se, they are manufacturing support workers and when the manufacturing operation moved, they were displaced as well as the actual assembly workers.

Q: In your opinion, to what extent schools offering CTE, which is Career and Technical Education courses, may be impacted by globalization and how?

ANS: Well, I think the short-term result is, as you have displaced workers, CTE programs are a very ready and logical choice for people to turn to in order to improve their education. So the first difference that you’ll see, I think, is an actual increase in enrollment in such programs.

Q: If we assume that schools offering CTE courses are affected as a consequence of globalization, what their responses should be in taking steps to prepare students—to combat or lessen the impact of globalization?

ANS: Oh, I think that the nature and the variety of CTE programs, will change as they are impacted by globalization. As more and more students, more and more people
are returning to school to look for something that cannot be relocated. Most notably medical careers where your product is created and used here on site. That is not as easy to avoid in some of the other technical areas such as mechanical design.

Q: In your opinion, has globalization influenced or altered decision making at the institutional level in any way to reflect a response to change in the focus as a result of globalization in technical and scientific career fields?

ANS: Oddly enough, I don’t see any evidence that, my institution is making any significant changes in terms of the affects of globalization. Perhaps they should have but I don’t see any evidence that they are.

Q: What do you attribute that to?

ANS: I think lack of foresight, lack of a global overview of what the workplace requires and the way the workplace is going.

Q: In order to avoid using the term “computer and technology” interchangeably, how would you define the term “technology” and what words would you incorporate in your definition?

ANS: Technology is, I think, just another word for tool. The technological aspect of it is usually reflects some type of tool with a relatively recent or contemporary nature to it. At one time, I think probably a metal ax was technology. These days it’s no longer the case. The term has been moved towards computers and other similar items. But technology at its most basic level is just a tool.

Q: In your view, what is the role of technology in development of labor force as a factor intensifying fierce global competition for skilled and educated worker?

ANS: Well, it is many different ways. First of all, you find that, technology invariably costs money. And so unless people are willing to make an investment, unless the money is available to make the investment, they’re not going to be able to maintain any technological advantage. Without a technological advantage, then you’re reduced to a simply a labor force, and it’s very difficult for a developed region to compete against less developed parts of the world or for developed countries to compete against less-developed countries on the basis of just being labor force. Also, I should add, that the technology also provides access to students who normally would have difficulty in accessing programs that can improve their employability. At the same time, it also offers access to the skilled work done in other countries. Here in the United States, for example, outsourcing of service call centers, outsourcing of IT services, outsourcing of CAD, outsourcing of dictation, things that you can now procure overseas by means of electronic communication systems that would be otherwise unavailable.

Q: So that’s really an inevitable challenge. We can’t get away from it. So what do we do to make sure we don’t lose more of it? What do we do to make sure our jobs can actually stay in the United States? As you know, one of the arguments is that
we are losing middle class more and more because we are losing those high-paying jobs and on the other hand, going back to the question of changing lifestyles and improving lifestyles of those countries like India, China, Ireland, Brazil, they’re gaining a much larger share of the, you know, middle class. So we are losing the section that can actually be a good, you know, income base, tax-base for our society. So how do we make sure that we at least maintain a solid footing rather than losing our edge?

ANS: I think it’s going to continue to be very difficult. I think that another aspect of technological development is it enables fewer people to do more and so a lot of the tasks that have been improved by technology now can be done by much fewer people, which means, I think, in the long term that a developed country in order to maintain a high standard of living will necessarily have fewer people with more developed skills and more technologically-advanced tools. And most of what used to be the middle class involving manufacturing and assembly will continue to be displaced.

Q: Question number six: What type or types of technology or technologies are your students exposed to in the course of a semester or a year within the programs that you teach? And is the technology that they’re using the same or different than what is used in business and industry?

ANS: It’s as close to being the same as we can possibly make it. We use all standard software packages as used in industry. We have an Industrial Advisory Board that keeps us reasonably current with what industry is using. We have the same laboratory equipment, except in the cases of the most highly-specialized machines. Generally speaking, have a pretty good relationship between our equipment and what is used in industry.

Q: Could you name a couple of the software specifically?

ANS: Yes. At the university we use solid modeling software by PTC Corporation, SolidWorks, Solid Edge and CATIA. All these packages have both CAD capability as well as manufacturing interface capability. We also use programs, specific to certain industries like Moldflow for plastic and injection molding. We use MathCad and various math based programs to do analysis similar to what is done in the industry.

Q: Globalization of the economy to a large extent and the shift of American economy from a largely manufacturing base to a high-tech knowledge base are inevitable, which we just discussed. Based on this assumption, in your opinion, what kinds of employability skills are required of the students graduating from technology-based programs and what skills are considered essential by employers?

ANS: Well, it’s actually kind of a twofold answer. First, most employers require/prefer a new employee to be familiar or competent on the tools that they currently use, such as they want them to be familiar with solid modeling software packages,
mold analysis packages. They expect the new hire to be familiar with these things. In addition, they also expect the new student to have a broad enough background in basic science to be flexible enough to adapt to the changes that inevitably will occur. So they want specific knowledge but they also want people with a general enough background that they can adapt to future change. And the last thing that they constantly talk about is the need for communication skills, both written and verbal.

Q: That was my next question. In your opinion, in addition to course work what are some of the things that students are doing or need to be doing to prepare themselves for future employment?

ANS: I think they have to seek out opportunities to be involved in activities that relate to their chosen profession. Be it in clubs or hobbies or internships or co-op opportunities. They have to make an effort to include that in their school.

Q: It is understood that a highly educated and trained workers of tomorrow must possess three sets of skills. These skills are basic skills, critical-thinking skills and customer service skills. To what extent skills such as problem solving, decision making, good communication and customer service skills are taught as part of the courses offered here in anticipation of preparing students for entry into the world of work?

ANS: We have quite a high level of integration of writing reports and technical communications. Within the program, we have an extensive communication and presentation content in the program, both as individuals and as teams. Also, the nature of their classes allows us to present students with open-ended design decision based questions so that they’re not simply following some type of a prefabricated formula to create a product or to complete a design. This particular part really is geared to help the student become more versatile, to be able to take general principles and to apply them to a wide variety of specific cases. And they do that in teams and individually to develop troubleshooting skills.

Q: Considering your knowledge and experience working at this institution, over time what changes have you witnessed taking place within this program to reflect change in response to shift in the labor market needs and organized in response to changes brought about by globalization of the workforce?

ANS: The curriculum has become much more computer based. Laptop PCs, which were integrated into my program about 1999 or 2000, are now involved in nearly every class in one way or another. We do not have an extensive online offering at this time simply, because we haven’t found a method suitable to deliver what we need to teach that way. But that is what the workplace requires these days, that workers know how to access sources by computer in order to be able to solve problems. Students need to have access to tools and resources in the same manner that they will in industry.
Q: What kind of planning or change is taking place at the program or department level currently at this institution to meet the challenges posed by globalization regarding the labor market needs at the local, state, or national level?

ANS: At the university and college level there’s definitely a lack of any real fundamental changes. At the program level, we try to maintain a high level of currency in whatever technology is present, whatever’s being used in industry, so, by staying on the leading edge, we hope to prevent our obsolescence.

Q: What is the role of technology in the current teaching and learning environment at this institution? In another word, how is technology integrated in the curriculum planning and content delivery?

ANS: As I said, we have included extensive use of online resources in terms of access to databases and information in the Internet, in almost every class. We also have increased the amount of writing and the level of writing competence in all our classes using word processing programs and improvements in it. We have also incorporated progressively more demanding computer-aided drafting programs. We’ve also included computer-aided engineering programs, such as the Moldflow I mentioned earlier, into the program.

Q: It is my understanding that a process of program evaluation called Academic Program Review is utilized at this college with technology-based programs. What is APR? Why is it used and how does it affect the programs offered at this institution?

ANS: Well, in concept, the Academic Program Review is designed for each program to do a self-study of their current performance. It consists of elements done by their advisory board, by their graduates, by their current students and by the faculty. And collectively it presents an overview of the program to identify areas that need to be improved or areas that are doing well.

Q: How is the collected data utilized in regard to the programs that are reviewed?

ANS: It depends. In concept, the Academic program review is reviewed by a committee. The committee has the ability to recommend programs to be just simply continued as they are. It has the ability to recommend that a program be enhanced and there is, in general, money apportioned to provide those programs additional cash for specific purposes. For example, my program in 2000 received an enhancement recommendation and we use that to retrofit our major classrooms with seating and audiovisual equipment that we use to this day, suitable for laptop/computer-based instruction. And on the opposite end, an unsatisfactory review by the APR committee can result in a recommendation that a program be either placed on probation or even discontinued.

Q: So you do see some benefits to it?

ANS: Oh, yes. Yes, it is. I don’t think it is as effective as it could be but it’s infinitely better than having no such review process.
Q: Question 12: In your opinion, what role business and industry and public/private partnerships could have in helping to prepare students for future jobs?

ANS: Well, the industry or the private sectors are responsible for keeping us briefed in terms of what they see new trends and new requirements are. They’re usually not reluctant to do this but unfortunately they typically lack any significant long-term vision. When they make a recommendation, usually it’s a recommendation for a shortage they have today, and many times we’ve had recommendations from our advisory board or from industry in general to start a certain program or a certain skill, only to find out that by the time we had integrated that into our curriculum that they no longer wanted it and they’ve moved on to something else.

Q: So that brings up the argument that the research makes that the new generation of workers really must be adaptable because of the change.

ANS: Oh, very adaptable. Yes, yes. It also means that although it’s important to stay current and on the leading edge, it is inadvisable to follow the leading edge too closely because it tends to produce a lot of a boxcar effect where you’re starting to make significant changes with little basis one way or the other. And if you spend significant time and effort acting on an impulse, you detract from your efforts in the long term for a better strategy.

Follow up: Are there any collaborative and partnership initiatives between public/private sector and the university that you’re aware of?

ANS: At the university level, I’m not sure. I could be just unaware of them but at the college level there’s a number of programs where industry will provide projects for students to work on, will provide internships for students, will provide support for visits and even hands-on demonstrations of their products and their procedures. So there’s a fair amount of private industry integration with the programs within the college.

Q: Are faculty and students able to visit job sites and how often and talk with employers in the field and learn about their needs and the latest trends?

ANS: Yes. In general, almost all programs have various tours and visits. Sometimes the companies will come in and present on campus and sometimes we’ll actually have an excursion to a certain facility to see something. That’s commonly done, plus, most of the students in our areas will have some type of internship activity or summer employment where they actually work in the industry that they’ve selected for a career.

Q: I want to follow up on that. Now the information they gather from such a visit, how is that incorporated into you hear they really need something, although we talked about it, it can be such an instantaneous thing, but if it’s something that you see some long-term benefit to it, how is that incorporated into, you know, curriculum planning and also is that beneficial to the students? Job-site visits, how do they learn? You know, what do they learn from that?
ANS: Well, the job-site visit for the student gives them in many cases reinforcement that what they’re learning actually has application. The programs themselves do not use job-site visits as a vehicle for program change that much. They primarily rely on their advisory board, which is made up of industry people, rather than, you know, visiting various companies.

Q: But it does help the students and yourself to understand what the trends perhaps are?
ANS: It helps motivate the students because they believe that what they’re learning has value.

Q: Okay. Question 14: What has changed or is changing in a globalized teaching and learning environment, given the current state of jobs and global competition for skilled employees? I can clarify a little bit better. The job environment, such as GM, Chrysler, Ford, such things don’t exist anymore, so things have changed and we have to sort of retool our thinking in order to be able to compete with the rest of the world. So as you look at your experience, how things have changed?
ANS: Well, you find a lot of people that have been displaced are not university and program graduates. Typically they’re people that with high school level education that have assumed a position at some employer and had that position go away. So then they typically will come to seek higher education as a means to improve their current situation but also providing more secure future. But unfortunately they’re not particularly selective in terms of what they pick for higher education and there is a prevailing thought among both students and university/college leadership that the key to it is a college degree. That is not true. There are college degrees that have very little actual value to a student in today’s marketplace. By the same token there other college degrees that are critical and of extreme value in today’s marketplace. But simply just to label getting a bachelor’s degree as a touchstone to success, is grossly misleading in my opinion.

Q: So getting a relevant education for a specific job is much more valuable?
ANS: That’s true. There are many things that you can study that have very little application in anything approaching the workplace. There are schools that are less scrupulous, that will allow a student to—given that they pay their tuition—to graduate without any real skills. And eventually you’ll see as education becomes more and more common, that there will be a progressive differentiation between, different programs within schools and you will see, I think, that programs that place students in employment will command a higher value than schools that don’t or programs that don’t. The next thing to watch for, I think, is higher education particularly, rather than fundamentally differentiating the degrees they offer, will assume that’s what’s needed is more education. And so you’ll see today’s bachelor’s degree as an entry requirement will become a master’s degree in the future. It will not solve the problem. It will not address the fundamental
problem of subject areas and programs that really contribute precious little to a student’s real intellectual development. You see it all the time.

Q: Research indicates that countries like China, India and Russia are producing more graduates in science and engineering fields. Although this may be open to debate. These graduates in return work hard, are innovative and therefore creating serious competition for U.S. graduates. It is believe that we are losing our edge in this area. If this assumption was true, in your opinion, what do you attribute this shortfall to and what needs to be done to overcome it?

ANS: I think it’s a complex problem and also a complex solution. All degrees, all engineering degrees, all technical degrees are not created equal. Just for someone to earn a degree doesn’t necessarily imply that they have a certain skill set. I would think that it is important as to assuming that graduates everywhere and say in engineering field, have a basic set of skills. Beyond that, I think that thing that makes competition much more difficult for a student in the United States is the fact that graduates of foreign schools and even foreign students typically are much more competitive than students here in the United States. They grow up and are educated in systems where there is no accommodations made to make anything easier for them. If it’s difficult, it is simply difficult and either you measure up or you find a new field. Whereas in the United States, we make continuing efforts to try to open things up to people with more marginalized skills, and then when they graduate they expect some kind of continued support system, whereas in many cases engineers that I’ve known from educated and foreign countries will work much harder with much lower levels of economic reward and in reduced working conditions than U.S. graduates will.

Q: Where do we have to change that? How do we change that because it doesn’t start at the college, of course?

ANS: No, no, no, no. No, it starts all the way back… All the way back…Yes. I think that the only way that it will change is I think the social environment will have to change for people. When it becomes obvious that the only way that you will in fact succeed is by making these sacrifices and being flexible enough to work under all conditions and when it becomes when it gets to the point where if you do not do this you do not have a job, not that you can fall back on some kind of support system, then people will adjust. And in many foreign countries, for example, I went to school with many people from China and Thailand and the Philippines, people from these cultures are willing to work extremely hard, much harder than a typical student here in the United States. They will, if given an unreasonable requirement, simply work 24 hours a day to do the unreasonable requirement, whereas a typical student here will find a way to go to the Dean’s office and complain about the unreasonable requirement and get it changed.
Statement: Legislations such as The Perkins Act of 2006 or state and local initiatives have always played a strong role in development of CTE programs and consequently have impacted work-workforce development and strategies.

Q: Question 16: In your view, what needs to be done to improve the level of collaboration, cooperation and communication between private industry and educational institutions to impact development of highly-skilled workforce to be able to compete in a global economy? Is this kind of relationship beneficial, necessary?

ANS: Well, I think, the question in a way is kind of misleading because what you’re talking about in the case of Perkins is government funding that’s targeted at specific areas of industry and so it is an industrial need as interpreted by the government to return funding to the university to meet that need as opposed to directly where, you know you’re dealing with an actual employer and he’s telling you what he needs to have and staying current. It’s an indirect process and from what I have currently observed the fallacy in that system is that the people that operate the government link are not experienced in the workforce. They are by nature professional government employees and bureaucrats who are trying to interpret something they have no direct knowledge of. And so when they are making the determination as far as what an industry needs and how it should be met in many cases they fall far short of being effective.

Closing Statement: Well, at this moment we have reached the end of our interview. I want to thank you for taking time out of your busy schedule to spend an hour with me. But before I close, I would like to give you an opportunity to make a comment regarding any question, any topic. The choice is yours.

ANS: I think that globalization is a fact and I think that the United States as a whole is currently undergoing an education of its own in terms of the impact of globalization, some which really can be foreseen, and some which cannot be foreseen. I think that we run a very real risk of having a small number of highly-educated, technologically-capable people that make a very good living and below that an entire economy of service workers that lie below—that. So I think that one of the affects of globalization in the United States will be a progressive separation between the middle and the top part of the middle class will split and move upward and the lower part of what we used to consider the middle class will go downward. And you’re going to wind up with a great disparity between income levels between. We’re going to turn into, more or less, a bipolar society with more numbers on the low end than on the upper end.

Follow up. You said globalization is a fact. You also mentioned all the things that I believe I’m trying to get answers to in this research. Do the policy-makers really see that this is a real phenomenon? This is really something that’s going to change the way we are going to be seen in a global, competitive environment in the next
10, 15, 20 years, perhaps even fall off that leading edge. If we fail to see that, what would be the consequences?

ANS: I think that what you’re going to find is the country as a whole having a progressively weaker and weaker international position, both in terms of financial or economic position, but invariably the manufacturing base and the technological base of a country is also directly related to its ability to defend itself. And that if it’s allowed to atrophy too far, we will, wind up creating some severe security problems in the longer run, I think. I believe that you can find a precedent for this type of thing if you look back towards countries, for example, Spain, which at one time was a very significant military power but lost economic power and also military power and by the start of the century has become almost peripheral as a world power.

Q: So the lesson is learn from the history? [laughs]

ANS: I would think yes. I don’t believe that there’s anyone in our current government that would deny that globalization is a real affect. I don’t believe that anyone thinks it’s really just temporary. I think that although most people have a very limited understanding of what to do about it. And I’m not sure that there are any easy solutions as far as what to do about it. There’s nothing that you can do, I think today and see a result by tomorrow, even though the socioeconomic and technological factors are moving faster now than they ever have before. What used to happen in centuries now happens in decades and I think that’s going to continue.

Q: Well, thank you very much. I really appreciate it. That was very fantastic. Thank you, sir.

End of Interview
Today is December 2, 2010 and time is about 5:20. I’m speaking with Faculty Participant Number Three from Software Engineering Program at Ferris State University. Are you ready, sir?

ANS: Yes

Q: Could you please briefly share with me what are some of the courses you teach at this college—university?

ANS: Actually I teach around—I think roughly 12 to 14 classes, and they range from Introductory Software Engineering, Computer Programming One and Computer Programming Two, to all the way up to the capstone, a certification class in the Software Engineering, Data Structure—Software, Data Structure configuration management and Software Testing.

Q: Do you have any other roles and responsibilities and/or serve in other capacities in the course of your duties at this university?

ANS: Yes, I have a number of roles that I that I serve in and one of them has to do with advising. So I advise the students as to what class they should be taking. I also talk to them in terms of the internships. I get them prepared for the internships. I also go out to the field and talk to companies and let them know about our students, what their qualifications are, talk to them about our program. I also go into the middle schools as well as the high schools to promote the program.

Q: Let’s talk about globalization. Considering the working definition of globalization, we’re talking about competition, technology, new economy, umm, demographic shift [clears throat] and political change, and consequently the interconnectedness of ideas and resources created on a global scale. So based on this definition, the term globalization is often mentioned in conversations, newscasts, published articles and so on in a context of its impact on a global economy. I’m interested in your understanding of globalization. Therefore, in your opinion, what is globalization and how it happens and why it happens?

ANS: I guess my view of globalization is more from a human perspective and I feel well I know for a fact that—that we’re all—we’re all the same and the only thing that really separates us is some very basic, very, very small differences and I see that technology has allowed us to shrink the distances between us, and also give us opportunity to get to know each other better and sooner. People have an
opportunity to meet people that they had never met before and understand things that they hadn’t known before either. I think that globalization in a way is bringing us inevitably closer together and allowing us to work together to be more productive, definitely more innovative and more effective in whatever we decide to do as a race of people.

Q: According to what you just said, just to follow up on that, how does globalization impact people, education culture, jobs, and global economy in the long term?

ANS: I think long term by interacting with one another and collaborating, we’re going to develop best human practices in every area that affects us as a race and so I think from each culture, each economy each education system that we work with globally will develop strong best practices that I feel will continue to elevate us as a race and evolve us as a people. In terms of other cultures some that might not have had the opportunity to have the same resources as some of the other places, whether technology, whether that’s education or whether that’s actual resource in terms of food, even water, I think that will allow them to hopefully not too quickly but to develop and grow in those areas that they are that they are lacking because with everybody on the same potential, it’s just that they lack the resources and I think that globalization will help bring those resources to people that desperately need them.

Q: As you know, globalization is not a new phenomenon. However, its impact has been much more pronounced and its pace much faster in the first decade of the 21st century than any other time in the history. In your view, what factors have contributed to the fast paced spread of globalization in the first decade of this century?

ANS: I think a couple of things have happened. One, before we really didn’t have an opportunity to daily see what’s happening around the world and it was very sporadic how often we received news and now we can receive news from around the world nearly instantaneously and we’re no longer tied to waiting for the news to come to us on a TV or through the radio. People can go out and get the information readily whenever they need to and so it’s on request. Information about any place is on request and I think that has helped a lot and I think the second part is due to the fact that we have that ability and we have so much contact with the rest of the world, I think it’s made us more aware and I don’t want to say tolerant, because that’s the exact word, but I think it has made us more appreciative of other circumstances and other people and so, I think that it has allowed us to be more empathetic and more supportive and giving to other people.

Q: So what causes that sharing of information and interconnectedness and all that?

ANS: You know, I really feel that once you really get to know a people, that empathy, you realize that we’re all here for the same reason, to make each other better and
to make everybody else’s quality of life better, to improve it, you know. If that was not true, we’d all have our own planet, if we weren’t here for each other.

Q: It is widely believed that globalization is causing major changes in employment opportunities in very competitive global environment. In what ways, in your view, globalization may impact or has impacted the field of software engineering?

ANS: I guess I’ve been involved in software, really involved with software about 30 years and so, I saw it come in to the homes on that level with PC’s and at that time it was really easy for four or five people to crank out some software that could make some money. Now you need very large teams. You need a large intellectual base. You need to have a well planned out strategy, not just a short terminate path. The short-term strategy worked, but now you need long- and short-term. I think the competition that we’re seeing from other countries that now are able to have the resources, and you also have the intellectual capital and the planning in place to continue growing strong in those areas. I think competition is going to be good. Well, competition is always good as long as it’s constructive, and I think that initially there’s going to be some growing pains because it’s the same scenario where as a real simple example, two brothers that are two years apart and at some point in time, they’re really far apart in terms of skill set, but the younger one is growing so much faster because the other brother has stopped growing adequately. So, I think right now we’re pretty much twins. I think this is us, and the rest of the world is really right there, you know, and it’s happening so quickly, and I think the same types of feelings that happens with brothers, where one who used to be, you know, was teaching this person or showing them this is how you do this and once they learned it and they’re like, “Hey, you know what? I see what you’re doing, but I want to do something different also,” and I think that type of competition is good and then the same thing with the big brother. The brother says, “Wow! I hadn’t seen that before.” You know, I think that type of escalation is going to continue to occur until we all max out.

Q: Question three: In your opinion, to what extent schools, such as this one, offering career and technical education courses may be impacted by globalization and how?

ANS: Well, my hopes are that we have a more diverse base of instructors, staff and students and that meaning that not just to be diverse to be diverse but because they have ideas. They have insights that we don’t have that we desperately need. In order to prepare our students to go into a world that’s globalized, that’s flattened, if you will, they need to talk to and they need to interact with people that they’re going to see out there and that have those ideas.

Q: If you assume that schools offering CTE courses are affected as a consequence of globalization, what should their responses be and what kind of steps should they
be taking to prepare students to be able to combat the impact of what globalization might bring?

ANS: Travel. I really think that we need to have a strong exchange program and very few schools are doing it to the level that. I feel that in the software engineering area, technical area, we really need and it’s largely due to finance and bureaucracy.

Q: In your opinion, has globalization influenced or altered decision making at the institutional level in any way to reflect the response to change in focus as a result of globalization in technical and scientific career fields?

ANS: Yes. We actually have a position here that’s an international position and it’s that individual’s job to look at other institutions around the world, at other universities and establish relationships with them and also companies.

Q: What kind of information are you looking for in that setting?

ANS: Actually studio level, where we can work with them to develop products that are non-profit, but it gives their students an opportunity to do internship-like things and allow our students to collaborate with them.

Q: In order to avoid using the term computer or computers and technology interchangeably, how would you define the term technology and what words would you incorporate in your definition?

ANS: I would say that currently technology would be an effective use of information in the sense to better our society. I believe technology is synonymous with information on demand, be it video, words, audio, or data-on-demand, which is our information. What’s happening now is we’ve realized that is the key that is where real power is at. Now it’s I want my data, whatever it is, wherever I am, how I want it, when I want it, served up exactly the way I like it.

Q: In your view, what is the role of technology in development of labor force as a factor intensifying fierce global competition for skilled and educated workers?

ANS: One of the areas I think we have been sort of derelict in America is pushing information and technology in a direction that it should be going in faster. We’ve allowed private sector—the private sector to dictate the pace, instead of really looking at where our society really needs. We’ve allowed money to dictate how we should share knowledge, how we should share technology and capitalism—I don’t want to get to that, but we have to be careful with what greed breeds, and I think when your society is running on a cash machine as its focus, you’re going to have problems long-term. And I think if where our country realizes that, we need money, we need resources of everything, but we’ve got to remember why we need it, and that’s for the people. I think if we would have 20 years ago done what we said we were going to do, we wouldn’t be where we are right now. We did not do what we said we were going to do; we said we were going to be efficient, we said we were going to be eco-focused, that we were going to look at alternative
energies in a very serious way and—actually it was more than 20 years but we did not follow through.

Q: Question six, what type of technology or technologies are students exposed to in the course of a semester or a year within this program and is the technology used by the students in their course of their learning the same or different than what is used in business or industry, and can you explain why that might be an advantage or a disadvantage to the student?

ANS: I’ll go middle of the road with this because I have students that are freshmen and seniors, but typically when they’re done with the curriculum they have been introduced to all the major toolsets that Fortune 500 companies are using: Microsoft products, Java, in terms of software, we have a class where there is like a survey of technology, survey of languages, so they have an opportunity to work with eight different programming languages. I mean, they actually have to write code for them. They have to learn the basic fundamentals, and then they also have to produce a working application. It’s a pretty intense class. Again, technology is information, so they have to do every one of their projects. They have a lot—I’m going to say a lot of documentation, meaning that they have to have a design spec. They have to have a requirement spec. They have to have a maintenance plan, a configuration plan. They have to write the code. So—and that’s on every project, so that’s the type of technology, even though it’s not electronic, but it is best practices. And I think the written words are best technology ever. In terms of hardware, they work on PCs, of course. They work on Macs. They work on operating systems in terms of Mac OS, Linux and Windows. They write software for game systems: the Xbox 360, the iPod and Android. So they get a wealth of what’s out there. They get all the current stuff but then I make sure that they get some of the traditional stuff. They do have to write some COBOL applications.

Q: So how is this helpful to them?

ANS: The best part is when I go into organizations because I’ve scouted the organization ahead of time and I’ve picked technology that’s in 80 to 90% of the companies, when I go in I can say, “These students are fluent in the following technologies.” And it correlates directly, or corresponds directly to what that company is using, and then I can also say, “In addition to that, we’re also using the latest and greatest thing in terms of best practices, in terms of tools, in terms of design patterns and so, I want to make sure that students leave here not as entry level software engineers. I want them to leave here as third and fourth year level current software engineers. And when they leave here, skill-wise, they have had at least two years of in-internships. And they leave also with a portfolio that they take with them that they can show off in their interview.
Statement: Globalization of the economy to a large extent and the shift of the American economy from largely a manufacturing base to a more high-tech knowledge base, as you said, information economy is inevitable and based on this assumption:

Q: Question number seven, in your opinion, what kind of employability skills are required of students graduating from technology-based programs and what skills are considered essential to the employers, in addition to the really know-how technology?

ANS: They have to know the technology. They have to be fluent with different paradigms that the company may use, the tools of course, but the things that stand out the most and I really encourage the students to work on are their teambuilding skills. And what I mean by that is not being afraid to voice your opinion in a respectful manner, not being afraid to say what your good idea is or—and not holding back your good idea, being open to sharing and working with people and also being tolerant as well as appreciative of other people’s ideas. Sometimes we get students in that are somewhat arrogant and somewhat feeling entitled and I have to speak with them and say, “You know, you can’t talk to other people this way. You need to address them with respect. Your idea may be great, but you know, show some understanding with theirs” and so, collaboration and the knowledge that you will be in a lot of meetings.

Q: Just to follow up on that, in your opinion, in addition to course work, what are some of the things that students are doing or need to be doing to prepare them for future employment?

ANS: Reading. They have to stay on top of their craft, you know. This is—I explain to them, day one, that you are, you might not know it, but you’re going to be perceived as a doctor, a digital doctor. You’re working in an inorganic world, but you’re a problem solver and you’re going to be a go-to person. Because you have that title engineer, they’re going to think you can do anything.

Q: It is understood that the highly educated and trained workers of tomorrow must possess three sets of skills. These skills are basic skills, critical thinking skills and customer service skills. Now, to what extent skills such as the ones that I just mentioned: problem solving, decision making and good communication and customer service skills are taught as part of the courses offered here in anticipation of preparing students for the workforce? You mentioned some of it already, but say more.

ANS: I would say the one skill that I didn’t have leaving college I really push onto them, which is the ability to close a project, because academically, you’re giving a homework assignment and it’s pretty straightforward, you get this thing done but in the real world, you get that thing done and there are a lot of other things around it that you have to complete. You have to tie up all those loose ends and you don’t have to worry about that in school. If you don’t tie up a few loose ends, it’s not
that big of a deal because you’re done with that class and it doesn’t impact anybody but yourself, but in the real world, it impacts your employer, it impacts you and your customers, and so I impress upon them that they have to close everything, that they can’t look at the software, the actual software product as it. That’s not it. It is part of the entire package, and so I impress upon them that they have to be a good closer.

Let’s look at question number nine. These questions deal with institutional responses.

Q: Considering your knowledge and experience working at this institution over time, what changes have you witnessed taking place within this program to reflect change in response to shift in the labor market needs and demands or in response to changes brought about by globalization of work force? In another word, what is really changed here that tells you we are doing some things in response to the demands and the pressures applied from external forces?

ANS: You know, I just try to keep them up to date on technology that’s here and that people are working on globally and outside of that, nothing really other than, like I said, we do have this individual that’s out there promoting the program and other programs globally. They’ve been to Turkey and other places: India, China, I think France, they’ve been to a number of places I know in the last year.

Q: What kind of planning or changes is taking place at the program or department level currently at this institution to meet the challenges posed by globalization regarding labor market needs locally, statewide or nationally, and how do these changes impact student readiness for workforce entry?

ANS: You know, the way I have the program structured, it’s that way for the on—you know, from the very beginning so that it’s already in place, but the one thing I’m trying to do additional to supplement that is work-working with Microsoft. They have a competition called Imagine Cup. It’s a global competition and so, umm, I’m working with the students. I’ve shown them what the competitors are doing, how they’re ranked and so they know what they know who they have to compete against. And it’s five categories, and the competition is to create in each one of the categories. It’s like software design embedded design one is actually game design and two other categories and whatever you create, your solution supposed to solve some kind of world problem.

Q: Who are the competitors?

ANS: You know, I’ve got to tell you, the ones that are doing really well: Brazil, India—India is dominating, China, they have some strong representation. If I’m talking about just the top—I think it’s the top 30, I think India had like 10 or 12.

Q: Why do you think that is? What’s the difference?

ANS: I think I know why that is. I can’t remember the minister’s name. I think the Minister of Technology, some 25 years ago, made India realize and like I said, we
realized it too, but he realized what direction things should be going in and not from a necessarily monetary point of view, but just realized what the world’s going to need and so he presented his case to the government and they supported him and so they got the whole country behind going into technology and help in those areas. So it came from the top. They pushed it down and they really encouraged and provided the resources for that country to move in that direction seriously. Instead of just, you know, talking, talking, talking, they’re actually doing things. And that was years ago, and so now, they’re just reaping the benefits.

Q: Question number 10, what is the role of technology in the current teaching and learning environment at this institution? In another word, how is technology integrating in the curriculum planning and the content delivery?

ANS: Right now, everything’s online. You know, of course, I teach a class, but all the material’s online so I get them comfortable with being part of a digital environment, also reducing the paper transfer and things like that. Currently whatever the latest technology is that comes out; I receive a number of periodicals, journals and things like that. And we have current events so I go and talk to them about it. We discuss it. And that keeps them up to date on whatever’s going on from IEEE. So I keep them up to date because my undergrad is electrical engineering, so I keep them up to date with microcontrollers, keep them up to date with software and how that plays into today and what it’s going to mean tomorrow.

Q: All right. Question 11, it is my understanding that a process of program evaluation called Academic Program Review is utilized at this college with technology-based programs.

Q: What is APR? Why is this used? How does it affect the programs offered and how does it benefit students?

ANS: We look at a number of things; One, the evaluations that come back from students. We look at other instructors and what they’re doing and their feedback from them, and how we can improve the program. And then this is all online—and then we just really use that so that we can track year to year and say, “Okay, this worked, this did not work. Why didn’t it?” and then we make adjustments.

Q: Who are the other participants? Is there a committee?

ANS: Just kind of like our department, our off campus people that are here. So like DAGD (Digital Animation and Game Design), and then we also have someone from [Redacted] that comes down and helps us formulate some questions. So there’s various people that become part of that, you know, meeting.

Q: Okay. How is this beneficial to students?
ANS: It’s all student focused. Everything we’re looking at is, you know, are the students meeting the outcomes for that course? You know, prove it. Show me how. What are the grades? And then we can also look at what the students are saying because they’re very candid with how they really feel. So it really goes both ways. It shows the relevancy, you know, or the timeliness of the course in the—in the current environment. And we’ve received some very strong feedback. And also when—like, for instance, this semester I had a certification class and I had really high expectations for how much material we were going to cover and it was my first time teaching that course, and we just couldn’t do it. It was too much. It was like 2,000 pages of reading, and that’s a little much, so I had to scale it back to 1,200 pages to make it work and it really listening to the students.

Let’s get back to the area that I think it’s important to this conversation, and that’s private/public collaboration.

Q: Question number 12, in your opinion, what role business and industry/public-private partnership should have in helping to prepare students for future jobs?

ANS: I think they have a huge responsibility because we’re factory for them. And I think they need to—for me, I have to go to them and I receive tremendous push-back or just pure rejection or no response from industry. You have to have an in. You have to know someone who’s a friend of somebody that’s in there and that shouldn’t be the case. They should come here and be basically begging for these students because these students are begging for them and I think if they establish a relationship early on we would have something. We’d have much stronger software engineering program and a stronger representation in the world.

Q: Do you think that it’s due to competition from other parts of the world because of the globalization, because of the technology making it possible to do these things in other places rather than bring it, you know, giving it to American students?

ANS: I don’t think so. You know, if it has anything to do with it, it’s very, very tiny. I think what it has to do with two things. One, that’s not something they focus on. They are focused on, “Hey, let’s get people with experience. Get them in here; throw them on a desk so they can start working now.” We’ve got to make money now. And our culture is so set up now that we’re in a greater immediacy of almost everything now and you can’t do it. I mean, remember before there were apprenticeship and all this stuff, and now, what’s happening? I tell the students, I say, “Every job I ever had, even the day I started, they always had this binder and they’d say, ‘You’re going to go through training for three months and da, da, da.’” You know what my training is? “Here’s your desk. Here’s the software. Load it on. We’ll have a project for you tomorrow.” That—that’s not enough.

Q: Are there any collaborative partnership initiatives between the public-private sector and the university related to work force development? If so, please briefly
explain how it works. If not, in your opinion, should such collaborative efforts take place and how might this benefit both sides?

ANS: To my knowledge, at least in my department, there isn’t. The relationships that I’ve established with companies have just been, “Oh, hey. I’ve got this great student. You have a need. Let’s take care of that.” I think that there should definitely be conversations in place so that we have a really smooth transition, a nice conduit from here to there, but I think it gets down to companies just have never really taken it seriously to the level that they should have.

Q: According to American Manufacturer’s Association based on their research that 85% of the industry really doesn’t hear from other agencies and colleges and universities about what they can do and also, students are not qualified to work because they lack basic skills. How can this problem get so that there communication between universities and industry?

ANS: I stumbled on this organization and they’re here—well, I should say I stumbled on this individual who works for an organization West Michigan Strategic Alliance, WMSA. They have an initiative to, umm, get companies to provide—I think it’s either 3,000 or 5,000 internships. So, they have a-a young lady by the name of X. Here’s her information if you need to contact her. And as part of providing training for organizations. So let’s say you have an organization, uh, XYZ Corp, and you guys do whatever—manufacturing, software, whatever it is. She would contact us and say, “Hey, listen. I think your organization would be great to have an intern.” “Well, I don’t know how to do that, you know. We don’t—we can’t do that. We’re too busy,” and she would say, “Hey, come to our training. We’ll show you how to do that. We’ll show you how this can be beneficial to your organization.” So two weeks ago she conducted another training and she had, I think, roughly 45 companies show up and so—well, she wants to communicate to them it’s doable. You can do this, and that’s what we’ve been missing. We have, for the last 40, 50, 60 years been missing out on a real initiative to go out there and educate these companies and let them know how how to do this, that it’s beneficial and they will give them all the training material and all the material to make it happen in their organization.

Q: Are faculty and students able to visit job sites, how often, and talk with employers in their field to learn about their needs and the latest trends? If yes, how is this information obtained or—or how is the information obtained, incorporated into the curriculum planning? If not, what would you recommend to stay in communication with businesses and industry to learn about their needs, and I guess we talked about that a little bit, so—but just to follow up.

ANS: Yeah, the only other thing in addition to that—that I put in place for the students that whenever there are conferences that are local, I let them know about them so they can show up and network in that way, and learn also about some new things
that are happening there but we go on what we call fields trips. So I’ll call the organization and say, “Hey, you know what? I see what you guys are working on there. I think the students would be really interested. Can you—I’d like to bring three or four students in and could you talk to them about what it’s like at the—at your company and what you’re working on?” and that’s, of course, to build a rapport with them so that I can establish a relationship and an internship.

Q: Question 14, what has changed or is changing-changing in a globalized teaching and learning environment given the current state of jobs and global competition for skilled employees?

ANS: From my point of view, what I would like to see changed—I can’t say it’s happening here is that we open up our doors in the sense of online classes so that I can instruct someone in Mali, so I can instruct someone in, you know, in Greenland so that it’s just open. You know, and one of the things I’ve noticed, and there are a number of large universities, more prestigious universities that are doing, you know, podcasts, webcasts or putting things out there for MIT. So you can go out. You can go to iTunes and download some of those things and if you have a computer—you’re not getting credit—but, hey, if you have a computer and you have a great idea, you can take some courses online for free and you can, with your $300 computer, maybe change the world, maybe make something that competes with Google.

Statement: Research indicates that countries like China, India, and Russia are producing more graduates in science and engineering fields. Although this is open to debate, these graduates, in return, work hard, are innovative, therefore creating serious competition for U.S. graduates. It is believed that we are losing our edge in this area. If this assertion was true:

Q: Question number 15, in your opinion, what do you attribute this shortfall to, and what needs to be done to overcome it?

ANS: The shortfall is attributed to a couple of things. One, we have always had a base fear of math in America and science, for whatever reason. It’s been accepted a lot more in past years. And the reason why it’s been accepted more—it hasn’t been pushed to the point where it’s like, “Hey, you might be afraid of it, but don’t worry about it. It’s just step-by-step. It’s really easy,” but instead of saying that, what we’ve said to America is, “Hey, if you want to make a lot of money, you need to go into business,” and so, students that may have had a tiny bit of interest, that could have, you know, it could have been a tiny spark that would have turned into a flame, like, “What? Really? I should go into business?” and of course, in America, everybody wants to make lots of money, because that’s why you’re born, to make lots of money. No other reason and so, people have followed what I call the money trail and it hurt us, you know, significantly. We’ve had significant drop offs in computer-type technology programs for years now.
Q: What do you recommend? How do we overcome it?
ANS: The only way that I recommend overcoming it is to start really early with the students and showing them how fun technology is, like how fun science is, how easy math is, that it’s just step-by-step and the benefits that they’re already benefitting because of those things, the games they play the TV they’re watching, the toys they play with. That’s all—it’s all software. It’s all technology. And find a way to make it cool. Cool, yes. You look at things on TV now, you know, Law and Order and all these other things, being a lawyer is cool all of a sudden. You know, it’s the greatest thing and you know, you look at some of these shows that are on TV, the Wall Street one that’s out there where it’s like Michael Douglas and those guys, business is always cool. It’s always, you know, party after party. Well, CSI’s cool, too, for some of us.

Statement: Let’s talk about the last question. Federal legislation, such as Perkin’s Act of 2006 or state and local initiatives have always played a strong role in development of CTE programs and consequently have impacted work force development strategies.

Q: Question 16, in your view, what needs to be done to improve the level of collaboration, cooperation and communication between private industry and educational institutions to impact development of a highly skilled workforce, to be able to compete in a global economy and is this relationship necessary?
ANS: I think that it’s all so intertwined, that it is necessary. I think that we need to remember that the product that our educational system was created to produce is not necessary anymore. We need to say, “Hey, look, that we were making people that could survive in a workplace. Now, we need to make people that can thrive in a workplace.” Not only survive, but to be able to compete. They need to be able to thrive. You know, just getting out there and barely making it will kill you now. It’s not enough and on some levels, that’s unfortunate. On some levels that’s unfortunate, but I tell my daughter, I say, I said, “You know what? The demands that are placed on you guys are higher than the ones that were placed on us,” and I can keep doing that all the way back to whomever, but that’s what’s happening in our society. We keep pushing those boundaries. Keep pushing it and pushing it and I’ve got a six-year-old who’s in the first grade, and when I talk to her teacher and her teacher’s been doing it for years, she’s like, “Things have changed so much. The amount of information,” and she said it’s the pressure that we’re putting on these little kids is really too much but that’s what the state is demanding in order for us to compete globally, and so, I think, we need to really look at what is the product our education system should be producing.

Q: At this point we have reached the end of this interview, I want to thank you for the time you gave me today. I appreciate that and before I close, I would like to
give you an opportunity to make a closing comment regarding anything you’ve heard or anything you would like to share with me.

ANS: I would say in closing, the transition that we’re going through right now, this globalization transition, in so many years—I don’t know how many—the term globalization will not even be used anymore. It just won’t be. It’s just going to be the state we’re in and I think that’s going to be a great time because I think people will be the barriers will drop across many, many countries because of the level of collaboration that we have to have to have in order to thrive as a race and I think, that will be good but right now and during any time when you’re going through a transition, a little bumpy, but with the right attitude and solid leadership, which we desperately need, you know, we’ll be okay. We’ll be okay.

End of Interview
Appendix F

Student Participant Interviews
Student Participant Interview #1

Opening Statement: This is Al Moradi and I am talking to [redacted]. Today is November 2nd, 2010 and time is 6:02. Are you ready, ma’am?

Q: 1 Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate.

ANS: I’m a student of [redacted], which is a program offered by [redacted] State University where students can go down a number of different paths all related to the creation of digital interactive media which includes games, and other little things like DVD menus and things like that. So some students go down the path of like more special effects and things like you see in the movies, others go more for 3D modeling. My particular track is actually the technical artist and programmer, so I know how just about all of the different software pieces work in the industry but I specifically work with the programming and bringing things together from a sort of a communication bridge between art and programming at the same time.

Q: 2 what would you say are some of the key features of this program for someone such as yourself, which wants to be a digital animator and game designer? What are some of the key features?

ANS: Well, there’s the 3D modeling, knowing how to use the 3D modeling tools, to produce something that works efficiently and looks good. There’s the texturing for knowing how to use various paint-type programs produced extra affects onto the 3D model so it looks really good knowing how to build a user interface so that it’s both aesthetically pleasing and easy to use. Knowing the dynamics of how to go about building a level so that it-it’s enjoyable thing to go through and a lot of learning how to learn because things are constantly changing in the industry so, having that ability is really needed being able to pick up new programs very quickly on your own.

Q: Follow up 1: I think you shared with me a lot of things that my questions are asking for so I’m going to turn this question around just a bit and concentrate on what kind of industries find your services valuable?
ANS: Well, there’s the entertainment industry for home entertainment games. I don’t know if you can call the Internet exactly and industry but there’s an awful lot of games and things that go with Internet and a lot of advertising for just about any industry having an interactive advertisement especially on the Internet has become very popular, movie industry is another.

Statement: Now we’re going to talk about globalization. The term globalization is often mentioned in conversations, newscasts, published articles and so on in the context of a globalized economy.

Q: 2 I’m interested in your understanding of globalization, how it happens and what it does?

ANS: Globalization, it’s sort of the breakdown of your traditional walls that are normally erected around society. Sometimes in the past those walls have been like physical barrier it’s caused them and a lot of times also there’s language barriers but as you break those down and people from one part of the world are talking to another part of the world that they didn’t previously, that’s what I consider to be sort of the spread globalization is, an increased communication from one location to another.

Q: Follow up 1: Now it is generally accepted that globalization is not a new phenomenon and it has been present with us for centuries. Globalization has been spreading at a much faster pace in the first decade of the 21st Century than any other historical period. In your opinion, what factors or factors are causing such a rapid pace in the spread of globalization?

ANS: I think the Internet’s probably the largest factor in that and in related technologies because suddenly the physical barriers are pretty much gone and all you have left are the language barriers and, amazingly enough, people find ways of getting around those. It is much more common to run into people who know multiple languages today than just even 10 years ago when I was a kid.

Q: Follow up 2: It is believed that globalization has a far-reaching effect on the life partially the developing world and the emerging economies. How does globalization affect people, countries, cultures and competition for jobs, education and other aspects of daily life as a positive or a negative development?

ANS: Well, I think it goes a lot of different ways depending on what the culture that this becomes part of or as it becomes integrated globally, sort of a per culture thing where in some cases they may end up losing some jobs because somebody else can do the same thing for cheaper or whatever and it doesn’t become competitive. In other cases, they may actually start getting a lot of jobs where they didn’t before because where they live locally it happens to be really good for growing something that’s popular in some other country but wasn’t necessarily popular in their country. It’s a little scary for like global level environmental thing, because unfortunately a large number of the sort of the industrial leaders right now are
pretty bad about their resource management, and if those practices get picked up by an island nation they’re going to have major issues because their resources are going to run out a lot faster. So that’s a scenario of concern and there’s a lot of debate about that. But I think it’s really sort of one of those things where it’s a case-by-case basis on whether you’re going to… you know, in the end, it probably evens out fairly well but there’s probably fairly bumpy ups and downs along the way.

Q: 2 Global competitions for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your program of study and the career of choice?

ANS: In my interest area where it’s the programming and creative director and communication side of it, it’s interesting because there’s a chance that I’ll need to communicate with people who English isn’t their first language. I only know English but that’s actually a bad thing for me in that regard but it’s actually a very good thing for me because until fairly recently, actually, a lot of the really good interactive media and games and things weren’t actually so much made in America. They were made in other countries like Japan, so in that regard it’s good for me because now there are more of these types of jobs over here in America than there used to be. So it’s one of those mixed blessing things again but I think it’s one of those things that there’ll be times where I get the bonus. There will be times where other people get the bonus but in the end it’ll probably end up being about the same.

Follow up 1: Your comment brings me to the next question which is pretty in line with some of the things you’ve already said. What does the future career outlook in the context of a globalized labor market looks like in your field of study?

ANS: I think there’s the potential to have some cultural things enter into games that previously haven’t been in them, so instead of the mythology that we see in every single video game, it’s starting to get some of the mythologies from parts of the world where their culture hasn’t been as thoroughly explored. At the same time, there is a chance that if video games become too much of a repetitive industry which it seems like every time that a new geographic area starts making video games, they start making the same ones over and over and over again and they do that for about 10 years before they start branching out again. So every new company, every new country that picks it up tends to get caught in these little cycles, which is kind of funny where they just make the same types of things over and over again. So we’re probably going to see that, although that seems to happen all the time anyway. I’m not totally sure where things will go. I mean creativity can come from anywhere. I think looks good because even if an idea for a new type of way of doing things comes from another country or another
location, when people get a new idea and they like it, they tend to run with it in 50 different directions, especially in America we like to do that. And so bouncing off of somebody else’s idea and really just taking it out there those starter ideas are pretty rare globally so the more people working in the industry the better for those little jumps that then get things started into a big domino effect into a new innovation.

Q: In your opinion, how does globalization contribute to or intensifies competition for jobs, markets, resources and skills of educated workforce?

ANS: Well, a lot of times, you know, in order to be really, really good at something, it’s not always simply a matter of how much time you put into it. A lot of times it takes just the right sort of person with the right sort of thing. I never intended to be a programmer. I got called out as having “the right stuff” for programming and originally I was like, “What? Are you serious? I don’t know about this.” But they were able to convince me that yes I’m one of those people that I should take the fact that I’ve got a talent in this area and do something with it. And whenever you’ve got a skilled labor or creative or skilled thing, there are a limited number of people who are going to really hit that level and each person has their own. I think everybody has something that they’re really good at but there’s a lot of some things out there and in the game industry there aren’t actually really that many people who really shine in specific areas. And so, more people means more opportunity for people who are really, really good at something. That means you could start to get gatherings of people who are really good at this stuff and maybe even get better stuff out of it. I sort of think of it like there’s a whole lot of heart surgeons and things that I’ve run into in recent years that are from India. It’s not like it’s hurting the heart surgeons from America but there’s also some really great heart surgeons from India because, let’s face it, there’s a limited number of people who can be good heart surgeons as a percentage.

Q: Follow Up 1: Based on what you just shared with me and your understanding globalization, when you think about your career in a globalized labor market, do you feel prepared for or are you concerned about any challenges posed by competitors from around the globe that have similar high skill talents…

ANS: Really, other people with a lot of talents? I suppose there’s always sort of that self-doubt thing. I don’t know if anyone ever really gets passed the, “Wow, am I really actually? Is this really my specific talent thing?” But when you get away from that I start to look at, okay, there’s a finite number of people who really do excel in these things and then communication is absolutely massive for the particular role that I’m in. And if so as long as there’s a correct ratio of people in the other positions who speak English, they’re probably going to want to work with somebody who also speaks English as their first language simply because it makes the communication a lot easier at which point that’s not really a threat. On
the other side of the coin, it is a little bit scary that I don’t know a foreign language right now because that does limit me to just the people who are speaking English right now, so it would be advisable for me to actually learn another spoken and written language at some point in time to be more competitive with it. And that’s something I might not have considered before.

Q: Follow up 2: Based on what you just stated, do you think that globalization has a positive impact on the American workforce or is it a negative impact in terms of its infancy and growing up, spreading? How is it doing?

ANS: I actually think it’s positive. I know a lot of people don’t think it is but I think it’s a positive thing because it makes us a little bit more aware of what we’re doing and the competition on a global level. Kind of helps break things up a little bit. I mean it… America’s big but we still often times end up with one company in a pretty big seat of power and if you can break that up a little bit more by just having some of these other countries come in that’s probably a good thing and it keeps things fresh and new and innovative.

Q: 4 Could you share with me some of the courses you’ve taken and perhaps taking during the course of your studies?

ANS: Yes, there’s Digital Modeling 1 and 2 where we basically learn how to use programs like 3D Studio Max to produce 3D models and rigging them and animating them and texturing them and setting stuff up with lights and such. I also took a course in Softimage, which is another 3D modeling course that works like Max. It’s good to know more than one. ZBrush is an interesting program. It doesn’t do the rigging or the animation but it lets you sculpt on a very, very high-poly, which means more polys, more detail. So art classes like that. On the other side, programming courses like I’ve taken Multimedia 1 and 2, which are actually courses in learning Flash ActionScript 3.0. And then I’ve also taken a course know as Multiplayer Game Programming where you learn how to integrate programs so they talk to each other over the Internet or network or whatever and that also involves learning to use a programming language—C Sharp—with the game engine Unity and some level design courses where you’re looking at how to document and communicate things as well as how to use various game engines such as Unreal.

Q: Research conducted on behalf of the manufacturing industry tells us that in addition to the course work as part of a higher education some other skills are considered relevant to the job market. In addition to the course work—things you just mentioned—while in school, in your opinion, what are some of the skills that are valued by employers, other skills other than course work?

ANS: The ability to communicate especially in the area that I’m looking at, being a bridge between the artist and the programmer, a lot of times the lingo and the personality types vary quite differently between the two groups so being
somebody who can at... even if you’re not part of, say, the art group, you’re a programmer who understands where they’re coming from. That can be a big help. Same thing with the designer understanding what is going to be a huge amount of work for a programmer versus something that’s quick and easy to do and not changing it on them suddenly. But I think employers really like the communication skills but they also really like adaptability and especially being able to pick up new pieces of technology very quickly because the industry changes really fast and if you haven’t learned how to learn how to use new software right when it comes out, that’s going to be troublesome for you. And that’s actually one of the things that I really like about this specific program that Ferris has. One of my Professors specifically, works very hard to get the programmers to start thinking about how to figure out how to answer programming questions themselves instead of just memorizing one language, knowing how to pick up whatever language is there and very quickly figure out exactly what is needed to get the job done.

Q: Would you say, according to what you just shared with me, that these skills are valuable but are they taught as part of your school work or is it something you’re learning as you go along?

ANS: Well, Professor X’s courses, with the different programming, he actually does present it in a way where basically at first he’ll show you everything but then in the next one he won’t show you everything and you’ll have to figure some of it out on your own and he’ll keep making you work a little bit… he’ll tell you in the end if you really can’t find it, but he’ll keep probing you to try and figure it out on your own for a while which is a really effective method. The communication thing, and the group working, that has been missing a little from the course work but in the last year or so they’ve started integrating that more into the existing classes and are even starting up a new course that’s going to be very heavily based on working together as a cohesive group which is so important. The team building thing is huge in the industry.

Q: Generally, local, state and national economy needs and adequate number of high-skilled employees in certain fields. In your view, how do you find out what kind of high-skilled jobs are in demand in the local and the national labor market?

ANS: A lot of times it’s sort of a word of mouth thing. That’s a really good question and I’m not really entirely certain how. I guess, one way is looking at where a company’s located for some of this stuff, because like for my industry in particular, it’s an entertainment thing so needed is not necessarily the best word for it but wanted is maybe, you know, more accurate in that case. But you know, if you make something in Michigan, it’s still going to end up all across the U.S., so needless to say, if there’s a studio in Michigan, there’s not a lot of demand for people who do this stuff in Michigan and there really aren’t that many studios in
Michigan, therefore the demands’ not here. But if you go and look at California, Arizona, Texas, Washington State, those have tons of studios in them so the demand for people to move there to do the work increases. So I guess you look at where the studios are, for the most part, or the related industries, too.

Q: What factors influenced your decision to pursue your education in this program to become a digital animator and software designer?

ANS: Well, it’s always been an area of interest for me and I used to play around with neural networks and artificial intelligent stuff as a kid. I actually went to school to become a biologist originally and I got my-my undergrad degree in there but, physically, a lot of these people are just really just ridiculously athletic and I am not and I just could not compete or keep up with them and it suddenly occurred to me that there’s actually a lot in common between studying living things and going out and doing field work and then basically making living things and fields in a computer but one of them is a lot more athletically demanding than the other. So I sort of switched over to the less physically demanding of them. And I had originally thought I was going to be doing the art but, like I said earlier, I got flagged down as people said “You’ve got some good potential with the programming thing. You should focus on that,” and I was surprised to discover that I’m actually fairly decent at it.

Q: What other factors, other than the career itself, other than wanting to be a game designer and software maker, what other factors, in your view, influenced your decision to choose this particular field of engineering?

ANS: Well, the physical thing, the creative thing and also it’s sort of the desire that I wanted to be able to do something that would maybe, even if physically I couldn’t go out and do something, maybe I could inspire someone else to and the media entertainment is a great way to help inspire and influence the culture of the world and interactive all the better. So the opportunity to really go out there and maybe even if just one person is inspired to do something that just turns out to be really grand, that’s enough.

Q: How does program helping you to prepare for employment in a highly-competitive labor market seeking skilled individuals? The program itself, how is it helping to prepare you?

ANS: Well, there are the basic skills, but also the instructors are very good. If you really want to know where you’re at and things they will tell you straight up whether or not you are actually competitive at something. If you’re not cutting it, if this wouldn’t fly in the real world, they will tell you, “No, this will, you know, you may be able to pass a class barely with this but nobody’s going to hire you for this.” That’s a really good thing to have. I’ve known plenty of schools and programs where they’re just sort of like, “Oh, yes, all you need is your degree.” That’s not the way it works. They’re very focused on you and you have to
actually seriously be able to do this stuff and you have to have a good portfolio. They also help direct students towards communications with some people in the industry and they encourage students to go to the Game Developers Conference in California each year to try and make connections with people in the industry because that’s really important for finding a job.

Q: I know you discussed a lot of things and I’m always already convinced that I have most of the things that I want out of this question. However, would you explain to me how the technology integrates with your course-work class-work; rather it becomes more of a hands-on? I want to make sure I understand clearly.

ANS: Well, I clearly understand that. In the industry, having a computer that’s capable of building a 3D game model and running all the stuff before it’s been completely turned into a nice concise package for people is extremely expensive. The computer itself is expensive, the software, you’re looking at a few thousand dollars, often time per program. So, learning this stuff on your own is almost, you know, would be very difficult because you simply just wouldn’t have enough access to the materials to do it. So one great thing that we have here is almost all of the classes are project oriented where you’re using the stuff that’s being used in the industry and they update our programs every year with the updates that are happening in the industry. So you’re right there using the actual stuff that people are using to make real games right now.

Q: Now in order to avoid using the terms “computer” and “technology” interchangeably, what does technology mean to you?

ANS: Well, technology can be the physical manifestation of things like the computer or an automobile or a palm pilot or a iPhone, or like Xbox or whatever. But it’s also sort of the idea of the knowledge base and the thought process and the way of interacting with all of this stuff that sort of builds on top of each other. So it’s really, I guess one good way I think of it is everything that enhances a human that isn’t actually physically the human.

Q: How important is the role of technology in your learning currently at school? You have said a lot of it.

ANS: Very important. I mean what I do is literally work with the technology and around it. Although for specific technology that’s very important too… for it, the Internet, having basically a giant pool of information where you don’t have to necessarily memorize a bunch of anything—you can just go and look it up if you need to—is, really, really nice. It’s like a giant vat of everything known in the world.

Q: Could you briefly share with me some of the technologies that you’re exposed to in course of a semester or a year and elaborate on whether these technologies are the same as or different than what is used by the industry?

ANS: Well, the physical part, the hardware used is fairly similar to the same… it’s pretty much the same hardware, just variants of the same things that are used for
the modern banking systems and libraries and the Internet and all that stuff. The software’s a bit different because its tools that then build the interfaces and the things that people interact with on the hardware rather than directly being… it’s a little bit different in that way because I’m building the thing you’re going to interact with on that piece of hardware rather than just interact with it automatically in that manner.

Q: In addition to learning some of the things that we learn in school we also need to learn some other skills that are really important in the course of our learning and working with other people. Basically what I’d like to know is what steps have you taken or are currently taking or working on to prepare yourself for challenges posed by labor market, in addition to your school/coursework?

ANS: I’m always researching everything pretty much, from new tools and things and games to just what the trends are in society, what areas are of interest and always researching lots of different things. Unrelated, let’s see, I am studying more on how to cook because it’s… if you’re going to be on your own it’s good to be able to cook and sort of general stuff like that.

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly-skilled and well-educated workers?

ANS: I think so, for the most part. I don’t…I can’t say there’s ever really a substitute for having a bit of an experience in the actual field, even as an intern, it’s not quite the same as actually being the employee, but, internships helps in that regard. I think they do as good of a job as one can without actually being employed.

Q: What other opportunities are available to you at school to learn about job market and trends that you can take advantage of?

ANS: I believe there’s a career counseling center. I’m not sure if there’s one actually available for [redacted] right now at the [redacted]. I know that there was one in the past and they haven’t had one for a while. I don’t know if they have one now. I check every so often to see if they do. There’s a Game Development Club actually, that also helps with that.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department or in this program over the time that you’ve been here that reflects changes in industry needs due to globalization?

ANS: A lot less emphasis on the modeling art and more on the actual design aspect and the programming and I think that part of that may be related to the globalization because of all of the things that are done in this field, the physical modeling of things is one area that actually very easily jumps to whoever, because if you’ve got your concept art, all you have to do is say, “Hey, turn this into a 3D model,” and they send it back to you and it’s done. So I’ve definitely seen some more emphasis on the communication between the different groups because that is still useful to have, and a lot more focus on the design and the programming and we’re
just now starting to get some more focus into the actual animation technique, which is another area that is a little bit more of a skill trade, rather than just reproduce what I have in this diagram but make it 3D.

Q: Do you believe that the faculties at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: Yes, I do, actually. They’re really some of them are very, very much on top of it to the point where they’re like “Oh, hey, you know, in this... the first thing, you know, whatever it is style of doing something that’s been done in this region of the earth. Whoa! You know, and keeping us up to date on things like that and or “Hey, all the jobs this one company just got cancelled and were sent over there.” So we get news updates and things, actually, sometimes through my instructors. And I’ve even had a few where they literally ask at the beginning of every class, “So did anything important happen in the industry or related fields that anyone was aware of” and they ask that at the beginning of every class and there’s usually somebody who’s heard or seen something.

Q: follow up: How do your instructors transfer their knowledge of globalization to their course planning and therefore introduce for the benefit of the students?

ANS: Well, I don’t think they often times get up and say, “Hey, we’re, you know, this is way too common across the world now, you guys needs to shift your focus in this.” They tend to be more along the lines of, you know, “This is a relatively common skill.” Maybe they devote an extra week. They take a week off of that area and move it into an area that’s a little bit different, and they constantly are tweaking their lesson plans and stuff and because, you know, like I’ll talk to one student who’s in a class, you know, the semester before me and they’re like, “What? We didn’t do that project. We did this one.” And you can see why they’ve changed stuff because this is an industry that changes so rapidly that you just constantly are having new material.

Q: Do you visit job sites and talk with employers to learn about their needs and the latest trends in the labor market?

ANS: The one time that I do really get to do that is at GDC when we go over to California. The one weak point of the program and it’s not actually a weak point of the program; it’s the geographic location that we’re in. There aren’t a whole lot of game studios here yet. But because of some of the things that have changed in the last few years regarding the tax breaks and things we’re starting to see a little bit more of the trickle in of these things. Actually, right around the borders, it’s almost humorous how it literally is seeping in from the borders. So, you know, like, yeah, that’s partly one of the reasons why the instructors encourage us to go to the Game Developers Conference because that is where you get the opportunity to go to a big hall and talk to representatives from hundreds of game development companies, many of which are actually from other parts of the
world too, in order to know what they want, what they need, how they have things set up and show them your portfolio and know, what they like, what they don’t like, what to change and why—what to keep the same.

Q: To what extent skills such as problem solving, decision making and good communication skills and customer service skills are taught as part of the courses offered here in anticipation of preparing the student for entry into the workforce, and do you think that the employers find these skills valuable?

ANS: Other than the customer service one, pretty much all of those are taught pretty heavily. Being the flexible, adaptable, communication thing that “technical artists,” which is somebody who can do art and program at the same time, it’s sort of what produces in this program. They pretty much make everyone, whether they’re an artist track or a programmer track, get some experience with the opposite track to make sure that they, at the very least are able to understand what the other people on their team go through when they ask for a slight change that maybe isn’t so slight and to be able to communicate, so that’s something that they do a really good job of.

Q: in your opinion, do you think students, should develop these skills?

ANS: Oh, definitely. You’ve got to have, and, you know, the customer service thing is a good skill to have. It’s not super heavily taught although in Junior Project they do have a client that you’re producing something for. That’s much more important if you’re working for yourself but at the same time, being good with customers probably also means that you’re going to be better with whoever you’re working with. So I would certainly encourage students to try and learn those skills on their own if not through a specific course, maybe through some other classes or a customer service job. The adaptability thing, if you can’t adapt in this industry, don’t stay in it. So, yeah, they’re very important.

Q: Now we’re going to talk about assessment for a brief second. As you know, State University, especially with these technological departments, specifically with the technological departments, they have a evaluation called Academic Program Review and I’m not sure if you’re familiar with that or not but the purpose of that is to talk to present students, ex-students, alumni, folks in industry, you know, other stakeholders that may have an interest in what the college is developing. And the purpose of that is to evaluate programs to see if they’re effective, they’re not effective, to change them, to make enhancements or, you know, to get rid of ‘em to, uh, completely. Now first I’m going to ask you, are you familiar with this program?

ANS: I guess I assumed that they had something like that. I’ve never participate in it… in it specifically.

Q: Follow up: I’m looking at this question from two fronts—one for faculty and second for the students. Both of these groups can benefit from it. In your opinion, how
does this process helps faculty and then the students? How could it become beneficial?

ANS: Well, it helps the-the faculty know what-what they need to focus on. if something isn’t working in the real world, that doesn’t mean it won’t work in the classroom. So it could be going fine in the classroom but if it turns out students then get out in the real world and they’re like, “Oh my gosh! I don’t know what I’m doing,” and they start to… they-they want to be able to get… I mean their-their whole job is to get students ready to work in the real world so if it’s not working out well, I certainly see them wanting to fix that to make it so it does work out well and the, of course, the students then benefit by it working better.

Q: How would you benefit from it?

ANS: Well, if I learned something a specific way and it turns out that that’s probably not a very good way to go about doing it in the real world; I’m going to probably be a little bit annoyed that I just spent a bunch of money and time learning something that’s completely irrelevant. So it’s a lot of benefits to the student to know that things are kept as up to date as possible.

Q: Well, at this point we have reached the end of our interview. I want to thank you for taking the time to talk to me, but before I turn you lose, I’d like to give you an opportunity to share with me any recommendation, anything that comes to your mind that you believe it’s important for me to know, I would like to hear whatever you’ve got to share with me as a closing comments.

ANS: We talked about a lot of things, very impressive stuff.

Q: Anything comes to your mind that you think it’s good for me to know as part of this data collection process, I would appreciate it.

ANS: It seemed like a very thorough survey and I hope everything works out well and you are able to get enough data out of it to get your study done.

Q: I appreciate that.

ANS: Yeah.

Q: Thank you very much.

End of Interview
Good afternoon. This is Al Moradi. Today is November 4\textsuperscript{th}, 2010. Time is about 3:05 pm, and I am speaking with Student Participant Number Two from DAGD.

ANS: Yeah.

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: I am in Digital Animation and Game Design program and specifically I am most involved with the art and 3D side of it, and I expect to graduate after this May.

Follow Up: What a Digital Animation and Game Design engineer do?

ANS: It’s a pretty broad subject. We’ve got a lot of people that are just game designers. They come up with the ideas, the concepts that they want to be sort of like the producer and kind of run behind things. We’ve got programmers. We’ve got 3D artists, 2D artists, kind of anything it would take to make a game and for me it’s just the 3D, the art and sort of that kind of thing.

Q: Globalization: the term globalization is often mentioned in conversations, newscasts, published articles and so on in a context of a globalized economy. I am interested in your understanding of globalization, how it happens, and what it does. What do you think?

ANS: Well, to me, globalization is kind of—it covers a lot of things. For one; it can be anything from technology and computers and businesses and people to religions and cultures and basically everything. To me, it’s kind of the idea of how things are changing on a world-wide scale and how things are almost meshing together and relating and just evolving as time goes on.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the first decade of the 21\textsuperscript{st} century than any other historical period. In your opinion, what factor or factors causing such a rapid pace in the spread of globalization?

ANS: That one, I would have to say is pretty heavily based on our computers and our ability to be able to actually like go on eBay and you can go buy things from an outside country or with the help of like—we can even take a plane and go and talk
with other companies and just the computers and everything that really seem to be advancing it.

Follow Up: What do you mean by computers? What kind of computers?
ANS: Well, I guess it would vary there. I mean, if you’re a company, it could be just recording financially what your order is and how we want to get your product that you need or etc, or your parts. If you’re more of an individual, it could be as simple as like I said, just jumping onto eBay or Amazon, or just ordering that way and using that to your advantage.

Follow Up: What’s changed with computers?
ANS: well, I mean, back in the days, there really used to be sort of a limited scope on it where you could only communicate so far, and nowadays, you can literally talk to somebody like I am right now with you, like just one. You can talk with them readily and at the very moment from across the world with, for instance, just Skype or MSN.

Q: What kind of technology is used for that?
ANS: Well, now for me, a lot of like I said, I like to use Skype specifically where I can just directly talk to somebody and I don’t have to worry about having to type everything up. Everything’s pretty instant and I use it mainly just to communicate with somebody like strategy. I play a lot of video games so that’s where it comes in a big hand for me.

Follow Up: It is believed that globalization has a far-reaching affect on the lives of people especially in the developing world and emerging economies. How does globalization affect people, countries, cultures and competition for jobs, education and other aspects of daily life, either as a positive or a negative development?
ANS: Well, I guess the first place I would want to start with that is competition-based and that’s because it—no longer are you just competing with people that are like right near you. You’re not just competing with people in your state or in your county. You’re competing with people world-wide because companies are willing and able to talk to people and ship them over and actually work with them. And with computers you can actually just let them work from home. So, as a skill, you need to be sort of on top of your game, and I guess that would be sort of like a good thing and a bad thing. It’s a bad thing for me because I’m having to compete with people who I don’t even know, and I don’t even know their skill level or anything, but it’s a good thing for companies because they’re able to go and say, “All right. Well, we need that position filled and this person can do it the best. Let’s work with them.”

Follow Up: How does it affect culture? What-what changes as a result? How-how do things change as a result of globalization?
ANS: I would say it’s a lot of advancements, whether they be kind of good or bad. Like another thing to look at would be farming and science and things like that, being
able to actually say, Well, we’ve come up with this method, and throwing it into other places and actually helping them out and agriculturally helping the culture.

Q: 2 Global competitions for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding of or perception about the impact of globalization on your program of study and the career of your choice?

ANS: Well, for me, globalization is a pretty big deal because I am pretty heavily involved in a very technological program. So, I am—as I was kind of explaining earlier, I am basically competing with anybody and everybody that’s able to get into my degree, and for example when looking for a job, I’m not actually looking in just this state. I’m looking in anywhere that they will take me. So in that sort of sense, I’m kind of trying to use it to my advantage to be able to say, “Hey, I have skills and I’m willing to go over there and help you out. I might not live there, but I can do it,” but at the same time, I’m still having to compete.

Follow Up: does globalization have a positive or a negative impact on the program that you are studying and ultimately the career that you will choose?

ANS: well, I’m hoping it’ll be positive. I guess it’s one of those things where it depends on if I get the job or not but it’s positive in the way that I’m getting to really sort of see where other people are at because I can search them up and I can check them out and see at what level they are and try to surpass that.

Follow Up: Have you experienced or noticed trends and/or changes in the job market or more competition for jobs in your field?

ANS: I’ve—I mean, this is going kind of way back because I’ve been pretty involved with sort of games and stuff like that since I was a kid and I can remember back in the day, it used to be one of those things where if you didn’t have a degree, you didn’t—they wouldn’t accept you into the field, but nowadays, they’re like, “If you just have the skill and you’ve really worked at it, we’re willing to look at you and maybe even hire you.” So, in that sense it’s broadened a lot and there’s a lot more opportunities there.

Follow Up: What does the future career outlook in context of a globalized labor market looks like in your field of study? In another word, what is the trend? Is it going to grow? Is it going to shrink? What’s your understanding?

ANS: from what I can tell, it looks like it’s going to continue to grow. I do feel personally that in the United States, gaming is growing a little slower than it’s been on a world-wide scale. Even though it’s still progressing, there’s a lot more laws going down and a lot of people seem to be almost fighting it, but what’s nice is there are other places such as Tokyo, which is really open to the technology and just totally open to gaming.

Statement: Let’s talk about technology and competition as two of the main components of globalization:
Q: 3 In your opinion, how does globalization contribute to or intensify competition for jobs, markets, resources and skilled and educated workers?
ANS: I think it makes the competition dramatically much more of an important factor in the terms of getting the job. And as I was kind of explaining it’s just something where you have to really be aware of what’s going on and if you’re not actively involved in what you’re doing, you’re going to fall behind, unfortunately.

Follow Up: What are some of impacts of globalization as a result of advancements in computer technology and therefore, creating more competition? In another word, how does globalization contribute to or intensify this process? What are the factors?
ANS: well, for my degree specifically as an example, we’re pretty heavily reliant on technology and computers and if you don’t have that as your source, you’re going to run into a major block so to say. Like, for example, I actually just bought a new computer just to try to keep up with everything because I need to be quick at what I’m doing and I need to constantly be moving and learning, versus somebody who, let’s say they’re working on an older computer model and they’re not able to really get the programs to run. They’re going to be behind in the sense that they don’t have the programs, they don’t have the skill, and they just overall don’t have that understanding yet.

Q: So now take that example and transfer it to the global market.
ANS: The big picture?
Q: The big picture, yeah.
ANS: well I guess in that sort of sense, it’s just a thing where if you’re not really involved with what’s going on, there are going to be other people that they can select from that actually—have those resources already so they don’t have to train them. They don’t have to worry about, “well, can this person do it?” because they already know they have these skills.

Follow Up: So you would agree, or you would say as a result of technology being available around the globe, it makes it possible for every person who has the means and the education to compete with anybody around the world?
ANS: Basically if they’ve got the—if they got the drive and they got the resources, I mean, it makes them where they’re at a competitive level.

Q: 4 Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the world for high skilled jobs? How does that make you feel?
ANS: well I’m always kind of aware and always kind of watching to see sort of how the industry is progressing because I don’t want to fall behind on it, and there’s always that sort of unknown factor of where I wonder what other people are at right now and how they’re standing trying to get into this job. But I’d say this
program actually set me up pretty well in the sense that I feel like if somebody were to ask me to do something, I can definitely do it and I can do it quickly. And that’s always something that they’ve been saying is my strength there, so I’m hoping I don’t run into too many problems but you never know.

Follow Up: Do you think globalization may impact or has already impacted your field and in what way?

ANS: I would say it has definitely already impacted the field. Because if you kind of look at it, umm, our field is definitely a world-wide thing and when a game releases, it’s not just in an area usually. It’s often the more markets you can get, the better. So they aim for everybody. It’s not just the United States. It’s not just Europe. It’s—everybody is involved and that’s just kind of all part of it. It’s definitely a positive in the sense of the companies, I would say.

Q: Follow Up: What type of changes if any do you foresee as a result of globalization of labor market in employment opportunity, given the very competitive global environment?

ANS: well, not in the sense—I mean, I would say the market’s kind of opened up in the sense that I’m not limited to just this area, which is great because unfortunately Michigan doesn’t offer a lot of job opportunities for game design, but it leaves it sort of like an open door in the sense that I could end up anywhere. I could be working out in California. I could be working out in Russia or Australia or Japan, wherever I need to go.

Q 5: Could you tell me a little bit about some of the courses you are currently taking or have taken in the past? Just-just briefly name a couple of them.

ANS: Well, I’ve taken a lot of, uh, 3D modeling courses. That can be anything from 3D Max to Z-Brush. I’ve taken programming courses even though I’m not planning to be a programmer. It’s just good to understand how the whole process works so you can actually help everybody else. We’ve done a little bit of game design, a little bit of level design, and lots of business and project management, speech, everything like that.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course work, as part of a higher education, some other skills are considered relevant to the job market. In addition to the course work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: I—that-that’s always a kind of hard one because, I mean, from what I’ve learned is it-really varies based on the company but most companies, to me at least, it sounds like they’re interested in somebody that’s able to fit into the business culture and actually get along with everybody and flow well, but it’s also having the skill to do what’s needed in the time that’s needed, and that’s really important.

Follow Up: Can you name some of those skills?
ANS: Well, I guess, I mean, specifically from me a lot of those skills would be, definitely a project management, just understanding what it’s going to take for me to get it done, but also to still understand what it’s going to take for everybody else to get it done off my work and knowing what’s coming to me and—because I’m—I’m kind of in the middle there. I’m not at the beginning step or the end step.

Q 6: Generally, local, state and national economy needs an adequate number of high-skilled employees in certain fields. In your view, how do we find out what kind of high-skilled jobs are in demand in a local and a national labor market?

ANS: That one I’m not as aware of but I would probably go the route of the Internet and just relying on that to kind of—based on how often something comes up or, like if I go onto a job site such as Monster or something like that, and using that to sort of see what’s in demand.

Follow Up: Do you attend job fairs and things like that?

ANS: Recently I’ve gone to GDC, which is the Game Developers Conference and that’s out in California and I’ve gone there every year since I started the degree, and that does a lot of like career expos where you get to directly talk to the companies. And that’s more directly involved with my field of study.

What factors—what factors influenced your decision to pursue your education in this program to become a [Game or Digital Animation and Game Design] engineer?

ANS: Well, for me that goes way back because my dad’s always been really big into computers and technology and sort of the next new thing and I think I was five or so when I really started paying attention to my dad playing on a computer and stuff, and I got involved in games and I started wondering how it was made and sort of progressed from there to get to where I am right now.

Q: what other factors, other than the career itself, in your view, influenced your decision to choose this particular field of engineering?

ANS: Well, for me, I’ve always as a personal goal, I really just generally like finding a way to make people happy and it’s kind of a different way of doing it, but it’s—gaming’s always kind of been one of those things that it interests me and it intrigues me and it kind of brings up this world that could never exist, and you kind of feel—it’s just different and it’s kind of a fun experience, and so I don’t want it to just be a personal thing. I want it to be enjoyed by just about anybody and being part of that process is what really does it.

Q: How is this program helping you to prepare for employment in a highly competitive labor market seeking high-skilled individuals?

ANS: I would say right away they are providing a lot of the resources that we need. They’re telling us what types of programs are most common and what types of skills are very valuable and how to sort of manage your time and really be competitive with them, and what’s really great is that, like I said, if you don’t have the resources, they actually have the resources here.
Q: You mentioned they tell you what skills are required. Can you share with me what some of those skills are?

ANS: well for me as a 3D artist, it’s understanding not just how to do what we call rigid body modeling, which is like structural, almost bulky, but also understanding how to do organic, and it’s understanding how to do a low-poly, which doesn’t involve a lot of polygons and stuff, but still has to have a lot of control, versus something that is high-poly that not only has control but has that high detail.

Q: Because of the advances in technical innovations, careers of tomorrow are in constant flux. In your view, is this program going to meet the current and future demands of the labor market?

ANS: I would think so for that one. I mean, it’s evolved already just in the couple years that I’ve been there. Like, for example, we used to be really big into I believe it was called VRay, which is just a lighting renderer and stuff, but we now use MentalRay. That’s just like a small change there, but then it’s also affected like how we actually organize the program and what programs we’re actually using. Like, it used to be XSI (Investigator Note-XSI is part of the Softimage suit) was like the next big thing. Now it’s not, so we’re moving on to Moto and we’re just trying to keep up to date.

Q: In order to avoid using the terms computer and technology interchangeably, what does technology mean to you?

ANS: for me technology is mainly just like advancement. It’s sort of like—I would just describe it as advancement or a progression of something that actually further helps you do something. So even though computers tend to be a pretty big thing for that, it could also include things such as like sciences or advances in agriculture and stuff like that.

Q: What role does technology play in your current learning environment?

ANS: for me, it is—I would say it’s definitely surrounded about the computers and the programs that I’m getting to use, and a good example of that would be back in the day, you’d have to do everything in low-poly models and it was really hard to try to fit everything in the small, little space, and nowadays it’s just so much more open. You have more creative freedom, so to say, less worry about restriction.

Q: What type or types of technologies are you exposed to in the course of a school year?

ANS: well that’s pretty hard because, I mean, for me, I definitely focus pretty highly on the computer end of the technology because I surround myself with a lot of computer technology, whether it be literally my PC or any of my consoles or just anything related to that. And I think what really helps me say that it focuses towards that, is because with computer technology, it almost seems to upgrade like in a matter of—it feels like days or weeks. I mean, you never have the same thing a year later.
Q: Is the technology or technologies used in your class the same as the technology used by businesses and industry, meaning are the different or the same?

ANS: I’m not fully sure what the businesses specifically end up using, but I do know there is a difference between what we’re using here at school and what I’m using. For example, a lot of the stuff that we have at school, though it’s really good, the stuff that—I actually just got a new computer and it’s—I’d say it blows it out of the water in the sense of I want the stronger equipment, the equipment that pushes everything further and faster.

Q: In your opinion, is there an advantage for the school and students if the school was teaching/using software similar to what is used in the industry? And are there any advantages to trying to coordinate the use of some of these tools with specific industries?

ANS: Well, I think it luckily tends to be that, if the program can run, I mean, you’re going to at least progress and get things done but I’d say the biggest disadvantage would be if I knew what type of technology companies were using, I’d be more tempted to try to use them myself so I’m more familiar with it and I feel like I’m actually up to date and I’m understanding what’s going on. Like, for example, for a while there, I was actually just running off of Windows XP, and just going from that operating system to Windows 7, it’s a completely different feel, though it feels similar. It’s just having to re-learn a couple of little things just to navigate around the computer.

Q: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in a labor market.

ANS: Well, for me this one’s definitely covered in our program. There’s a lot of people that tend to sort of focus down on video games and saying “I just want to get into that,” but we can do a lot more with our skills than that. For example, just the 3D alone can be used for like the health industry around here and actually doing demonstration videos on how this thing works, or it can be used in architecture and trying to say, “This is what your building would look like in an actual 3D space rather than just your 2D,” and it’s things like that, just being able to say, “I don’t need to be in this one industry. I can use my skills towards almost anything.”

Q: In addition to school work, can you share with me some other activities that you undertake to improve the chances for employment and learn about the world of work?

ANS: for me, I definitely put a lot of time more towards the video game end of it. However, I still dabbled a little bit in things such as I’ve messed around with 2D
and sort of the marketing end of things. I really like graphic design, so I’ve messed around with that quite a bit and I also at one point was helping a group called Hyrail, a group out in Detroit, and what they were hoping to do was basically create a public transportation system and they needed to describe it—they don’t have the system in hand yet, so they needed somebody to take all their blueprints and all their ideas and actually try to make a 3D system so that they could show people and have people understand what they’re talking about.

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers?

ANS: Well, I’d say, let’s put it this way. I’ve gone to GDC a couple times and while there talking to the companies and stuff, a lot of them surprisingly don’t know Ferris, but they always react with a, ―How did I not hear about your school?‖ because they are actually finding that our students are pretty knowledgeable and pretty talented.

Q: In your opinion, what other opportunities offered by schools such as this can help or can be helpful to students preparing to enter the job market? What other things can the school do to help you prepare?

ANS: that is always hard because I mean, part of the reason why I got into this school specifically was because they were the most (they weren’t just focused on one area of study) they were willing to say “All right. Well, these are all the possible things that are related to this whole process,” versus like I used to be really interested in going out to a school called DigiPen, and the advantage that they had was that they focus you very strongly toward one point and you have—like basically by the end of the six-year program, you were a master at that point. Nobody should be able to top you but the problem with that is that you don’t understand anything else that’s going on. So I’d say for our school, it’s a little bit harder for me to say exactly what we could improve on in the sense of broadening it, because already we seem to be competitively broader.

Q: As a student preparing to enter the workforce soon, what kind of changes have you noticed taking place at this department or in this program over the time you’ve been here that reflect changes in industry’s needs due to globalization? In another word, have the programs, things the way they are presented, has anything changed to tell you we are doing this to respond to external pressures?

ANS: Well, the program definitely evolved kind of since I got there. Like, it changes from the applications that we’re using, the process that we’re doing to get things done and, I mean, almost everything in some way has at least upgraded or been changed around, even the whole structure of the program. I think, just either a year or two ago, somewhere in that range, we actually restructured it so that it included more of the game design and programming end of it.
Q: Do you believe that the faculty at this institution of higher learning is up-to-date regarding globalization and the need of industry?

ANS: I’d say there are definitely some that are more up-to-date than others. But, one teacher that I have been specifically focused around has [REDACTED] and he does a lot of freelance, so he has to know what’s going on because he’s competing with actual major companies and he’s just a small company, but he’s still getting the jobs because he knows what’s going on.

Q: In your opinion, does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching? In another word, what they’re doing is really in response to what’s in demand.

ANS: Yeah, I’d say, for example, a lot of processes tend to change at least every year. They sort of re-look at it and almost remap it if it’s necessary. Like what’s a good example? ZBrush is a major 3D program, and as that one’s been updating, we’ve had to sort of change it and refocus it, and then we even got to a point with it where it’s not just a high resolution or a high-poly program to take video models, but you could literally go in there with no modeling experience and still take the class, and so we’re actually allowing students with almost no 3D skills to come in and be able to actually just almost model like with their hand sort of feel. It’s almost clay-like.

Q: Do you visit job sites and talk with employers to learn about their needs and the latest trends in the labor market and work force?

ANS: I’m going to be doing that a lot actually after I’ve graduated since I’ll be more able to move around and talk to companies because right now, unfortunately there’s just not a lot of companies in Michigan, and while I’m at school, I don’t have the time and the resource to really head out and check companies out. So the only way that I’ve been able to do that is through GDC and actually going in there and trying to ask them as many questions as I can without actually being in their place, trying to figure out how does their company actually work, where they’re located, what’s their culture, those type of things.

Q: If you actually had a chance while in school to go to a job site and visit with, you know, with folks in industry—in what way could this information be helpful to you? What would it do for you?

ANS: I’d say it at first it would provide sort of more opportunity in the sense that they look at you and they say, “Well, you’ve been involved with this company and they liked you and everything went well. Then I don’t see why we can’t work with you,” and, umm, kind of like an internship I’d say in that sort of sense.

Q: To what extent are skills such as problem solving, decision making, good communication skills and customer service skills are taught as part of the courses
offered here in anticipation of preparing the students for entry into the work force?

ANS: with us, it’s definitely something that they’re trying to teach you and it really plays a big role when you’re hitting your capstone, which is what I’m actually taking right now. They require you to go to sort of like a mock interview with one of the…I can’t think of what her actual position is, but her name is Z and what you do is you basically you show your resume and they critique it. Basically, she’s sort of involved with the whole process. She tries to stay up to date with what type of things companies are looking for and she makes sure that our resume fits that and our skills are as well—like a career counselor, employment counselor, more of that line.

Q: how are these skills essential to you and the employer? Why are they necessary?

ANS: Well because when you’re actually making a game, it’s not like you’re just sitting into like a cubicle and working on your own, and everything just happens. It’s a sort of process that involves a lot of people and if you’re not able to communicate to people, then you can fall through on some spot and then things just sort of become more of a hassle than they’re supposed to be.

Statement: This school does some program evaluation every five years known as Academic Program Review specifically dealing with technology courses offered. As a result, they collect data by talking to current students, past students, employers, other stakeholders to gather information to gauge effectiveness or lack of effectiveness of a program, whether to keep the program, modify it, scrap it all together and start all over again. Are you familiar with this program?

ANS: No, actually.

Q: But if such a program evaluation plan was available, how could this evaluation process help the school, the faculty and the students?

ANS: Well, I’d say it’s kind of like how we do our teacher evaluations and class evaluations. It tells them what students feel like they’re not getting enough of, or something that they feel like might not be necessary, which is nice because then the students are getting taught what they feel should be taught. But then the professors can also sort of take all that information and go, “Well, this is what we need to teach the students. They’re definitely—they might not be aware of it, but they should be learning this,” and the school can sort of take everything all again together and remap the program to whatever is necessary to get those skills taken care of.

Q: In your opinion, can this process be helpful to students planning, reflecting changes based on industry needs? In another word, if the student is more aware of what’s really going on in the industry as a result of the academic program review, then they ought to be able to make better decisions, in another words, select courses according to what’s really needed out there. So the question is, is this
process helpful to students in that regard, to take courses that really matters to
their educational preparation process.

ANS: Yes, I’d say it’s helpful to the students because they’re getting the skills and
they’re basically keeping up to date because a lot of people, especially in our
program, they tend to just assume that if they go through it everything should be
great. So they don’t do a lot of the research themselves. So having this
information would really help sort of keeps the course on line to help the students
really keep in line as well.

Closing Statement: Well, at this point, we have reached the end of our interview. I
wanted to thank you for taking time to speak with me today and helping me with
this study but before I close, I would like to give you an opportunity to, comment
on any of the topics discussed, or something that you would like to share with me
that you believe it to be important and helpful for me to know.

ANS: Nothing that I can think of. I mean, that—that covered a lot of stuff. [Laughs]

Q: Any recommendations? Anything you would like to see happen or improved or—

ANS: Well. [Laughs]

Q: Something they do very well?

ANS: This is something that actually I plan to bring up to the instructors first to kind of
see how that goes, and then we’ll see what happens with it. But right now, our
school’s actually trying to do something where a class is basically not just a,
“you-have-to-be-there” half-online, half-in-class course because we’re getting a
lot of students that are—like for me, I’m only—you know, I’m traveling about 30
minutes from home. There are some students that are traveling almost two hours
to get here. So they’re doing like a class that meets every three weeks, but you
still get in-class time, but you get to work at home, too, so you’re not having to
stress as much about it. And though it’s a nice thought, I’m actually, very against
it because it’s just one of those things where you’re paying for the hands-on
experience and you’re not really getting it. It takes away the feeling that you’re
actually learning something. It makes it more of the things where if you don’t
have that skill, it feels like you are probably just going to fall behind.

Q: Well, thank you very much. I really appreciate it and it was very good.

ANS: Yeah. Thank You.

End of Interview
Opening Statement: This is Al Moradi and today and I am and I don’t foresee graduating for another two years, at least, hopefully that’ll be it, so spring of 2012.

ANS: Yup.

Q1: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate.

ANS: I’m currently enrolled in the Currently enrolled as and I don’t foresee graduating for another two years, at least, hopefully that’ll be it, so spring of 2012.

Q2: Please share with me what are some of the key features of this program of study that peak your interest?

ANS: I kind of was not necessarily pushed towards here but because my alumni, I get a scholarship for that and because it’s one of the only public colleges in the state that credits actually transfer if I were to try and go on and get like a Master’s or something above a bachelor’s and other technical schools like that just don’t cut it.

Follow Up: what a Digital Animation and Game Design Engineer do? What are some of the specific things you work on?

ANS: I’m leaning towards environmental modeler. I would make like buildings, structures, plants, just like a world that either would be used for assets for a world that would be used for, you know, some sort of an animation purpose or video game purpose.

Q: So you’re talking about a virtual design?

ANS: Yeah.

Q1: The term globalization is often mentioned in conversations, newscasts, published articles and so on in a context of a globalized economy. I’m interested in your understanding of globalization, how it happens, what it does, what do you think?

ANS: Globalization affects us more than what we think it does. I mean you think in aspects of being in the U.S. we’re just like out here in the middle of, kind of ocean locked between the two oceans so we think like what happens in the rest of the
world really doesn’t affect us, we just kind of stayed contained. But it’s not so. I mean with everything that we import. I mean we import like what? Twice as much if not more so than what we export so it’s nothing that is to be kind of frowned upon, I guess. It’s just that, because a lot of places offer cheaper labor, jobs gets shipped overseas and then people feel the impact from that and then it’s kind of the trickledown effect of, well, if the middleman can’t get a job to pay for basic food and necessities and stuff for his family, everything just goes down from there. Businesses don’t get money because people don’t have money to spend.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the first decade of the 21st Century than any other historical period. In your opinion, what factors are causing such a rapid pace in the spread of globalization?

ANS: Well, obviously it’s technology. I mean the turn of the 21st Century, I mean with computers and the Internet it’s just like a click of a button, a millisecond later it’s on somebody else’s desktop halfway across the world. So, orders can be placed and then packaged and shipped all in the same day. It’s no longer just calling up another country or a branch in a different country and it’s like, “Okay, well, we need this, just make sure you get it to us packed and shipped by the end of the week.” It’s just you can place the order. People are specializing in just making sure that they receive that notice now so they can get things on the ball and going. And with the way people like to be serviced as fast as possible, as soon as possible, orders are packaged and shipped usually the same day that things are received so it’s a two or three day wait.

Follow Up: It is believed that globalization has a far-reaching affect on the lives of people, especially the developing world and emerging economies. How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life both as a positive or a negative development all around the world?

ANS: In some aspects it’s a good thing. I mean, China and India have been for the last couple of decades kind of emerging as industrial powerhouses and that’s true more so today than I think it was in the past. I mean for them it’s only a good thing because they have a constant influx of money coming in but for those of us that are feeling the opposite side of that affect, it’s because we have a minimum wage thing here in the U.S., and we can’t really compete. And with the unions always trying to get as much money and benefits as they can, that drives the cost of objects up especially like cars and electronics, it just drives them up and if they can produce it cheaper somewhere else then including the shipping back here.
Why not, it’s good business sense. I mean at the end of the day I don’t think people really think of it much as an ethical problem anymore.

Follow Up: So what is the end result? If you think about the United States, is there a country that’s perhaps losing job and let’s assume that Chinese and Indians and others are gaining job. So what is the impact of this job movement from one part of the world to the other? How does that affect the livelihood, the life of average, ordinary person in those countries?

ANS: Well, we’ve had a steadily rising rate of unemployment. National average, I think, used to be about 5% and then this great recession hit and now it’s like 11.5%, 12%. I mean it’s even bigger here in Michigan because we focused on the auto and that took one of the biggest hits because people just weren’t buying the big vehicles and the gas guzzlers like they were specializing in. But then you turn around and you look at China and they’re favorite vehicle over there is the Cadillac Escalade. So they definitely are starting to live the life of luxury over there and they’re becoming more and more of a world powerhouse in terms of industrial…. and it just kind of I like to think of it in the ways of sports. I mean you got one team really good for a while and then just things kind of trickledown, players get old, and younger players go to other teams so, you know, one team that used to dominate, is no longer dominant and you got these other teams rising, so…

Q2: Global competition for resources and skilled labor force is one of the main arguments regarding the impact globalization. What is your understanding about the impact of globalization on your program of study and the career of your choice?

ANS: Well, because we’re like a technical school, we focus on a lot of computer-related technologies, programs and stuff. I don’t really see much of a downside to what we do because everything that I read says that this specific industry is constantly growing and sales show it as well. People are going out and not necessarily buying new hardware and consoles to play video games on but it’s a cheaper alternative to get a video game that you can play for 60, 70 hours at $60 than going to a movie with the family. It’s the same price for two hours of enjoyment. So, the numbers that I’ve been reading only says that our industry is growing and with looking at the jobs and internships that I have been, it doesn’t seem like it would be difficult. I don’t know a whole lot of like other schools and stuff. I mean, there are a few big ones out west and there’s the one that just popped up in North Carolina because of that’s where all the industry seems to be going to now. But I don’t see a whole lot of… like I’m not really worried about graduating as long as my stuff is good not getting a job.

Follow Up: Based on what you just said, have you experienced or noticed trends and or changes in the job market or more competition for jobs in your field?
ANS: I definitely, like the numbers here at our program in itself have doubled in the two years that I’ve been here. So I think people... what draws them in is the fact that, “Oh, well, we get to make video games. We’ll just spend all day playing video games and that’ll be it.” And then they’ll come into this program, because I know I’ve been in the lab a couple of times for some of the entry level stuff and during the first couple of weeks the instructors have to be like, “Okay, well, the stuff you see on TV where the guys are sitting in the chairs with the controllers like, ‘Oh, we just need this sound,’ and click, there is it,” that doesn’t happen. So then it’s just people realize that it’s not playing video games all the time and that you actually have to go through and make the models and rig them, and code it and everything. It’s not just sit down in a day and the game is done. So, it’s kind of for those of them that still have the drive and stuff, they still want to do it but I’ve seen a lot of people be like, “Well, this isn’t anything like I thought it was. It’s a whole hell of a lot more work.”

Q3: In your opinion, how does globalization contribute to or intensifies competition for job market, resources, skilled and educated workforce?

ANS: Well, being as the video game industry kind of started in Japan, it’s still… that’s still like I guess the Mecca of the video game industry and everything kind of just points out from there. I mean like we do have a lot of companies in the U.S. that do extremely well and focus on certain aspects of the market, but everything has trickled down from Japan, so, they’ve been doing it a lot longer than we have. They definitely have the experience and the workforce to do so. I just feel that, like, that would be a main source of competition is outside and not necessarily inside the U.S. borders.

Follow Up: But how does globalization really intensify that competition? How does that happen? What causes it in addition to Japanese being the original starters of this particular phenomenon? The globalization itself is a phenomenon. It makes it possible for Japanese and American and Brazilians and others to compete and so the question is: How does globalization contribute to this factor? How does it intensify that competition? The same thing you’re making here, they’re making in Japan, they’re making… so it makes it much more, you know, complicated for development and sales and marketing and all the other stuff. How does it do that?

ANS: I guess it would just have to be with the way it doesn’t take as much time for things to get places anymore. Umm, I mean they don’t have to bring… or people don’t have to relocate to do jobs as much anymore. They can just stay at home and work on their computers and stuff and then just e-mail the file, you know, to a director’s boss or, you know, somebody above them. So it just has to do with the information super highway.
Q4: Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or concerned about challenges posed by competitors from around the globe for high-skilled workers?

ANS: Oh, yeah. I mean our program here is nothing but high-skilled. You can’t expect to do half-baked (Baked was used to replace another work that the student investigator felt although used commonly would not be helpful hear) work. I mean, sure, you can graduate with a degree if you pass all the classes, but that doesn’t necessarily mean you’ll-you’ll get a job anywhere. And with our program being so technical, the slightest detail can prevent you from getting a job in comparison with somebody else. Employers don’t have to take you because you come from the U.S. now. They totally have their pick and choose now because it doesn’t like I said earlier, it doesn’t take as long for information to be sent from one place to another.

Follow Up: What type of changes, if any, do you foresee as a result of globalization of labor market and employment opportunities given the very competitive global environment?

ANS: Well, I know I’ll probably end up having to relocate. I mean the market just isn’t here in the Michigan area and I’m well and prepared to do so. It’s just where I’d be relocating to that is on my mind. I mean, I have no problem going wherever the work is. If I can land a steady job that would be secure, I myself definitely wouldn’t have an issue relocating to Europe, or, to China or even Japan, as long as I could get a secure job and just be able to work.

Q: So you believe that is one of the major changes—we must go where the jobs are?

ANS: Yeah. You can’t just expect… I mean, I come from a small town so it wasn’t really much of a hard choice to get out of it. There was nothing there. The industries were set and that was basically it. I mean it’s a lot harder for people like my father’s age and older to just up and relocate for work. But those of us that’ll be fresh out of college, it shouldn’t be much of a major concern.

Q5: Could you share with me a little about some of the courses you’ve already taken and perhaps you’re currently taking?

ANS: This semester I’m enrolled in Unreal Development Kit or Level Design 300 and we basically are given a set of rules for a level that instructor wants us to complete each week and then we just fulfill those parameters while keeping it--while doing whatever we want with it. There’s hardly any right or wrong answer as long as you fulfill the requirements that the instructor’s looking for, you’re golden. Of the things that I love about this program is that it’s not okay, “Well, you guys needs to model this,” or “You guys need to make this level.” It’s so open and creative. The teachers basically like, “Well, you got an idea for, you know, a model or, you know, a game that you want to make, then, you know, go ahead and do it” It’s creativity aspect is definitely way up there.
Follow Up: Research conducted on behalf of the manufacturing industries tells that in addition to the course work as part of higher education some other skills are considered relevant to the job market. In addition to the course work while in school, in your opinion, what are some of the skills that are valued by employers? This is in addition to the school work.

ANS: Okay. Well, just even taking my job at [blank], one of the things that they value extremely is teamwork and communication. Here we do a lot of work by ourselves but at [blank] it’s definitely a team effort to get things done for the day and if you can’t communicate with your co-workers or your manager as to what you’ve done or what needs to get done or what needs to improve, then nothing’s ever going to change.

Follow Up: Are those skills taught at your school?

ANS: Not really. We have a few assignments that I’ve done that have been like team based but it’s more of a real world experience.

Follow Up: So do you consider these skills essential?

ANS: I would. If you can’t communicate your point across with somebody else, then nothing’s going to happen. And if you can’t work with other people, no one’s going to take you on as a team member because you’re just insufferable.

Q6: Generally, local, state and national economy needs an adequate number of high-skilled employees in certain fields. In your view, how do you find out what kind of high-skilled jobs are in demand in the local and in national labor market?

ANS: I mean you can just watch the news for the things that they’re looking for as far as the national scale goes. And then like for local or state wise, you I like to use MSN.com. They usually have a lot of articles on like something that the Better Business Bureau has put up saying, “Okay, well, in the last five years, hiring in this sector has gone up by so much,” and I mean that’s the kind of stuff that I like to look at. But then if you just go on any sort of job website; Michigan Works or Monster.com, and you see all the kinds of jobs that they’re looking for. It gives you a good idea, I mean here in Michigan it seems like if you’re not a trucker or if you don’t have a dental assistant’s license, or a nursing license of some kind, then you’re basically out of luck.

Follow Up: In your opinion, what kind of information may be helpful to students when selecting a program of study toward a future career?

ANS: I just chose something that I thought was interesting and then I met with an advisor. When I came down for a scheduled meeting, they told me right then and there that it wasn’t what they show on TV where guys just sitting in chairs pushing buttons and stuff all day. It was actually a lot of work and when they told me that it was this free and I could basically do like if an instructor wants a character, make your own character as long as you can keep it inside its constraints, you’re golden. That was one of the things that interested me. I mean
I’ve never been much of a… I mean I’m good at math and science and stuff like that but that kind of stuff never really interested me and I know a lot of people from my high school like, “Oh, I’m going to be a pro athlete and stuff,” and it’s like bring it back into the realm of reality here.

Q7: What factors influenced your decision to pursue your education in this program, meaning Digital Animation and Game Design Engineering?

ANS: I stated earlier that this is the one of the few public colleges in the state that offers this program that credits will actually transfer. If I were to go on and try and get a master’s degree which I would like to at some point in time. And if I were to go to a technical school like ITT Tech or something, credits won’t transfer except inside their system. So if I did get a bachelor’s degree from them, that would be like my cap. The equivalencies just wouldn’t factor in if I were to try to go somewhere else. They’d be like, “Oh, well, from the credits that we’ll actually take, you only have an associate’s. You know, what are you doing here?”

Follow Up: What factors, other than the career itself, in your view influenced your decision to choose software engineering?

ANS: Umm…

Q: You mentioned your dad?

ANS: Yeah. He went to [unintelligible] and he graduated with a degree is Automobile Mechanics and because he’s an alumni from [unintelligible] and I’m a direct relative of his I get a scholarship every year. It’s like keeping it in the family type deal. So that was definitely a major push in the right direction for me. If [unintelligible] is going to give me money to come and take classes there, then its money that I don’t have to pay out of pocket.

Q8: How is this program helping you to prepare for employment in a highly-competitive labor market seeking high-skilled individuals?

ANS: Each and every year two or three instructors, along with a bunch of students, go to the Game Developers Conference in San Francisco and the instructors, they don’t go… there’s a couple of ‘em that don’t go just for their personal use. They go the entire time just trying to find out what business and companies are looking for trying to make contacts for our benefit, like helping out with internships or maybe getting an on-spot interview with a possible graduating senior in the spring. So, at this conference everybody’s there that’s anybody so it’s not hard to go out and just find somebody to talk to about it. I know a bunch of my friends here that went as sophomores with their portfolios and they weren’t looking for an internship or a job and they’d just kind of be like, “Okay, well, these are good starters. Just build on them and then come back to us in a year and we’ll see what you’ve got.” So, you would think that big companies like that would be like, “Oh, well, why are you even talking to us? Your stuff is crap,” even if you’ve only been doing it
for two years. But they’re more than willing to help and give their two cents on what they think to help you along.

Follow Up: Along what you said, is this program going to meet the current and the future demands of the labor market and, also I want to emphasize, is there a demand for the kind of skill you’re learning?

ANS: It’ll definitely meet it. I’ve had a couple of instructors and students with portfolios, seniors that were going to graduate that year that went out to the conference with their stuff and they’re like “This is amazing. And we do that kind of work in three months and you do it in a month and a half and it is game ready already. It looks just like the stuff that we’ve been doing.” And as far as demand goes, from what I’ve been reading, one of the most like, I’m trying to think how to word it, one of the highest growing technical aspects in the market at the time.

Follow Up: So is this one of the fastest growing jobs?

ANS: Yes, I think it’s like third or fourth behind nursing is like one or two.

Q: To avoid using the term “computer” and “technology” interchangeably, what does technology mean to you?

ANS: Technology just to me means something that helps you get stuff done faster. I mean, and that can be anything from a car to get you from point A to B faster than walking, telecommunication wires, being able to communicate with somebody 20 hours away or something in the drop of a hat.

Follow Up: So you would say they have a far-reaching effect on the quality of life or would they change the environment?

ANS: Yeah, whenever there’s been a change in technology, the quality of life seems to have gone up. I mean just taking a look like at the Industrial Revolution, once people finally figured out that they can mass produce clothing everybody had nice clothes and…

Follow Up: What role does technology play in your current learning environment? How important is that?

ANS: Umm…No response was given.

Q: What type of technologies are you exposed to in the course of a school year?

ANS: Yeah, programs on the computer are changing every year. So like companies are always updating, trying to make their programs better, more reliable or faster, they can do… handle more so that they become like an all-around, you only need our program now. I mean taking a look at like the Adobe Suite, you know, what they have in CS5 is so far up and beyond what they had in CS4 in terms of going from CS3 to CS4. CS4 to CS5 jumps that like three times over. So…

Q: So you’re saying that’s much better than Photoshop 4 or 5?

ANS: They’re—they’re…Those are the ones I use. Well, even going from CS4 to CS5. I’m in Photoshop this semester and there are tricks and things that can be done in 5 that 4 couldn’t and only having the year past, you know, and they’re like, “Oh,
well, we can do this now or we can, why didn’t we do this earlier,” you know, it… and stuff like that just kind of blows my mind.

**Follow Up:** Would you say the technology that’s available to you in class is similar to what industry uses? If different, how is it different than what is used by the industry?

**ANS:** We basically have non-commercial rights to programs that the industry actually uses. So the programs that we use here, if you can get familiar with them and you can land a job somewhere, you’ll use the same thing. So you don’t have to learn a whole new system. That’s one of the things that I know our instructors and our program advisors strive for is having industry standard software and that was another one of the reasons why I came here.

**Q11:** In addition to the education appropriation process that the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. I am curious about some of the steps that you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market.

**ANS:** Well, I do plan on going out to the Game Developers Conference in March so that’ll give me a huge idea as to where I stand and possibly make a few contacts with companies as far as getting an internship because if you can, from what the instructors have said, if you can land an internship with a company that actually makes games or does something that you enjoy, chances are when you graduate, as long as you’re not taking an internship the year bef… like if you’re coming in as a senior and then you take an internship, chances are pretty good that they’ll hire you when they have a position open or they’ll… you’ll keep in contact with them and let them know like, “Okay, well, you know, I graduate in May, you know,” like, “Okay, well, we’ll expect you here end of June.”

**Q:** Do you go to job fairs, for example, here?

**ANS:** Not really. I mean I’ve got a [redacted] that pays for my essentials and stuff so I’m not really kind of looking at the moment. That stuff probably will happen more as I get closer towards graduating.

**Q12:** In your view, is your current education and training preparing you to meet the needs of the employer’s seeking highly-skilled and well-educated workers?

**ANS:** Yes. As long as we put in the time on our models or our programs, whatever aspect we’re specializing in there’s no reason why you can’t in the time it takes to earn a degree be good enough to get a job somewhere.

**Follow Up:** Is there anything else or other opportunities that the school can offer to help prepare students better for the future?

**ANS:** I’m not really sure because I’m not really, I still have another couple of years yet before, I mean, probably after, not this year but next year, I’ll actually start
thinking about getting a job somewhere and with the load that I have on me for this current time is just kind of… it seems too far in the future to try and look at.

Q13: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department or in this program over the time you’ve been here that reflects changes in industries needs due to globalization? That means we are doing things here because things have changed outside. You mentioned that programs are more up to date.

ANS: Of course, there’s a reason for that. That’s because…Because they’re... the programs that we use are industry standard so if we were to fall behind on that and then students were not to have access to the newest stuff without them paying for it as the school would provide it, it would definitely be a shortcoming as someone who would enter a job and it’s like, “Okay, well, we’re using 3ds Max 2014,” or something. “Oh, well, I’m only familiar with 2010,” it’s the short end of the stick on there because then you have to, and they’re like, “Oh, well, just go ahead and learn the rest of it, it’s no big deal.”

Q14: Do you believe that the faculties at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: They definitely know what the industry is looking for. I mean we have three instructors that have their own little studio on the side and they are constantly in contact with other representatives from the industry. And then we’ve got the senior instructors that came from the industry so they’ve in it, they’re good 20, 25 years and then felt like that it was a time to change and teach like the next generation.

Follow Up: In your opinion, does the faculty develop programs of study that reflect the influence of globalization on their course planning and teaching?

ANS: Oh, yeah, just this being my second year into the program itself, the classes are constantly evolving. Instead of for example, in my 150 class, we made a game document. Well, that was just basically all text and now because industry kind of frowns upon nothing but text and reading, we do a lot of little prototyping so classes are constantly evolving. It’s not just, “Okay, well, we’re set in our ways. If it isn’t broke, don’t fix it.”

Q: In your view, does this transfer of knowledge about globalization beneficial to students and in that ways?

ANS: I would say so because if we’re constantly changing just as the academia, imagine how the market is with it, being competitive and trying to make money or it’s definitely just a, like a shadow of what the industry does. They don’t stay static. They’re constantly changing and trying to become more fluid, more efficient. That’s the kind of things that we build and focus on here as well.
Q15: In a previous question you mentioned that you do not visit job sites but, if it was possible for students to visit job site, could this be helpful to students and what would they learn and how could they use that information?

ANS: It can’t hurt. If students were to go to even just like a film studio, because we don’t just focus on video games, there are people that do all sorts of thing. You can do animations, cinematic. It can’t hurt. I mean you get in there and you see what they actually do and then you can compare it to the stuff that you do in class and be like, “Oh, you know, I’m doing the same stuff that, you know, somebody is sitting in a, you know, office doing the same thing.” You know, I… that’s something in common with somebody who is already out. So it’s actually a good experience?

Q16: To what extent skills such as problem solving, decision making, good communication skills and customer service skills are taught as part of the courses offered here in anticipation of preparing students for entry into the job market? They are not really separate courses but are they part of your learning process/teaching?

ANS: Yeah, the upper classmen students are always willing to give under classmen a hand. If they have a question, it’s like “Okay, well, I’m looking to help…” You need help on this and someone steps up and gives a hand. If you’re willing to ask for the help, you can find somebody here who has no problem giving a hand.

Q: But overall, do you find the skills essential? Are they necessary? Do we really need to be all those in the world of work—problem solving, decision making, the good communication skills?

ANS: I mean like I said previously, if you can’t communicate, you’re not willing to work with others, you know, you cannot succeed.

Q: Are you familiar with the Academic Program Review at this university?

ANS: No.

Let me explain what it is. Academic Program Review is something that does every five years. Basically, they evaluate the programs that they are teaching and collect data from current students, past students, alumni, employers, and other stakeholders that have an interest in this program. And based on the collected data they will decide whether they should keep a program, change programs, modify it or, just scrap it and start all over again.

Q: Based on the explanation provided, in what ways can this process become a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs?

ANS: Well, I guess I could compare it to like shopping online. I mean if you’re looking at a particular product and you see a bunch of user reviews, rating it at so many stars and you see something that someone says, you’d be like, “Oh, well, it broke within three months of me using it or “It was the best product I’ve ever had.”. If
students inside the program are willing to say good things about it, not just for the sake of doing so to keep the program, because they actually feel that the program is really good. And I know a lot of people around here do, even the transfer students that we’ve had, feel that this is better than what they came from, even if they’ve only been here the semester. So of course, that’s helpful to the school and the faculty and in designing programs that are perhaps much more tailored to their current needs and the needs of the industry.

Closing Statement: Well, with that, I want to thank you for taking part in this study. We have reached the end of our interview. And before we conclude, I want to give you a chance to bring up any topic, any ideas that you may have, any recommendations that you may like to share with me.

ANS: I don’t really have anything sort of input on that. Umm…

Q: End of Interview
This is Al Moradi. Today is November 4, 2010 and I am beginning an interview process with Student Participant Number Four from DAGD. DAGD stands for Digital Animation and Game Design. Now, may I proceed?

ANS: Yes.

Q1: Please briefly share with me, what is the program you are currently involved in and when do you anticipate to graduate?

ANS: I’m currently enrolled in the GAGD program, Digital Animation and Game Design. I enrolled in the fall of 2009, so I would expect to graduate either spring of 2013 or fall of 2013.

Q2: Could you explain to me what are some of the key features of this program of study that got you interested in becoming a digital animation and game design engineer?

ANS: Well, the thing about this program is that it was local. It was very close to where I live. I literally drove about 15 minutes to get here and I can do that every day, and then it was exactly what I wanted to do. I would look everywhere else and I would see software engineering programs or some kind of really in-depth computer programming classes, but nothing about game design. And when I found out about how [Ferris] has a game design program downtown, I was all for it, so…

Follow Up: What’s a digital animation and game design engineer do? What do they exactly do?

ANS: Well, it all depends really because like in our program, there are three different places you can go with it. You can either be an animator, a 3D artist or 2D artist and animate things. You can be a game designer which is what I aspire to be, and who, you know, think up the games, go through the development process, see it to its end, come up with the ideas and then you have programmers who help and assist those game designers by writing code for the games.

Q1: Globalization. The term globalization is often mentioned in conversations, newscasts, published articles, et cetera in the context of a globalized economy. I’m interested in your understanding of globalization, how it happens? What does it do?
ANS: Well, when I think of globalization, I think of either cultures or economic structures, or pretty much anything around the world coming together and having some type—kind of similar idea, and being able to communicate it beyond language barriers, cultural barriers, economic barriers, things of that nature. Really, I think that it’s a good thing, first of all, because it kind of had—it fits into that like the world becoming a smaller place kind of thing, more ideas being communicated easier, so.

Follow Up: So, the world is flat. Is that what you said?
ANS: Well, not necessarily flat. Flat sounds like there’s no difference between everyone. I mean, we still have all our differences, but we still have that connection on some even ground.

Follow Up: It is generally accepted that globalization is not a new phenomenon and it has been present for centuries. Globalization has been spreading at a much faster pace in the first decade of the 21st century than any other historical period. In your opinion, what factor or factors causing such a rapid pace in spread of globalization?
ANS: The Internet. I can tell you right off the top that I use the Internet every day. I’m looking at it all the time and honestly, the thing is like in the 1990s when I was growing up, I barely knew about the Internet and what it could do and even in the early 21st century, after Y2K, when everyone thought the big scare was going to happen with computers, that was when I got my first e-mail account. I’m like, “Wow! This is actually some pretty cool equipment.” Then I realized, holy cow, millions and millions of people use this thing. So really, the thing for businesses looking for jobs or looking for buyers to sell their products to—yes, they found that this tool can be used to millions of degrees of spreading it around the world.

Follow Up: It is believed that globalization has a far-reaching effect on the lives of people, especially the developing world and the emerging economies. How does globalization affect people, countries, cultures, competition for jobs, education, resources and other aspects of life, as a positive or a negative development all around the world?
ANS: Well, when you get people that are looking for efficient ways to do things, you get offers from places that you might have never been to like say if someone in Europe needs some kind of, well, in relation to my profession, if they needed some kind of 3D animation for a project, they can ask me even though I live half way around the globe, for a project and then they’d pay me for it, and then I would have this connection with this company.

Follow Up: How does it affect our lives in the United States? How does it affect the lives of people of India, China, because you’ve got to remember these are new, emerging economies, and the rest of the world? How does it affect the cultures, the people, the job market, education?
ANS: Well, I think it’s making it more rich in education, first of all, because people are looking for places to take their product all the time, and if you can expand to those markets where people have never seen something like that before, that’s definitely going to change their lives, or they’ll even reach out to people and say, “Hey, if you want to learn how to do this, we can help you do that.” and that’s a good thing. That’s definitely a good thing.

Q2: Global competition for resources and skilled labor, or a skilled labor force, is one of the main arguments regarding the impact of globalization. What is your understanding about the impact of globalization on your program of study and career of choice?

ANS: All right, so how would it affect something like a digital animator or game designer? Honestly, and this might be just the fact that I’m not old enough to know better, but I’m not too worried about globalization in my field because I have two aspirations: one is to be an independent game designer, meaning I would work for my own company, and the only thing that I would have to worry about is rival companies in different places of the world, and then the other one is to be a comic artist which, it’s not so competitive, and especially if I’m doing it all on my own and I’m trying to move forward by myself. If I’m not part of a bigger company I guess I don’t think I have to worry about it too much.

Follow Up: I am going to assume that you have definitely heard the word that competition is good? If you agree that competition is good and it’s not going to put you out of business, what incentive would competition provide to the businesses?

ANS: I think it’s just getting people interested in your product and showing interest in people. That’s where I want to know where it’s all going.

Q: Would it help create a different product? Would competition help create a different product, a better product, a better mousetrap?

ANS: Yes, because the whole idea about competition is that you’re trying to one-up the person that’s ahead of you, and that only means bigger and better.

Follow Up: What does the future career market or career outlook, in the context of a globalized economy, looks like for your field of study? In another word, what is the trend?

ANS: Are you talking about like me finding a job in that economy?

Follow Up: This field as a whole.

ANS: Well, if I were to work for a big game design company, let’s just say, I would feel that I don’t really know about any other kinds of colleges or places overseas that have the same kind of programs as us and I know that while there are people around the world who can probably study the same thing that I study, I know that here in the U.S. and probably over in Japan are probably the two biggest places for game design, and I don’t know how that would affect my being a game
designer. But overall, is it good for the outlook of the whole field. Video games are going immensely in the market and having people around the world that are able to have these skills rather than just a few select people helps countries everywhere.

Q3: In your opinion, how does globalization contribute to or intensify competition for jobs, markets, resources, skilled and educated workforce?

ANS: Well, I know that when people know that you can have competitors from all around the world, you’re definitely working harder to make yourself better and draw more attention to, I don’t want to say—that sounds really selfish to draw more attention to myself.

Follow Up: What’s making it impossible? What’s making this intense competition possible? What tool or factors are responsible for rapid pace of globalization?

ANS: The Internet again. I don’t know. It’s the Internet technology, the Internet communication technology a major factor in making it possible for people from around the world to compete with each other.

Q4: Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the world for high skilled jobs?

ANS: Do I feel ready for it? That’s why I’m still in school. Will I be prepared when I get out? I hope so, and I have some steps that I’m taking for myself to better myself and just to be aware of what’s around me. I look at competitors all the time or I’ll look at games and when I’m designing my own, I’ll look at other people and see now what does the competition have that I should have that makes it more appealing to the same market, so—and, you know, having people around the world doing that kind of thing.

Follow Up: What type of changes, if any, do you foresee as a result of globalization of labor market in employment opportunities, given the very competitive global environment?

ANS: Well, I might not be working for a studio in the U.S. I might have to travel to Europe or to Asia to find the market that I’m looking for or to find an employer, that kind of thing. I mean, I never really thought about it until now, but if it keeps going as it is, then there might be big game companies all over the world.

Q5: Could you share with me some of the courses you’re taking and perhaps are currently taking as part of your studies?

ANS: I can’t recall exactly how many credits I’ve taken but last fall I had two or three courses in 3D modeling and animation, two courses in programming and game design and two courses in story and character design and drawing.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course work as part of a higher education, some other skills are
considered relevant to the job market. In addition to the course work, while in school, in your opinion, what are some of skills that are valued by employers?

ANS: The ability to communicate well, to do public speaking skills are like the biggest thing that people look for and—as well as confidence in your ability to communicate and time management. Those are like three big things: confidence, communication, time management, how you hold yourself, that kind of thing. Those are the more social aspects of having a job that really make people stand out.

Q: Are these skills taught as part of the learning process here at your school?

ANS: I’ve only run across a couple classes that have dealt with it. I mean, maybe like two or three classes that literally would say, “Here’s how you’d want to explain this to a future employer or something like this.

Follow Up: In your opinion are these skills valued to future employees and employers?

ANS: Yes. They—well, like I said, when I took my public speaking course, we learned that the number one thing that employers look for is your ability to manage your social skills and manage your time, as well as your confidence. So, I could be a super good game designer with little social skills and I could lose out to someone who is very confident in what they do and forward with talking with people and all that stuff and that’s why I’m trying to work on it. So, I don’t want to lose my job to someone like that. I mean, not that they shouldn’t have a job either, just because it’s competition.

Q6: Generally, local, state and national economy needs an adequate number of high-skilled employees in certain fields. In your view, how do we find out what kind of skilled jobs are in demand in the local and in the national labor market?

ANS: What kind of skilled jobs are in command? Well, the part of it is just that when students go into school, they have to know or they have to understand that they’re going into what their field of study is. They have to know what their job market’s going to be in a projection or, in four or five years when they want to graduate, and the other half of it is if you are an employer looking for the perfect welder, I guess you could look for where your future employees would have gotten their education from, but look deeper into what not necessarily into the individual and what school he went to but the school itself, and how they teach their classes, what their instructors do in the classroom. I know that’s a lot of work, but it definitely—I don’t know, to me, that would seem to produce the best you’d definitely find the best of the best that way.

Follow Up: Can you think of some sources that could give us some insight into what the labor market looks like? Where would be a good place to start looking? What kind of employees the employers are looking for?

ANS: Are-are you asking in terms of jobs like what’s in demand right now? Oh, shoot, Honestly, I am not really sure. I mean, I know teachers aren’t because my mom is
a teacher and she’s looking for a job but usually doctors are always in demand because everybody always needs one of them.

Follow Up: Well, let’s not look at what is in demand, but look at how we find out what’s in demand. For example, what sources I could consult to find out what’s going on.

ANS: To give you an example, I could perhaps talk to my school career counselor to find out what’s going on. I definitely remember talking to my counselor about things during high school, what I wanted to be. I wanted to be an architect first, and then my architecture teacher kind of turned me off to it, but then other sources my college professors, I talk to if you [redacted]

Q: Sure, I do.

ANS: I talk to him every now and then and then about the perspective market for my job and how it’s looking right now, and [redacted] That’s another person.

Q7: What factors influence your decision to pursue your education in this program to become a digital animator game designer?

ANS: Well, I’m a very creative guy so I like to be creative and show it and I like to throw out my ideas to people and see what they think about it. I’m always one of those people that are open for you to critique (constructive criticism), that kind of thing and the other big influence is that they gave me a full ride.

Q: In addition to what you just mentioned, the career itself, what other issues influenced your decision to choose this field, other than the job, other than wanting to be a game designer, is there anything else that influenced your decision?

ANS: Well, one of the things I was looking at when I started in this program that I wasn’t really aware of until I started it is that I could be working from home. I could be working with my own small business. I could work freelance. I don’t have to be tied down to one company. I don’t know what would be the best option at this point because I’m not too experienced in it, but I’m sure I’ll figure it out.

Q8: How is this program helping to prepare you for employment in a highly competitive labor market that’s really seeking very high skilled individuals?

ANS: Well, the thing about our classes is that the professors are all I would say relatively young compared to other programs [redacted]. I [redacted] [redacted] [redacted]. what’s hot and what’s not kind of thing we should do. And he’s always talking about getting to know people as well, [redacted] always talks about and [redacted]. The global design—or the game design conference that’s held in San Francisco, going to that and just meeting people just to know them so that you have those connections.

Q: That’s the Game Developers Conference?

ANS: Yes.
Q9: In order to avoid using the terms computer and technology interchangeably, what does technology mean to you?

ANS: Technology to me means a more sophisticated way of producing a similar—like—it's an easier way of—how do I say this? A method is a series of steps that you take to complete a process and technology is just a machine that you use to make that method and process faster and easier, and a computer is just something that you put numbers into. So it'll do whatever you tell it to.

Follow Up: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

ANS: It's very important. It's not 100% important. I mean, the thing about game design is that when—and I get hung up on it, too—we always get hung up on video games and things, but there are board games that game designers make and look how successful they are, things like Monopoly and Life and things like that. I mean, you don’t necessarily need it, but it opens up your doors way wider to people who are helping or able to help you or employ you or things like that. So, and plus, your skill set goes way beyond what someone can’t do without—with computers can do if you have one.

Q10: What type of technologies are you exposed to in course of the school year? Are the technologies used in class the same as or similar to what the industry uses?

ANS: Well, pretty much every program that we use here at school is an industry standard, 3DS Max is a 3D imaging software that is used by the industry. Adobe Flash is a 2D game development tool or just animation tool that is used by the industry. Visual Studio is a programming device that is used by the industry. The big thing about coming to school here is we get to jump right into what the pros are using and that is such an advantage because while there is free software out there that can do similar things, it might do it at a similar level, it's still a jump to get acquainted to a new interface or a new program that if you tell someone I’ve worked with Gimp and Blender before versus, yes, I know my way around Adobe Photoshop and 3DS Max and 3DS Maya and things like that. Then they’re definitely going to say, “Well, you are obviously more experienced in what we are going to be looking for.”

Q11: In addition to educational preparation process that the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. Can you share with me some steps you have taken or are currently working on to better prepare yourself for the challenges posed by the local and global labor market?

ANS: Well, I know that I don’t want to be a person who knows just one thing and will be able to sell my services for just one thing. I want to be a well-rounded person and I’ve taken a class that has tried—that I’ve used all my communication skills.
I’ve taken a class in theater just to see what characters—how it feels to act as a character. I’ve taken a story about my class just to add that depth to my games that can—my game design story. So I get some of that inside industry thing and having that edge of knowledge I guess kind of helps me prepare for that.

Q12: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well-educated workers?

ANS: I think so. Employers look for your education and what you did in school, and how well you did. But the other big thing is if you had this—the initiative to do it yourself. If you have the passion to like—we’ve always been told that, if you just show an employee, “Here’s a bunch of school projects I did. Look at how great they are,” versus, “Here is where I graduated from and here is my final project, and here are some things that I did during the summer,” or, “Here are some things that I’ve done on my own,” then that will catch a person’s eye. That will be like, “Well, they’re passionate. They are what I need.”

Q13: As a student preparing to enter the work force soon, what type of changes have you noticed taking place at this department or in this program over the time you’ve been here that reflects changes in industries need due to globalization?

ANS: Well, I think the one big thing is, looking at our program is that it seems that 3D design is all over the world, but the big thing is that they’re looking for programmers now and that’s why I decided to take a programming track, as well as they’re looking for actual people to design things and shoot. There was something else I was thinking of animation. We’re called visual animation and game design, but we have almost nothing in animation yet and we figured if we get an animation class in here that will definitely broaden the scope for what students are able to do.

Q14: Do you believe that the faculties at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: Yes. I definitely do. The great thing about the professor here is that they are always well-informed about the field that they teach. For example, and they’re sharing those with us during class and giving us tips on how to deal with your competitors and how to be better than them.

Q: In your opinion, does faculty develop programs of study that reflect the influences of or influence of globalization on their course planning and teaching? In another word, they’re doing things in response to external demands?
ANS: Yes. Like I said, one of the big things is he says “Go to the movies or play a game and look at the credits and call the guy in the credits. Just talk to them.”

Follow Up: How do they transfer the knowledge of globalization to the classroom?

ANS: Well, for example, the other week about their video game that they made over the summer, they were talking about how they were selling it to their client and he was saying how he tried to sell it to one client and dressed up all nice and stuff, tie and everything and they didn’t take him seriously as an artist and just going in there an being yourself, as well as knowing what they want will help them to sell the product, and they had to compete with other people trying to get their game published by this same company and the fact that they had all the information. They knew what they were talking about and they were well aware of what the other people were going to present. That helped them to get their game in there. I don’t know if it’s going to be published by them yet.

Follow Up: In your view, does this transfer of knowledge about globalization beneficial to students and in what way? How does that affect you?

ANS: Well, it just gives me the knowledge that it’s out there. I definitely know about it and don’t forget it. So, it’s nice to hear because, if you don’t hear about it, you’re just trapped in the bubble until you say, “Oh, hey, I graduated. Go out there,” and that’s scary.

Q15: Now do you visit job sites and talk with employers to learn about their needs and the latest trends in the labor market and the trends in the work force?

ANS: Well, I did over the summer go to their game studio a few times, and it was nice to see what their work flow was like. The environment is a mixture of work, fun and goofy because there are specific times.

Follow Up: So what does that tell you? What are they looking for?

ANS: Well, it means that if I can have this job in the future, I can have fun doing it, and that’s the big thing that’s important for me.

Follow Up: But you also have to be serious and productive and all that.

ANS: Productive, yeah. “Shh. He’s on the phone. Don’t say anything.” So, you know, it teaches you what a real job’s like.

Q16: To what extent skills such as problem solving, decision making, good communication skills and customer service skills are taught as part of the courses offered here in anticipation of preparing students for entry into the work force?

ANS: Well, umm.

Q: The question is whether they teach these skills separately or perhaps as part of the learning process. How do they manifest themselves in the learning process? How do these issues come out?

ANS: Umm.
Q: Do you do projects?
ANS: Yeah, we do projects and the thing about, like, I’m in a class right now with—where we have a 10-person team and we’re doing a project, and we have to pitch our project to the class next week and, umm, yeah. I mean, we do projects like that. We have—I had another class where we had to present to the class our game design idea and, you know, it’s pretty much presentations such as that sort that you—that we learn how to do those social skills thing.

Q: So in your view, do employers value those skills and why? Why is it important for the employer?
ANS: Well, it just shows that you’re confident if you can get up there and know what you’re talking about, and present it in such a way that someone would be more interested to know more on the subject that you’re presenting.

Q: This school has a program evaluation process called Academic Program Review (APR). This process is designed to collect data for the past five years from faculty, from past students, present students, alumni, folks in industry and those who are interested in the program for the purpose of evaluating the effectiveness of the program, whether to modify it, to keep it, change it, Discard it and start all over again. Now, are you familiar with that? Have you heard of APR?
ANS: It sounds different. Like, the thing that you talked—when you said—you first said the name of it, the first thing that came to mind was the teacher evaluations.

Follow Up: Yes, you are doing teacher evaluation which is specifically for that program, but this is for the length of five years, looking at what has happened in the five years and what is important is that the data that’s collected from such a study tells the school, the instructors, students, how this program is doing.

Follow Up: So my question is, if such a data was available to you and your faculty, what kind of decisions can you make with that? What would it tell you?
ANS: It would—like, I’m assuming this information would be like things like how many people graduated and how many got successful jobs. That would help me take and see if certain classes are really necessary for the program, if certain teachers aren’t teaching a subject very well, or well enough or maybe you just need to change a teacher, and you know, how much—

Q: How does that help the students specifically? How is that beneficial to you the students?
ANS: It makes the process of choosing their classes and their major easier and it’s more streamlined. It helps them. They may not understand, they may not know it, but the things that the faculty does really helps the students get to where they need to go faster.

Q: Well at this moment, we’ve come to the end of our interview. I want to thank you for taking time to, uh, share your thoughts with me, but before I close, I would like to give you an opportunity to, uh, comment on any of the topics discussed or
something that you would like to share with me that you believe would be important for me to know.

ANS: Uh, well, I don’t know. I, uh-uh, I can’t really think of anything off top of my head.

Q: Recommendations?

ANS: Umm, I don’t know. I guess the only big thing I can really think about is how the Internet is definitely the biggest tool that like things like social networking sites, Facebook, things like that—

Q: How can this technology be used in your learning process?

ANS: Well, I can use it—if I’m not using it to talk to friends; I’m using it to keep in touch with people that I’m working on projects with or, things of that nature. I can collaborate on different things on Facebook.

Q: Do you see value in integrating this into your classroom, that—with a group of people, instructors? It doesn’t cost anything.

ANS: Right. We generally don’t like using Facebook in class rooms but to that end, we would use—Google has a whole ton of services that they have and their documenting services are amazing. GoogleDocs is what it’s called. You can literally be online and looking at the same document as five other people, editing it all at the same time. That’s something that brings—that can really help people around the world get together and do—and as well as presentations and things like that. You can look at one PowerPoint at the same time but—

Q: Well, thank you.

End of Interview
Student Participant Interview #1

ID #
Date of Interview: 
Transcriber Name: Al Moradi
Length of Interview: 36 minutes, 23 seconds
Length of transcription: 7 pages

Q: Statement: Good Afternoon. This is Al Moradi and I am meeting with (SP1 - MET). SP1 MET stands for Student participant 1 from Product Design Engineering Technology at FS University. Are you ready?

Q1: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: Manufacturing engineering technology plan to graduate May 2011.

Q: Please explain some of the key features of this program of study that got you interested in becoming a Product Design engineer.

ANS: I like all the hands on lab time verses like lecture, theory based lectures; I like to get hands on experience verses just being told how it is.

Follow Up: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: School’s providing like job fair, stuff like that, in my classes we go through resume building, how to you know how to interview, things like that. What sets our program apart, things like all of our extra hands on experience that we get verses other programs.

Follow Up: Can you tell me a little more specifically about some of the things you learn with technology that is available to you?

ANS: I learned how to actually like build tools through my associate program. Through the Bachelor program I have done a lot of time studies, a lot of industrial engineering stuff hands-on verses doing it in class, oh, I have done a lot of processing and production runs, actually doing it verses just simulating it.

Follow Up: What does a Product design Engineer do? Please share some of the reasons that you consider important in choosing this filed as a career for your future?

Q: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?

ANS: I think it’s how, how like western culture is going throughout the world, looks like you see McDonald, you see Americanized culture, Western culture, om how that is affecting us here at home and people in other the countries.

Follow Up: Is globalization something new?

ANS: I do not believe so.
Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what actor(s) is causing such a rapid pace in spread of globalization? It is believed that globalization has a far reaching affect on the life of people specially the developing world and the emerging economies.

Statement: How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development? Can you further elaborate on some of the key features or components of globalization?

ANS: you could see for example someone from another country seeing, om, you know coming to America to live the you know so called American dream wanted to come here that where they could push another person out of a job because they might work for cheaper because that’s what they did in the country they were from that would affect our jobs in my opinion.

Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?

Q: I think it does. I think I’ll be competing against, you know, other, other people from other countries no matter where I go, because it is not necessarily just the U.S. any more, be it’s a global market. There is not, not just one singular market. So I be competing with someone for the same job somewhere across the world, who is applying and would move this way if they did get the job.

Follow Up: What does the future career outlook in context of globalized labor market look like in your field of study?

ANS: I think it will be better, because from what I understand the global economy is kind of picking up. The company I work, I work for is a global company, so if one part is hurting, it would hurt the rest too.

Follow Up: In your opinion, when you think about globalization and careers and all of that, what is changed? How is it changed?

ANS: A lot is changed. I like said earlier, with the, with the world-wide market you might compete with someone from anywhere, it is all changed, whether you know back in the day you could go college or come back become an engineer or didn’t have to go to college, you could work your way through the company to become an engineer and you never had to leave home, now to be competitive you may have to move across country or move where ever. In another word you have to move where the jobs are.

Follow Up: Does this make the job outlook more challenging more exciting or has no effect?

ANS: I think it makes it more competitive, definitely.
Q: In your opinion, what are the causes of globalization? Let me explain a little bit better. Can you think about some factors that may slow down or speed up the process of globalization if you look at it as a process, as a system, In your mind what do you think is happening that is making this period in history so different than the rest of the times that globalization has been a factor?

ANS: When it comes to like as a world-wide thing, the cultures are starting to blend in my opinion. World-wide communication is best it has ever been. Previously when they had globalization it wouldn’t be you know, you had individual cultures that were right next to each other but you know did not communicate, cultures really did not blend, now with the world being all connected as one global market, it I think is having something to do the blending of all cultures together. They are still separate but they are starting to blend.

Follow Up: What makes the blending of those cultures possible? What tool makes it possible? (I do not want to lead you but I like to know what makes it possible for us-for cultures to blend so easily that was not possible in the past?)

ANS: Integration, immigration, you know, people moving to one country or another due to the job where they have to go over there for jobs or some come over for jobs.

Follow Up: Anything else comes to your mind?

ANS: Just the fact that you are not dealing with people specifically in your country anymore, you are dealing with customers and suppliers from the other side of the planet.

Follow Up: What makes communication with those customers possible?

ANS: World-wide phones and all that, definitely you have to learn their culture if you are going to go over there you know so I think kinda coming together that way.

Q: Based on your understanding of globalization when you think about your future, how do you feel?

ANS: I feel optimistic, I think, I think my hands on experience will give me a good shot to have a good job and a good career. But with globalization I think it will all end up being one, I It is already one big market but it will keep progressing toward one giant global market more so than it is now.

Follow Up: Do you feel prepared for future challenges posed by competitors from around the globe based on what you just said?

ANS: I am prepared as much as I could be without actually going out and interacting, just getting out of school, without the experience. I think a lot more of that will come with time and experience dealing with….

Q: In addition to course work what other skills are considered relevant to the job market.

ANS: A lot of your computer skills, personal skills, the ability to communicate. Confidence level is another big one I think.

Follow Up: How do you learn about those skills?
ANS: Dealing with people, mock interviews, going to job fair type places, taking other classes minus your actual core courses like computer classes, the other English classes and communications classes and stuff like that.

Follow Up: How do you think these skills are essential both to you and the employers? Why are they important?

ANS: To me they help me get a job with variety of different employers by being a versed person when I get of college in multiple different areas. It makes my ability to get a job in multiple different industries greater.

Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your opinion do you have enough information to make an educational and career choice to meet those needs? In another word how do you find out what those are? How do you know what skills are needed? How do you get to that conclusion based on the needs of the local economy?

ANS: By being involved in your local businesses, being involved in local community, you can find out what is out there. Being involved in the workplace not just coasting through day-by day paying attention to what is going on in other industries around you. Groups like SME (Society of Manufacturing Engineers) give you updates and find out all sorts of information out there, you can get all kind of information, who is looking for who, what skilled employees are needed and where, also there are local places like that too

Follow Up: Anything else comes to your mind at the college level?

ANS: like if you have a degree obviously you are considered more skilled I think.

Q: What factors influenced your decision to pursue your education in this program to become Manufacturing engineering?

ANS: I went to high school for machining because I thought it was cool to make things with my hand and not just you know be button pusher, I like to actually make things. My professor in high school attended here and got me interested in the program and came up on visits and I really like what I saw. I liked the hands on-approach verses just in class time, I like being hands on. And that is what drew me to the program.

Follow Up: What other factors may have influenced your decision?

ANS: I like the campus a lot too verses being all spread out. I was 10 minutes away from my class for two years when I lived in the dorms. There is nothing in campus that is more than 15 minutes walk at the farthest point. I really like that point and it like the small towns like where I grew up.

Follow Up: On personal level what do you want out of this program? Basically you choose this program because you like it obviously and it appeals to you. Is there more, more intrinsic value to what you are doing?

Q: I think the reputation of the program has a lot to do with it and helps too.
Follow Up: When you graduate what do you want out of this?
ANS: When I go to apply for a job I want people to recognize and say ok he went to here (Ferris) and I should give him an extra look because I know I want to go and apply what I’ve learned here.

Q: In your opinion what is the job outlook for this field in the near future and is this program going to meet the current demands in the labor market?
ANS: Job market I think is going up from everything that I can see. Prospect are looking good. A lot of companies I’ve talked to are experience hiring at multiple level of staff. I think the program is supplying good people for market place. They are doing some revamping through, but that is always on the up and up.

Q: I want to ask you a general question. Think about the term technology. Give me your understanding of what is technology? If you were to define it what would you say?
ANS: technology, ??

Follow Up: Well look at this tape recorder, is this technology? Ok, is this a machine or technology?
ANS: Both I think
Follow Up: But there is something else that makes building this machine possible and that is what you are doing. You are building a machine that is generated by technology, created by technology and that technology is the software and hardware and everything else that you are using to model this and design it, so having said that, if you go back and take a look at it, what is really technology? What are we talking about? What do we mean by technology?
ANS: Just the advancing of our respective industries, you know, making advancements here and there I guess. Someone comes up with an idea, puts it to use and it is way beyond what was previously been in advancing technology. The latest greatest thing is to make new machine, better machines.

Follow Up: Having discussed the definition of technology and your understanding of it, what role does technology play in your current learning environment?
ANS: It plays a big role, with all the computers we use, the technology that is used to produce all software, the bigger and faster computers, more powerful computers. The machinery we use, the latest technology in those, and stuff like that.

Q: What type of technology are you exposed to in course of a term or semester and is this technology the same as technology used by business and industry? Is it different and how is it different or the same? Give me your best understanding.
ANS: The technology we have is, including computer software technology, we use the most powerful design parametric software in the world. It is not the most widely used in the industry. But with parametric modeling, 3D modeling is kind of as you learn one you learn them all. Just minor nuances here and there, different buttons pushes, stuff like that. The other technology we use in the machines –stuff is a…
they are good machines, they are not the most widely used in the industry but they
serve the purpose that they need to here. Easier is to use for the students to learn
on and learn the basics of machining.

Follow Up: So do you find that to be a helpful process or (not negative) you are using
things that industry is not using, does that make you more marketable, more
knowledgeable. How do you feel about that, I guess?

ANS: Sometimes I feel ahead of others. I wish we could learn, use more stuff the
industry uses. You go out in the market place, workplace, but you might have to
re-teach yourself. You know how to use the real complex one, (not audible) if the
bring you down to easy one you are not as, you have to re-learn it even though it
does not take as long.

Q: What steps if any are you taking to better prepare for the challenges posed in the
current labor market environment. For example, What are you doing on your own
including, your school environment, course taking, research, networking with
others, what are you doing to prepare yourself better?

ANS: Working in industry, the weekends during the school year, I prepare myself to
learn more of the company I plan on working for when I graduate. So I am better
versed about the way company works when I get there. Constantly building my
resume, and updating a resume, keeping it always ready to go. Going out and
meeting new people at the company I work for all the time, networking there,
networking at the job fairs, online networking.

Q: In your view, how is your current education and training preparing you to meet
the needs of the employers?

ANS: I think it’s good. All the training we get is practical. Its very hands on to learn
how to do everything that we need to know how to do in the industry.

Follow Up: Are you doing anything in addition to school work, to learn about skills that
the employers need.

ANS: In my current class I am trying to apply some of the stuff I have learned, I use at
my company, and I also take the stuff I lean in from school and apply it where I
work, improving things there that they may have not remembered from school or
things that may be newer since the management was there.

Q: As a student preparing to enter the workforce soon, what type of changes have
you noticed taking place at this institution and in this program over the time you
have been here, reflecting changes in the industry needs? What has changed that
you have noticed compared to the past years?

ANS: When I first started, the first two years we used really complex software, which
does not hold a major market share. They went from something that was widely
used in the industry to this other software for an unknown reason really. That’s
the major change that actually makes you want to wait in that aspect. But another
aspect, I am getting hands on more and more lab time requiring more out of the
projects, making it harder on the student but the student gets more out of it then originally they were. That’s a good thing change I noticed since I have been here.

Follow Up: Would you say that there have been changes in curriculum design, or changes in the way the course are presented either as a result of globalization or responding to the employers need?

ANS: My entire associate program that I went through the curriculum is completely changed. Classes that I had, when I was a freshman, that where 8 credit classes that were one class lab-lecture are now two separate 4 credit classes. They split from one program to two, so instead of being manufacturing tooling you can have manufacturing general, the blending of welding plastics manufacturing and CAD drafting type stuff, you can get all that in one degree instead of focusing on one of the multiple different ones.

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization? Please explain?

ANS: Some yes and some no. oh, some professors here have had lots and lots of industry experience and continue to go to conferences, continue to go to places to learn what is going on in the industry. Others never had more time in the industry than an extended internship. Came back, got a Masters and started teaching.

Follow Up: How does the faculty transfer their knowledge of globalization to the classroom?

ANS: The better professors, which are majority, are, yes. They present it as global industry, a global market. The ones that are not as well rounded don’t. They mostly lecture; they talk a lot to make people think they know what they are doing.

Follow Up: Does this benefit the students or the program? Do you see any benefit to that?

ANS: No I don’t. I think (Instead of using actual names-letters of Alphabet were used) professor A for example would say that they do not as much input in the program as much as they should, because people like professor B come in and try to run them out, acting and thinking they knew more than they do. And I believe that’s actually hurting our program by these people coming in trying to change everything that is going on, granted change is needed, not that way.

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends?

ANS: I have a little bit. Not a lot. We are going on some plant tours with my student organization and try to communicate with industry that way and try to learn what is going on throughout multiple-different industries not just automotive for example.

Follow Up: In what way could this be helpful to students? Would you say that it would help to have a better understanding of what employers looking for in the manufacturing and technology fields?
ANS: You see what is out there and what they are looking for toward-or for in the future. I think it is a definite plus to know what they are looking for. It would give you a big upper hand when it comes to hiring. If you know what the industry you are trying to get into, what the trends are like, what they do and what they need.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce?

ANS: A lot of our classes deal with stuff that we have to supply to our customers or suppliers, telling us that the customer asked for this, the customer is always right. We generally do not argue with that unless it is a point you know you have to have whether be a design change on a part because it is not logical to manufacture it that way, impossible to make it that way. Because a lot of times customers have what they want and lots of times we are taught to review that, give the customer what they want but make manufacture it the best way possible.

Statement: This University, with Career and Technical Education (CTE) courses, utilizes a process called Academic Program Review. APR is completed every five years as a evaluation of the programs within the colleges. This process collects data from past students, alumni, employers, and other interested stakeholders in order to learn about the effectiveness of the programs and where to make improvement or change a program completely.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs?

ANS: Yes. I think it is very valuable to get the course back on track to where it was when I got into it. People like the example I gave earlier, are I believe hurting the program and stuff needs to be done about what is going on there. I think an academic program review would definitely if they get the opinion of the industry verses what is going on I think definitely will help. I am not familiar with and not familiar with all its features. I have never been involved in it but I have heard of it.

Closing Comments:

Q: Any recommendations or final thoughts?

ANS: I would like the program to use more industry wide used stuff I guess. Whether it be the machines that we talked about earlier that serve their purpose here but they are not most widely used. I feel they need to get stuff in here that people are going to see in the industry. If most the common machine in industry is machine A, we need to have machine A in our lab. Most common software and variety of software need to be taught. We need to teach multiple ones and not one that 80% of the time you are not going to see again. I think they need to bring more
qualified instructors into the program with multiple years of experience, rather than those that are going to learn on the job and further their education.

Follow up: What does this school do that you like them to do more often and better?
ANS: I like the job fair, I think it is really, really, a big thing. I think it is really important to bring potential employers on campus whether be it interviews, people sign up for interviews for different programs. Bringing different industries in to tell us; this is what we do, and this is what our company is. Bringing major companies here to school to give us the opportunity to go out and network with these major companies. This is a big thing I really liked. Like they are trying to help you get a job and not just saying go get a job.

Closing and Thank you comment and a reminder to participant:
Student participant was reminded that the data will be transcribed and that the participant will have an opportunity to review it and make sure it is accurately transcribed and make modifications if necessary.
Student Participant Interview #2

ID #: [Redacted]
Date of Interview: [Redacted]
Transcriber Name: Al Moradi
Length of Interview: 31 minutes, 13 seconds
Length of transcription: 5 pages

Opening statement: Good Afternoon. This is Al Moradi. This is Interview # 2 with Student Participant 2 from Manufacturing Engineering Technology. Today is October 28 and the time is 4:50 P.M.

Q: Are you ready sir?
ANS: Yes

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?
ANS: I am enrolled in Manufacturing Engineering Technology and I plan to Graduate this May (2011).

Q: Please explain some of the key features of this program of study that got you interested in becoming a Product Design engineer. What are some things that are important to you?
ANS: Mostly the machining work and some of the computers designed to work with those programs, like CATIA, Pro E’s, and thinks like that. Well, they say in manufacturing engineering you never do the same thing, because a lot of other different jobs you can do when you are a manufacturing Engineer. You have a priority of doing different jobs you can do. You never get bored of your job.

Q: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. Can you share with me what is your understanding of globalization and what it does?
ANS: Globalization to me is just the whole world being connected; being able to share lots of information, companies working with companies just all around the world, not just focused on one company, being able to communicate with the whole world.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. In your opinion, what factor (s) impact or speed up the rapid pace in spread of globalization?
ANS: Definitely technology now days. It’s got to be Internet, everything can be sent over the web, files, being sent over the internet. All the technology that we have today is a major factor.

Follow Up: How does globalization affect people, countries, cultures, jobs, etc.?
ANS: Definitely the companies that go overseas provide jobs (cheaper wages) accidentally impacting one country losing jobs but sending jobs to other countries impact one country in a good way and the other in a bad way.

Follow Up: Please explain what you mean by good way and bad way?
ANS: The bad way for U.S company going overseas taking jobs away from U.S., that’s bad for us but it’s good for the company of course because they are going overseas, getting employees who take lower wages close to nothing, what I have heard, I guess. So it’s good for them because a lot of people over there with lots of population, they need a lot of work, and they are willing to take anything. So that helps them improve their quality of living.

Follow Up: If we understand that globalization is not new, then what makes so different now in the 1st decade of the 21st century moving in such a fast pace now?
ANS: Just like I said definitely technologies that we have, everything is so much faster now, to communicate right away with touch of button on your cell phone or click of mouse on a computer we can communicate instantly that makes it a lot easier to communicate.

Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?
ANS: Because I am in manufacturing engineering, basically every company deals with manufacturing of some sort and me being in Manufacturing engineer when our jobs are being sent overseas, so that is definitely going to impact how many jobs are going to be here verse jobs over there. That means fewer jobs here.

Follow Up: What does the future career outlook in context of globalized labor market look like in your field of study? In another word is your job open to global rather than just local competitors seeking job opportunities?
ANS: Job outlook is definitely looking as going down because of the jobs and companies going overseas. It is increasing the job market wherever these companies are going but for here us here looks like it is going to be decreasing.

Follow Up: What do you think are some of the reasons for that? What is really changing?
ANS: I believe just wages that people are willing to accept. They can find talent who get paid for less and they may not have the same smarts or degrees that we have but definitely money impacts it a lot.

Q: In your opinion what are some of the factors contributing to a very rapid pace of globalization in the 1st decade of the 21st Century?
ANS: I think it’s the, being able to travel as well coming into the U.S. You can bring in products from all over the world. This makes it possible for information and goods and services and people to travel as a result becoming more interconnected and can impact jobs here.
Q: Based on your understanding of globalization when you think about your future, how do you feel?
ANS: Right now I feel pretty good because they say the economy is coming back up. I do have a job working as a manufacturing Engineer now which I feel pretty lucky to have. But it seems to be going up. I got my hopes up.
Follow Up: Do thing globalization may impact or already has impacted your field and in what ways?
ANS: yes, it has impacted already, companies just sending jobs overseas.
Follow Up: Anything else comes to your mind? Do you feel prepared? Do you feel concerned because you are being challenged by others from around globe or the same jobs? So what kind of concerns does that create for you?
ANS: Not being able to find a job.
Follow Up: What are you doing about that? How are you preparing yourself?
ANS: Just getting a degree if you can and find a job and I would definitely go for higher education.
Q: Can you tell me a little about some of the course you have already taken or are taking now?
ANS: Machining. One of the big ones we take is PRO-E, a software for running machines, just basic programs running on computers.
Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course-work as part of the higher education, some other skills are considered relevant to the job market, in your opinion what are some of these skills that are valued by employers?
ANS: Definitely people skills, being able to communicate with one another, not being shy and being able to express yourself.
Follow Up: Do you think these skills are necessary?
ANS: Yes definitely. The way people communicate, if you get along with somebody than you are going to be able to work with them. But if you can’t get along because of poor communication you can’t work with them.
Follow Up: What else comes to your mind along those skills that you consider important?
ANS: You have to be energetic as well, can’t be lazy.
Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view how do we find out what kind of high skilled jobs are in demand by the local and the national industries?
ANS: Going to job fairs and learning about what employers are looking –hiring for.
Like I learned that the workers for plastics were in demand. So if you study in this field you have a good job. So that is what we learn by talking with employers.
Follow Up: Based on our discussion, what would you recommend for students to do to find out what is available and what kind of jobs are out there?
ANS: By talking with big companies that one might be interested in working for. Talking with employers to find out what is high demand.

Follow Up: Based on what we just discussed do you feel you have enough information to make an educational and career choice that really meets your needs and the needs of the employers? Please elaborate.

ANS: I like what we are doing in our classes. It motivates me to keep doing it, I enjoy doing it and I feel I am on the right path. I am working for a manufacturing company, I like what I do and I like working there.

Q: What factors influenced your decision to pursue your education in this program to become Manufacturing engineering?

ANS: Definitely the classes that I am taking. Education is one part of it. I chose this field because as a child I always wanted to be an engineer for some reason because it definitely offers higher pay. Career as an engineer offers me a secure future.

Q: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: The classes offered here like machining are being used in the real job setting. We are getting hands on experience to be prepared for when we go out. We also read a lot, testing, do process in our field.

Q: In order to avoid using the terms “computer” and “Technology” Interchangeably, What does tech means to you?

ANS: Technology is faster ways of communicating.

Follow Up: What role does technology play in your current learning environment? We write programs on the computer, we have all these software on the computers which runs the machines. Machines themselves are technology with software built into them so everything is just connected to technology.

Follow Up: What types or types of technology you are exposed to in course of a school year?

ANS: The computers and the machines we run.

Follow Up: Is the technology you are exposed to in your class, in your opinion is the same as technology used by business and industry or is it different and how is it different?

ANS: It is definitely the same where I am working now. We are using the same stuff. Different programs maybe but computers and machines are the same unless working in a bigger company where they may have bigger and very different machines than what we have here. I think they are trying just to teach us the basics of a machine how to run it and this is what you can expect out there.

Follow Up: So in your opinion that’s adequate to get you started? Should you do more or you are doing fine?

ANS: You can definitely always do more but if you just want the basics this is adequate.
Follow Up: Who decides how much is enough?
ANS: School and on the job employer.

Q: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market?
ANS: Working and attending job fairs and applying for jobs.

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers? Please elaborate.
ANS: I believe it does. You can always go for more but that depends on your employers because different employers want different things. This is just the basics of manufacturing engineering, if your employer needs more than you can go for more. Companies always train you specifically for what they want.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?
ANS: It has to be the software. We are always changing from software to software. We have Auto-CAD, PRO-E, and CATIA that we have here. They are preparing us for a very diverse workforce out there reflect what is needed out there.

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?
ANS: Yes I think they are. They try to keep us up to date. They talk about news and what is going on in the world. They try to do that for us, and we should definitely look into that to know what is going on in the world. I believe they are up to date.

Follow Up: In your opinion does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching? How do they transfer that knowledge to the classroom? In your view does this transfer of knowledge about globalization beneficial to students and in what ways?
ANS: They just tell us what changes they are seeing out there and they tell us look, try to knowledge yourself about all these changes and so that you can learn what is going on out there and you need to definitely look into it. That is what they encourage us to do.

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends?
ANS: I do visit job sites but not really looking to what their needs is because I have job.

Follow Up: In what way could this be helpful to the students and faculty and how?
ANS: Yeh, yeh, definitely. Looking at job sites it tells you what they want from you. Then you go to school and you study that specifically, you want to apply for a job then you know what they are looking for.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce? What other ways you can employee to learn these skills essential to your career success? In your view, do employers value these skills and why?

ANS: yes definitely, Communication skills, giving presentation in front of class or to the teacher, writing reports. Right now, the class that we have now, we are basically given something to do and we have to figure it out without much instruction. But that is up us because we have to solve pretty much every problem we that get. Yeh, they apply all that. They give that to us to better our skills.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the student’s future educational and career planning efforts? In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

ANS: No I am not familiar with that. I guess it can be beneficial you would know what you need to study, or what you need to know. Definitely as for the school they can prepare classes for you. I don’t see anything other than just knowing what you need to know that be beneficial. I would like this as a information available to students.

Final Comments: Closing
At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know.

ANS: I do not have anything else to say.
Thank you again for your time and I wish you the best.
This is Al Moradi and today is [redacted] and the time is 5:00 and I am meeting with student participant number three from Manufacturing Engineering Technology. Are you ready sir?

ANS: Yes

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: I am currently in [redacted] and expect to graduate in May 2011.

Q: Please explain some of the key features of this program of study that got you interested in becoming a Manufacturing Technology Engineer.

ANS: I like it better with hands on and we have access to CNC equipment and a lot of hands on projects that teach us how to design a part and take it and put it into production.

Follow Up: Please share some of the reasons that you consider important in choosing this filed as a career for your future?

ANS: I think there is a lot of opportunity with Manufacturing Engineering it’s extremely broad so I don’t feel like I am limited when I look for jobs and the things I can do.

Q: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?

ANS: My understanding of globalization is just the fact that with the internet and everything else, we can talk to somebody in China today and it used to take months so it’s just you know, a lessening of borders I guess.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor(s) is causing such a rapid pace in spread of globalization?

ANS: I would say technology with cell phones and internet like I said and everything else and video conferencing, technology has sped up globalization.
Follow Up: How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development?
ANS: We have a lot better outlook on different cultures I think than people used to because of being able to research them and we can fly to different places and do mission trips and that kind of thing and we get to experience more of other cultures.

Follow Up: If globalization is not new what makes this era of globalization so different?
ANS: Transportation and communication, like I said, flying. They are coming up with faster planes now and you can get from point A to B faster and talk to people whenever you want, wherever you want.

Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?
ANS: Well, I think it has definitely made me have to work harder to sell myself to a company- they could go to India, I know there are a lot of engineers over there who are extremely smart and will work for a lot less than I would and so I feel the pressure to sell myself more than I would have 20 years ago.

Follow Up: Have you experienced or noticed trends and or changes in the job market or more competition for jobs in your field?
ANS: I am not real sure, I know last year’s seniors were having a lot harder time finding jobs than we are right now and I think it was last years’ recession and all that, and there has been a bigger push to keep jobs in America so and I think that’s something that employers are finding. So, I mean yeah we are losing jobs overseas and stuff, but I feel like, I went to the job fair today and had a bunch of opportunity and gave my resume to several people.

Follow Up: In your opinion what are some of the factors contributing to the rapid pace of globalization in the first decade of the 21st century?
ANS: I mentioned transportation and technology; I think those are the big ones. I think there might be renewed interest in learning about other people and other cultures than there used to be.

Follow Up: What does the future career outlook in context of globalized labor market looks like in your field of study? As a result of globalization, in your view, what are some of the reasons if any that are causing changes in the labor market demand?
Q: In your opinion, how does globalization contribute to or intensifies competition for jobs, markets, resources and skilled and educated workforce?
ANS: Well, I think improvements as I mentioned in transportation and communication using the internet technologies and the other countries being able to compete in larger markets are major issues to consider, I mean people can make things in one
place and sell it somewhere else. This adds to the competition for all kinds of things.

Follow Up: Can you think about some other things impacted by globalization?

Q: Based on your understanding of globalization, when you think about your career in a globalized labor market, how do you feel about that?

ANS: I feel confident that I will be able to find a good job.

Follow Up: Do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for high skill jobs?

ANS: I think there is always a concern for that. That’s what drives America. We want to be better than China and Japan. And so I think it is a driving force to help us keep improving

Q: Could you tell me a little about some of the courses you are taking or have taken during the course of your studies?

ANS: I have taken CAD-CAM Course where we did computer aided machining and manual G-coding. I have taken Industrial Engineering course where we learned about ergonomics and how to lay out a plant. I have also taken Calculus 1 and 2, Physics 1 and 2, Chemistry 1 and 2, Statics, Circuits, and Process Planning.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course-work as part of higher education, some other skills are considered relevant to the job market. In addition to the course-work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: I think that a hand on experience is extremely valued by employers. That’s one thing that I have noticed just from talking with companies. I have a lot more hands on experience than a lot of other guys because my dad owns a machine shop that I have worked in since 6th grade, and they tend to like that a lot more than guys that don’t have experience. That’s really the main thing they want, is experience, I think. Common sense is another valued quality that employers look for. I mean you can be book smart or have common sense. And I know sometimes they shy away from guys with 4.0 GPA and they’ll go with somebody with 3.7 GPA just because people with a 4.0 may be able to do a derivative but out there on the street they do not know how to change the oil in a car. Just simple stuff that some of us take for granted but there are a lot of people out there that have absolutely no clue how to do something like that. And those are the type of skills that I think prove that you can think on your feet and show that you are able to, if met with the challenge, figure it out.

Follow Up: Are these skills taught as part of your education for workforce preparation? Do you think these skills are needed? How do you prepare for such skills?

ANS: I don’t know if you can teach common sense, I think, that’s the kind of thing you can learn but there is no class on common sense at (Ferris). There is some, I mean our instructor will tell us if we had dumb question (well there is no dumb question
I guess) but you know, they push common sense. You need to think before you ask something, think through stuff to learn to troubleshoot and solve problems.

Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view, how do we find out what kinds of high skilled jobs are in demand in the local and national labor market?

ANS: Well, I know a survey, that’s a lot of what [school] does. They say (meaning the school) this is a good major and we have this job placement rating and all that stuff, so I’d say survey is probably a good way to start. By going to job fairs you learn also what companies are looking for, for example today (job fair) a lot of companies where looking for engineers and welding engineers to be specific. You do not know what companies are looking for unless you ask them.

Follow Up: How do we know what employers are looking for? In order to meet the needs of the domestic industry seeking highly skilled workers, in your view, what are some steps or measures that can be taken to meet those needs? How do we go about learning what kind of skilled workers are needed in the industry and prepare accordingly? In your opinion what kinds of information may be helpful to students when selecting a POS towards a future career?

Q: What factors influenced your decision to pursue your education in this program to become a Manufacturing Engineering?

ANS: I like the hands on part of the [school]’s teaching, and that it is not all theory based, it’s really practical, you know. We are able to apply the stuff that we learned in the classroom here on the shop floor. And I think that is one thing [school] does better than other universities. That was the major reason why I choose this program because of their technical application of theory based learning.

Follow Up: What other factors other than the career itself, in your view, influenced your decision to choose engineering? Was your decision influenced by other considerations and how?

ANS: Well, I started out my education at [LeTourneau University] in Texas and I am from Ohio. And so I was down there, I was in mechanical engineering, and I did not like being that far away from home, so I transferred up here, because it was closer and I switched my major because of that. Which I think I would’ve either went with MET if I stayed at [LeTourneau] I would’ve went with technology degree but since I moved they had MET-Mechanical Engineering Technology major here and they had Manufacturing engineering Technology as well and after researching both of them I thought manufacturing was better but this from home was a key and that is why I chose [school] Too. Well, I feel like I am best gifted to be an engineer. My personality traits, what I am interested in, you know, my hobbies, all that kind of things are all geared toward engineering. If I was a doctor I wouldn’t be a very good doctor because I just don’t have a passion for that and I don’t like blood so.
Q: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: We have a lot of new technology available here to us at ____. We run a CAD software called CATIA, that’s the brand, and that’s top of the line. Like I don’t know Honda uses it, like most companies don’t use it because a seed of it cost like 30 grand, so it is top of the line stuff we have here at our finger tips and we have really nice, new CNC equipment and so we have some of the new stuff out there and we are able to get our hands on in under graduate program

Follow Up: Please explain few of the things you learn here. What methods are used by faculty teaching courses? Because of the advances in technical innovations careers of tomorrow are in constant flux. In your view, is this program going to meet the current and future demands of the labor market? is there a demand for the kind of skills you are learning? What does the competition for jobs in this filed looks like?

ANS: I feel like this program has a little bet yet to be desired. There is a, I mean some of our professors do some stuff differently than I would do it, Like for instance, we are working on a project with CATIA and none of us have ever used it and the professor was like here is the project, here is the seed (seat?) of CATIA go learn it and a its really self-taught which there is a place for that but also there is a place for lecture and taking us through how to do it. I think I am not so sure all the professors here know, know the software they are using as well as they should and that needs to change. Because if the student has a question the professor better be able to figure it out or know how to figure it out. You know, because they expect us to get the projects done but if they do don’t know how to do this stuff themselves than they can’t expect us to learn it either. So there is some issues like that. I think you run into that at any college you go too as well.

Q: In order to avoid using the terms “Computers” and “Technology” interchangeably, what does technology means to you?

ANS: I mean technology, obviously, the use of computers is essential in technology. It’s just an advancement I think of everyday things we do. Without the cell phone you wouldn’t be able to travel as freely and talk to people from just anywhere, and with the use of just new things that people have invented we are able to have a better standard of living. So I think it is increasing standard of living or making it easier although sometimes it complicates things too.

Follow Up: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

ANS: It is extremely important. We use computers on a daily basis and we are constantly using new equipment, I mean the CNC (Computer Numerical Control) equipment we have out there that’s I would say all fairly new technology, and then Touch Probes, and they have laser and all that stuff now, we use it daily.
Q1: What type(s) of technologies are you exposed to in course of a school year?
ANS: Well, computers, Touch Probes, calculators, I don’t know, digital cameras..
Follow Up: Is the technology (ies) use in the class the same as the technology used by business and industry? If different, how is it different? Please explain if these differences are helpful or a hindrance to student success?
ANS: I would say yes. I think for the most oh like.. we use CATIA, and I wonder if that is the best program sometimes, because unless you are a huge company you can’t afford to have enough seeds of the software to support your engineers. So a lot of people run like Solid Works and then use Master CAM as a CAM package and I think I know a lot more companies that run that than CATIA. And there is pros and cons to both. Personally I feel like what more companies run is what we should be using because that’s what the companies want us to know. Do you have experience with the software we use and they do not care if you have experience with another package which the learning curve to learn a new package once you know one is definitely lower but they want you to have experience with their software.
Follow Up: In your opinion, what would be the best way to prepare students to meet the employers skilled labor needs?
ANS: Well, I mean, when you do Parametric Modeling, I personally have used 3 different packages: Solid Work, CATIA, Inventor, and I know there is Pro-E out there which I do not have experience with, the basic template-concept is the same. You make a 2 D sketch, and extrude it, or cut it and do all that. You are basically learning Icons and that is what it comes down to when you learn a new package
Statement: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment.
Q: I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market?
ANS: Well I have started applying for jobs now rather than waiting till next semester. I have applied for probably I don’t know, 20 jobs so far and that’s because internet allows me to do that to find out who is hiring who is not and so that the big way I have tried to get my name out there, get my resume out there and just see what comes of it. You can always do more and depends how much time you have and how much time you can devote to work. I don’t know, I could probably spending more time you know with the material that I am learning and the stuff like that really just trying to absorb it. Right now I have a just kinda got a little bit of senioritis so I just do what I need to do to get through to get done.
Follow Up: In addition to school work, can you share with me, what other activities do you undertake to improve your chances for employment and to learn about the world of work?

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers?

ANS: Yes I feel like it is. I feel like they do the best job they can trying to teach us how to think, and I think that’s what the main purpose of college is for. It teaches you how to think. I mean if you look back on all.. there was an statistic I heard, you retain 25% of what you learn in college. It’s a lot more of how to learn than it is what you learn I think. I mean that’s important too but I think you got to learn how to learn because If you don’t you won’t progress.

Follow Up: In your opinion, what other opportunities offered by schools such as this can be helpful to students preparing to enter the job market?

ANS: We are required to do an internship and that is extremely helpful. I know some colleges don’t require that. I feel it should be a requirement because most companies want to see an internship, you know, because that’s a real world experience that you are getting and that’s what really matters to the company. Ye they care about your GPA and all that stuff they want to know can you actually apply what you’ve learned and that’s what an internship shows you.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?

ANS: I think they are starting to recruit more here. That’s want thing that I’ve noticed. Their numbers were down last year and the teachers and professors definitely, have not told us directly but I’ve sensed they have a little more urgency about getting students in and appealing to students interest and stuff like that. So that one thing.

Follow Up: The labor market is changing, jobs and demands for jobs and skilled workers are in constant state of change. As the result of these external changes how this program has changed?

ANS: I am not sure. I mean we had a couple of… they restructured the whole engineering department here and there is a dean that who that I don’t even know if he is an engineer, and he is like the dean of our department and so I think that’s one change that’s probably gonna hurt the department more than anything or the school of technology because if you do not have somebody who’s engineer and knows what kids need to learn than he is probably not going to approve budgets that need to be approved and stuff like that. So that’s one change that’s happened that I think is part of the bureaucracy of a university and they have bunch of a needless jobs here that could be eliminated. People get tenured and don’t care anymore and so I am not sure as much as changed that should be changing.
Follow Up: In your view, have there been changes that reflect the need of the industry as a consequence of globalized completion, training for current jobs?

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: One thing I like about this program, most of the professors have had real world job experiences. It might have been 20 years ago but they all work in the industry and understand what we are going out into. So I feel like, they’re pretty up to date on what’s happening. A lot of the still do consulting work and that helps them stay in the real world. You know you get in the university setting and talk about theory all the time and you do not know what goes on out in the real world so I think they are pretty up to date on what’s going on.

Follow Up: In your opinion does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching?

ANS: Yes. I think they try extremely hard to develop courses and classes that are representative of what actually goes on out in the industry. I have had some conversations with my professors just about this and he says this is what we did in the industry so this is why I want to teach you how to do this.

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends?

ANS: I talk with my former boss from my internship and he tells me often about the shifts he senses in the market this way or that way.

Follow Up: In what way could this be helpful to the students and faculty?

ANS: Yes that would be great. It is always good to hear it from somebody that’s in the industry about what’s going on and what the companies are planning for.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce?

ANS: Yes, I think they are. I think one good way to get that into the classroom is to have projects and group projects and that’s what we do a lot of. You learn how to work with people which is what you are going to be doing out in the industry. Two heads are better than one and so I think that’s probably the best way and that what does, a lot of project. You learn better, I feel, like actually you go out and do what you have actually learned in the classroom and you are able to apply when you run into problems and got to think through them. So yes…

Follow Up: In your view, do employers value these skills and why?

ANS: Well it’s important because in order to be successful in a position you have to have those skills. If you do not develop them in college or have them naturally, then you are going to end up fired or quitting, one of the two, because you do not like what you are doing because you are not good at it or they do not like what you’re doing because you are not good at it.
Follow Up: What other ways you can employee to learn these skills essential to your career success?

Follow Up Statement: This University, at least with Career and Technical Education (CTE) courses, utilizes a process called Academic Program Review. APR is completed every five years as an evaluation of the programs within the colleges. This process collects data from past students, alumni, employers, and other interested stakeholders in order to learn about the effectiveness of the programs and where to make improvement or change a program completely.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the students’ future educational and career planning efforts?

ANS: Yes, I think it is a great idea. I think you have to accredit to have a major and that’s extremely important. You have to have some kind of a standard to hold what you are teaching up to and to make sure that well thought out and is you know, if they tell that’s the major you want to get, that’s the major you want to get. You don’t want to get oranges when you should’ve had apples.

Follow Up: In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

ANS: Yes. I think of course it would be. If bunch of companies are saying that, look, we are moving in this direction then the colleges better be moving in that direction too or you are going to have bunch of people who graduate and have absolutely no clue how do the stuff that the companies are doing.

Final Comments: Closing

At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know.

ANS: I think we are good.

Thank you again for your time and I wish you the best.
Student Participant Interview #4

ID #

Date of Interview: 

Transcriber Name: Al Moradi

Length of Interview: 48 minutes, 38 seconds

Length of transcription: 10 pages

Opening statement: Good afternoon. This is 

ANS: Yes

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: I am in 

Q: Please explain some of the key features of this program of study that got you interested in becoming a 

ANS: I went through the associate program here at 

Follow Up: Please share some of the reasons that you consider important in choosing this filed as a career for your future?

ANS: A lot of things. What I always hear, and I get manufacturing news week every month. They always say service spreads wealth where as manufacturing creates wealth. I see the country needs to get more manufacturing and I feel that I can help.

Q: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?

ANS: Globalization basically a company here can have their outsourced whether they are having the whole product built out overseas or just certain aspects of it. This is to basically to reduce cost and big thing that I have seen is like you can be designing here in Michigan with somebody in India same timed it through technology through CAD program they have they do same time product...
development and you can process it and you have them run it and you know because you built the process here that is coming out there.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor(s) is causing such a rapid pace in spread of globalization?

ANS: [Company] company and when NAFTA went down, he said that first year he moved down just a ridiculous amount of companies. It seems that when we took on NAFTA we opened up basically to the rest of the competition, where before we basically blocked everybody else. I seen that and also technology like I said where basically acting on design with somebody in china wherever where we can design at the same time and I can build the process here on my computer know that it is going to come out good.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor(s) is causing such a rapid pace in spread of globalization?

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Follow Up: It is believed that globalization has a far reaching affect on the life of people specially the developing world and the emerging economies. How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development?

ANS: This summer I interned at [Company], in one of the manufacturing plants. We actually had a girl from India come in and work with us. Over there [Company] has a place over there, all they do is PPEPS which is pre-production part approval, which basically they pay them to figure out how to do all this stuff. When they have new products coming out they ship somebody from India over, they do the PPEPS. So I have seen that kind of impact.

Follow Up: How does what you described influence or impact peoples’ lives?

ANS: It kind of that would take away from the engineer in that factory doing it so. It would affect them that way but it is one last job that was in that factory that’s now taking their place by somebody from a different country flying in and doing that job.

Follow Up: What factors makes this era of globalization different? Can you further elaborate on some of the key features or components of globalization?

ANS: One thing that always comes to mind is that there was a company in [City] and the people look at that, as it was not a new thing. There was a company that followed them with the cameras and when down there where they were putting this plant in this city in Mexico where people rejoiced that this company has come down there because they are actually losing to South American companies that are cheaper that. It seems way cut-throat that here are companies that normally went to China and Mexico and now they are becoming more expensive.
Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?
ANS: I can see that there is a big thing; I mean this summer, they are basically building our competing plant in Russia. So it is probably cheaper to build it over there definitely in automotive market. If I get into that that there is always the risk that gonna outsource your plant somewhere. So I mean you have to fly there or you might lose your job just completely.

Follow Up: Do you think about your career in context of a globalized labor market?
ANS: Yeh, I, like this summer even some the parts we had came from other countries. I definitely see working with those other countries. I mean It seem you can’t get away from it so you gotta learn to deal with it and how to find the benefits through doing that.

Follow Up: Do you sense a competition for jobs in a local market because of globalization?
ANS: I do in the sense that a lot of people are out of work so there is a lot of engineers out there looking for work but one of things is that we are kinda fresh from school and so we have a lot more of the technology that they those engineers wouldn’t have had been taught on.

Follow Up: In your view what has changed that impacts your career?
ANS: A lot of the companies getting leaner and getting rid of this engineers so that they can compete with these places so they are kinda shrinking down their work force size and in doing that they don’t need as many engineers and their manufacturing is cut down where there is a lot more automation. You know, one engineer can handle a lot more automation than one engineer would handle more people.

Q: In your opinion, what are some of the factors contributing to the rapid pace of globalization in the 21st century?
ANS: Kind of, I guess I do not know enough about that but at least what we are taught is that like I said, countries are competing with each other to see who can be cheaper. A lot of countries have just huge numbers of people. Like the teacher said, they have the resources just to get away plus all the EPA and everything, it just seems like that number of people they have they can pay them real cheap and if those people want more money there is thousands more that would take that job. With the Government control of taxes I know it is big one but if you move to these places you do not have to pay.

Follow Up: Can you think about some other things impacted by globalization?
ANS: The resources and the people are the only thing I can think of. Like the natural sources, water and pollution and stuff that we have to control here where they do not have to do as much.
Q: Based on your understanding of globalization, when you think about your career in a globalized labor market, how do you feel about that?

ANS: It was pretty scary in high school especially when that NAFTA passed. Being from the Detroit area we really got hit bad you know, I thought man I don’t want to get in manufacturing but through going school here I kind of learning more about it and learning how the ways that we can keep our plants here and keep them competitive. You know I kind of felt more confident that it will come back because of these things that we learning and change within it.

Follow Up: Do you think globalization may impact or has already impacted your field and in what ways?

ANS: Yes I do. Just plain and simply you know if you plant is more expensive, you know, they can ship it to China or Mexico or south America and basically a lot of places have lost their factories already and they are implementing lean just trying to stay competitive, so…

Follow Up: Do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for high skill jobs?

ANS: I still feel that United States has kind of got an edge because we have all the skilled workers and everything and you always hear about these companies coming back. I know a big thing is quality and just ship time with the parts on time that they have now, basically if you build a mold over there and have it shipped over and if something is wrong, now you got to ship it back, get it fixed and bring it back here so, I don’t know, I have heard quite a few companies coming back just because we have the skilled workforce and you know, definitely cost time and money.

Q: Could you tell me a little about some of the courses you are taking or have taken during the course of your studies?

ANS: One of the big ones or I had last semester, probably the most one I had was Industrial Engineering where we learned basically how to work with the people to assemble parts, and weld parts. Basically it a manual operation of these operations and you know, so that was really handy, just kind of learning how to talk with people, how to do the time studies, and everything. Right now we are basically in our senior Capstone class where we learn the automation side of things and we learn how to optimize our processes to get every second we can out so that we can increase our throughput.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that In addition to the course-work as part of higher education, some other skills are considered relevant to the job market.

ANS: One of the biggest things that I’ve heard is basically [[ ]] is a very hands on school so if that a machine breaks students are right there fixing it. We don’t have to really don’t have to wait on people. We kinda, they let us learn you know, stuff
breaks, we learn how to fix it and I talk to a lot of people and they say yes it is good to get a Masters but going through a program like this, we just have the hands on and you know a lot more of the ability to fix stuff, and you know, kinda think for ourselves not just the theory behind how it would work. We know how it actually ....

Follow Up: In addition to the course-work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: kind of, we get a wide array of what to do. You know if we work on a process and it just doesn’t work we can kind of, think. We are doing this on the lathe but what if we put the stock in the middle you know, and cut it like that. We kind of think out of the box. Um, like common sense, like the lathe example. We know how this process works so we can use what we have learned and just kind of use our basic physics and just kind of what we know, what we understand about how it works to you know to put it into a different machine and run it that way.

Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view, how do we find out what kinds of high skilled jobs are in demand in the local and national labor market?

ANS: We use what teachers experience and you know and see with that. This summer we did our internships and all summer we spent at a certain company and it’s really promising this year actually because I think there is roughly 80% of us already have job offers on the table. What we hear a lot is the number of graduate in manufacturing is actually down and number of jobs are actually up that they are taking mechanical engineers and companies retrain mechanical engineers to do our jobs.

Follow Up: How do we know what employers are looking for? In order to meet the needs of the domestic industry seeking highly skilled workers, in your view, what are some steps or measures that can be taken to meet those needs?

ANS: Kind of to put a good spin on things, there is a lot out that manufacturing is down so I think a lot of people stayed away from it but, there is still those people out there, I think just to feel the true facts and not what you hear on T.V or what you hear through a friend, you know, let people know that is out there and may be show the numbers that these plants are doing good and that manufacturing is here to stay.

Follow Up: How do we go about learning what kind of skilled workers are needed in the industry and prepare accordingly?

ANS: The job fairs are big thing. We go and we talk to companies, you know, and they talk to us because a lot of them need people really bad. John Deere alone picks 500 interns during the summer.

Follow Up: In your opinion what kinds of information may be helpful to students when selecting a POS towards a future career?
Q: What factors influenced your decision to pursue your education in this program to become [redacted]?

ANS: My father was a big push. He has always dealt with manufacturing in one form or another and I know that I wanted to get into that type of industry. Basically, it is hands on here and I don’t think I could sit and learn from a textbook all day. It’s nice getting down there making chips and getting dirty.

Follow Up: What other factors other than the career itself, in your view, influenced your decision to choose engineering? Was your decision influenced by other considerations and how?

ANS: The pay is definitely a good thing. I got a job offer, really good one. What is really nice about it is that I really didn’t want to really get stuck in welding so I came to manufacturing because of the wide array of jobs that I can actually do. I can do industrial engineering, I can make chips, I can do welding, just do can do a different job everyday and you know, it’s all related to manufacturing but you can control the whole process.

Q: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: They are teaching us basically what they used in the industry and not only that but they find what is the most cutting edge software, like right now we are working with CATIA and you can optimize the process. They are finding that this compare to MASTERCAM basically, with stock CATIA you are getting more optimized tool packing and everything. On top of that as soon as you learn the software you can optimize it further to get out all the wasted time.

Follow Up: Because of the advances in technical innovations careers of tomorrow are in constant flux. In your view, is this program going to meet the current and future demands of the labor market?

ANS: Yes, one of the big things that I have seen, anyway, when you are in an industry there are people designing parts and they give the people that make the part their design and I can definitely see that, you know, Japan is already doing it. We are kind of following the ball on that one but you need to have manufacture and designing in one which we do here. They tell us you going to do this project; right now we are building a pen. We design the pen in the best manufacturing possible because we know how to cut it where as a design person may know how to make it but then that have to give it to us and we have to make design changes where as right now we make the design changes as we go based on that. So, you know, you can definitely see that coming in the industry that the manufacturing and mechanical engineers are going to be working side-by-side developing the parts and process at the same time.

Q: In order to avoid using the terms “Computers” and “Technology” interchangeably, what does technology means to you?
ANS: Technology, You know, just everything, from the equipment that you are using, even just you know, how stuff is done basically, you know, the process behind the thing, just you know, how everything works within an industry.

Follow Up: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

ANS: It is definitely used in, we see it on like these CNC machines you know, basically is just optimizing the process, using the most recent technology for ways you know, to get better parts quicker, speed up everything.

Q: What type(s) of technologies are you exposed to in course of a school year?

ANS: All sorts. We learned, you know, we have metrology class. We learned the technology, how they check parts like feral arms and stuff, which are basically are just portable CMM,s (Coordinate Measuring Machine) to check the parts, you know, all the dimensions of it to make sure it’s in so this summer I worked with that and found you know, through when I went here were these basically these laser feral arms, we used those this summer I showed them how to do that. Definitely the CNC is a big part, but we also, used some of the older technology with the new ways through, you know, like SNADVIK we get different technology that, you know, optimize our process because we can than make larger cuts with this inserts.

Follow Up: Is the technology (ies) use in the class the same as the technology used by business and industry? If different, how is it different? Please explain if these differences are helpful or a hindrance to student success?

ANS: A lot of it is very similar and the same. because the machines we have here are job-shop type where as you know at Ford or anywhere else they have these big, huge turning centers and stuff that are made for spitting parts as quick as they can. So it’s a little bit different in that it’s the same setups and everything, it’s just the machines you know, aren’t as rugged and everything and seems like in industry they use more of like MasterCAM and lot cheaper but quicker stuff to built the parts and the process behind them. Whereas we are learning CATIA which is a lot more time intensive, but you know, in the end you might save 2 second per-part, you know. So it seems like we do on the software side a little bit higher but our machine just aren’t quiet as ??? the differences in technology kinda helps us. I think I brought up the concept of where the manufacturing engineer will do the design and process, and that’s what CATIA does. It does the design and process where as MAsterCAM and stuff you get a pert from somebody, you put it into MasterCAM and do the tool path. So

Statement: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment.
Q: I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market?

ANS: Like I brought up, I went through welding and I like welding but if it goes down I am stuck with that ship going down where as I changed to manufacturing so that you know I’d have everything and we are taking mechanical classes actually which kind of goes along with how we are going to start designing parts eventually, I can see that coming and so I know within our they send them out. They have to take plastics courses; they have to take welding courses. So we get a broad array so when we get out that we not just stuck making chips we can go and we can do molds and run actually run the plastics injections molds, that a plastics engineer would do.

Follow Up: In addition to school work, can you share with me, what other activities do you undertake to improve your chances for employment and to learn about the world of work?

ANS: We have a SME which is (Society of Manufacturing Engineers) and I am currently the president of that. We are building molds and we do plant tours just to, because a lot of students here just have never been in an actual production environments, so we take them to these plants and we expose them to that.

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers?

ANS: Yes, like I said, I have already got my job offer from [blurred] you know as soon as I came back to [blurred]. I had that locked down the second week of school and I see that as a really good sign that they like what we are doing in here.

Follow Up: In addition to what you do, what can your school do to help you to get ready for work in a globally competitive environment?

ANS: They should bring people from the industry to just sit down and you know just talk with us every now and then because we can only take so many kids on these plans tours. So, if brought somebody in down here to sit down and just have a little info session just take the manufacturing to a personal level where they can discuss; this is what I do and this what you are probably going to do when you get to give us a better view of the industry.

Follow Up: In your opinion, what other opportunities offered by schools such as this can be helpful to students preparing to enter the job market?

ANS: Yes, I think that would open up a lot more when people find this is what I am going to do out there, so maybe I should work on this at school. It might lead us in one direction or another more.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?
ANS: One big thing I noticed; they never used to have you design and build the part. That’s one thing that I see, you know, changing in gear. Another thing they do have every now and then a company will come in and show us, you know, this is our new product, let us talk to you about it. You know, so they kind of have this companies come in and show us the cutting edge stuff that when we get somewhere we might see a use for this you know, so that we can bring something new to the table. You know, hey, I learned about this in school; let me show me how it will help you.

Follow Up: The labor market is changing, jobs and demands for jobs and skilled workers are in constant state of change. As the result of these external changes how this program has changed?

ANS: You know, like even SandVik comes in and shows us these are drills that help in that’s normally the slowest process in the industry is a drill cycle, and so they are showing us drills that you know cut maybe in half the time, so it definitely shows a way to improve cutting time.

Follow Up: In your view, have there been changes that reflect the need of the industry as a consequence of globalized completion, training for current jobs?

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: Most of them, yes. There is some that, I don’t know the best way to put it, like seems like they’ve been here you know, maybe they’ve been out of it too long you know. Definitely, thus far the classes I’ve had so far they’ve all, most of been geared toward is how to deal with that and how to make your plant stay with that.

ANS: Yes, definitely, the industrial engineering class, it definitely seemed geared around, basically we learned what Toyota does, this is going to be your competition, you know, they set these process so make sure you at least do this.

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends?

ANS: Yes, like my father is a Vice President of a company in Detroit, and a lot of times when he is working at a plant I go on Friday because I don’t have classes and I get a chance to talk to the engineers that he is working with. A lot of time I just sit down and talk with them about their process and there are past grads that I have also maintained contact with. Knowing what is coming next year, every couple of weeks I talk to them and we just talk about what they are doing there and what they are gearing toward.

Follow Up: In what way could this be helpful to the students and faculty?

ANS: To kind of morph what we are doing here to kind of gear towards, the one thing I know they do in automotive program is that once a month they actually bring people from industry here, once a year, they bring them in. they not only sit with the student but they sit with the teachers, this is what we feel you know, this class
is good, and we feel this class, you know, yes it was relevant five years ago but, you know, they are not doing that anymore. I wish we had that that people from the industry sit with the teachers and us you know explain to us, this is what is relevant. It is good to know but it is not done.

Follow Up: What characteristic are employers looking for in their skilled worker entering the job market?

ANS: I think definitely the ability to do more than one thing. To be very savvy on pretty much on everything in the plant that you might be working on the assembly line one day you know, doing industrial, the next day they might have a problem with automation you know, basically that you have the understanding everything in that plant you can jump from one thing to the other without any lag-time of learning picking it up. The employers are looking for employees to be knowledgeable and be able to multitask and adapt.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce?

ANS: It seems like, a lot of it is, like working with people, a lot of that seems theoretical but the problem solving, I mean, you know, when we design our own processes they are not going to be too good because we have not done it as much, so, you know, we have to make maybe 15 changes but by the end we go you know, ok, this will work or that will work. It’s definitely a learning curve through us doing our own to figure that out. But the theoretical side will be more like talking to the operators and because we are young students, but we get that through internship. This summer I definitely get any respect when I first went there from the operators that I worked with. But, I read a book, Dale Carnegie, How to work with them. I use what I’ve learned through that book to problem solve and to get the operators my trust.

Follow Up: In your view, do employers value these skills and why? What other ways you can employ to learn these skills essential to your career success?

ANS: We get through team work that they have us do. You know, I mean, that’s a big thing because anything you do out in the industry you’re going to be working with a team and, so we get that through working with our teams you know, you might want to do it one way but your partner wants to do it in another way, so you know, you normally can find the happy medium that takes your good ideas with their good ideas. But on top of that, the Dale Carnegie books, they are from the 1920’s or something, I know that, still all the stuff is relevant. It’s you know, very psychological, how to gain peoples trust and….

Statement: This University, at least with Career and Technical Education (CTE) courses, utilizes a process called Academic Program Review. APR is completed every five years as a evaluation of the programs within the colleges. This process collects
data from past students, alumni, employers, and other interested stakeholders in order to learn about the effectiveness of the programs and where to make improvement or change a program completely.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the students’ future educational and career planning efforts?

ANS: No I am not but I definitely see that as beneficial like I brought up getting people from the industry. But 5 years seems way too long to wait to do this.

Follow Up: In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

ANS: Yes, I mean, they can tell us, you know, these programs are a lot more used, you are going to see this when you get out. Ok, when we are doing our process lets us this program. Let’s learn this so when we get out we know how it works and know about it.

Closing Comments:
At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know.

ANS: The big thing is I see manufacturing is coming back, because like I mentioned, manufacturing creates wealth and soon I think our country is going to realize that we can’t just be a service industry, because it is not creating anything. I believe in manufacturing enough and that it’s going to be big in the United States to stay here. So, I would not have gone into this field if I didn’t foresee it.

Thank you again for your time and I wish you the best.
Opening Statement: This is Al Moradi and I am meeting with student participant #1 from Product Design Engineering Technology. Today is October 27, 2010 and it is almost 5:00 P.M. Are you ready sir?

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: I am enrolled in [redacted] and I anticipate graduating in spring of 2012.

Q: Please explain some of the key features of this program of study that got you interested in becoming a Product Design Engineer.

ANS: Mostly the product design in engineering but most of the reason I came to Ferris was. It was available at night. It picked my interest just because it is already where I am already working. I am working in the field and correlates well with what I am already doing.

Follow up: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: That’s a tough question. Most of the classes are generic throughout the country from as much as I can understand. The program has been modeled after other one, specifically, [redacted] mentioned [redacted] product design program. I think it is pretty generic across. As far as competitive thing, I don’t think it gives you an advantage or disadvantage. One disadvantage you have being a [redacted] graduate in this program is that it is not a ABET (Accreditation Board for Engineering Technology) accredited program. I would rather have it be an ABET accredited but because it was at night it worked best with my schedule. So …

Follow Up: What are some of the things you learn specifically?

ANS: Specifically, thermodynamics, dynamics, kinematics, I can’t think of all the core classes I have taken, machine design, machine design with FEA (Finite Element Analysis).

Globalization

Q: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?
ANS: I term globalization as technology that has allowed globalization to become more easily accessible. I don’t even know if that is the right way to say it but, technology has allowed communication across borders and bodies of waters, across continents to become easier, which thus allows people to work off-site, allows other competitors in different markets from different countries that might not have normally been there without this technology, uh, kind of like the urban sprawl of the industrial age?

Follow Up: Is Globalization something new? Can you please elaborate?

ANS: I think globalization would be not termed new but as ever expanding, and that is just mostly due to technology.

Follow Up: It is believed that globalization has a far reaching affect on the life of people specially the developing world and the emerging economies. How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development?

ANS: I think it puts everybody on a level playing field. For instance if China, would China be the industrial nation it is today without globalization, without technology leading the globalization? Ah, I think not, my opinion that not. Other nations are starting to get into that, India, Thailand I have heard, and things like that to answer the question.

Follow Up: Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor(s) is causing such a rapid pace in spread of globalization?

ANS: Technology, video conferencing, e-mail, supply chains the way that they are used. Just that the evolution of technology in the human race as a whole has allowed for a leveled playing field. Globalization is all encompassing in my mind with that.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Can you further elaborate on some of the key features or components of globalization?

Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?

ANS: Absolutely, if there is for instance India as another example. We have seen a lot of engineers being educated out of India recently. They are working from home and some of them are moving here. Their schooling is allowing them to be competitive and at times work for less money or be more adapted at doing the job better. So it definitely has an impact. We have to do whatever we can to become more versatile because of that because competition is greater now. You are not just competing for jobs with others in your area, city or state; you are now competing in a global market place.
Follow Up: What does the future career outlook in context of globalized labor market looks like in your field of study? As a result of globalization, in your view, what are some of the reasons if any that are causing changes in the labor market demand?

ANS: I think things will be Ok but I think the scope of what an engineer does out of the United States, might shift a little bit. I think the job market will be there but I think the job responsibilities might shift to more of a project manager role rather than the day to day engineering.

Follow Up: Have you experienced or noticed trends and or changes in the job market or more competition for jobs in your field? What has really changed? What is different?

ANS: In my specific work environment we do a lot of work with China. Two years ago we would have a Chinese partner do the engineering and the design work and then they would send the designs to us to check or and do sign off and what not, and things didn’t go too well like that. It was too much run-around and hassle all the time because the things weren’t just getting done properly, whether that was a lack of understanding of what we were really looking for or a lack of knowledge. I couldn’t tell you but now today we do more of the engineering work and designs work ourselves right at home. And that’s on specific instance. As a whole I wouldn’t be able to say how much change has occurred in the past years that I have been working as an engineer I have not seen a major shift. If there were major changes to occur, as other nations become more capable doing that type of work, the Americans and American companies have to become more project managers than engineers at that point.

Let’s for a moment talk about the technology and competition as two components of globalization:

Q: In your opinion, what are some of the causes of globalization? What causes this phenomenon?

ANS: Investments in development project, if it cost American engineer $50,000 a year an engineer from another company may work from $35,000. And that is the major cause. It’s just money.

Follow Up: Can you think about some other factors that cause globalization to speed up or slow down?

ANS: Technology and the demand for it, quicker designs, cheaper designs, cheaper investments upfront.

Q: Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for high skill jobs? How do you feel about that?
ANS: You always feel less secure because there is more competition but my outlook is that you have to change but your vision as to what the job might be to adapt and make yourself competitive or valuable to the company you’re working for. If they need you to project manage and understand what they are doing or what they are going through, than that’s what you got to do.

Follow Up: Do you think globalization may impact or has already impacted your field and in what ways? What type of changes if any do you foresee as a result of globalization of labor market in employment opportunities given the very competitive global environment?

ANS: Specifically because of globalization, I think that things will stay the same as it is today.

Follow Up: Do you feel prepared for or are concerned about the future challenges posed by competitors from the globe for high skilled workers?

ANS: Out of school, I think directly out of school no. But within several years of working in the correct environment you may be. School doesn’t, school doesn’t prep you on globalization, project management, dealing other cultures, and the experience does. Coming right out of school, are you ready? No, but with the right mind set you could be within a few years.

Follow Up: How does globalization contribute to or intensifies competition for jobs, markets, resources and skilled and educated workforce?

Q: Could you tell me a little about some of the courses you are taking or have taken during the course of your studies?

ANS: This semester, Machine design and mechanics and kinematics.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course-work as part of higher education, some other skills are considered relevant to the job market. In addition to the course-work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: Project management, organization, is two big ones that come to mind right away. Employers value organization and project management for sure. On top of that flexibility and on top of that you have to know your engineering work you know, it is important, it’s like an important base of your knowledge but is it the knowledge that get you to do your job everyday very well from the skills stand point.

Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view, how do we find out what kinds of high skilled jobs are in demand in the local and national labor market?

ANS: I don’t know if I can answer that accurately. Personally I haven’t looked recently. Sometime you look at Monster (online job site) to see what is out there to see what jobs and what areas are available. But, most of the time I don’t know. I don’t have any good answer.
Q: What factors influenced your decision to pursue your education in this program to become Product Design engineering?

ANS: In high school I did a lot of CAD classes and I was interested in that and frankly good at it so I pursued doing an associate degree in CAD engineering. And that led me to the next step which would be bachelors in product design engineering technology. I like the way things work. As a kid I always took things a part just to see how they work and it was interesting to me. From manufacturing processes, growing up my dad worked in a machine shop so being able to go there on Saturdays and see them (workers) machining parts, it was always interesting to me so it was kind of a natural progression.

Follow Up: In your opinion what is the job outlook for this field in the near future and long term? And do you think that we have enough engineers to meet the current demands of the economy for engineers and highly skilled workers?

ANS: I see it staying the same, I really do. I don’t see a major shift in more engineered either less. I think it is going to be the same over the next 20 or 30 years. Boy it’s hard to tell outside of our (City Name) bubble. The demand, there is not a lot of demand out there for it right now for it. Whether it’s gonna increase. I do not know. I really don’t.

Q: In order to avoid using the terms “Computers” and “Technology” interchangeably, what does technology means to you?

ANS: Advancements, and mostly just in computers and their speed and their capabilities, from my stand point CAD system and what they can do and a lot of that in engineering perspective takes hand calculations off the paper and puts on the box and that important, that important from speed stand point and accuracy stand point

Follow Up: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

ANS: Some classes have labs centered on learning around the technology that is used. But 70% of the program is built around theory, 60 to 70% and the rest is actual technology around that. I think that’s a good mix.

Q: What type(s) of technologies are you exposed to in course of a school year?

ANS: CAD System, that’s basically it. The only other thing is ever used would be internet for research.

Follow Up: Is the technology (ies) use in the class the same as the technology used by business and industry? If different, how is it different? Please explain if these differences are helpful or a hindrance to student success? In your opinion, what would be the best way to prepare students to meet the employers skilled labor needs?

ANS: Yes. It is a help. The technology is generic but yet specific at the same time. If you do it,
CAD systems, parametric systems in specific work similar, learning one, in our program we learn one. The only problem with is when you go out into the market place there is 6 or 7 different types. Would it give you an advantage if you learned one (system A) in school and the employer is looking for system A, absolutely, but sometimes they are looking for B or C and it give you still an advantage if you knew A because it gives you a general understanding but not as much as another student from another college that might learned system B. So it’s an advantage yes but there is more opportunity there but how you ever fit all of that into a schedule is impossible.

Statement: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment.

Q: I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market?

ANS: I am going to school. I do some outside learning, some project management reading just mostly textbooks that you can buy at any store, and that’s pretty much it because that’s where I see me specific job is going and frankly my market is going toward that little more and that’s an important aspect. Other than project management I keep up with current events and where I see other countries coming in and what they are good at and what they/how they are developing, just to keep up with current events from that aspect.

Follow Up: In addition to school work, can you share with me, what other activities you undertake to improve your chances for employment and to learn about the world of work?

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers? What specific skills do employers look for both on educational and personal level?

ANS: Learning the fundamentals of the engineering and theory. I think flexibility, blending in with the group (team work) and good personality are important. Professionally, being able to adapt to different technologies is the key.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?

ANS: NO

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: Some of them. Some teachers that have recently worked in the market, you can tell that they understand the effects of the globalization of co-working with other
countries and other, and even within your country, across the country without… some of the understand that have worked recently, if they haven’t or never have you can tell, there is a difference.

Follow Up: in your opinion does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching? How do they transfer that knowledge to the classroom? In your view does this transfer of knowledge about globalization beneficial to students and in what ways?

ANS: Sometime they’ll be on a certain subject and instance will come up or a subject will come up kind of out of the blue and they’ll take that opportunity to explain how it works in the business environment. I had a _______ and, sometimes _____________his difficulty with the Chinese supplier or the Taiwanese supplier and they use their own experiences to explain how something might be solved or used.

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends? In what way could this be helpful to the students and faculty? What is your understanding of those needs and trends?

ANS: NO. It diversifies your viewpoint. When you, for instance for me, I’ve only worked in one engineering department and for one company. They do certain things a certain way and I know why but everybody does it a little bit differently and somebody else might do it better. And if you have not been immersed in that sometimes in viewing how they go about things, is a valuable learning experience.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce?

ANS: Communications specifically is, customers’ service not so much. Problem solving is that something that you learn or acquire going through engineering school.

Follow Up: What other ways you can employee to learn these skills essential to your career success? In your view, do employers value these skills and why?

ANS: Yes. All of them are important. Customer service specifically because even though you may not service the customer directly, you always have internal customers whether it is your sales department or manufacturing department or your materials department, it is important to treat them in the right ways. Communication is always important to relay your thoughts and ideas correctly and clearly, and accurately and organization is always vital.

Statement: This University, at least with Career and Technical Education (CTE) courses, utilizes a process called Academic Program Review. APR is completed every five years as a evaluation of the programs within the colleges. This process collects
data from past students, alumni, employers, and other interested stakeholders in order to learn about the effectiveness of the programs and where to make improvement or change a program completely.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the students’ future educational and career planning efforts? In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

ANS: No. Yes I think this process would be helpful because you would get real growth, feedback. But, if I don’t know about it I wonder how many other students don’t know about it as far as giving you feedback.

Final Comments: Closing
At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know.

ANS: No, I am all set.

Thank you again for your time and I wish you the best.
Q: This is Al Moradi and I am meeting with student participant #2 From Product Design Engineering Technology. Today is October 29, 2010 and it is almost 5:00 P.M.
ANS: Yes

Q: Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?
ANS: I am currently enrolled in Product Design Engineering Technology and projected graduation is 2013.

Q: Please explain some of the key features of this program of study that got you interested in becoming a Product Design Engineer.
ANS: Probably the biggest thing that I got interested in is original design in, what I have grown up with boats. I lived in West Michigan, I’ve always wanted to design boats and design my own brand of boats. I got into engineering decided that design side rather than mechanical and technical side is what I want to go in. and basically to develop new and better products.

Follow Up: What does a product Design Engineer generally do?
ANS: Product design engineer would typically originate new and better process or features of a product. It depends on the field really that they are in. If they are designing electronics and be it an advancements in obviously electronics. If they are in automobiles could be any range thing from electronics to aerodynamics to whatever, in my opinion be the study of advancements. To better advance a product. On the other side it may be a solution to a product, solution to a problem.

Q1G: The term “Globalization” is often motioned in conversations, newscasts, published articles and so on in the context of a globalized economy. I am interested in your understanding of globalization, how it happens and what it does? What do you think?
ANS: To me, when you say globalization, I think of the, if I could use the term interconnectedness of the world in not one area, in any topic that you discuss. So if you were typically used in economic ways, the world economies are all connected in one way. Its more than that, it’s in any way it’s in technology, in competitiveness through technology. The competitiveness has got much broader and in some way it’s actually hurting some countries or areas because if they a
specific area that they are very good in for instance, the U.S, it’s a major automobile manufacturer and now everybody in the whole world is manufacturing automobiles and now we have the other country’s automobiles inside the U.S. It’s really broadened the competitiveness of the world and it’s connected everybody in a way. The things we do on daily basis are all connected to the whole world now.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the 1st decade of the 21st century than in any other historical period. In your opinion, what factor (s) is causing such a rapid pace in spread of globalization? Can you further elaborate on some of the key features or components of globalization?

ANS: In my opinion really the main reason for rapidness of globalization would be technology. It would be that we can communicate with somebody around the world through Skype and through video chats and through e-mails and through phones and all this (obviously have been around) but you can have a video conference now with people all around the world which you never could before like they can see the stock markets and all that stuff. So, really technology as a broad term, technology is really the cause of the fast advancement of the globalization.

Follow Up: It is believed that globalization has a far reaching affect on the life of people specially the developing world and the emerging economies. How does globalization affect people, countries, cultures, and competition for jobs, education and other aspects of daily life as a positive or negative development?

ANS: I think it definitely have both effects positive and negative. Positive things would be because of advancements in things like medicine, and things like automobiles and with energy really is the term I am looking for. The use of energy and the consumption of energy, everybody is trying to find a solution to using all the oil. Those are ways that I believe it’s a positive. The negative side is what I spoke of earlier with the competition. It’s still a dog-eat-dog world, and so with somebody that’s very good at specific area of manufacturing or any area of anything, now with competition because of globalization, people that had a the grasp on a product or may had a monopoly per-se, they may not have that any more. And yes we may get cheaper prices but a lot of things are shipping out of the U.S. that used to be made in the U.S and I believe globalization is an effect of that. I think even currency is part of globalization. With the value of the Dollar or Euro or even a Pesos, it I think globalization in a rapid manner has somehow leveled out a lot of those values. We used to be able to go to Canada and you know, fifty cents on a dollar, (or I don’t know if it was ever 30 cents on a dollar that I can remember) but it used be very... they used to love American money well now just
last month I was there and the Canadian dollar is actually worth more than the U.S. dollar now. So, it not only has brought us to a level playing field, I think and some ways like I said, it is going to hurt the U.S. But, money, currency, technology, competitiveness and I also think standards in everything, and that becoming a general term. Standards in manufacturing and safety standards and your all different types of---. The playing field has been risen I think, because of globalization.

Q: Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your POS and career of choice?

ANS: Well, one viewpoint I have is I believe with the baby boomer and because of globalization, a lot of people have actually lost their job in the United States. So in my field of, to use a very general term, engineering, there is a lot of engineers out there right now that are looking for jobs but to look at the people have lost those jobs, a lot of them of are approaching retirement, they are approaching getting out of work or may not in entry level or mid level position that I’ll be looking at. So in a big pool, yes I think it will hurt me because there is a lot of people out there looking for technical jobs but in specific field of specific job, product design I think that my generation of, generation X per-se is what we need to take this into the future. But globalization has taken people from all around the world and brought them into the U.S., into Japan, into China, into Germany to study and work and do other things as well.

Follow Up: It is also believed that when the baby boomers retire it actually creates a shortage of skilled workers. In your opinion does this hinder our ability to compete with the rest of the world?

ANS: I think that our young skilled people have gone into the job force with no experience, you know, and again that’s where someone maybe like myself was worked and gone to school at the same time because I wasn’t able to pay for school without working. I chose not to take student loans so I got ten years of working experience along with my education. That made me valuable out in society when you know, the baby boomers retire. I think that is going to be our biggest problem when baby boomers retire, is that all of our young skilled people won’t have the experience that the baby boomers have had because there was definitely a gap between the baby boomers and my era. There is a big gap between technical skilled people.

Follow Up: Have you experienced or noticed trends and or changes in the job market or more competition for jobs in your field? What has really changed? What is different?

ANS: Yes I have. I work for a company that does a lot of defense and military work and through my own pursuit of different employment, you know, I am always
looking, you know, for better, different place to work, they have started to require more experience and that’s where I come back to the previous question kind of a, they require five years of experience in design or masters degree or ten years degree experience in mechanical engineering or technical position. And a lot of the people that are graduating now don’t have that experience.

Follow Up: What does the future career outlook in context of a globalized labor market looks like in your field of study?

ANS: I think there is going to be high demand for people like me in the field of technical side of things. Then again, it goes back to the experience thing. I think there will be a great demand though. I just don’t know if they’re going to have the experience. It goes back to experience, but I think as far as my field of education, my field of study, I think there is going to be high demand for people in my field of study.

Let’s for a moment talk about the technology and competition as two components of globalization:

Q: In your opinion, how does globalization contribute to or intensifies competition for jobs, markets resources and skilled and educated workforce?

ANS: Well because of globalization and the communication technologies, we have communicated all around the world that we can take a class in Michigan, with people all around the United States. Now, if we have people that can get educated anywhere, not just in the United States, and those same people that may not be able to come to the U.S. to get the education or travel to some other country to get the education they need. They can stay at home and get the education they need and then that will allow them to be very competitive in the job market.

Q: Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for high skill jobs? How do you feel about that?

ANS: I do think it is a risk because everybody still wants to come to the U.S. to live. They really do. And with the education, again, like the previous question, it is education you can get anywhere in the world and now you can come to the U.S. and be valuable. I do think how we have thought previously that there may be a lack of people with experience, the way I interpret that is inside the U.S., so with people coming from overseas into the U.S. and not necessarily taking the jobs but competing for the job, it definitely is going toughen that job market up out there.

Q: Could you tell me a little about some of the courses you are taking or have taken during the course of your studies?

ANS: I have taken a lot of CAD courses (Computer Aided Design) and I have taken a lot of math courses, physics, and material science courses. Physics can be defined,
schematics, mechanics, and electronics and all that. Those are some of the classes I have taken along the way.

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to the course-work as part of higher education, some other skills are considered relevant to the job market. In addition to the course-work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: I think a few of the most valuable ones in my job would be a problem solver, would probably be one of the biggest ones. Most engineers are given a problem and told to find a solution. I think globalization skills are very important and I think that communication would be another one of the top things I see are not done individually, they are done in teams in groups in all the projects per-se that are problems, there is always a team so communication would be a very large part of the solution.

Follow Up: Are these skills taught as part of your education for workforce preparation? Do you think these skills are needed? How do you prepare for such skills?

ANS: I think organizational skills are not necessarily taught. I think that they are hinted towards through the use of binders and books and stuff to keep track of everything. But as far as team work and communication, I definitely think they are. In the schooling that I’ve had you still work on projects in teams and I think the teamwork and communication are definitely taught. And these skills are absolutely necessary.

Q: Generally, local, state and the national economy needs an adequate number of high skilled employees in certain fields. In your view, how do we find out what kinds of high skilled jobs are in demand in the local and national labor market?

ANS: That’s actually, kind of a tough question. Being a guy that has always looked for better company or position to work for, it is kind of tough to find that through different types of job searches and some people use head-hunters. I have never had. I am always proosing job search web site and stuff like that. The way I like to do is, to find a company that I like to work for and then search them and not necessarily look for engineering job but find an engineering firm or a company that I like to work for and pursue it that way.

Q: What factors influenced your decision to pursue your education in this program to become Product Design engineering?

ANS: I’ve always been a mechanical guy and I’ve always been great with mechanics. And probably one of the biggest things is that my father is an engineer. So I instantly got into engineering. So once I got into engineering classes and some of the technical classes, taking a couple of design courses, I realized that I really wanted to design and develop rather than do a mechanical side of things.
Follow Up: What other factors other than the career itself, in your view, influenced your decision to choose engineering? Was your decision influenced by other considerations and how?

ANS: Just probably my mindset, being a mechanical minded guy, very hands one, I am not the guy to seat behind the desk. I enjoy working, designing, thinking of the way to work things and than going and getting hands on a little bit. I don’t know really know if that answers the question. It’s just what I have always leaned toward. I enjoy it. I didn’t, you know, the money side, the financial side really to me it never mattered. Engineers used to be able to make a lot of money and they still can, but entry level engineers don’t typically make as much as they used to because there is a lot of them out there now. But, I’ve always just enjoyed it.

Q: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: I think that the types of skills that they are teaching are great feathers to put in your hat per-se. Through the CAD work that we use in the Material Science and all the physics and all those, to be able to say you know how things work, obviously gives you the leg up in that industry. But, you can go back and say that everybody teaches those skills. Every university offers those skills. I think what may do is, they do a great job of real world and technological, they add them together.

Q: In order to avoid using the terms “Computers” and “Technology” interchangeably, what does technology means to you?

ANS: Technology to me would be the advancement of anything. Technology can be anything. It does not have to be electronic or computer-based technology. It can be in any way, but it is the advancement of something, of how it works.

Follow Up: What role does technology play in your current learning environment? How is technology utilized in the course of your learning?

ANS: The courses that I am taking right now would be like kinematics courses. It’s kind of a physics-based. So the study of physics, the technology of physics is what is driving those courses.

Q: What type(s) of technologies are you exposed to in course of a school year? Is the technology (ies) use in the class the same as the technology used by business and industry? If different, how is it different?

ANS: I think they are very similar. You know, I think that the technology of mathematics and physics and stuff like that is a great base of knowledge that you have to have to go out in the job market. An employer may go more specific in an area of anywhere from designing gears to designing bridges, still the same base of knowledge they are using but it may be more specific on a job specifics. Like computers, and the books and stuff like that, but the study of it depends on the courses you are taking. It could be from a calculator to a computer for design.
work and CAD. One great way to coop a work studies, would be a good one, you know, internships and things like that, you know, at the minimum you know, even the field trips and stuff like that, I know that’s kind of an elementary term but it can be very helpful to have somebody say we designed this beam this way, why, I don’t know because the story prompt told me to. Well, if you go on a site and you find a problem arises, you need a beam to withstand this much load or whatever, then you can see why you are doing those applications.

Statement: In addition to the educational preparation process the students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment.

Q: I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the labor market? In addition to school work, can you share with me, what other activities do you undertake to improve your chances for employment and to learn about the world of work?

ANS: You can join any type of club or outside school activity; I chose to go to work. With working and going to school, I don’t have a lot of time for other clubs to join, but there is a race team club, there is study club and stuff like that that can help give you a leg up in schooling. Less experienced students absolutely should take on activities that help them learn about job market. I think that even a part time job with an employer is better than you know just doing nothing but going to school.

Q: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly skilled and well educated workers? What specific skills do employers look for both on educational and personal level?

ANS: I do, I do think it is.

Follow Up: In your opinion, what other opportunities offered by schools such as this can be helpful to students preparing to enter the job market? In addition to what you do, what can your school do to help you to get ready for work in a globally competitive environment?

ANS: Kind of goes back to one of our previous questions of work studies and stuff like that. For people to understand what employers do, to see what they would be interested in because you can go into study of mechanical engineering but mechanical engineer can do a million things but I think work study programs, again to use the term field trips to see what employers are doing, to see what students are interested in.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department, in this program over the time you have been here, that reflects changes in industries’ needs due to globalization?
ANS: I have not seen that, because I have not been in the program as long as some of the other people. I have not seen the program change because of industry or because of globalization. I have not seen that.

Q: Do you believe that faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry? In your opinion does faculty develop programs of study that reflect the influence of globalization on their course planning and teaching? How do they transfer that knowledge to the classroom? In your view does this transfer of knowledge about globalization beneficial to students and in what ways?

ANS: I absolutely do. I think that in an engineering world, I believe that an engineer is always under study. I enjoy learning things and I think that a lot of people with technical mind always enjoy learning more about things. So I think the faculty is very educated. Dr. X is one of the most qualified people ever meet with [REDACTED]

Q: Do you visit job-sites and talk with employers to learn about their needs and the latest trends in labor market and workforce trends? In what way could this be helpful to the students and faculty? What is your understanding of those needs and trends?

ANS: No, not really, because I am currently employed. That’s probably the biggest reason I don’t go to job sites. However, I absolutely recommend this for younger students like work studies and stuff like that, and job placements and co-ops and internships. I think it is a great idea for students to go see the employers.

Q: To what extent skills such as problem-solving, decision-making good communication skills and customer service skills are taught as part of the courses offered here, in anticipation of preparing students for entry into the workforce?

ANS: I think it is wrapped into a lot of courses we do. I think it’s a under minded (integrated into) that they teach you to work in groups, you don’t necessarily have a group, a class on how to work with a group but you know a lot of our projects and stuff you work within teams and in groups and it forces you to communicate. They teach you to work with somebody and by working with somebody you then in return learn how you communicate with somebody. This is important because this is how a lot of employers and jobs are like today because nobody is doing something on their own. I think advancements happen because of argument and competition. I think you only get better after challenging people and in a rough way look at and arguing about something. You fight it out, who is better, who is right, and who is wrong. I think it takes a challenger to bring the best product.

Q: Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be
helpful and important to the students’ future educational and career planning efforts? In your opinion, can this process be helpful to students planning reflecting changes based on industry needs?

ANS: No, I am not familiar with or heard of this process. But I think it would be very good for people in the program, that it would help them because it make the faculty aware of where they are struggling, what they need help with. And if they were to talk to people that outside the program and have completed it, it would again help them understand what else they could teach them or what else they could cover to help to prepare students for the job market. This helps students because I think students need to first realize where they want to go? Where they want to be when they grow up before they can really realize what is going to help them. I think that is done through again like co-op to see if they want to do an internship to see what they want to do. I think that, you know I don’t think that faculty can tell students what they need to do. I think the students need to realize that for themselves.

Final Comments: Closing

At this moment we have reached the end of our interview. I want to thank you for your giving time for this study. Before we close I would like to give you an opportunity to comment on any of the topics discussed or something that you would like to share with me that you believe it to be important for me to know.

ANS: I think that over all the questions that we have gone over, that globalization is a moving target, is the best way to say it. Because of the advancements in technology and the competitiveness of jobs and ideas, people always think globalization is an umbrella that is always moving. I think that it can help us and hurt us but it is a tough thing to study and look at especially with technology.

Interview concluded. Thanked the participant.

Thank you again for your time and I wish you the best.
Good afternoon, this is Al Moradi and I am conducting an interview with Student Participant number three from Product Design Engineering Technology and today is November 1st and time ten after 5:00. You ready?

ANS: Yes.

Q: Could you please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: I am in the Product Design Engineering Technology at [redacted]. The planned graduation day, I believe, would be the spring of 2012.

Q: Please explain some of the key features of this program of study that you got interested in becoming a Product Design Engineer. In other word, what were some of the features that really attracted you to become a Product Design Engineer?

ANS: The main thing that peaked my interest in this program was just the availability of the Grand Rapids campus being close to where I live and the availability of the classes being in the evening hours.

Q: What does a Product Design Engineer do?

ANS: Basically, it’s kind of what I described; we design products, we engineer the product, we design them, evaluate them, test them with different means. My job is we do basically the same type of things that I’m learning at school too, so it’s very relevant.

Let’s talk about globalization.

Q: The term globalization is often mentioned in conversations, newscasts, published articles and so on in the context of a globalized economy. I’m interested in your understanding of globalization, how it happens and what is does. What do you think?

ANS: My basic understanding of globalization would be just, you know, you know, 20, 30 years ago, you know, everything was kind of American made and America had its own industry and pretty much, I guess, would be like self-sufficient. Umm, in today’s world, in today’s economy, globalization is, basically, it’s almost like a one world economy. You know, we do business with… America does business with China who does business with Russia and England and products flow in and out of each country pretty freely. I mean there are still some trade limitations but, you know, you can sell your product in America or China or England or…
Q: Good. Uh, it is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much rapid pace in the 21st... or the first decade of the 21st Century than any other historical period. In your opinion, what factors or factor or factors are causing such a rapid pace in the spread of globalization?

ANS: A couple that come to mind would be... first it'd just be, I guess, the China being kind of... what I'm more familiar with is just the-the-the cost basis that we can get parts from China now, it seems to be, quite a bit less than what we can get American made parts, so a lot of companies are looking to China to be able to supply them with parts to make certain items in America. I think another factor's just the technology age that we're in and just, you know, you can send a drawing to China where before you'd ha--... maybe you'd have to mail it and it would take two weeks to get there. They can have in the next day and start making parts. So it's... I think those two factors are a major contributor.

Q: In your opinion... well, we've got that. It is believed that globalization has a far-reaching affect on the lives of those that develop... the developing world and emerging economies, how does globalization affect people, countries, cultures, competition for jobs, education and other aspects of life as a positive or a negative development?

ANS: I think it kind of depends on what country you’re in. I think globalization is taking away some jobs that other people in America could have, umm, but maybe in some of the, like you said, some of the underdeveloped countries, they’re probably being exposed and becoming more technologically aware of things that maybe perhaps that they wouldn’t necessarily be exposed to. So and with that, the education, transportation, all those type of things that you need to-to develop a country are being introduced and making that country perhaps better.

Q: So would you say that it has a net positive effect on developing countries more so than some country like United States and...

ANS: On a company or country that’s maybe underdeveloped, I would say, yeah, a net positive.

Q: It does...

ANS: Influence on that country.

Q: Okay. Global competition for resources and skilled labor force is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your program of study and career of choice?

ANS: That’s a... I hadn’t really thought about that one. Umm, as far as my career, I guess I don’t really see that big of an impact in as far as my-my personal job. Umm, I think that parts still need to be designed and tested are pretty much going to be made in the U.S.A. are going to be used in the U.S., I guess. As far as where
the components come from and the manufacturing part of it, I think, is probably the biggest part of where parts being made overseas. But as far as the development and the design, I think, are still pretty much done in the U.S.

Q: Have you experienced or noticed trends and/or changes in the job market or more competition for jobs in your field?

ANS: I think with the overall way the U.S. economy’s been in the last four to five years, I think everybody’s job is somewhat competitive. I mean I don’t think anybody’s safe anymore. So I don’t know if it has necessarily to do with the globalization or it’s just the way the whole economy of the world is just doing right now.

Q: Okay. What does the future career outlook, in context of globalized labor market, looks like in your field of study, general, the whole field?

ANS: From reports I’ve read on the Internet, I still think it’s a pretty strong field. I think there’s going to be a good demand for engineers in the future in the U.S., so I, like I said, I’m not really that concerned as far as that job market or job field goes.

Q: Let’s discuss globalization in terms of competition and technology. In your opinion, how does globalization contribute or contributes to or intensifies competition for jobs, markets, resources, and skilled and educated labor? How does globalization contribute to or intensifies...

ANS: It’s kind of like what we mentioned before, you know, the competition in jobs is, you know, if we make the part in the U.S. or in Canada or wherever in North America, it’s job in that location where if it’s global then you’re not just fighting against, you know, Joe Blow down the street but you’re fighting against, you know, Joe Blow and, you know, halfway across the world.

Q: Now can you think about some other things impacted by globalization in addition to technology being one part and competition? Anything else come to your mind that’s influenced by globalization?

ANS: Well, it’s kind of like what we mentioned before, too, on, you know, just the way maybe an undeveloped country how they have to put in place the infrastructure to be able to handle... if they want to be, you know, in the ways of the world market, they have to be able... they have to put an infrastructure in place would be one thing I could think of.

Q: Okay. Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for the high-skilled jobs?

ANS: Personally, I don’t feel, like I said, I don’t feel that threatened about my job per se. Umm, I think still the globalization as of right now is more of a manufacturing aspect of actually producing the part than more of the design of the parts.
Q: Mm-hmm. Okay. What type of changes, if any, do you foresee as a result of globalization of labor market in employment opportunities given the competitive global environment? What could change down the road?
ANS: I think, you know, if we like I guess in the U.S. aren’t prepared to train in, you know, our people for… to make those high skilled or technical parts, then, you know, like I said before, you’re not just competing in… against somebody in the next state, you’re g---- you’re competing against somebody across the world.
Q: Okay. Tell me a little bit about some other courses you’ve taken or you’re taking right now?
ANS: Umm…
Q: In general.
ANS: I’ve, [indiscernible 10:47] I’m hopefully going to graduate in the spring ‘cause I’m pretty much through with the program. I’ve taken, Thermodynamics. I’m in Machine Design and, umm, Kinematics this semester. I’ve taken [Spanish 11:03] taken a couple Pro Engineer classes, a Plastics class, quite… a couple manufacturing processing classes.
Q: All right. Research conducted on the behalf of the manufacturing industries tell us that in addition to course work as part of a higher education some other skills are considered relevant to the job market. In addition to the course work while in school, in your opinion, what are some of the… some of the skills that are valued by employers? Other than your course work, what are some of the skills that are valued by employers?
ANS: Umm, I think a couple of them are just kind of basic. You know, just basically being, umm, a dependable worker who shows up every day, umm, somebody who can… it’s not really a learned skill but who can think through a problem, evaluate the problem, come up with varying solutions to the problem and that’s… is something that is learned as you do it. It’s not something that can really be taught.
Q: Okay. Generally, local, state and national economy needs an adequate number of high-skilled employees in certain fields. In your view, how do you find out… how do you find out what kind of high-skilled jobs are in demand in the local and the national labor market?
ANS: I think you just have to do a bit of research and find out what kind of sectors, I guess, you know, what kind of jobs are in demand. Umm, you know, is it computer like Inter… you know, IT type job? Is it more technical, you know, even with like doctors or, you know, it depends on what kind of field. So you just have to do a little bit of research and figure out what demands are going to be. You know, you know, with the baby boomers there… is there a certain sector that’s maybe retiring soon that those jobs need to be filled?
Q: How do we go about learning what kind of skilled workers are needed in the industry and prepare accordingly? In another word, if you’re in school, we’re just
in school, but we really don’t know what’s going on outside this school, so I may get a degree in, let’s say, teaching…

ANS: I’ve looked on the Internet and there’s, research firms that do research on potential growth in job markets whether it be like a teacher, a lawyer, and doctors. You know, what kind of field would… are going to be a high-demand job in the future? You just… you just have to do a little bit of research to figure out and hopefully find something that you’re also interested in.

Q: What factors influenced your decision to pursue your education in this program to become a [Redacted] Engineer?

ANS: I’ve always kind of wanted to be an engineer. It’s something that I am interested in and, like I said, this program seemed to fit my working schedule and just the availability of classes, the evening and just the location being close to home.

Q: Now what other factors, other than the career itself, other than being an engineer, in your view influenced your decision to choose engineering? Not the job itself, what else?

ANS: Part of it would be is my-my current job that I have in order to in… to advance in my job at-at work requires a engineering degree so in order to advance myself in my current place of employment it’s-it’s required. It’s something I’m interested in so…

Q: How is this program helping you prepare for employment in a highly-competitive labor market seeking skilled individuals? Now we’re talking basically about what this program offers…

ANS: I believe this program, which is unlike some other engineering programs, it’s more of a application base versus a theory base where it’s not… this program doesn’t have as much math involved in it and the Calculus involved in it where it’s more of a… you do some of the computer things in the lab. You actually get to work on projects that, you may have… I’ve worked on… in a couple of the classes, I’ve worked on projects that I’ve actually had at work so you can also… it’s kind of a dual benefit there.

Q: In order to avoid using the terms “computer” and “technology” interchangeably, what does technology means to you?

ANS: Technology is anything, I guess, technical… whether it be electronics, TV, to a new breakthrough in a-a circular saw, you know, an-anything technical aspect that requires an engineer to develop some aspect of that wide, I guess, or whatever you would want to call it.

Q: What does or what role does technology play in your current learning environment? In another word, how is technology utilized in the course of your learning? How is it used in your class?

ANS: Like in our [Redacted] class, you know, we’re developing different components of different machines that, umm, you have to have a technical, I
guess, bent towards that to kind of grasp some of the concepts and that. We also use the computer in using the Pro Engineer to develop a part, play with it, look at it in the three dimensional space and also, umm, instead of just making the part and testing that way you can also test it using just the computer before you actually even machine a part.

Q: What type of technologies are you exposed to in the course of a school year? Particular software, particular machines, etc..

ANS: in the [redacted] or, yeah, I guess in the [redacted] location we don’t have quite as many benefits as on campus as far as some of the-the testing equipment they have at the campus in [redacted]. But we do have the computer labs down here with the Pro Engineer. That’s pretty much it as far as I’m aware of as far as like the [redacted]. Like I said, we don’t have as many.

Q: Although you said you do not have as much or as many, the technologies that are… that you guys are using in your classes, would you say that they are similar to or different than the technologies used in the industry?

ANS: From what I’ve learned from my professors, it… a lot of it is what’s used. I mean there are national standards, you know, standardized tests that are done to get material properties into different aspects like that and they’re—they’re standardized so it’s pretty much just the same as it was out in the… in the field.

Q: Do you consider that to be an advantage to the students or disadvantage?

ANS: Oh, definitely I think that’s an advantage.

Q: In addition to the education preparation process that students experiences or experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. I’d like to know some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the global labor market.

ANS: That’s the main reason I’m in this program right now is to get a degree and to be able to advance my career and my current job where I’m at now.

Q: What are some of the things that you find helpful in the work environment that could lead to future advancements or future connections?

ANS: In my current job, we deal with, underwriters, laboratory, and, it’s just the ability, the testing they do there and being able to understand the tests and parameters that you have to set up to do each of the tests I think would be a great asset, you know, that I’m learning that normally may not be exposed to elsewhere.

Q: Okay. In your view, is your current education and training preparing you to meet the needs of the employers seeking highly-skilled and well-educated workers? This is about what employers are looking for.

ANS: I believe so. I believe that this program gives you more of a, umm, I don’t know. Hands-on isn’t quite the right word but just the more, I guess, broader spectrum of
different areas that employers may be looking for that… like if you go to just a pure engineering degree that you might… it’s all theory and you may understand how to do it but you’ve never actually done it.

Q: So to make sure that students are prepared, they understand the challenges out there and the school is doing everything they can. What opportunities are there?

ANS: A couple things that come to mind would be, this is based on just the [redacted] is having some more equipment [redacted] that we could actually do some of the things they do on campus. I know with space limitation that may not be practical. But I think also maybe offering a class in like globalization, you know, like a world economy type class that I’m sure a lot of… you know, I,… like I said, I’m in the working world so I’m exposed to it but, you know, if you’re thinking of somebody just coming out of high school going into college, they probably don’t have the exposure of globalization, world economies, that I’m… I already am.

Q: As a student preparing to enter the workforce soon, what type of changes have you noticed taking place at this department or in this program over the time you have been here that reflects changes in industry needs due to globalization? In another word, things have changed because the work environment is changed, because the globalization is pressuring us to change accordingly. Anything that in this school you know that has really changed one, two, three… I don’t know how long you’ve been here. A year ago?

ANS: I guess only taking the one, you know, the classes I have, I haven’t, I guess, noticed anything that stands out to me right now. You know, I know… and I haven’t had to really, you know… You take a class, you’re pretty much done with this. You can’t go back and see what’s changed in that class so it’s kind of… kind of hard to put that perspective on it. So…

ANS: I guess I can’t really think of anything.

Q: Okay. Do you believe that the faculty at this institution of higher learning are up to date regarding globalization and the needs of the industry?

ANS: I do believe they are. I believe the professors that I’ve had, I would say most of them have been in industry at some time and are aware of, how the market actually does work, how the job market is working, how it’s not just like they graduated from college and started teaching. They-they had been in the market. They’re… and they have a appreciation for how the world market does operate.

Q: So based on what you just said, would it be safe to assume that the faculties develop programs of study that reflect the influences of globalization on their course planning? In another word, they’re planning accordingly to what is really happening?

ANS: I believe so. I believe, you know, they try to stay, umm, up to date as much as they can from, you know, going out in the industry and talking to people in the
industry and getting feedback from them of any changes in the curriculum that they need to make or anything like that, so…

Q: Do you visit job sites—and I want to rephrase that sort of. Do you… does your class, groups, individuals, activities such as this; go into the job site talking to employer to learn about what’s going on in the industry, what are their needs, what are the trends?

ANS: I myself have not done anything like that. Like I said, I don’t think it’s as much as on the [masked] campus, ‘cause I think this program’s developed for more of the working person. But I-I know they do have like job markets and job fairs up on the [masked] campus where they do bring employer… potential employers in. I don’t know if they do any sort of job visits or onsite visits. I’m not sure of.

Q: Given your experience with the labor market, would you say that is something that’s helpful to younger students?

ANS: I… definitely I think, any exposure that, they could get to how the actual work environment does work and I know we’ve had people, students come into our… where I work and do like a job study and actually follow engineers around to get an appreciation of how their day-to-day operations work and the things they have to deal with every day, so…

Q: To what extent skills such as problem solving, decision making, good communication skills and customer service skills are taught at as part of the courses offered here? In another word, does your school teach those skills as part of the learning process in order to make sure students are prepared before they enter the labor market?

ANS: I know I’ve had a class this last summer in Communications, which really helps you be able to, learn how to prepare and give presentations to clients or to, different departments. Umm, and I know there… upcoming, there will be classes that do that same type of thing and there’s an English class about technical writing that’s coming up. And our final presentation kind of culminates all that together so that, you know, will be forthcoming but…

Q: This University has an evaluation program called Academic Program Review. Are you familiar with that?

ANS: Yeah, we as… they actually had just a, like a luncheon type thing that I was part of that really asked a bunch of questions [masked] like that.

Q: Okay, because that’s the point of this question that this is process that collects data from current students...

ANS: Mm-hmm. Yup.

Q: …past students, alumni, you know, uh, folks in the industry trying to understand whether a program is effective, what needs to change, how to change things, you are familiar with it but based on the explanation that we just shared, in what ways
can this process be valuable to for future course planning, by faculty, in making critical changes based on workforce needs?

ANS: I think it would be valuable... you can bring, people from the industry in and hold a forum and get feedback from them. You can get, you know, same… do the same thing with current students, of what their… some of their expectations are. You can also bring in, like you mentioned, you know, previous students who’ve gone through the program, you know, realize what this program’s about who are now in the workforce and, you know, say, “Well, wow, I wish I really would have learned, this before,” and, you know, they can give feedback of, just things that can be implemented to improve the program.

Q: So would you say that this would be something that would be very useful to students, especially younger students that do not have much experience?

ANS: Oh, definitely. I think it would give them great exposure to some of the different areas that...

Q: How does it help the college? How does it help the program?

ANS: It would help the college by being able to get that feedback from all the different areas, umm, you know, from current students, previous students, you know, current people in an industry in order to make a-a better program overall for-for future students.

Q: Absolutely. I want to thank you for taking time to participate in this interview. Our regular question and answer session is over. I want to give you an opportunity to discuss any topic that may have come to your mind that I could have asked, anything that comes to your mind would you, you know, if you wish to make a comment on that I’ll be happy to record that..

ANS: The only thing I about of after reading through this, I guess, first thing for my end in industry or whatever, working with our purchaser… purchasing people and stuff, we like to keep things in the United States because we’re a business in the United States but it’s almost to the fact that our competitors go overseas to produce parts and get ‘em cheaper so in order for us to stay competitive in the same market we pretty much almost have to do the same thing. I guess that would be the only other comment I would have or like to add, so.

Q: Well, thank you very much. I really appreciate your time.

End of Interview
Q: Today is November 5th, 2010, and the time is about 3:25 and I’m still speaking with Student Participant number 4 from PDET. PDET stands for Product Design Engineering Technology. May I proceed?

ANS: Yes, sir.

Q1: All right. Please briefly share with me what is the program you are currently enrolled in and when do you anticipate to graduate?

ANS: Product Design Engineering Technology is an engineering course that is concentrated in mechanical design with a CAD emphasis and in that we will take a product or an idea and we will develop the process and a product to make it happen. I’m going to graduate… January of 2012 is my last class so I’m guessing May of 2012 is when I plan on graduating.

Q2: Please explain some of the key features of this program of study that got you interested in becoming a [blank] Engineer.

ANS: Well, some of my hobbies, I love computers and on my last job I was programming CNCs and my love of math led me towards engineering and basically I looked at all the schools and looked at their programs and basically this is the only one I could graduate before I was 50. To be perfectly honest I do like it. It matched me to a T. I liked the CAD and I liked the engineering aspect. That’s how I think.

Follow Up: You may have answered this but what does a [blank] Engineer do overall?

ANS: We’ll take a concept. So you approach me and you say, “I want to produce this widget.” We look at that and say, “All right, this is what it’s going to take to do it. This is the forces that we’re going to work with. These are the problems that we’re going to find,” and we’re going to go into engineering detail to figure out everything we need to produce your item and whether or not it can be done. That means we’re going to pick a material, we’re going to pick a process that it’s going to be made and as the end product, and we’re going to hand you over this… all this information saying it’s going to be out of aluminum. It’s going to have to be this aluminum and you’re going to have to change it because it cannot handle the forces you need so we’re going to have to make it larger.

Let’s talk about globalization.
Q1: The term globalization is often mentioned in conversations, newscasts, published articles and so on in the context of a globalized economy. I’m interested in your understanding of globalization, how it happens and what is it.

ANS: Globalization, it is basically- it run a gambit, meaning cultural we are introduced now. When I was growing up, you didn’t even ever hear of the term Muslim or Buddhist or any of that. Now we’re introduced to that on a daily basis. We see different cultures in school and on the streets. Our jobs are affected by globalization. We’re not just dealing with, “Hey, we got a ship this part across.” No, we’re sending people to China to work with people over there. We’re not dealing with a market that’s just Grand Rapids anymore. We’re dealing with Mexico, China, India, everything’s opened up. Education, I’m not just learning about what happened in Texas in the Alamo. I’m learning about Gandhi and Marxism and all this stuff around the world because you need to understand how other people are thinking. Globalization is also, health wise. We don’t have just the flu to deal with. We have flues that are coming from other countries and diseases from other countries and we’re having to deal with that. So globalization pretty much affects every aspect not just jobs, not just money, but everything.

Follow Up: It is generally accepted that globalization is not a new phenomenon and that it has been present for centuries. Globalization has been spreading at a much faster pace in the first decade of the 21st Century than any other historical period. In your opinion, what factor or factors are causing such a rapid pace in the spread of globalization?

ANS: I don’t think anyone could deny it has to be the information and the Internet. I mean it’s just… it’s opened up everything. I can talk to someone across the world. I can Google something and get it at my fingertips right now. It’s… the information, the cell phones. Talk about globalization. People in Africa out in the bush have a cell phone. I mean it’s crazy. I mean I can talk face to face with people. That’s what’s spurred it on and it’s just going to keep going.

Follow Up: Along with what you just said, it is believed that globalization has a far-reaching affect on the lives of people, especially the developing world and emerging economies, how does globalization affect people, countries, cultures, competition for jobs, education and other aspects of daily life both as a positive or a negative development all around the world?

ANS: Well, as a negative, we’ve seen our manufacturing base spread outward. Why would I have Joe Buick down the street produce an item making $10 an hour if I can hire someone in Mexico to do it for $4 or $3 or whatever? And that’s great for them. There’s the positive. These guys in the developing countries that just were held down by politics, strife and wars and this and that when all of a sudden these businesses are coming in and saying, “Hey, I’ll hire you.” They’re getting jobs. They’re getting medical insurance. They’re getting medical supplies. They’re
getting education. That’s huge for these countries. A lot of the countries have come up 30 years in the past 10 years because all of a sudden, “Hey, we got to start getting an education and we get a job and we can feed our families.”

Q2: Global competition for resources and skilled labor or skilled labor forces is one of the main arguments regarding the impact of globalization. What is your understanding or perception about the impact of globalization on your program of study and your career of choice?

ANS: As it impacts my career, again, I’m not competing with my neighbor. I’m competing with the rest of the world because as a product designer, someone in China can hand me a product and have me design it. On the same token, someone here, I’m competing with people around the world because it’s all information and it’s not hands-on, physical making a piece. I’m actually studying it and engineering it. Well, there are some sharp people over in China, India. That’s who I’m competing with now.

Follow Up: Have you experienced or noticed trends and/or changes in the job market or more competition for jobs in your field?

ANS: Yes. A lot of what I do is on tool and die. Tool and die, used to be a Mecca of tool and die. It used to just…it was a main thing here. Now, I would say we have 20% of what we had just 10 years ago because these products are being produced all around the world now and even a lot of American companies are shipping this stuff to Mexico and China and having them built there because they’re trying to compete with the rest of the world.

Follow Up: According to what you said, what does that say about the job outlook, about the career outlook for your future in the context of global economy? Is it going to grow? Is it going to shrink? What’s your feeling?

ANS: I think it’s going to shrink but you’re going to have to force your niche. You know, instead of waiting for someone else to take your job, you’re going to have to say, “This is what I do and this is what I do really well,” and it may not be exactly what you’re trained to. You’re going to have to find your niche that someone else doesn’t want to do or someone else doesn’t have the training to do and that’s what you’re going to have to go for.

Q3: In your opinion, how does globalization contribute to or intensifies competition for jobs, markets, resources, and skilled and educated workforce?

ANS: Well, it’s going to contribute by opening up my market so now I can actually deal with other countries but it’s also, again, I have a larger competition field. Globalization, in order for me to compete, I may have to take up a second language because all these other countries, they have a second language. If they deal with the United States, they speak English and their original language. All I know is English and a little bit of Spanish. Well, I’m going to have to pick up more if I’m going to compete.
Follow Up: Can you think of anything else that may be impacted by globalization?
ANS: I think the way people perceive each other is going to impact it. It used to be really strange to see someone from another country and now people are more accepting. And I know with the war, that’s kind of taken a back seat a little bit. It’s gone down a little bit. But on the same token, I think people have seen that just because someone is a Muslim doesn’t mean they’re going to blow up the world. It’s been all these years, get along.

Q4: Based on your understanding of globalization, when you think about your career in a globalized labor market, do you feel prepared for or are concerned about the challenges posed by competitors from around the globe for the high-skilled jobs?
ANS: I’m very concerned about the globalization. It’s harder. You got to be sharp. Am I sharper than some 18 year old in my position? Probably not, but I have to, again, I have to find my niche that other people don’t want or that they don’t have the skill set or the drive to do. It’s got to be, like I say, you got to be to work on time. You got to be proactive. You got to be a team player. All that comes into play that I can do better than some young guy. I can stand up in front of 300 people and talk to them. And, again, that’s something that they teach here. You know, you’re always doing speeches and projects. In this field, in most of these classes, I would say 10% of the first class is you’re doing projects that involved speaking with groups and that’s going to help.

Follow Up: What type of changes, if any, do you foresee as a result of globalization of labor market in employment opportunities given the competitive global environment that we live in?
ANS: I think we’re going to see more countries actually coming over here, more people from other countries coming over here and working alongside us and that can be a plus because now all of a sudden we can pick up stuff from other countries that we don’t even think about that… and they think different, which is great. If we can just tweak our minds a little bit and think a little bit different, that can help. On a downside, again, I got more competition. It’s always going to boil down to that you’re going to have more competition but you’re also going to have more opportunities. And these businesses, they’re competing on a world market, and if they’re doing good, they’re going to hire you. It’s as simple as that.

Q5: can you tell me a little about some of the courses that you’ve taken or, you know, taking right now?

Follow Up: Research conducted on behalf of the manufacturing industries tells us that in addition to course work as part of a higher education some other skills are
considered relevant to the job market. In addition to the course work while in school, in your opinion, what are some of the skills that are valued by employers?

ANS: I think promptness, loyalty. I think ability to speak well and communicate is a big thing. I mean even getting the job, that’s big. Just sitting at an interview, being able to speak well and impart ideas and ability to change. Things happen quickly now. You can’t be set in your ways and just go down one path. You have to be able to just change at a moment’s notice and go on to something else, multitask, work with technology. “Here’s the latest and greatest. Learn it.” You have to pick it up.

Follow Up: Are these skills taught as part of your education here?

ANS: I think so. A lot of the CAD classes we’ve had, they’re up to date, they’re relevant. The same way with the physics. If something changes, which a lot of physics doesn’t change, but the examples change and so we get a lot of the latest examples.

Follow Up: Do you think these skills are needed?

ANS: Absolutely. I mean it’s crazy not to think that you need these skills.

Q6: Generally, local, state and national economy needs an adequate number of high-skilled employees in certain fields. In your view, how do we find out what kinds of high-skilled jobs are in demand in the local and national economy?

ANS: Well, the Internet gives you a lot of information on that. I mean I was actually laid off for six months or so. My company closed its doors. And they are willing to go on the Internet and put out job postings and put out information, put out requirements and even if you’re not going to, say, move to Texas for that job, you look at the requirements and you make it a point of learning that requirement for something closer to home.

Follow Up: What factors influenced your decision to pursue your education in this program to become a [Product Design Engineer]?

ANS: My job was programming CNCs. Well, over the years, that position it used to be 10 people programmed. Well, because of technology changes and 3D solid modeling, things got cut down. So gradually I became the only programmer in my field and I could see it changing still to where I was going to be out of a job in five to 10 years. And so I decided to go back to school because I needed to compete and I didn’t want to go backwards, to rely on old skills. I had to develop new skills.

Follow Up: In addition to your choice of this field, are there any other factors that you can think that is really an influence on your decision to continue in this field?

ANS: Probably the ease of this program being right [Grand Rapids]. It was handy. It was easy for me to just step in and pick up because I had had a lot of the classes I needed because of my prior field, which was tool and die.
Q8: How is this program helping you to prepare for employment in a highly competitive labor market seeking skilled individuals?

ANS: It’s given me the CAD skills. It’s given me the engineering skills, like machine design and stuff that I will need. And a lot of employers, they don’t want to hire someone without a bachelor’s degree. They want that bachelor’s degree. And even though I had all the skills and all the experience, a lot of times I’m competing with 50 to 100 people with bachelor’s degrees and they take precedence. And even my current job, when I got hired in, when I get my degree, I get a raise.

Q9: In order to avoid using the term “computer” and “technology” interchangeably, what does technology mean to you? Okay. So what does technology mean to you?

ANS: When I think of technology, I think of anything that’s going to get smaller, better, more easily transferred to the rest of the world as technology. It can be electronic. It can be physical. It can be a tool or it can be an idea. But when you think of technology you think of innovative and just more easily that everyone can use. A lot of the wells over in Africa are getting cleaned up on small tools that we had come up with or filters. I mean it’s that kind of thing.

Follow Up: What role does technology play in your current learning environment?

ANS: The role is it’s making my job easier, faster and more able to keep track of what I’ve done in the past or other people have done. So not only do I get to see if I need to go back, I can look at something I designed three months ago or three years ago. I can also look at what the person across the country has done at the same time and that’s the kind of stuff technology is helping me with.

Follow Up: How is it really influencing your learning here, now, at school?

ANS: It is… it helps me being able to go on the Internet, that’s for sure, being able to study, being able to learn new ideas and answer questions. There are a lot of times people ask me a question. I don’t have the answer. I can find it on a computer, always.

Q10: What type of technologies are you exposed to in the course of a school year in the course of your learning?

ANS: I’m introduced to computers, to programs, to software and ideas. We do analysis on different software and I’m also introduced to new process of manufacturing and new material types. And that’s a big thing with the material types.

Follow Up: Now to follow up on that is the technology or the technologies used in class the same as the technology used by business and industry and if they’re different, how different are they? Is that a benefit to the students? Is that a, you know, negative for the students?

ANS: I think a lot of the stuff is what industry is using and the only thing that’s not is some software. You’re taught Pro/E or Unigraphics while other people are using CATIA or SolidWorks. It’s hard to teach someone every software you’ll ever
need. But I’ve taken the time to actually take extra classes to learn different software so I’m more relevant.

Follow Up: In addition to the education preparation process that students experience in the course of their studies, they also need to explore other opportunities and activities to improve their chances and broaden their understanding of their environment. I am curious about some of the steps you have taken or are currently taking to better prepare yourself for the challenges posed in the global labor market.

ANS: Well, I had the chance to take an elective. I took World Geography even though it was not required; I already had that requirement taken care of. I took World Geography, great class and it was an online class. And I learned so much about the rest of the world because I always thought geography was just dealing with places but it’s about culture. So I learned a lot of different cultures. My speech class, I really learned a lot of different items just listening to people’s speeches and how they talked and being able to impart more information. It’s the same way with software. I took a CATIA class, which is a design-software, not because it was part of my curriculum but because a lot of jobs were posted needing that skill, so I took an intro class.

Q: Could you spell CATIA for me? Is it…

ANS: C-A-T-I-A.

Q12: In your view, is your current education and training preparing you to meet the needs of the employers seeking highly-skilled and well-educated workers?

ANS: Absolutely.

Q: Can you explain to me a little bit?

ANS: It’s given me all the needed skills I needed the CAD skills, which are humongous. And even the terms you learn, the people you interact with here in this field, I’ve picked up a lot from them so you really get a little taste of everyone else’s careers and you get a chance to kind of probe a little bit.

Follow Up: In your opinion, what other opportunities offered by schools such as this one can be helpful to students preparing to enter the job market?

ANS: Well, I think people need to look at the courses they’re studying. I mean right now medical field is huge. That’s a huge thing they can get into is the medical field. The school… some schools have sororities, fraternities, which some people think of as party things, but they’re doing charity work and it’s networking. Networking is big in schools. And just learning to speak and impart ideas is huge.

Q13: As a student preparing to enter the workforce soon, although you’re currently working, but we’re going to ask the question in the same way anyway, what type of changes have you noticed taking place at this department or in this program over the time you have been here that reflects changes in industry’s needs due to
globalization? In another word, have things changed in response to an external factor?
ANS: I think they have. I know, again, going back to the World Geography, that never
used to be on there and it was just put on the curriculum now. Even though I
didn’t have to, I took it. That was added and I think that was a great thing. I think
the software used has changed. They are using a little bit different software, a
little bit more relevant. It’s no longer 2D. Everything’s 3D and years ago it used
to be, it went from board drawings to 2D to 3D all in like seven years or
something.

Q: Do you believe that the faculties at this institution of higher learning are up to
date regarding globalization and the needs of the industry?
ANS: I would say the majority are. There is some that aren’t, some that are just… I
mean you get that everywhere. You get, “It’s my job. Here you go. Done.” You
move on. But the majority of the people, they stay up to date and they force you
to stay up to date. You know, they have you… We had class where every week
we had to write a paper and it was always about a relevant person in this field and
it was, you know, innovative ideas, you know, the segue or the-the-the movies,
how they’re changing, that kind of thing that we had to actually pick up on. So
they were forcing us and they were staying on top of thing.

Q: Okay. Now in your opinion, does faculty develop programs of study that reflect
the influence of globalization on their course planning and teaching? In another
word, do they bring those experiences; do they transfer those experiences to what
applies to you because of what’s happening outside the world?
ANS: Maybe by accident or however much you want to pick up. But as a plan, I don’t
think so. I don’t think it’s planned out that way. I wish it was more that way.

Q: Do you believe that it would be helpful to students and why?
ANS: I think it would be helpful. I want… I want to know how they’re doing things in
China. I mean it-it… everyone wants to say, well, they’re just paying ‘em for, you
know, 20 cents a day. Well, there’s more than that. They’re taking ideas and
they’re making them better and then they’re selling them right back to us and
we’re buying ‘em and they’re… we’re just… They’re doing so much more than
what we are, not just because they got cheap workers, but because they got
innovative thinking and they’re thinking about… they have a plan. They’re
saying, “All right, I’m going to grab this. How can I make it better?” And we’re
not doing a lot of that. We’re going to make it.

Q: Okay. So in your opinion, if we did that that would be helpful to students because
they’re planning something that’s really, both the student and the faculty and the
college as whole, they’re planning on things that are relevant to what is really
happening in the world that we know, work?
ANS: Right, I would like to-to experience more different cultures, different ideas that we’re not getting. It would be nice if they actually brought in some teachers from other places that are seeing things differently.

Q: Although you are in the labor environment, however, do you visit job site and talk with employers to learn about their needs and the latest trends in the labor market and the workforce development?

ANS: [Sigh] I would say no I don’t.

Q: If you did, in what way could this be helpful to students and faculty, to go out visit employers, visit job sites? How-how could that help ‘em?

ANS: If I visit those places, I can bring back ideas. I can bring back concerns and I know there’s other people in our in our company doing that but there’s a lot of times you don’t even know there’s a problem until you go talk to someone or you might see ‘em out there and they’re they’re cutting off this little thing. It’s like, “Well, why you doing that?” “Well, we always cut it off.” “Well, we spent hours putting that on there.” And that’s the kind of stuff you-you see out there all the time and I hear stories about it. It’s crazy. And I wish, again, we need to get out more and do that.

Q: To what extent skills such as problem solving, decision making and good communication skills and customer service skills are taught as part of the courses offered here (although this question was asked before) you already answered that—in anticipation of preparing students for entry into the work, you know, into the workforce? So would it beneficial for the student to learn these skills?

ANS: Absolutely it’s going to be important. I mean you really need to learn the good communication skills, the eye contact, the communicating with another person, not just texting on the cell phone like the young people are doing now. You need face to face, and imparting ideas, it’s really important to be able to express yourself. In the classes they have here, you have speech class. You have art where you’re introduced to art. You have to take that class and it was a great class and it kind of opened up a whole new little field and I found out I enjoy drawing. So that’s the kind of stuff that you can get.

Q: Last question really deals with program evaluation. Ferris State uses a program called Academic, Program Reviews. Are you familiar with that? Have you heard of it?

ANS: Yeah, it’s…

Are you familiar with the Academic Program Review (APR) conducted by faculty every five years? Or based on the explanation provided, in what ways can this process to be a valuable tool for future course planning by faculty in making curriculum changes based on workforce needs? In what ways can this process be helpful and important to the students’ future educational and career planning efforts? In your
opinion, can this process be helpful to students planning reflecting changes based on industry needs?

Q: This is basically what they do is they talk to current students, past students; employers…
ANS: And-and we grade them.
Q: No, I think you’re talking about teacher evaluation.
ANS: Okay.
Q: But based on the explanation that I provided, how could or how would such a process be beneficial to students, to the faculty in the course of planning their courses and the college as a whole?
ANS: I think it’s very important to do that and not just… I think they think a little bit too small because they’re going out to local businesses, which is… which is great for people like me. I’m coming to this program. I’m going to get a job in the area. I’m staying here. But on the same token, some people aren’t. They need to expand on that and, say, go across the United States. And maybe they do. I don’t know. But in-in… across the world, what are the… what’s the rest of the world using? If the… There’s 20 other countries using different software. We’re the only ones using this. Maybe we should be introduced to that. That’s the kind of things that we need to look at as a, you know worldwide…
Q: How does that help students in their future planning, course planning, career planning? Is that helpful to them?
ANS: Absolutely because now when I graduate I haven’t learned a bunch of obsolete items or I’m not in an obsolete field. There are some fields that no longer exist and why would you want to do something like that? It would be easy to be steered down that road and you finish school—you don’t have a job. You know, you have to… you have to be relevant and it has to be up to date always. I mean even… every five years, that’s probably the minimum you want to wait.
Q: Well, at this moment we have reached the end of our interview. I want to thank you for taking time to spend in an hour with me today. But before close, I would like to give you an opportunity to comment on any topic that we discussed or something that you may find helpful to share with me, uh, as part of this process.
ANS: Well, I’ve actually kind of enjoyed the-the energy in here. It’s kind of made me think a little bit. That’s always a good thing. I guess I don’t have any questions or comments.
Q: Recommendations?
ANS: Recommendation…
Q: For school, for myself or, you know, anything
ANS: I guess for the school I’d like to see, again, I’d like to see us introduced to more cultures and more technology that other countries are using. I don’t know if they’re using the same as us or not.
Q: Okay. Well, I want to thank you and that concludes our interview.
End of Interview
Appendix G

Demographic Questionnaire
This form will be used to select appropriate candidates for participation in the study titled “A case study of how postsecondary students enrolled in CTE programs and faculty understand and assess the implications of globalization on career preparation” in March, 2010-March 2011. This is a qualitative research study and the researcher is purposefully selecting participants for the study based on the criteria outlined in the sample and sample characteristics, in the methods and procedure chapter of the proposal. The purpose of this questionnaire is for the researcher to learn about interested participants, their interests, and other information, based on demographic data provided, to be able to purposefully complete the selection process. You may only complete this form after receiving; reading and signing a consent form provide and explained to you by the researcher.

In order to be eligible for participation in this study, please complete all the fields and return this form to the student investigator or at the address provided below in a self-addressed envelope provided. You may also return this form at the designated location in the College of Professional and Technological Studies, Grand Rapids Campus only.

Please Note: None of the information provided here will be shared with anyone except as outlined in the consent form.

Please print:

Contact information: You may choose a method that is convenient for you to receive information from the researcher. You may choose more than one option:

☐ U.S. Postal Service ☐ E-mail ☐ Telephone (Including Cell Phone)

Name: __________________________________________ Dr. Mr. Mrs. MS. Other___

Last            First          M.I.          (Please circle one)

Complete home mailing address:

Street Address        City        State        Zip
E-mail: ____________________________________

Is this your private e-mail address? ____ Yes ____No

Second E-mail address: ________________________________

Home Phone: (___) _____________ Work Phone: (___) _____________

Cell Phone: (___) _____________

When is the best time to contact you? ______________________________

Primary Participation Criteria:

In order to take part in this study, you must be

1. Currently a student at [ ] State University, College of Professional and Technological Studies, Grand Rapids, Michigan Campus only.   Yes ___ No ___

2. Between age of 18—99   yes _______ No _______

3. Currently enrolled in one of the three following programs:
   • Manufacturing Engineering Technology, B.S. program   Yes ____No ___
   • Product Design Engineering Technology, B.S. program   Yes ____No ___
   • Digital Animation & Game Design, B.A.S. program   Yes ____No ___

4. A senior in the final year of your studies?   Yes ___ No ___

5. Your current GPA is between 3.00 and 4.00   Yes ___ No ___

6. You currently are NOT in a job re-training program?   Yes ___ No ___

List your honors and accomplishments: (i.e. dean’s list, etc…)

__________________________________
__________________________________
__________________________________

Any additional comments:

__________________________________
__________________________________
__________________________________

__________________________________.
Appendix H

HSRIB Approval Letter
Date: February 3, 2009

To: Richard Zinser, Principal Investigator
    Mohammad Moradi, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number: 09-01-15

This letter will serve as confirmation that your research project entitled "Globalization and Its Impact: Postsecondary Career and Technology Education Leadership (CTE) Students' Perception and Institutional Responses" has been approved under the expedited category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: February 3, 2010
Appendix I

Participant Selection Letter
Dear Faculty and Student Participants:

I would like to inform you that after serious consideration of the demographical data provided by you, I have completed the selection process. Therefore, this e-mail (attachment) is intended to inform you of your selection to take part in the study “A Case Study of how Post Secondary Students Enrolled in CTE Programs and Faculty Understand and Assess the Implications of Globalization on Career Preparation” to be conducted in 2009.

I have set up a Date---------- and Time …………… for us to be able to meet. The location will be the on the 1st Floor, Conference room 123. The purpose of this meeting will be to officially welcome you for taking part in this study and to discuss the “consent Form” and the “Interview” format selected for this study. In this meeting I will provide you with detailed information about the study and I will go over your rights and responsibilities as well as my role in this process.

I will explain the data collection process and I will be delighted to answer your questions. I will also provide you with contact information, tentative schedule for the interviews with the time and place. This meeting will take at least one (1) hour.

I want to thank you for your time and interest in this study. If you have any questions please feel free to contact me by e-mail or call 616-570-1662.

Thank You.
M.A. Moradi
Appendix J

Letter of Acceptance, Faculty
Dear Participant-

I would like to take this opportunity to thank you for taking the time to learn about the upcoming study “A case study of how postsecondary students enrolled in CTE programs and faculty understand and assess the implications of globalization on career preparation” in March 2010 - March 2011. I am writing to let you know that I am pleased and grateful that you have decided to voluntarily take part in this study.

Included in this letter is a tentative schedule of date, time, and the place where we will meet for our interview. I intend to begin the data collection process using an in-depth-interview format as outlined in the consent form signed by you.

I want to thank you for your time and interest in this study. If you have any questions, concerns or further information, please feel free to contact me by e-mail or call 616-570-1662.

Thank you

M.A. Moradi
Appendix K

Announcement Flyer
GLOBALIZATION, COMPETITION, TECHNOLOGY?

AMERICAN JOBS? GLOBALIZATION?
What does it all mean?
WANT TO LEARN MORE?

As a Doctoral Candidate at Western Michigan University, I plan to conduct a study on globalization and its impact on postsecondary students’ educational and career preparation and perceptions. Participation will include completing a Demographic Questionnaire and taking part in a one hour interview.

If you would like to learn more, please write or call me at
(616) 570-1662

Two decades ago, globalization was not part of our conversation. Just look at the recent global market events and you may find a connection.

Students from these programs are needed:
Manufacturing Engineering Technology, B.S. Program
Product Design Engineering Technology, B.S. Program
Digital Animation & Game Design, B.A.S. Program

Contact person: M.A. Moradi (616) 570-1662 mmoradi@charter.net
Appendix L

Letter of Acceptance, Students
Dear Participant-Name:

I would like to take this opportunity to thank you for taking the time to learn about the upcoming “A case study of how postsecondary students enrolled in CTE programs and faculty understand and assess the implications of globalization on career preparation” in March 2010 – March 2011. I am writing to inform you that you have been selected to take part in this study.

Included in this letter is a tentative schedule of date, time and the place where we will meet, to begin the data collection process, using an in-depth-interview format as outlined in the consent form signed by you.

I want to thank you for your time and interest in this study. If you have any questions, concerns or further information, please feel free to contact me by e-mail or call 616-570-1662.

Thank you
M.A. Moradi
Appendix M

Table of Comparison
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<th>It’s a pretty broad subject</th>
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<th>I got interested in original designing</th>
<th>Don</th>
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<table>
<thead>
<tr>
<th>What do you do?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entertainment industry</strong></td>
</tr>
<tr>
<td>Game design</td>
</tr>
<tr>
<td>Internet applications</td>
</tr>
<tr>
<td>Advertising</td>
</tr>
<tr>
<td><strong>Concept development</strong></td>
</tr>
<tr>
<td>Taking customer idea into production</td>
</tr>
<tr>
<td>Best design and material, cost effectiveness</td>
</tr>
<tr>
<td><strong>What is globalization?</strong></td>
</tr>
<tr>
<td>The breakdown of your traditional walls that are normally erected around society as barriers</td>
</tr>
<tr>
<td>Has a wide ranging meaning</td>
</tr>
<tr>
<td>Has cultural component, getting to learn about other people</td>
</tr>
<tr>
<td>It reflects change</td>
</tr>
<tr>
<td>Affects our Jobs</td>
</tr>
<tr>
<td>Global cooperation between producers and manufacturers</td>
</tr>
<tr>
<td>We are not dealing with local markets only</td>
</tr>
<tr>
<td>Mexico, China, India, everything is opened up</td>
</tr>
<tr>
<td>I’m not just learning about what happened in Texas in the Alamo. I’m learning about Gandhi and Marxism</td>
</tr>
<tr>
<td>Affect health of the population globally globalization pretty much affects every aspect not just jobs, not just money, but everything</td>
</tr>
</tbody>
</table>

| **Language barriers less important** |
| **Increased level of communication around the globe due to technology** |
| If I could use the term, inter-connectedness of the world in not one area, in any topic that you discuss like connected economies, technology competitiveness is much broader which in some ways hurting one country while helping the other |
| U.S was a major automobile manufacture and now every country is making cars and inside U.S. |
| The things we do on daily basis are all connected to the whole world now. |

<table>
<thead>
<tr>
<th>Globalization phenomenon, What factor help to spread it</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internet and the related technologies are the largest factor</strong></td>
</tr>
<tr>
<td>Disappearance of physical barriers and distance</td>
</tr>
<tr>
<td>People knowing multiple languages</td>
</tr>
<tr>
<td>Can’t deny it is happening</td>
</tr>
<tr>
<td>Internet and information</td>
</tr>
<tr>
<td>Ease of Global communication</td>
</tr>
<tr>
<td>Google equals access to information on any topic</td>
</tr>
<tr>
<td>Cell phones, smart phones, cell phone in the Bush in Africa</td>
</tr>
<tr>
<td>NAFTA and movement of jobs and companies increased</td>
</tr>
<tr>
<td>Increased competition</td>
</tr>
<tr>
<td>Design and built outside U.S</td>
</tr>
</tbody>
</table>

| **pretty heavily based on our computers** |
| Advances in transportation |
| Communication among individual and business |
| Internet technology |
| The main reason for rapidness of globalization would be technology. |
| It would be that we can communicate with somebody around the world through Skype, through video chats, through e-mails and through phones and all this (obviously have been around) but you can have a video |
| Technology, communication devises and internet, video conferencing |
| Technology has sped up globalization |
conference now with people all around the world which you never could before. They can see the stock markets and all that stuff. So, really technology as a broad term, technology is really the cause of the fast advancement of the globalization.

<table>
<thead>
<tr>
<th>Cultural Impact</th>
<th>Depends on the culture</th>
<th>Negatives--Manufacturing spread outward Mexico, cheaper labor</th>
<th>Internship at John Deer manufacturing plant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Creates competition</td>
<td>We lose jobs, They gain jobs</td>
<td>Indian student working with us, coming from India</td>
</tr>
<tr>
<td></td>
<td>Perhaps create more jobs in that area due to type of resource and positioning</td>
<td>We lose our middle class, they create a new middle class</td>
<td>Jon Deer plant in India: PPEPS which is pre-production part approval</td>
</tr>
<tr>
<td></td>
<td>Can cause environmental problems due to lack of proper leadership</td>
<td>Consequently companies make more money, pay less taxes and impact their own national economy</td>
<td>Indian workers perform the same task for less and do it in India for Jon Deer</td>
</tr>
<tr>
<td></td>
<td>It has both positive and negative effects.</td>
<td>Positive--Improvement in their standards of living</td>
<td>It takes jobs away from us</td>
</tr>
<tr>
<td></td>
<td>Positive like in medicine and automobile and energy like finding a alternative solution to use of oil</td>
<td>Political change, less war, strife, more jobs, better education</td>
<td>Improving their income and quality of life</td>
</tr>
<tr>
<td></td>
<td>Competition is a negative effect of globalization in a dog-eat-dog world.</td>
<td>Explosion in global participation for market share</td>
<td></td>
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<tr>
<td></td>
<td>people that had a the grasp on a product or may had a monopoly per-se, they may not have that any more</td>
<td></td>
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<tr>
<td></td>
<td>Currency is a more global tool</td>
<td></td>
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<tr>
<td></td>
<td>Globalization has leveled out a lot of those advantages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>With impact of globalization on currencies, technology, competiveness and also standards in everything that is become to general is going to hurt U.S.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Global Competition and demand for skilled labor Program Impact? | Communication with non English speaking global population | Competing globally and not locally Competing with sharp people from India and China | Companies move for profit Mexico benefits because of the competition from other south American companies And we lose those jobs and products are not any cheaper for our consumption |
|---------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------|
|                                                              | Bad for me, I need to learn another language               | It’s driven by information                                                                                     |
|                                                              | Japan was the leader in my filed, Same jobs are now available here | |
|                                                              | Looking for job and competing anywhere Have to compete Positive to know where the competition is coming from | |
|                                                              | Baby-boomers leaving the job market and the role of globalization in job losses in this country, there are many engineers that are out of work So in a big pool, yes I think it will hurt me because there is a lot of people out there looking for technical jobs but in specific field of specific job, product design I think that my generation of , generation X per-se is what we need to take this into the future Globalization has also allowed people from around world to come t U.S or Americans to work in other countries |
|                                                              | We are building our own competing plant in Russia (John Deer) | |

<table>
<thead>
<tr>
<th>Shift in job market trends Job outlook</th>
<th>Shift based on cultural relevance</th>
<th>My city was a center of tool and die The workforce has been reduced dramatically Manufacturers shipping jobs to other countries like Mexico Job market will shrink Niche market development This is what I do and do it really well</th>
<th>We are building our own competing plant in Russia (John Deer)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repetitive production cycles</td>
<td></td>
<td>If you want these jobs you have to go there</td>
</tr>
<tr>
<td></td>
<td>Not sure where things will go New ideas will generate new ways of doing things regardless of its origin Leads to more jobs New innovation</td>
<td></td>
<td>I can see working with those other countries on the same parts, design or manufacturing while working for the same company</td>
</tr>
</tbody>
</table>
Degree is a must as oppose to old days
a lot more opportunities going to continue to grow
My filed gaming is growing slower than that of the rest of the world

With baby boomers retiring, there may be a shortage of skilled people
The new generation of skilled workers lack some of the counter-parts and that might hurt us initially
There is a big gap between technical skilled people
The employers are look for skilled people with experience to hire
They require five years of experience in design or masters degree or ten years degree experience in mechanical engineering or technical position. And a lot of the people that are graduating now don’t have that experience.

Environment matters

With baby boomers retiring, there may be a shortage of skilled people
So are lots of engineers
New workers may have an edge due to familiarity with newer technologies
Companies are getting leaner
Shrinking their workforce to be able to compete with other countries
Automation industry is most affected
Countries are competing with each other
Population difference is a factor
Less regulation on foreign producers
Less taxes

Globalization and competition

Limited number of people in the field
The more people get into this, more competition leads to more innovation

Open market competition among nations
Larger competition field
Language as a barrier for me and as a plus for my competitors
People’s perception or change in perception

competition dramatically much more of an important factor in the terms of getting the job
really be aware of what’s going on actively involved in what you’re doing

Because of globalization and communications technologies, people around the world know that they can take classes anywhere and go anywhere
They can come to U>S or stay home and compete with us for our jobs

Improvements in communications using internet and transportation technologies.
Countries being able to compete in larger markets
People can make things in one place and sell it somewhere else
This adds to competition

Career preparation in global labor market

Competing against other talented people
Finite number of people excel in this field
Second language is very important
Acquiring a second language something I did not consider

I am concerned about globalization
It is harder
Got be sharp, be proactive
Experience matters
Personal skills, communication, experience

NAFTA and Impact on Detroit, got hit bad
Going to school and staying competitive
My education is giving me confidence

reliant on technology and computers
I need to be quick at what I’m doing and I need to constantly be moving and learning
Prepare for competitive level

There may be a lack of people with experience necessary to compete
There will be a demand for people like me in technical fields
Experience is very important
There will be high demand for people in my field and program of study

I feel fine
I feel like I have a lot of opportunities
I can go out and feel confident that I can find a job

Cost of material in U.S. could send jobs to China, India, South America, Mexico
Getting lean to stay competitive
We still have an edge
Product produced overseas has more design problem
Repair cost time and money
Some companies are coming back

Globalization and job market

A positive impact
Makes us think and aware of competition on global level
Brings in fresh new innovations

More people from other nations coming to America
Creating diversity, it is a positive, exchange of ideas
We need to think differently
More competition also means more opportunities
Our success means more jobs

There is always concerns for what drives America
We want to be better than China and Japan and others so that keeps

unknown factor of where I wonder what other people are at skills wise like if somebody were to ask me to do something, I can definitely do it and I

Well because of globalization and the communication technologies, we have communicated all around the world that we can take a class in Grand Rapids, Michigan,
can do it quickly it has definitely already impacted the field our field is definitely a world-wide thing and when a game releases, it’s not just in an area usually It’s not just the United States. It’s not just Europe. It’s— everybody it’s definitely a positive in the sense of the companies I would say the market’s kind of opened up unfortunately Michigan doesn’t offer a lot of job opportunities for game design I could be working out in California. I could be working out in Russia or Australia or Japan, wherever I need to go. 

<table>
<thead>
<tr>
<th>Course taking and job relevance</th>
<th>Digital Modeling, texturing, ZBrush Multimedia courses</th>
<th>History, geography, math and physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D modeling courses, 3Ds Max to Z-Brush, programming, game design, a little bit of level design, and lots of business and project management, speech.</td>
<td>I have taken CAD, Math courses And Material science courses Physics, defining schematics , mechanics and electronics</td>
<td>I have taken CAD/CAM Industrial engineering where we learned to work with people, how to talk to people, how to do time studies, optimizing our processes Senior capstone project as a senior learning about the automation side of the process</td>
</tr>
<tr>
<td>The ability to communicate across fields Good communication skills Employers like adaptability Technologically savvy individual Problem solving Figuring out what is needed to get the job done</td>
<td>Promptness, loyalty, speaking, communication well, Must change and adapt to the environment Multitasking and working with technology These skills are essential</td>
<td>University states based on their survey that this is a good major. Has a high job placement rating Also by attending job fairs and meeting with employers to learn about their needs</td>
</tr>
<tr>
<td>somebody that’s able to fit into the business culture and actually get along with everybody and flow well skill to do what’s needed on time project management</td>
<td>Communication Organizational skills are not necessarily taught They do teach communications and teamwork. We work on projects in teams All these schools are definitely necessary</td>
<td>Teachers experiences are helpful to us Internship and on the job learning Job offers for 80% of graduates Hiring is on the rise for various engineering fields</td>
</tr>
<tr>
<td>Our professors first show us how to do it then give a problem to solve Communication and group team working has been missing They are doing more recently, courses based on group work</td>
<td>Checking internet job posting, indicating trends</td>
<td>Experience is one thing employers look for Communication skills Being able to solve problems</td>
</tr>
<tr>
<td>the Internet Job search sites Game Developers Conference, directly talk to the companies. Attending career expos</td>
<td>Employers are looking for people with technical knowledge, education and experience Engineers are given a problem to solve so they are problem solvers. Good communication skills Team work and ability to work in groups I try to learn what employers are looking for by cruising job search web sites I look for a company that I like to work for</td>
<td></td>
</tr>
</tbody>
</table>
| Relevant education and labor market needs | Word of mouth  
Good question  
I am not certain how  
Company location | Role of technology, need less people to do the same job  
Adapting to change I think as far as my field of education, my field of study, I think there is going to be high demand for people in my field of study. | God spin on the things  
Jobs are out there  
Increase manufacturing education engineering  
Many companies are doing good  
Job fairs  
Go and talk with companies  
A large number of interns at John Deer |
| --- | --- | --- | --- |
| Product produced here can reach the U.S. Market  
Michigan is not big in this area and the related industries | Technical fields will be in demand  
Education in this fields would be important and experience to compete  
Looking at trends  
What employers are looking for | Job fairs  
Hands on experience  
Opportunity for jobs  
High end CAD/CAM and CATIA software technology |
| Choice of educational program and preparation for work | Playing with neural networks and artificial intelligence stuff as a kid  
My physical ability (not very physical)  
My potential as a programmer  
Being creative in media entertainment  
Inspire others to do the same | I have always been a mechanical guy and great with mechanics  
The biggest factor was my father because he was an engineer, so I instantly got into engineering  
After taking some technical, mechanical and design courses, I realized that I really wanted to design and develop rather than working in mechanical side of things  
I am very hands on  
I enjoy the work and money did not come into consideration  
I think that the types of skills that they are teaching are great feathers to put in your hat per-se  
I think what may do is, they do a great job of real world and technological, they add them together. | I like to learn hands on rather than just theories  
Applying classroom learning on the shop floor  
Does this better than other schools and that is one of the major reasons I chose this program  
I am from Ohio, went a university in Texas and studying to become a mechanical engineer  
I did not like being far away from home so transferred to [Redacted] and enrolled and MET.  
I had various choices and I selected MET.  
I feel I am best suited to be an engineer, because of my personality traits and what I am interested in, my hobbies, etc. |
| Program of study and preparation for labor market | Learning basic skills  
Good instructors  
Being honest with you about your potential  
May pass the class but cannot get a job  
They are focused on your ability to do this  
Communication with industry  
Going to seminars  
they are providing a lot of the resources  
Learning about most common programs manage your time and really be competitive  
We change as the technology changes | CAD Skills  
Engineering skills  
Machine design skills and related skills  
Employers seeking workers with a Bachelor degree  
Income increase  
Organizational skills are not necessarily taught | Pay is definitely good  
Variety of jobs options  
Offers various other options and opportunities  
We learn what industry uses  
Cutting edge software and process optimization  
Learning to use various tools like CATIA  
Learning to create the best product using the tools we learn to use here |
| Technology and computers | The computers and the programs are very expensive  
Learning on your own would be difficult  
Classes are project oriented  
Based on industry practices | Smaller, better and transferable to the world population  
Could be tool or an idea  
Innovation for use by all  
Affects the quality of life for the populations around the world | Technology is everything  
Technology is equipment the we use  
Technology is the process behind the things  
Is just how everything works |
<table>
<thead>
<tr>
<th><strong>Software updated annually</strong></th>
<th><strong>Technology is mainly an advancement of something that actually further helps you do something things such as like sciences or advances in agriculture</strong></th>
<th><strong>The use of computers is essential in technology as an advancement of everyday things. Communication tools like cell phone contributing to the rise in standard of living.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology and Learning</strong></td>
<td><strong>Technology is physical manifestation of things like computers, automobile, palm pilot, IPhone, Xbox. It is also the Idea of knowledge base and the thought process Interaction with these items Technology is everything that enhances the quality of the human life.</strong></td>
<td><strong>CNC machines. Optimizing the process Using the most recent technologies Better parts, speeding up everything</strong></td>
</tr>
<tr>
<td><strong>Technology Types in the school environment</strong></td>
<td><strong>I would say it’s definitely surrounded about the computers and the programs that I’m getting to use more creative freedom less worry about restriction.</strong></td>
<td><strong>Technology in learning is extremely important. Use of new computer technology and equipment Use of touch probe, and CNC and laser technology.</strong></td>
</tr>
<tr>
<td><strong>Technology used in school and industry, Similarity and differences, Plus or a minus</strong></td>
<td><strong>Very important Internet a giant pool of information on demand</strong></td>
<td><strong>All sorts of technologies are used We learn the technology like checking FARO-Arms Portable CMMs to check parts.</strong></td>
</tr>
<tr>
<td><strong>Opportunities and activities to improve employment chances</strong></td>
<td><strong>I definitely focus pretty highly on the computer end of the technology Easy and fast upgrades.</strong></td>
<td><strong>I would say yes. Most items like CATIA (which is use in large companies that is very expensive) So companies us SolidWorks, Master CAM and CAM instead. I feel we should use what the companies use. There are pros and cons to both approach.</strong></td>
</tr>
<tr>
<td>Education and career preparation</td>
<td>I think so, for the most part</td>
<td>Gaining the necessary CAD (humongous) skills</td>
</tr>
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<td>-------------------------------</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>There is no substitute for a bit of experience in the field</td>
<td>Learning the terminology</td>
<td>They like what we are doing here</td>
</tr>
<tr>
<td>Even internship is not quite the same as being employed</td>
<td>Learning about other careers</td>
<td></td>
</tr>
<tr>
<td>gone to GDC a couple times and while there talking to the companies Learning about companies They learn about us</td>
<td>I have taken electives to learn about the world</td>
<td>I feel like it is</td>
</tr>
<tr>
<td></td>
<td>Learning about people and cultures and geography</td>
<td>They try to teach us how to think and I think that is the main purpose of college</td>
</tr>
<tr>
<td></td>
<td>Learning to design software on my own because a lot of jobs posted needed that skill</td>
<td>It is a lot about process of how to learn than what to learn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities offered through school</th>
<th>Career counseling</th>
<th>Joining clubs and activities</th>
<th>Bring people from industry to talk to students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game development club</td>
<td>Sororities and fraternities, and charity work Networking</td>
<td>Bring manufacturing down to a personal level</td>
<td></td>
</tr>
<tr>
<td>Staff are available</td>
<td>Public speaking and communication with others</td>
<td>We need to get a better view of the industry</td>
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<tr>
<td>definitely covered in our program but we can do a lot more with our skills than that I can use my skills towards almost anything</td>
<td>Work studies Internship and field trip to learn about jobs and work environment and what employers are doing</td>
<td>Required internship, important and helpful</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Most employers want to see a real world experience and internship does that</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Change in response to external factors</th>
<th>A lot less emphasis on modeling art and more on actual design aspects and programming Communication between various group with skill trade</th>
<th>Yes they have New items on the curriculum like the world geography Software changes and additions, From board drawing to 2D to 3D</th>
<th>People need to find out about what we do One big change, we design and build as oppose to past Companies coming to show us their new products Increase our knowledge of what is new and how it might be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>the program definitely evolved kind of since I got there Change of application and process Periodic change to stay relevant</td>
<td>I have not seen that</td>
<td>They are starting to recruit more Enrollment was down and there is a sense of urgency appealing to students to get more in the programs I am not sure but there has been some changes We have a new dean, not sure about his background</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Globalization and faculty</th>
<th>I actually do Some of them are on top of it Their knowledge of geographic location of certain developments They ask: did anything important happen in the industry or related fields Sharing information on new ideas</th>
<th>Majority are Some are not Weekly current events and personalities Learning about change on regular basis</th>
<th>There are some who have hang around too long They tell you about the competitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>there are definitely some that are more up-to-date than others Faculty own their own business, compete with others in the same business</td>
<td>I absolutely do, they are highly educated and my professor is one of the most qualified people I ever met with his PE and Ph.D.</td>
<td>I like that fact that most professors have had real world experiences They understand the need of the industry I feel they are up to date Many do consulting work They understand what is going on</td>
<td></td>
</tr>
<tr>
<td>Faculty and curriculum development in response to global changes</td>
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<td>---------------------------------------------------------------</td>
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<tr>
<td>They are not overt in their presentation. More along the lines: This is a relatively common skill. They allocate more time to that topic and less time for what may not be as important. Sharing information with students from the past classes: We did not do that, we did this. Reflect change in importance of the topic.</td>
<td></td>
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<tr>
<td>Accidentally maybe. As a plan I do not think so wish it was more that way. It would be helpful. I want to know how they are doing things in like China, China, taking ideas and making them better, regardless of pay scale and selling them right back to us. They are doing much more than we are. Not because of cheaper worker but innovative thinking. They have a plan. We need to experience more different cultures and ideas. Exchange of ideas through faculty connection.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No response</td>
<td></td>
<td></td>
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<thead>
<tr>
<th>Job site visits and latest trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game designers Conference in California Network with game design studios and representatives and hundreds of companies from around the world. Weak point of the program is our geographic location. Lack of game design studios. But changes in tax break for movie studios may change that a bit.</td>
</tr>
<tr>
<td>I do not. I would say it would be helpful to students and faculty. To get ideas. To learn firsthand about issues and problems. We need to do this more often.</td>
</tr>
<tr>
<td>My father works in Detroit. I go visit the plant and talk with engineers about the processes they use. Maintained contact with pass graduates. Meeting of industry people with teachers. Helps students and teachers to know what is coming, what to plan for.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Critical skills and employment</th>
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<tbody>
<tr>
<td>Absolutely important. Learn good communications skills. Eye contact. Not just texting and cell phone contact face to face communication sharing and imparting ideas. self-expression through art and speech classes. Drawing.</td>
</tr>
<tr>
<td>I think it is wrapped into a lot of courses we do. Teach you group work forces you to communicate with others. It create a competitive environment when people share ideas and challenges you to come up with ideas. Important in a work environment. A class to teach these skills is good.</td>
</tr>
<tr>
<td>The ability to do more than one thing-multitasking. Understanding your job and the plant-Troubleshooting ability. Knowledgeable and adapt quickly. Working with people. Learning through doing. Get people to trust you.</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Job site visits and latest trends</th>
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<tr>
<td>I'm going to be doing that a lot actually after I've graduated since I'll be more able to move around and talk to companies. Lack of jobs in state. Lack of personal resources. I've been able to do that is through GDC. Job site visits would provide sort of more opportunity.</td>
</tr>
<tr>
<td>I have a job so I do not do it. I absolutely recommend this for younger students like work studies and stuff like that, and job placements and co-ops and internships. I think it is a great idea for students to go see the employers.</td>
</tr>
<tr>
<td>I stay in contact with my former boss from my internship program and I learn what is changing. I think this is very important for all students because they hear about changes in the industry and see how work is done.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical skills and employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolutely important. Learn good communications skills. Eye contact. Not just texting and cell phone contact face to face communication sharing and imparting ideas. self-expression through art and speech classes. Drawing.</td>
</tr>
<tr>
<td>I think it is wrapped into a lot of courses we do. Teach you group work forces you to communicate with others. It create a competitive environment when people share ideas and challenges you to come up with ideas. Important in a work environment. A class to teach these skills is good.</td>
</tr>
<tr>
<td>The ability to do more than one thing-multitasking. Understanding your job and the plant-Troubleshooting ability. Knowledgeable and adapt quickly. Working with people. Learning through doing. Get people to trust you.</td>
</tr>
<tr>
<td>APR and student and faculty</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Helps faculty to know what they need to focus on</td>
</tr>
<tr>
<td>Their job is to get the students ready</td>
</tr>
<tr>
<td>Student want education with real world relevance</td>
</tr>
<tr>
<td>Keeps the faculty and students up to date</td>
</tr>
<tr>
<td>No, I am not familiar</td>
</tr>
<tr>
<td>It is important to do this</td>
</tr>
<tr>
<td>It is important to do this</td>
</tr>
<tr>
<td>Five years seems to be too long</td>
</tr>
<tr>
<td>No, I am not familiar</td>
</tr>
<tr>
<td>It tells them what students feel like they’re not getting enough of</td>
</tr>
<tr>
<td>that they feel like might not be necessary</td>
</tr>
<tr>
<td>the students are getting taught what</td>
</tr>
<tr>
<td>they feel they should be taught</td>
</tr>
<tr>
<td>the professors can also sort of take all that information and go, “Well, this is what we need to teach the students and the school can remap the program.</td>
</tr>
<tr>
<td>Yes, I’d say it’s helpful to the students, updating the programs and course relevance</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td>Half in class-half online, Do not like it, Effects my learning</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
Appendix N

Interview Schedules
Monday October 18, 2010

Hello Mr. [REDACTED]:

I have tentatively scheduled you for an interview for my upcoming research. Please let me know as soon as possible whether this works for you. I have tried to accommodate you based on your preference.

Please note your code-name and interview date and time.

[REDACTED] [REDACTED]


It is essential that I hear from you so that I can reserve a room for the date-time mentioned here for us to meet. A timely response will give us enough time to verify all details.

Thank you

M.A. Moradi

Graduate research Student, WMU
Appendix O

Thank You Letter
To: Participant (name)
From: M.A. Moradi, Student Investigator

Dear (name);
I want to thank you for your time and interest in this study by signing a consent form and completing the demographic sheet. I am grateful for your interest and willingness to take part in this study. However, as researcher looking for certain characteristic in informants, regrettably, I was not able to include you in my study.
The criteria set forth for participation stated that the participant must be;
1. Seniors in final year of their study
2. Not enrolled in a retraining program
3. GPA of 3.0 or above
4. Ferris State University, Grand Rapids campus only
5. Enrolled in one of three specific programs as outlined in the methods Chapter
6. Attending class on campus

Again, thank you for your interest. If you have any questions please feel free to contact me by e-mail or call 616-570-1662.

Thank you
M. A. Moradi
Appendix P

Glossary of Terms
Glossary of Terms

Definitions

Carl D. Perkins Career and Technical Education Improvement Act of 2006 -
The primary federal legislation that supports career and technical education programs at
the secondary and post-secondary levels; named for former US Senator, Carl D. Perkins
that the Carl D. Perkins Career and Technical Education Act of 2006 is an Act
implemented to develop more fully the academic, vocational, and technical skills of
secondary students and post-secondary students who elect to enroll in career and

Career and Technical Education (CTE) – Organized educational activities that offer a
sequence of courses that provide individuals with coherent and rigorous content aligned
with challenging academic standards and relevant technical knowledge and skills needed
to prepare for further education and careers in current or emerging professions.

Critical Thinking – Disciplined, self-directed thinking, which exemplifies the
perfections of thinking appropriate to a particular mode or domain of thinking; thinking
that, displays mastery of intellectual skills and abilities. (Missouri Department of
education, p. 3)

Curriculum Framework – Curriculum frameworks identify the required
components of a CTE course. The components are Industry Defined Standards, Show-Me
Academic Learning Requirements and Course Level Expectations, Thinking Skills,
Leadership Skills, Employability Skills, Relevance to Work and Performance
Assessments (Missouri Department of Education, 2008, p. 3).
Communication Technologies: Communication technology in a modern society builds on other existing forms of communication and includes hardware equipment, organizational structures, and social values by which individuals collect, process, and exchange information with other individuals. Radio, television, film, and now video teleconferencing, electronic mail, live chat, cell phone technology, ease of communication made possible by computer technologies, advent of Internet, development of better digital communication networks, satellites, broadband and networking communication all contribute to the concept of modern communication technologies for the purpose of sharing information ((Rogers, 1986, p.2).

Curriculum Integration- According to Hoachlander (1999), Integration of academics into the CTE curriculum is a major policy objective of the Carl Perkins Vocational Education Act (1985, 1990, and 1998) and the new Perkins Act of 2006 (Stone, et al., 2006, p. 8). Indeed, CTE courses hold promise as another venue in which to reinforce students' math understanding and skill (Stone, et al., 2006, p. 8).

Globalization- World Health Organization (2009) defines globalization as the increased interconnectedness and interdependence of people and countries and is generally understood to include two interrelated elements: the opening of borders to an increasingly fast flow of goods, services, finance, people, and ideas across international borders; and the changes in institutional and policy regimes at the national and the International level that facilitates or promotes such flows (p.1).

Program- A sequence of related learning experiences that are based on identified nontraditional, state, and regional employment needs that prepare students for responsible roles in employment, family community and continuing education. (Missouri
Program of Study- A program adopted and offered by local educational agencies and post-secondary institutions as an option to students (and their parents as appropriate) when planning for and completing future coursework. A program of study incorporates secondary and post-secondary education elements, including coherent, rigorous, and relevant content aligned with challenging academic standards in a coordinated, non-duplicative progression of courses that align secondary education with post-secondary education to adequately prepare students to succeed in post-secondary education. (Missouri Department of education, 2008, p. 5)

SCANS Report Competencies and Skills- in 1991, the Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, issued its report on the high performance workplace consisting of five competencies and three basic foundations (Lankard, 1995; Copple et al., 1993).

Technology Integration- Technology integration is using computers (in conjunction with other tools) effectively and efficiently in the general content areas to allow students to learn how to apply computer skills in meaningful ways.

Technical Education- A program of vocational instruction that ordinarily includes the study of the sciences and mathematics underlying a technology, as well as the methods, skills, and materials commonly used and the services performed in the technology. Technical education prepares individuals for positions—such as draftsman or lab technician—in the occupational area between the skilled craftsman and the professional person. (Snyder, Dillow, & Hoffman, 2008, p. 666)
Technology- is the process by which humans modify nature to meet their needs and wants explains Wright (2003) citing Pearson and Young (2002, p. 2). While technology, in its broadest sense, can be defined as "the practical application of knowledge" (from Webster's online dictionary), in this document we define technology to be "the combination of human imagination, inventiveness and electronic tools that transform ideas into reality to meet a need or solve a problem." Educational technology includes hardware (computers, handheld devices, printers, digital cameras), software and content applications (programming classes, productivity software), and media (the Internet and videoconferencing)- (2002 Washington State Educational Technology Plan, p. 11).
Appendix Q

DADG, MET, and PDET Proposed Course Schedules
DADG Proposed Course Schedule Breakdown by Semester

**Freshman Year**

**First Semester**
- DAGD 100 3D Modeling & Animation
- DAGD 102 Story Development for Film & Gaming
- DAGD 103 3D Visualization – 3D Drawing & Sculpture
- GRDE 216 Electronic Imaging
- GenEd (MA 107)

**Second Semester**
- DAGD 150 Introduction to Game Development
- DAGD 180 Digital Video Editing
- DAGD 230 3D Modeling & Animation II (DAGD 100)
- GRDE 226 Webpage Design (GRDE 216)
- GenEd (MA 108)

**Summer Semester**
- GenEd (EN 100)

**Sophomore Year**

**First Semester**
- SENG 100 Introduction to Computer Programming
- DAGD 101 2D Visualization – Storyboards & Style Guides
- DAGD 260 Multimedia I
- GenEd (SC 131)

**Second Semester**
- DAGD (Domain)
- DAGD 220 Sophomore Portfolio (DAGD 100, GRDE 216)
- MKTG 321 Principles of Marketing (BA 270 at GRCC)
- GenEd (Science w/ Lab)
- GenEd (Cultural Enrichment)

**Second Semester**
- DAGD (Domain)
- GenEd (Cultural Enrichment)

**Summer Semester**
- GenEd (EN 102)

For additional information on these and related topics please go to:

[www.ferris.edu/grandrapids](http://www.ferris.edu/grandrapids) to learn about program plan for this course.
MET Proposed Class Schedule
Last Updated: 02/25/09

FALL SEMESTER – Odd Years

- MECH 340 Statics & Strength of Materials (MATH126 or 130, PHYS 211)
- MFGE 321 Metrology (MATH 116 or 120)
- MFGE 324 Principles of Process Planning I (MFGE 311, MFGE 312) & (MFGE 321, MFGE 326 co-req)
- MFGE 341 Quality Science Statistics (MATH 116 or 120)
- MFGE 442 Design of Experiments I (MFGE 321, MFGE 341)

SPRING SEMESTER – Even Years

- MFGE 311 Industrial Engineering (MATH 116 or 120)
- MFGE 341 Quality Science Statistics (MATH 116 or 120)
- MFGE 411 Principles of Process Planning II (MFGE 322, MFGE 324, MFGE 342)
- MFGE 442 Design of Experiments I (MFGE 321, MFGE 341)
- WELD 416 Production Welding Processes

SUMMER SEMESTER - All

- ENGL 311 Adv. Technical Writing (ENGL 211 or ENGL 250)
- MFGE 326 Process Tolerance Analysis (MATH 116 or 120)
- MFGE 423 Engineering Economics (MATH 116 or 120)
- MFGE 393 Internship (Department Approval)*

4 Year Tracks
Note: Start at the beginning of the track (not mid track)
PDET Proposed Course Schedule

WINTER SEMESTER 2009
**PDET 311 Seminar in Product Design
**PDET 312 Advanced Tolerancing
**PDET 499 Product Design Project (concurrent with COMM 336)
**COMM 336 Technical & Professional Presentations

SUMMER SEMESTER 2009
OPEN

FALL SEMESTER 2009
**MECH 340 Statics & Strength of Materials
**MFGE 352 Design for Manufacturing

WINTER SEMESTER 2010
**EEET 201 Electrical Fundamentals (MATH 116 or equivalent)
**PDET 413 App. Fluids & Thermodynamics (MATH 116, MECH 340)

SUMMER SEMESTER 2010
**MATL 341 Material Selection Metals (MATL 240)
**PDET 321 Applied Mechanics & Kinematics (MECH 340)

FALL SEMESTER 2010
**PDET 322/DR 258-GRCC
**PDET 411 Machine Design (MATH 216, MECH 340, PDET 321)

WINTER SEMESTER 2011
**PLTS 342 Plastic Material Selection
**PDET 422 Advanced Machine Design with FEA (PDET 411)

SUMMER SEMESTER 2011
**PDET 412 Statistics and Ergonomics
**Social Awareness 200+ level

FALL SEMESTER 2011
**PDET 415 Advanced Solid Modeling CAD
**ENGL 321 Advanced Composition

WINTER SEMESTER 2012
**PDET 311 Seminar in Product Design
**PDET 312 Advanced Tolerancing
**PDET 499 Product Design Project (concurrent with COMM 336)
**COMM 336 Technical & Professional Presentations
& **These courses are part of the Product Design course sequence. They should be completed no later than the semester shown.

For additional information on these and related topics please go to: www.ferris.edu/grandrapids to learn about program plan for this course.