Institutional Changes in Western Michigan University for Incorporation of Education for Sustainability

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INSTITUTIONAL CHANGES IN WESTERN MICHIGAN UNIVERSITY FOR INCORPORATION OF EDUCATION FOR SUSTAINABILITY

by

Saman Khan

A dissertation submitted to the Graduate College in partial fulfillment of the requirements for the degree of Doctor of Philosophy
Mallinson Institute for Science Education
Western Michigan University
May 2021

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Higher Education institutions (HEIs) have the potential to be significant contributors in the pursuit of a sustainable world through the incorporation of Education for Sustainability (EFS). However, HEIs are entrenched with structures and values that are often resistant to change. The literature reveals that instructors’ beliefs and institutional contexts are the two main factors that impact the implementation of institutional change for sustainability education.

Western Michigan University (WMU) has created new required curriculum “WMU Essential Studies” (WES) for undergraduate students and they have targeted sustainability as an essential learning outcome, by integrating and applying it in content courses. Using a case study approach, this study examines how WMU is bringing an institutional change with regards to implementation of education for sustainability at the institutional level and what kind of barriers and avenues instructors will face for implementing sustainability learning outcomes. Results show that instructors’ own beliefs and attitudes play important roles in teaching sustainability. Most instructors (N=14/18, 77%) were passionate about teaching sustainability. Instructors who chose to list their class as a sustainability class under WES were already teaching sustainability
long before WES and sustainability is a main focus of their courses. Most instructors (N=5/7, 71%) who didn’t choose to list their class as a sustainability class under WES indicated that they do teach sustainability, but it is not the primary focus of their course. Most participants (N=20/23, 86%) see WES as a tool to institutionalize the teaching and assessment of sustainability on campus. All instructors mentioned that prior to WES, there was no institutional policy that tried to implement sustainability education at WMU.

Along with its positive effects on teaching sustainability, WES also posed some barriers that led many instructors (N=8/18, 44%) to not list their classes a sustainability class under WES. Most instructors who didn’t choose sustainability (N=6/7, 71%) felt that the WES sustainability learning outcome rubric is inflexible and difficult to understand, which made them reluctant to choose sustainability. Most WES administrators (N=9/11, 81%) said that the rubric needs to be general to help instructors from variety of different departments in designing their learning outcomes. But, only a few instructors (N=3/18, 16%) said that the WES rubric helped them connect their course topics with sustainability. Most instructors saw assessment as a barrier to making sustainability an essential learning outcome. Some instructors (N=5/18, 27%) view the WES requirement to assess sustainability as an extra burden on instructors and are concerned about how they will do it.
DEDICATION

Dedicated to Friends and Family
ACKNOWLEDGMENTS

When I joined the MISE doctoral program, I did not realize that the journey would end up being long, strenuous, and at times disappointingly slow. During this educational journey, I have made enduring friendships and acquired a lot of irreparable gratitude toward those who made this tolerable for me.

I owe my most profound appreciation to my dissertation committee members for their direction through my writing process. I have received an excellent deal of support and assistance during the writing of this dissertation. I want to thank my committee chair, Professor Dr Charles Henderson, whose expertise was priceless in formulating the research questions and methodology. Your insightful feedback urged me to sharpen my thinking and brought my performance to a greater level.

I would also like to express my gratitude towards my committee members, Dr Heather Petcovic, Dr Maarten VonHof for their valuable supervision for my research studies. I appreciate all the assistance and encouragement I have received from Dr Heather over the years. Your insight into my research provided me with the tools to choose the right direction and complete my dissertation.

Besides, I would like to acknowledge my parents for their educated counsel and a sharp ear. Finally, I could not have finished this dissertation without my friends' support, who provided
stimulating discussions and happy distractions to rest my mind outside of my research. Infinite thanks!

Saman Khan
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LIST OF ABBREVIATIONS

American College & University Presidents’ Climate Leadership Commitment (ACUPCC)

Association for the Advancement of Sustainability in higher Education (AASHE)

Decade of Education for Sustainable Development (DESD)

Education for Sustainability (EFS)

Higher Education Institutions (HEIs)

Planetary Sustainability (PS)

Presidents’ Council on Sustainable Development (PCSD)

Science, Technology, Engineering, and Mathematics (STEM)

United Nations Educational, Scientific and Cultural Organization (UNESCO)

University Leaders for a Sustainable Future (ULSF)
CHAPTER 1
INTRODUCTION

Higher education faculty have been instrumental in discovering and documenting the growing ecological crisis facing the United States and the world. Calls for rapprochement between human society and the natural world have come from all corners of academia. Institutions of higher education can be leaders in sustainable thought and practice. Yet, there is reluctance on the part of many higher education institutions (HEIs) in the U.S. and abroad to make sustainability-related issues a priority in the curriculum. HEIs tend to be very conservative and they are distinctly hesitant towards instructional change towards implementing education for sustainability (EFS). Many universities have signed sustainability declarations and have made institutional policies to infuse EFS into the curriculum. Yet widespread change towards EFS have not occurred.

Creating a university that encompasses sustainability education is no small task. HEIs are entrenched with structures and values that are often resistant to change. This dissertation explores how WMU is attempting to create an institutional change with regards to implementation of education for sustainability at the institutional level and what kinds of individual and institutional factors affect implementing sustainability learning outcomes. More importantly, this research develops a framework that can help to understand the substantial organizational factors which influence the institutional responses to sustainability.

1.1 Background: Higher Education Sustainability Initiatives

Recent decades have seen increased importance placed by HEIs on the teaching of sustainability. This section will describe efforts to incorporate sustainability into the higher education curriculum and why these efforts have not served their purpose. This section focuses on:
1) the definition of sustainability, 2) the vision of education for sustainability, 3) an overview of how education for sustainability became important for higher education institutions, and 4) the current situation of education for sustainability in higher education institutions and problems in implementation.

1.2 What Is Sustainability?

The term sustainability and sustainable development have been mostly used interchangeably. The most popularly quoted definition of sustainability is from the Brundtland Commission of the United Nations on March 20, 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 2017). This definition contains two key concepts within it: (i) the concept of 'needs', in particular the essential needs of future and present generations which can be satisfied by economic resources; and (ii) the idea of limitation of environmental resources to meet present and future needs." This connects the issues of economic development and environmental stability. This definition aims to provide a framework for the integration of environmental protection and economic development (United Nations, 2007). It means sustainable development is about enhancing the quality of life of the existing generation without extreme use of environmental resources, so that they can be saved for the next generations.

1.2.1 Definition of Sustainability in Higher Education

According to the Sustainable Development Education Panel (1998–2003) established by the government in the United Kingdom, education for sustainability (EFS) means education that "enables people to learn the knowledge and skills to participate in collective and individual
decisions that will improve the quality of life now without damaging the planet for the future” (Finch & Crunkilton, 1999). The Association of University Leaders for a Sustainable Future (ULSF), which is also the Secretariat for signatories of the Talloires Declaration, states that sustainability implies that the critical activities of higher education institutions are ecologically sound, socially just and economically viable and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally healthy and equitable society (ULSF, 2012).

1.3 History of Education for Sustainability in Higher Education Institutions

There is a well-documented history regarding sustainability education. The Brundtland Report laid the foundation for education for sustainability in HEIs (United Nations, 2007). The Brundtland Report (World Commission on Environment and Development, 1987) argues that "the world’s instructors … have a crucial role to play" (p. 14) in helping to bring about the "extensive social changes" required for sustainable development. After Bruntland, in 1990 many University presidents and chancellors gathered in Talloires, France to address their concerns and solutions about the deteriorating environment of earth. This group determined that “universities educate most of the people who develop and manage society’s institutions. This group of higher education leaders created the Talloires Declaration, which expresses these intentions of HIEs to transform in response to the sustainability movement. Over four hundred HEIs have signed the Talloires Declaration (ULSF, 2012).

Following the Bruntland report and the Tallories declaration, the United Nations Educational, Scientific and Cultural Organization (UNESCO) declared 2005-2014 the Decade of Education for Sustainable Development (ESD), with the aim of helping people “develop the
attitudes, skills, and knowledge to make informed decisions for the benefit of themselves and others, now and in the future, and to act upon these decisions” (UNESCO, 2010).

Individual countries set up commissions, councils and panels that sought to set guidelines, goals and policies that would keep them on the path towards attaining sustainable development, with education as a main center. During President Clinton’s term (1993), the Presidents’ Council on Sustainable Development (PCSD) was established, and ten national goals were classified. They included: “Health and the Environment, Economic Prosperity, Equity, Conservation of Nature, Stewardship, Sustainable Communities, Civic Engagement, Population Stabilization, International Responsibility, and Education for All” (US Population and Sustainable Development, 1996). The interdependence of these goals reinforces the council’s recognition of the crucial importance to include economic, environmental and social equity considerations with regard to current and future instructional practices. These goals are clear in their aims to work toward enabling the United States to actualize the creation of a sustainable society through education.

After policy recommendations by the council, there was minimal effort by the administration and the US Congress to implement them. The Council no longer exists. It has been emphasized by different scholars and researchers that there is a huge need to for the US to move towards the coordination of implementation efforts, both within the national government, and the public and private sectors. The USDA’s Office of the Chief Economist has created a position, the Director of Sustainable Development, that has been charged with “advancing the principles and goals of sustainable development through partnerships, collaboration, and outreach” in the domain of agriculture (USDA, 2012).

A group of stakeholders named "U.S. Partnership for the Decade of Education for sustainability" was created from a variety of authorizations, including government, business,
formal education, youth, and faith communities. Their vision is to fully integrate sustainable development into education and learning in the United States. This group has created National Sustainability Education Standards, though currently there is no mandate for implementation within the US formal education system (Tilbury, 2011).

In the United States, the American College & University Presidents’ Climate Leadership Commitment (ACUPCC) is the most well-known high visibility effort. Their goal is to create a network of colleges and universities that have committed to attain carbon neutrality in campus facilities, and accelerate the research and educational efforts of HEIs to “reorient its curriculum to formally prepare students and thus society with the knowledge and skills necessary to address the critical, systemic challenges faced by the world in this new century” (Dyer & Dyer, 2017). There are currently over six hundred signatories to the ACUPCC Climate Change agreement. External stakeholders, including accrediting agencies, community members, government, and employers, have all begun to exert pressure on universities and colleges to respond to the issue of sustainability in campus operations as well as in the academic curriculum. Multiple organizations, such as the Association for the Advancement of Sustainability in higher Education (AASHE), University Leaders for a Sustainable Future (ULSF), Second Nature, and College Student Educators International “assist colleges and universities in making sustainability an integral part of curricula, research, operations, and outreach." These organizations synthesize and publicize the important progress that has been made toward generating a coherent and significant response from HEIs (Weisser, 2017).

1.4 Problem Statement

We do not know how to bring institutional change for sustainability education
HEIs are essential for securing a sustainable future. But higher education institutions are very slow to change and any changes that are made can take a long time to show results (Summers et al., 2003). Research shows that, in spite of all the high-level efforts described above, HEIs have made slow progress towards integration of sustainability into their educational processes (Lozano, 2006; Waas et al., 2010; T. Wright, 2002). An analysis of the journals that publish research about sustainability (Vaughter et al., 2013) in Higher Education revealed that prior to 2010, most articles on sustainability initiatives in higher education were only focused on physical sustainability in HEIs; such as environmental management, university greening and reducing a university’s ecological footprint. Only more recent articles focus on sustainability literacy, pedagogy, learning and teaching for education for sustainability (EFS) (Wals, 2014). In next section I have explained what kind of factors influence the institutional change for integration sustainability is integrated into HEIs programs.

1.4.1 Factors Affecting the Institutional Change for Sustainability Education

Although there have been significant increases in the number and types of programs, the extent to which sustainability is integrated into university programs varies substantially and is influenced by a range of factors from both institutional structures and the personal characteristics of instructors. This section provides the theoretical foundation for organizing factors that shape institutional change in instructional practices for sustainability. I have started from a broad perspective of change in instructional practice in higher education that allows for the influence of factors related to individual instructor characteristics as well as factors related to institutional structures (Lattuca, 2005). Each of these types of factors are explained below.

Influence of Institutional Structures
The process of incorporation and diffusion of education for sustainability (EFS) is an innovative idea in most universities (Boud et al., 2016; Lozano, 2006; Rogers, 2010). Innovations can be incremental or radical (Afuah, 1998). Incremental innovations build upon previously existing knowledge and practices; while radical innovations are fundamentally different from existing knowledge and practices. Incorporation of EFS in universities falls into the radical category. Radical change does not typically happen in HEIs quickly (Zhang et al., 2012). Research shows that HEIs are among the most conservative institutions and they are distinctly hesitant towards curriculum change (Hoover & Harder, 2015).

Many HEIs have signed higher education sustainability declarations and have incorporated the principles of these declarations into their own institutional sustainability education policies. But, signing higher education sustainability declarations and creating sustainability policy does not ensure that the signatory HEIs are successfully implementing sustainability education (Wright, 2002). Regardless of universities signing sustainability declarations and committing to reform instruction and curriculum for inducing EFS, educational change has been problematic, with classroom practitioners demonstrating a consistent minimal interest and commitment in implementing curriculum reforms disseminated by administrators (Chisholm & Leyendecker, 2008; Tadesse, 2014; Tadesse & Gillies, 2015).

There is a difference between the radical changes called for by stakeholders in the sustainability in higher education movement and the routine cumulative changes which typically occur in HEIs. Universities have brought real changes in their policies to solve other social issues such as anti-smoking, sustainability operation drives, affirmative action against sexual harassment, race discrimination in education, and fair wages (Shriberg & Tallent, 2003). However environmental and sustainability problems usually fail to obtain the recognition of all
HEIs’ stakeholders and decision makers for it to be added to the curriculum university wide and needed to embed EFS across the university is barely begun (Hayles & Holdsworth, 2008; Martin et al., 2014).

It is also worth highlighting that in many HEIs there is not often adequate institutional support and incentives for those instructors who are willing to integrate EFS in their classroom activities (Hoover & Harder, 2015), and most of the efforts lie primarily on overcommitted instructors (Krizek et al., 2012). Most universities neglect the importance of participation of instructors during institutional efforts to make sustainability part of curriculum (Tilbury & Cooke, 2005; Nomura and Abe 2010).

Influence of instructors’ personal characteristics

Most HEI instructors receive little education about sustainability and its issues unless they were specifically involved in the subject or personally interested. For example, few academic programs explain how cleaner production concepts can be integrated into engineering practices, services, marketing, management and design (Gaziulusoy & Boyle, 2013). Instructors integrate different perceptions and personal approaches to sustainability are integrated into the specific courses’ instructors teach, but often with instructional methods that are not entirely appropriated to sustainability principles. For example; there is often a lack of integration of practical problems with theory in class instruction, which has been identified as a barrier for embedding sustainability in HEIs (Lozano et al., 2015; Sterling, 2005). So, most efforts focused on institutional change for sustainability have been criticized for being partial, lackluster (Sterling, 2013), and primarily focused on reducing the institutions ecological footprint (Cotton et al., 2007; Lozano et al., 2013). Some research studies show that typical approaches to teaching
sustainability in science subjects and geography have lacked such a human dimension which makes the teaching of sustainable development may be an even more challenging innovation than might have been anticipated (Orr, 1992; Rees, 2010).

1.5 Conceptual Framework

Little experimental research exists that examines the specific mechanisms underlying the complex relation among instructors’ beliefs, institutional context and instructional practice in higher education (Hora, 2012). So, the knowledge available in HEIs is quite extensive about what instructors teach and how they teach it but provides fewer insights about why they do what they do (Hativa & Goodyear, 2002).

Cornbleth (2008) analyzed and interpreted the research relevant to instructional contexts and presented a point of view that external contexts on instructors and are not merely singular or individual as in a single factor affecting an individual instructor and instruction. Rather, to understand contexts to meaningful instruction and learning, attention is directed to recurring patterns of contextual constraints (Mansour, 2009) and to how these contexts are created collectively and interactively to produce thinking that incorporates diverse perspectives and instructional methods. Cornbleth’s point of view perfectly complements the research on instructors’ beliefs and knowledge. It takes an external influence perspective, which recognizes and focuses on factors beyond the individual that both shape and constrain instructional process.

The institutional and personal belief perspectives together create a more robust theoretical framing to examine instructional practice.

An abundant literature exists on classroom instruction at the postsecondary level (e.g., Lester et al., 2017; Stark, 2000). However, relatively little experimental research exists which examines how faculty actually teach their courses, particularly in the science, technology,
engineering, and mathematics (STEM) disciplines. This situation is due to the lack of research which illuminate the subtle features of instructional change as it happens in academic settings. A fundamental argument advanced by this literature is that instructional practices cannot be adequately described as simply the enactment or delivery of rote pedagogical techniques, but instead as complex practices that are informed by both beliefs of individual instructors and features of the immediate instructional context (Hora, 2012; Borko et al., 2008; Schoenfeld, 2000).

Based on the literary foundations for instructional change in higher education institution, I developed the following conceptual model (Figure 1) to integrate research on instructor beliefs and institutional context that shape the instructional practices and its responsiveness to change for new trends like instruction for sustainability (Figure. 1.1).
In the following I discuss how instructors’ beliefs in general affect their instructional methods, followed by beliefs in the context of EFS. I then discuss the influence of institutional context in general, followed by institutional context in the context of EFS.

1.5.1 Importance of Instructors’ Beliefs and Attitude

Pajares (1992) supports the notion that instructor beliefs influence their perceptions, which in turn affects their behaviors during instruction. Instructors’ beliefs in the context of instructional practice often refer to beliefs about education, teaching, learning, and students. Instructors’ beliefs act like filters that guide them during curriculum and instructional decision-making (Golombek, 1998). In reviewing the research literature about teaching and learning, instructors’ beliefs have been shown to have a great influence on the way instructors perceive, judge, and act in the classroom. Instructors’ beliefs help them to make sense of the complex and multidimensional
nature of classroom life, to identify goals, and to shape their evolving perceptions of themselves as instructor (Tsui, 2003). Beliefs “determine how individuals organize and define instructional tasks and problems and are strong predictors of behavior” (Tsui, 2003, p.311). Clark and Lampert (1986) describe instructors’ beliefs as “the rich store of knowledge that instructors have that affects their planning and their interactive thoughts and instructional decisions” (p.258).

A number of studies investigating the relationship between instructors’ beliefs and change in their instructional practices for sustainability have found that instructor beliefs are consistent with classroom practices. Through their work with the theory of planned behavior, Haney, Czernaik, and Lumpe (1996) determined that instructor beliefs are significant indicators of the behaviors that will be presented in the classroom. Instructors’ beliefs and knowledge about subject matter have also been found to influence day-to-day decisions about what to teach, what to skip, and how much class time to devote to particular topic (Cronin, 1995).

Based on the acknowledged relationship between instructors’ belief/thinking/conceptions and instructional practice, some researchers have also argued that higher education faculty development programs should focus on the underlying beliefs, intentions, and approaches that are associated with change in instructional practices (Devlin, 2006; Kane et al., 2002; Prosser & Trigwell, 1996).

1.5.1.1 Instructors Beliefs/Attitude Affecting Institutional Change for Sustainability

Sustainability in Higher Education is an emerging field of inquiry primarily concerned with how to incorporate sustainability into the physical, curricular, and pedagogical operations of universities (Tomas et al., 2017; Fihlo, 2000). Previous literature about implementation of EFS (Cotton et al., 2007; Reid & Petocz, 2006) has been focused on assessing instructors’ general understanding of sustainability but it has not focused on how instructors are executing EFS and
what factors impact it. There is some literature focused on assessing the implementation of EFS programs by instructors who are already involved in bringing institutional change for EFS (Wright & Whilton, 2012). Different instructors in HEIs perceive and consider sustainability phenomena differently. Most instructors have strong positive attitude towards sustainability, and they understand their major role in EFS. Some instructors have limited knowledge of sustainability and they perceive their role as instructors as not so important for EFS. Some even regard education for sustainability as pointless and confusing (Sauvé’, 1996; Bonnett, 1999, 2002). Development of instructors' thinking towards integrated levels of sustainability impact the change in instructional practice for EFS. Instructors who have demonstrated a holistic and broader sustainability vision bring together social, economic and environmental factors in their classroom when they teach about sustainability (Hedden et al., 2017)

1.5.2 Importance of Institutional Context

Some researchers who have tried to understand why instructors fail to adopt new instructional strategies have highlighted the fact that instructors’ beliefs and perceptions are not solely responsible for how things happen in the classroom. Research shows that institutional context also influences instructional practices (Fairweather, 2008).

The word “context” implies “environment in which the features of the system are either reproduced or transformed” (Archer 1995, p. 11). HEI is an example of context, in which features of the instructional practice may be either reproduced or transformed. Archer’s definition of context is most applicable as he considers some of the ways in which institutional contexts may influence how change occurs with regard to instructional practice of instructors.
Contextual features of institutions (e.g., institutional structures, policies, etc.) interplay with the entity of human agency of instructors, and can result in the variability of outcomes in particular settings (Elder-Vass, 2010). HEIs are organizations of teaching and learning and they can influence any kind of change in instructional practices in form of constraints or opportunities (Trowler, 2008).

Support from the institutional context is important for successful change in any organization/institution. The whole change can fail due to incompatibility of the change with factors that are part of the institutional context (Weick, 1995). Thus, it is important to understand the effect of institutional context on change in instructional practices; how the institutional context are interpreted as constraints or opportunities to instruction, and how these interpretations influence instructional practices (Crandall et al., 2006; Weick, 1995).

A growing body research argues that instructional practice should be studied within a framework that is aware of the influence of Higher educational institutional context (Mansour, 2008). Instructional practice is a “reflection of their external context and cannot be properly understood without reference to that context” (Olson, 1988, p. 69).

For HEIs, important contextual features can include institutional policies about instructional tasks, role of instructors, and other aspects of their institution. Over time, instructors will repeatedly encounter certain contextual factors and become sensitized or accustomed to how these external factors act as constraints or affordances to instructional practice (Greeno, 1994; Greeno, 1998). As individuals internalize information and experiences from their environment, these factors become deeply embedded in the instructional practices through repetition, reinforcement, and attachment (Hora, 2012). Thus, while complex configurations of institutional factors at HEIs may shape the parameters of instructional practices, individual faculty make
sense of the institutional contexts under the influence of their own personal beliefs in tailored ways as they make decisions about instructional practice (Henderson & Dancy, 2007; Griffin & Museus, 2011). In broad terms, in examining why instructors teach in a certain way, instructors’ teaching behaviors are shaped by both instructors’ level factors and institutional context level factors (Angers & Machtmes, 2005; Au, 2007; Perfecto, 2012).

1.5.2.1 Institutional Factors Affecting Institutional Change for Sustainability

There is some literature focused on assessing the factors involved in bringing institutional change for EFS (Hover and Harder, 2015). Implementing and institutionalizing changes in curriculum and instructional to include education for sustainability takes a long time at the institutional level. Many aspects of institutional context cause a mismatch between instructional beliefs and practices; real-life factors, such as time, resources, and course contents, have an impact on the degree of beliefs-practice consistency.

Leal Filho and other researchers (2018) outlined a number of critical conditions for the success of sustainability initiatives based on case studies of universities worldwide (UK, Brasil, Spain, Serbia, Africa, and Syria) that have changed themselves to add EFS content in instructional practices; e.g., limited capacity of the curriculum of each program to integrate sustainability concepts, overall lack of awareness of university administrators about the importance of the issue of addition of EFS, resistance of some influential university authorities, lack of funding to support sustainable activities in classroom instruction, few financial rewards to instructors who transform their instructional practices, and the existence of hierarchical and stratified organizational systems that hinder the flexibility and the undertaking of integration activities for EFS.

1.6 Institutional Change for Teaching Sustainability in Western Michigan University
In the last two decades, an increasing number of educational institutions have adopted the agenda to integrate sustainability not only into universities' missions and physical operations but also into the curriculum (Martin and Samels, 2012; Rusinko, 2010; Barlett and Chase, 2004). Western Michigan University (WMU) has adapted sustainability efforts that feature "greening" efforts along with curriculum changes. The President of WMU signed the Talloires Declaration on January 1, 2008 (https://wmich.edu/sustainability/policies) which states that WMU will play an institutional role in higher learning and will be a leader in developing, creating, supporting, and maintaining sustainability. In addition, the university was named one of the best Green Schools in terms of higher education. This is due to its efforts to involve sustainability in their courses. WMU advocates and approves "campus sustainability initiatives and provides funding for student research". The university therefore serves as a leader in sustainability through conservation of energy, efforts to implement renewable energy, recycling and waste-reduction programs (School Construction NEWS, 2015).

1.6.1 WMU Policy for Making Sustainability an Essential Learning Outcome

In response to the calls for the transformation of education and the emergence of a new focus on sustainability and sustainability science, WMU has started to realign its priorities and programs, instituted new programs, and designed new structures to facilitate sustainability-oriented, interdisciplinary human-nature systems problem-solving research, and education.

WMU has created a new required curriculum for undergraduate students: WMU Essential Studies (WES). The program targets essential intellectual skills, identified as learning outcomes, by integrating and applying them in general education courses for undergraduate students. The new curriculum has five essential learning outcomes, with sustainability as one of those. WES has its own criteria about how sustainability learning outcomes should be integrated in courses.
1.7 Purpose of Current Research

Academic change for EFS requires the positive perspective of instructors towards change along with a supportive institutional context. There is a need to understand the barriers to implementation of EFS by investigating the issue from the perspective of instructors’ belief/attitudes and intuitional context. Using a case study approach, I will examine how one higher education institution in the U.S. (WMU) is making sustainability a part of the curriculum and what kind of challenges it encountered.

WMU was selected as a matter of convenience as it has created a new required curriculum for undergraduate students and they have targeted sustainability as an essential learning outcome, which makes it an ideal institution to study the implementation of institutional effort like policy change with regard to education for sustainability. There is little information in the literature about how institutional efforts like “policy changes” impact the situation of sustainability education. Thus, the implementation of WES is an opportunity to study the efficacy of such institutional efforts.

1.7.1 Research Questions

My research study explores how institutional factors and instructors are affecting the incorporation of sustainability education at Western Michigan University (WMU) through implementation of Western Essential Studies (WES). My main research question are as follows:

- What prompts WES instructors to incorporate sustainability learning outcomes in their WES courses?
- How is the WES institutional effort affecting education for sustainability within WMU?
• What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?

Data sources include interviews with key WES stakeholders (staff, instructors from a range of disciplines, Deans, Associate Vice Presidents and Vice Presidents) as well as written documents (WES proposals and course syllabi).

1.7.2 Significance of Study

This study will provide an insider's view of making institutional change within a higher education institution. Emerging from the outcomes of this case study are how the course curriculum, policy and programs of WMU have adapted to the institutional change of implementation of education for sustainability. This study will provide greatly needed insight into the conditions and situations important for initiating, administering, and implementing successful sustainability education programs at the university level.
CHAPTER 2
LITERATURE REVIEW

2.1 Overview of Literature Review

The literature on institutional change towards education for sustainability (EFS) is abundant, vaguely defined, and so fast emerging that it is impractical and infeasible to make an effort for full coverage or review (Pesqueux, 2009). There is a lack of literature in the area of factors that affect the success of institutional changes to bring about the implementation of sustainability education. This chapter focuses on literature related to instructional change, with a particular emphasis on institutional context and instructor beliefs, as well as studies relevant to EFS.

This chapter reviews different ways that instructors struggle with the problems related to teaching of sustainability in classrooms and instructors’ beliefs and institutional context that affect their instructional practice of integration of ideas related to sustainable development into their curriculum. Lack of incorporation of education for sustainability (EFS) in higher education is a problem, and an important part of the solution is to find out the instructors’ personal beliefs and external contextual issues that make it difficult for instructors to incorporate EFS in classroom. Therefore, a major goal of this literature review is to review the role instructors’ beliefs and institutional context play in teaching sustainability in classrooms in higher education.

As there is less data about institutional contextual, we will first review in general how institutional contextual factors affect instructional practice in HEIs and then examine the limited research about how these factors affect instructional practice in the context of education for sustainability.

2.2 Literature Selection and Delimitations
It is important to clarify how articles were selected for this review. Inclusion and exclusion criteria set the boundaries for the review.

2.2.1 Inclusionary Criteria

Our literature review draws on a selection of peer-reviewed publications in English. Major academic article databases, namely Google Scholar (https://scholar.google.com), Elsevier (www.sciencedirect.com), Emerald (www.emeraldinsight.com), Ebsco (www.ebsco.com), Scopus (www.scopus.com) and Springer (www.springerlink.com), were examined using keyword searches.

The intent of this literature review is to understand why EFS has not been implemented well in classroom instruction in Higher Education Institutions. This topic can be better understood by dividing it into smaller domains. Therefore, following the framework presented earlier (Fig 1.1), the two main topics under review are the following: (a) role of instructors’ beliefs in implementation of EFS in higher education, and (b) role of institutional context in implementation of EFS in higher education.

The inclusion criteria and keywords used for this literature search were the names of the selected domains plus some variations thereof, such as: “effect of instructors beliefs on instructional practices for sustainability” or “effect of institutional contextual factors on instructional practices” or “effect of institutional context on instructional practices for sustainability”. A literature search was conducted using online data bases such as ERIC via the Western Michigan University library and google scholar. It is important to note that the amount of literature available for each of the topics varies considerably. While the literature on the “education for sustainability” consists of hundreds of articles, research on the “impact of the
instructors’ belief and "institutional context" on instructional practices for "Education for Sustainability” results in less than 100 articles. The literature for review was further narrowed down by focusing on only those articles that have performed research in the higher education context, including universities, community colleges, post-secondary, and graduate schools. Many articles went through review, and many of them had to be discarded, mostly because these studies focused on teaching sustainability at the K-12 level or vocational education. These articles don’t translate into higher education for several reasons. First, there is a deeply-embedded chasm in preparation for instructors which divides K–12 from postsecondary/university level education in the United States (Kirst & Usdan, 2009). The preparation of K-12 teachers and HEI faculty are quite different. K-12 teachers get formal training and continued professional development. In HEIs instructors are considered content experts and they often plan their courses on their own. Prior to teaching, they typically spent years doing research in their disciplines. In contrast to K-12 instructors, they often have little to no prior teaching experience or formal training in pedagogy. Second, regarding institutional context, K-12 is highly driven by mandated state standards and assessment. In HEIs, the standards of academic freedom dictate that faculty own the curriculum and make the primary decisions of what and how to teach. So, because HEIs and K-12 are so different in both instructors’ beliefs and institutional contexts, I did not use K-12 studies for reviewing how instructors’ beliefs and institutional contexts affect instructional practices for sustainability.

The relatively new area of EFS in higher education suffers from a lack of empirical data and academic case studies. So, when I didn’t find papers on what factors that influence instructional practice related to EFS in HEIs, I reviewed broader literature about factors influencing instructional practice in science education, including the subject of environmental education and
other science disciplines. So, the scope of this review was further limited to studies related to instructors who were involved in general STEM education and specifically sustainability education in higher education institution, contextual problems faced by instructors in implementation of EFS, and different factors which impact their instructional practice for EFS.

2.2.1 Exclusionary Criteria

Since the review was conducted to identify factors affecting instructional practice for EFS, papers on student learning of sustainability, learning outcomes of sustainability instruction and specific instructional methods to teach sustainability in specific department were excluded from the review. Studies focused on teaching sustainability at the K-12 level or vocational education were also excluded.

2.3 Instructor’ Beliefs and Its Impact on Institutional Change for Teaching Sustainability

The words belief and attitude have been used interchangeably in educational research (Andersen, 2011). For this literature review we will use the term beliefs broadly to refer to beliefs, attitudes, and other similar constructs. According to researchers, beliefs cannot be directly observed or measured but must be inferred from what people “say, intend, and do” (Pajares, 1992, p. 314). Educational beliefs of instructors would include, but not be limited to: beliefs about knowledge/ nature of knowledge, the nature of the discipline, and self-confidence in the ability to perform tasks. There is a profusion of terms used by scholars to describe and study aspects of instructional thinking. For example, in his review of 13 studies on faculty thinking, Kember (1997, p.256) noted that researchers had used the following terms: “orientations, conceptions, beliefs, approaches, and intentions”. In research pertaining to the
construct of beliefs, Kember (1997) found that the term “beliefs” was less commonly used in the 13 studies he reviewed, but that in practice they were consistent with the term “conceptions”.

A growing literature suggests that instructors’ beliefs have great influence on their perceptions, and that these in turn affect their instructional practice (Nespor, 1987; Pajares, 1992). Pajares (1992) examined the nature of belief structures defined by key researchers in the field and synthesized their findings. “Beliefs influence how individuals characterize phenomena, make sense of the world, and estimate covariation.” (Pajares, 1992, p. 310) Another definition of belief was similar: “A belief system is a set of conceptual representations which signify to its holder a reality or given state of affairs of sufficient validity, truth and/or trustworthiness to guide thought and action” (Harvey, 1986, p.660). Kagan (1992) refers to beliefs as a “particularly provocative form of personal knowledge” (p. 65) and argues that most of an instructor’s professional knowledge can be regarded more accurately as belief.

2.3.1 Literature on Impact of Instructors’ Beliefs on the Teaching of Sustainability

In this section, I discuss research studies that show relationships between instructor beliefs about sustainability/EFS and instructors’ efforts to implement change in their instructional practices to integrate EFS in their courses.

Different instructors in HEIs perceive and consider sustainability phenomena differently (Scott and Gough 2003; Winter and Firth, 2007). For example, one study investigated the different ways instructors understand sustainability and how it impacts the way they teach about sustainability (Reid and Petocz, 2006). The study comprised a series of interviews with 14 lecturers across a variety of disciplines who were involved in teaching postgraduate students,
asking them a series of questions about their beliefs and attitudes towards sustainability and their
teaching about it.

The authors identified a range of concepts about instructor beliefs about what sustainability
means; dimension one, and about incorporating sustainability ideas into their instruction
;dimension two. Each dimension was broken into 3 major categories.

Instructors’ ideas about “meaning of sustainability” were categorized into three conceptions:
Distance, resources and justice. According to researchers each conception represents a broader
vision of sustainability than the previous one:

a. Instructors in first category was named “distance” as they were keeping sustainability
as essential aspect of their response, but they avoid further engagement with the
concept. Instructors from this category approached the concept of sustainability via a
dictionary definition of sustainability as “‘keeping something going’” and. It was the
narrowest vision of sustainability.

b. Instructors in the second category named “resources” approached the concept by
focusing on various resources, e.g. non-biological resources (minerals, water, soil) or
biological resources (fisheries, crops), or human resources (minorities languages,
overpopulations, economic development). Most instructors studied were found to be
in this category.

c. “Justice” was the broader vision about sustainability. Instructors in this category
approached sustainability as an equitable share of resources among different
generations and within the same generation as well.
The instructors were incorporating EFS in their instructional practices in different ways. The study found that instructors incorporated EFS into their courses in three ways; disparate, overlapping and integrated.

a. Disparate: Instructors were approaching sustainability via its dictionary definition of “keeping something going on” or the “‘green’” approach and they didn’t bring any change in their instructional practices. These instructors considered sustainability as an unrelated activity to their course contents and any part of the teaching engagement. They were not teaching about sustainability in their classrooms.

b. Overlapping: Instructors in this category did not mention sustainability explicitly in their classrooms but they were overlapping it to some extent with course topics. They incorporated the concept of environmental or cultural sustainability within the examples and problem situations they teach.

c. Integrated: Instructors were intrinsically connecting sustainability with teaching of all course contents. Instructors also encouraged the behavioral change in students regarding sustainability and incorporate it in their research planning.

The researchers concluded that most instructors had low awareness of issues of sustainability, and they were not integrating issues of sustainability into their teaching. Instructors’ limited views of sustainability led to limited incorporation of sustainability into their courses. Instructors with the narrowest vision of sustainability see sustainability as a bit of a nuisance, and possibly an interruption towards the real objective of course. Few instructors hold a broader vision and understanding of sustainability and they were bringing many changes in their classroom instruction; they were integrating sustainability in several key content of courses.

Language for sustainability was not a part of most instructor’s vocabulary. Indeed, most
instructors used very simplistic ways of defining sustainability and they were unaware of the holistic understanding of sustainability. The authors concluded that development of instructors' thinking toward these more integrated levels of sustainability can help in the reframing of instruction practice for EFS and curriculum development.

Sammalisto et al., (2015) conducted a case study at the University of Gavle, Sweden to explore and gain an understanding of sustainability and integrating it into instruction. Faculty and staff had received training in sustainability. A total of 783 surveys were sent to the faculty and staff by e-mail and total of 312 (response rate 40%) anonymous replies were received. Data was analyzed using different sets of criteria: (1) the component of sustainability that is being taught (ecological, social or economic), (2) instructors' perception of their role in sustainability instruction, and (3) instructors’ definition of sustainability.

Sustainability components are being taught: Results showed that 67% of instructors reported that they changed their instructional practices for inclusion of EFS, e.g., they incorporated sustainability in their curriculum, teaching materials, course evaluations, classroom discussions, and in case studies. The ecological component (74%) dominated the instructional practices for EFS. Environmental dimension was reflected in the theme named “saving resources”, such as waste separation and saving energy (43%), and “Using more IT/Technology” (9%). EFS practice was largely perceived to be directed towards ecological aspects; agreeing with the findings of Segalàs et al. (2019), Watson et al. (2013) and Wright & Whilton (2012). The social sustainability aspect of EFS was almost a quarter, 22%. The social aspect of sustainability (6%) was reflected in theme of “Promoting health” for various groups and a good working environment for oneself and colleagues. Instruction for economic aspect of EFS was very low, 4%. An example of instructors’ understanding of the economic aspect of EFS as teaching
“product life cycle from an economic/marketing perspective and relate it to the subject and “translate” the phases in the course content.”

A few themes represent one of the main goals of EFS, such as “long-term thinking” (4%) and “Holistic thinking” (4%) which characterize “thinking a bit further. “Discussing concepts” (2%) and “Critiquing EFS concept” (2%) include discussing concepts and knowledge as well as questioning and criticizing the whole sustainability concept, probably both in education and in answering the survey itself. The first statement illustrates a constructive EFS integration, whereas the second one asserts EFS has nothing to do with the support of academic freedom expressed in the university policy.

Some general themes about sustainability instruction were reported by authors: Such as “Providing information” to increase awareness and informing about sustainability (8%), “Promote/ inspire” for driving sustainability across classroom (6%) and “Following policy” (6%) includes goals and guidelines. “Discussing values/approaches” (6%) includes understanding nature developing the ability to evaluate an discuss worldviews and approaches.

A few of the instructors (6%) said that did not bring any change in their instruction with regards to EFS. They didn’t understand how to integrate EFS in their instructional practices as it seem unrelated. One instructor mentioned “sustainability is a lifestyle/an approach, which you cannot teach. I mean that it is a political statement and then it needs to be discussed WHAT you can do in education.” Only 2% of instructors perceive introducing EFS practices such as waste management and EFS content in courses as adding irritating requirements due to political correctness. Most instructors had clear ideas about what EFS means in their practical functions, which indicates a movement towards EFS integration in the university.
This study indicated that sustainability integration is happening in HEIs, but that the reasons and extent of integration differ within departments and individuals. There were differences in perceptions of the concept of sustainability and there was a lack of a single general definition of sustainability. The findings show that those instructors who have demonstrated holistic, long-term thinking and a broader sustainability vision were a minority. Thus, sustainability implementation, transformation and institutionalization are taking a long time. There was a wide variety of perceptions of sustainability and EFS among faculty and staff in different parts of the university. Sustainability as an ecological resource question dominates, but some instructors perceive sustainability in a wider context; long-term perspective with a holistic viewpoint. This is similar to findings by Sterling (2004) and Dobes (2001). The authors suggest that a broader vision of sustainability by all university instructors and staff would lead them to include all the aspects of sustainability in instructional practice.

One study was conducted by (Cotton, et al., 2007) to understand instructors' conceptions, understandings, and attitudes about sustainability as well as their beliefs about incorporating EFS into the HEIs curriculum. Researchers used an online survey which was sent to instructors from a variety of departments about their beliefs of appropriate instruction for EFS and asks about potential opportunities and barriers to the incorporation of EFS into HEIs. A total of 328 responses were received (response rate: 29%). Analysis of the survey suggested that instructors were broadly representative of the of instructors as a whole in terms of gender, age and contract status (full/part-time).

Results showed that instructors rated their understanding of the concept of sustainability as poor (5%), very good (11%); satisfactory (34%) or good (24%). When instructors were asked about their beliefs about bringing any change in their instruction for incorporating sustainability;
54% of the 328 instructors agreed that aspects of sustainability should influence their instructional practice, but only 18% (62 responses) of instructors expanded on their beliefs when asked about incorporating sustainable development into the higher education curriculum; They linked sustainable development with experiential learning and empowering students to take action. Some instructors who claimed that they had added EFS in their classroom practice were not integrating sustainability into course content. They believed performing sustainable practice in classroom, e.g. use electronic methods instead of paper to save resources, is a more appropriate way of engaging with sustainability in classroom. The most cited reason for not incorporating EFS in their course content was that sustainability is a “controversial and contested subject” (p.13). The results were confirmed in interviews. Instructor labeled EFS as “contentious issue” “complex”, “irrelevant” “imposing beliefs” and “doctrine” (p.13,14). These result indicated inconsistency about the links between 1) instructors’ understanding about sustainability and 2) instructors thinking about bringing change in classroom by making sustainability part of instructional practice and curriculum.

2.3.2 Summary of Literature Review on Instructors

Many findings regarding academics’ understanding of EFS and their instruction related to EFS, have some commonality. Studies have found academics’ perceptions of EFS to be a major inhibitor to EFS curricula inclusion. It is hard to implement sustainability because sustainability is a poorly developed concept and instructors lack a full understanding of it (Jickling and Wals, 2008). Academics who understand sustainability in a limited way tend to teach it in a limited way; thereby leading their students to similar limited understandings (Cotton et al. 2007; Prosser and Trigwell 1997; Reid and Petocz 2006)
Most instructors overemphasize the ecological aspect/environmental dimension of sustainability. This results in keeping the concept of sustainability at a distance from instruction because it is missing a holistic perspective that combines the social and economic aspects of sustainability along with ecological aspect. As a result of these limited conceptualizations, some research studies show that either 1) instructors can't find a way to connect sustainability with their course topics, so they avoid engagement and teaching about it; or 2) instructors only focus on the ecological aspect of sustainability. Instructors’ beliefs could be situational and are manifested in instructional practices in relation to the other opportunities/constraints of the classroom or whole institution. The next sections explain how the institutional context affects the process of institutional change for teaching sustainability.

2.4 Institutional Context of Higher Education and Its Impact on Teaching Sustainability

The higher education system is hierarchical and stratified. The hierarchy of HEIs is composed of three main levels. At the center is the technical core of the whole system where professors are teaching, and students are learning in their classrooms and laboratories. The second and middle level is the managerial level where administrators (such as department Heads, college Deans, etc.) are buffering and bridging between the other two levels. Finally, the outer level is the institutional level where administrators, like university presidents and their support staff, are dealing with the external institutional environment (Thompson, 2003). HEIs are also stratified with research intensive universities occupying the highest level, the comprehensive universities focusing on mass higher education, and the universities of technology facilitates the acquisition of technology-based qualifications. This hierarchy and stratification of HEIs creates distinct type of the institutional structures of HEIs with varying institutional type and culture. This distinctiveness reflects the unique aspects of institutional context of HEIs which is an important guide to
institutional activities including instructional practices, strategic planning, curriculum planning, and student affairs. Given this hierarchy and stratification of context of HEIs, it can be argued that it is necessary to explore the aspects of institutional context that influence teaching activities and changes in it (Leibowitz et al., 2015).

Many aspects of institutional context cause a mismatch between beliefs and practices; real-life factors, such as time, resources, and course contents, have an impact on the degree of beliefs-practice consistency. Few higher education researchers have explained the subtle interactions between contextual factors and faculty work (Lande & Mesa, 2016, Lattuca, 2005). The institutional conditions/factors of HEIs that have been commonly examined by researchers include institutional policies, regulations, practices regarding promotions, logistical factors, collaboration, disciplinary environment and governance which are operating at institutional and departmental levels (Leibowitz et al., 2015; Barman et al. 2014; Hora, 2012; Henkel, 2000; Deem and Lucas 2007). These organizational factors influence instructional practices in HEIs and can inhibit the adoption of new instructional practices (Mathieson, 2011; Kaatrakoski et al., 2016, Hora, 2012, Crandall et al., 2006).

2.4.1 Literature on Institutional Factors Affecting the Teaching of Sustainability

This section will analyze how instructional practices for EFS are being affected by organizational factors of higher education. While the effect of organizational factors on instructional practices has been researched to some extent (as described above), little work exists on examining the impact of institutional contextual factors on instructional practices for complex issues like sustainability.
Within HEIs, the sustainability agenda has not evenly spread across disciplines. There are research studies about instructor beliefs about sustainability and instruction for it (mentioned in the previous section) but there is limited empirical evidence about the influence of organizational factors on EFS instructional practices in HEIs (Martin et al., 2014; Shriberg & Tallent, 2003). There are a few studies (e.g. Leal Filho, 2018, 2002; Shriberg, 2002; Velazquez, et al., 2005) that have examined sustainability initiatives implementation in higher education. Leal Filho and other researchers (2018) outlined a number of critical conditions for the success of sustainability initiatives based on case studies of universities worldwide (UK, Brasil, Spain, Serbia, Africa, and Syria) that have changed themselves to add EFS content in instructional practices. Instructors faced many institutional barriers during the change in their instructional practice towards EFS: limited capacity of the curriculum of each program to integrate sustainability concepts, overall lack of awareness of university administrators about the importance of the issue of addition of EFS, resistance of some influential university authorities, lack of funding to support sustainable activities, few financial rewards to instructors who transform their instructional practices, and the existence of hierarchical and stratified organizational systems that hinder the flexibility and the undertaking of integration activities for EFS. According to Leal Filho et al (2018), the origin of challenges to all efforts of instructors to integrate EFS in instructional practice is often found in the traditional segregated and compartmentalized structure of universities. Velazquez and other researchers (2005) reviewed the literature to identify general factors that restrain the implementation of sustainability initiatives in HEIs. This research also showed that the slow pace in HEIs’ movements for EFS has been particularly influenced by the decentralized organizational structure of the institution and institutional resistance to change in general.
As HEIs try to respond to the calls for instruction for sustainability few studies provide an in-depth understanding of what is involved in the process. Different kinds of social, economic, and political components of the organizational structure of HEIs are involved in instruction for sustainability. There is little understanding of the complexities between dynamics of instructional practices for EFS, and organizational structures. So, in the following sections I discuss literature about how institutional context factors generally and specific to EFS interplay with institutional change with regards to instructional practices. I will explain how faculty perceive different factors as constraints or affordances to their teaching practice, and how these interpretations influence their instructional practices.

2.4.1.1 Lack of Policies and Lack of Policy Implementation for Change in Instructional Practice

Institutional policies are the most commonly reported challenge to mainstreaming change in instructional practices for EFS (Englund et al., 2018, Leibowitz et al., 2015; Barman et al. 2014, Hora, 2012). Funders, policymakers, and instructors have been increasingly investing efforts through policies and educational initiatives to change instructional practices in sciences and math disciplines at the undergraduate level of HEIs, but institutionalization of such changes is uncommon. (National Research Council, 2005; Seymour, 2001, Bok, 2007).

Until a few years ago, the existence of policies for backing sustainability education initiatives in classrooms was rarely found in universities and when they existed, policy enforcement was lacking and not truly effective in guiding daily campus activities (Wright, 2002). One research study (Salvioni et al., 2017) observed the sustainability policies and governance orientation, through the analysis of the data available on the websites of 3 types of universities (20 universities in each group, total n=60) in the international Top 500 Academic Ranking of World
Universities 2015 ranking. The aim of the study was to understand the degree of sustainability education culture in universities. Analysis of website information was compared with STARS (Sustainability Tracking, Assessment & Rating System) self-reports from the same universities. Results found that 21% of universities (n=13) had an EFS plan, 13% universities (n=8) showed reference to sustainability activities in the action plan, 18% universities (n=11) showed presence of a sustainability report, and 53% universities (n=32) showed unorganized, outdated or incomplete information about sustainability activities in campus. Results showed that more than half of universities in the standings denote an insufficient integration of the principle of sustainability education in the policy of the university. Universities made commitment towards disseminating and studying sustainability principles rather than their integration in university governance and culture so it ultimately failed to impact instructional practices in classroom.

Many HEIs have signed national and international declarations and made commitments to integrate EFS in their system but they have not created their own institutional policy to make sustainability a part of classroom instructional practice. Even institutions that do create policies for sustainability education initiatives typically lack monitoring, assessment and reporting so the initiatives are not implemented (Wright 2002, 2004). One research study (Moore, 2004) was conducted to understand barriers in implementation of sustainability instruction in a university. The university had created its policy which stated that the university “seeks to become a center for teaching and learning about the skills and actions needed to manage ourselves in a sustainable way”. The University was also committed to improve its performance in sustainability at an operational level. Moore collected data from interviews, and he triangulated it with university policy documents, and with documented observations made during researcher involvement in sustainability dialogues on campus. Results showed lack of clear evaluative structures for
university policy and plans (i.e. lack of policy implementation). The current institutional policy for sustainability outlined the need for changing instructional practices for EFS, ecological literacy and sustainability education and result showed that practically few sustainability education programs were happening at the university.

2.4.1.2 Instructor Awareness of Institutional Policies

Most HEIs are bottom-up institutions where instructors’ practice on how to achieve goals - educational and research – is formulated by individual instructors, department structures, faculty governance and faculty control of the curriculum (Kezar & Holcombe, 2017). This academic autonomy is often considered as indispensable in HEIs (Kezar & Eckel, 2002). In general, instructors decide what to teach and how to teach; with little guidance from other stakeholders; though professional bodies, accreditation organizations, the public and student opinions can play a role (Goodlad, 1988; Åkerlind and Kayrooz 2003). Under these circumstances, bringing any institutional change in HEIs is extremely challenging if instructors are not part of it.

Curriculum frameworks and policies mandated by institutions carry the most influence if instructor participation is involved in the creation or revising of the curriculum and/or course of study for their institutions (Grant, 1996; Louis, Febey, Schroeder, , 2005). This participation serves to create content connections, purpose, and to illustrate the value of the professional educator’s authority and discretion concerning teacher-as-gatekeeper of the curriculum (Thornton, 2006; Grant, 1996).

The autonomous freedom of instructors and top-down efforts that aim to create changes in teaching and learning become obstacles to implementation for EFS (Scott and Gough, 2006). Commonly, administrators and authorities sign decelerations on sustainability education and
develop institutional policies for EFS without an input from instructors who are expected to implement those policies. Projects and policies that address key sustainability issues fail to reach the faculty, staff, students, and they fail to be a part of the collaboration culture of the institutions (Barlett & Chase, 2008, Kilinc & Aydin, 2013, Gudz, 2004 and Krizek et al., 2012). This leads to failure in creation of the desired changes in curriculum and instructional practices for EFS (Wals & Blewitt, 2010, Christie et al., 2015).

Hoover and Harder (2015) used qualitative methods to analyze 13 HEIs related to change towards sustainability. The goal of the study was to find hidden organizational complexities behind poor implementation of sustainability education in HEIs. Their study showed that lack of knowledge and awareness among faculty about their respective HEIs’ commitment towards sustainability had weakened the performance of sustainability education programs in these universities. Another study was conducted by Shriberg & Tallent (2003) to understand how sustainability declarations and institutional sustainability policies are being implemented in 59 HEIs. As part of the study, they collected data from participants at all levels of the educational hierarchy. Their findings showed that instructors were not implementing EFS in their instructional practices. These instructors generally have positive opinions about sustainability, but they do not know how to translate it into their instructional practices in different disciplines because HEIs have not communicated with instructors about the sustainability policy nor have they given any clear guidance in their policies that can help instructors to translate sustainability into their instructional practices. Their findings showed that about 75% of respondents were unaware of their university’s commitment to sustainability. It is hard to effectively implement institutional sustainability policy when key stakeholders in the university fail to understand the policy and the importance of its implementation.
2.4.1.3 Institutional Research-Intensive Culture

This factor describes the impact of research-focused policies of HEIs on instruction. Some HEIs are described as having a research-intensive status which is foregrounded in their institutional culture and practice (Leibowitz et al, 2014). Research-intensive status is an institutional category that means that specific HEI has a high degree of research activity (Carnegie Foundation, 2009). Expectations for research productivity are included in departmental recruitment, tenure, and promotion policies. These policies set standards and criteria for what is admissible as evidence of productivity and what will be valued and rewarded when hiring and promoting instructors. Research shows that in many HEIs, these policies prioritize research productivity over teaching and service which results in slow progress towards institutional change for instructional practice (Casanova, & Price, 2018).

There was a lack of research on understanding the impact of “research intensive” status of universities and instructional practices for EFS. One review (Wals, 2014) on the teaching and learning processes for EFS was done in higher education. It showed that most of the universities that engage in EFS have a focus on education rather than on research. The more research-intensive universities are less interested in curriculum change, generally (Brownell & Tanner, 2012). Universities with a strong research focus tend to pay less attention to both EFS and sustainability in general.

2.4.1.4 Lack of Collaboration Culture Among Instructors

Collaboration and communication among instructors is associated with a departmental culture of reflection and collaboration and discussing of instructional methods which will lead to improvement of performance and skills of instruction at institutional level (Daniels, 2011). Collaboration and opportunities for dialogue among instructors is a mediational tool to solve
tensions and facilitate collaborative solutions to emergent contradictions about institutional change with regards to instructional practice (Wertsch, 2007). As mentioned before (section 2.3.1, “Research about the effect of instructor beliefs about sustainability on the teaching of sustainability”), instructor beliefs about instruction become explicit after collaboration and reflection between instructors. So, instructional practice can be changed if instructors share the new information about their teaching profession with each other, which will ultimately influence the instructional practice within a department or institution (Lauten, 1996). Mostly, this will be the result of an external incentive, direction, motive or pressure provided by: colleagues, superiors (representatives of the institution), the department, and the institution (Ernest, 1998). Co-workers have a strong effect on the motivation to change beliefs and instructional practice. If some members of the department are trying a new instructional practice, it is often more comfortable for others in the department to do so (Henderson, 2007). Many researchers indicate that it is the collegial sharing of ideas, experiences, failures, and successes that play a crucial role supporting change in instruction (Baldwin, 2009; Bender & Weimer, 2005; Burks et al., 2009; Gess-Newsome, 2015).

Differences among instructors' knowledge and belief about instruction are evident in varying academic organizational cultures which result in divergent disciplinary teaching and instructional practices, where different and conflictive conceptions of teaching and learning become apparent (Becher, 2001; Neumann et al., 2010; Lee, 2007). The departmental culture of collaboration and communication influence the change and improvement in instructional practice (Leibowitz et al., 2015) where lack of communication and collaboration with colleagues lead to lack of consensus among instructors and it has been experienced as a constraint.
There was not enough data to analyze how collaboration among instructors impacts the institutional change with regards to instructional practice for incorporation of EFS.

2.4.1.5 Restricted Disciplinary Approach

Disciplinary boundaries are based on internal cohesive attitudes, conceptualizations, and values of an academic discipline that serve to distinguish it and separate it from other disciplines (Wang, 2018). HEIs maintain disciplinary boundaries because they are thought of as are necessary to maintain order and structure of HEIs. The rigid “one-size-fits-all” model of the institutional organizational structure leads to discipline-based and department-based silos, restricted curriculum and resistance to innovation and risk (Klein & Martin, 2012). According to Trowler and Knight (2002), HEIs are too rigidly entrenched in disciplinary culture to bring an interdisciplinary change in their departments and institutions. HEIs are culturally simple organization, with all activities fitting into "a small number of pigeonholes". Interdisciplinary instruction complicates the problem of “contextual simplification” because it cut across boundaries of pigeonholes and HEI are too conservative to bring that change.

Wright (2002) outlines the common themes in HEI approaches to sustainability education, including developing an interdisciplinary curriculum. A key problem in fostering sustainability education in HEIs is that a lack of interdisciplinary education hinders the infusion of the holistic perspective of sustainability; economic, environmental, and social perspectives. Stimulating interdisciplinary education has been one of the most difficult tasks in universities (Velazquez et al., 2005). Often, there is insufficient coordination and collaboration among instructors in the different academic units (Capdevila et al., 2002).

Disciplines differ in the questions they ask and the tools they use to answer them. Disciplinary differences in approaches to analyzing and interpreting the world create barriers that
can be difficult to overcome. Sustainability problems cross-cut so many dimensions of socio-ecological systems that strictly discipline-based approaches can be inadequate (Miller et al., 2011). Consequently, putting together a curriculum that integrates different disciplines in a coherent manner is challenging. A transdisciplinary approach can help science instructors address complex and real-life problems with high social and environmental relevance (Gaziulusoy and Boyle, 2013), which are main characteristics of EFS. It has been reported that in some disciplines, sustainability issues are marginal or non-existent (e.g., mathematics, psychology) but they have an increasingly higher profile in others (e.g., geography and environmental science) (Dawe et al., 2005). Levinson et al., (2002) showed differences between science and humanities instructors. Science instructors consider their role to present the ‘facts’ of their subject, while humanities instructors are more confident covering general ethical and social issues.

An action research study conducted by Moore (2004) is a good example of “disciplinary boundaries” as a constraint to EFS implementation. Moore conducted in-depth interviews with 30 participants to check their understandings and beliefs about the barriers to implementation of EFS in the University of British Columbia. The researcher mentioned that his intention behind choosing "action research as a methodology" was to create change. He mentioned that he wanted to bring changes in attitudes and understandings of members of the university community towards EFS so they can recognize the importance of implementing the EFS policy. The researcher did two rounds of the interviews. The first round consisted of a population of instructors only. He asked those participant instructors to identify other individuals of importance. His second round of interviews was focused on administration and faculty who were considered more influential in the campus initiatives for EFS as they were working in academic programs and departments; Deans, Associate
Vice-Presidents and Vice-Presidents. Results were based on thematic analysis of the opinions of participants.

The most commonly found barrier to the implementation of EFS reported by most respondents was "the disciplinary environment". Although the UBC strategic Plan supported and promoted interdisciplinary education, the university was closely tied to disciplinary boundaries (e.g. departments of sociology, biology, history, etc.) There were other interdisciplinary programs, including Interdisciplinary Arts degree, Integrated Sciences Program, and Individual Interdisciplinary Studies. Yet, many instructors mentioned that for EFS infusion in instructional practices, there is the need for more interdisciplinary programs. Instructors mentioned that "sustainability issues are interdisciplinary in nature, so it is imperative that undergraduates be exposed to the problems and products of interdisciplinary thinking and research."(Moore, 2004)

Instructors mentioned that UBC is discipline-centered, and they teach subjects to undergraduates as if "they were arranged in tidy boxes". The critique of the disciplinary nature of UBC matched the concept of "pigeonhole" mentioned by Knight and Trowler (2002) in the section of "Restricted disciplinary boundary".

Several instructors were quick to blame disciplinary boundaries for a range of problems in the university. They also recognized that the system produces ‘excessively specialized’ experts. One instructor acknowledged that instead of finding the best interdisciplinary instruction practices for EFS, EFS itself can be used to help in starting the organizational culture of interdisciplinarity on campus. Another instructor discussed that the existence of different disciplines itself act as a barrier towards EFS implementation. Instructors preferred to have different subjects or concepts which can organize universities. "I believe that disciplinary boundaries are not useful in any truly
meaningful way. Sustainability is a perfect example of a subject that should not be constrained to one discipline".

One instructor also mentioned that "most of the major global problems are not disciplinary in nature (i.e. climate change, overconsumption, poverty, global trade issues. All of these topics are closely related to the concept of sustainability and it is commonly assumed that problems like these can be solved only with an interdisciplinary focus. HEIs can help prepare students to face these types of problems through EFS.

2.4.2 Summary of Literature Review on Institutional Factors

A substantial body of literature exists in research on HEIs that describes the influence of institutional context on instructional practice. Numerous contextual factors affect the nature and extent of the measures taken to accomplish change at the institutional level. A review of articles about the role of institutional context of academic institutions related to instructional practices reveals three important contextual factors: (1) institutional policies and regulations, as well as institutional policies regarding promotions, (2) institutional culture of collaboration among instructors, and (3) bounded disciplines at institutional and departmental levels.

(1) Institutional policies: Research has shown that generally institutional policies do not pay much attention to improvement of instructional practices. Many HEI policies prioritize research productivity over teaching and service which creates slow progress towards transforming of instructional practice. Further, when policies do relate to instructional practices, many instructors are not aware of the policies. Instructors who were supposed to implement those policies were unaware of the institutional sustainability policy which weaken the performance of sustainability education programs in these universities.
(2) **Collaborative culture:** Collaboration is associated with the departmental culture of reflection, collaboration and discussion of instructional methods among instructors. Instructional practice can be changed if instructors share the new information about their teaching with each other, which will ultimately influence the instructional practice within a department or institution.

Lack of communication and collaboration among instructors leads to silos in higher education. Research shows that departments where instructors worked in a less collaborative fashion, exhibit less favorable climate for teaching discussion and lack of exchange of new ideas for changing instructional practices. Researchers suggest that collaborative institutional culture can help spread institutional projects and policies that address key sustainability issues to all faculty and staff members which can increase the instructors’ awareness about the importance of teaching the concept of sustainability and instructors can shared same definition of EFS and implement it in their instructional practices. In the context of EFS, there was not enough data in the literature to analyze how collaboration among instructors impact the change in instructional practice for incorporation of EFS.

(3) **Disciplinary boundaries:** Disciplinary boundaries restrict inter and transdisciplinary collaboration that impedes instructional change to integrate specific knowledge and expertise such as EFS. The administrative structure in HEIs continues to be governed through the disciplinary division of departments, which leads to fragmentation and segmentation of curriculum in each department, resulting in a lack of integrative and connective instructional practices which are important for EFS.

In the context of EFS, there is also not enough research to see how strict disciplinary boundaries hinder instructional change for the interdisciplinary nature of EFS. Few research studies show that instructors reported that the university had a strong policy for the implementation
of EFS but discipline-centered subjects face problems in integration of EFS in their restricted discipline. Instructors often blame disciplinary boundaries for a range of problems in implementation of EFS in instructional practice in the HEIs.

2.5 Conclusion

This chapter has explained though literary evidence that HEIs are trying to change their educational landscape for infusion of EFS into instruction and why these efforts to bring a change are not usually successful. Literature shows that efforts to change instruction to making sustainability a part of instruction have not been successful because of resistant beliefs of instructors against sustainability and unsystematic partial measures at the organizational level of HEIs which have not generally touched core instructional practices for EFS.

There have been various studies of instructors and change in HEIs that show instructors are key actors in HEIs who shape the learning environment. Since instructors are central to preparing and organizing any changes in instructional practices in HEIs, it is important to be aware of the factors that affect instructors’ practice. Both instructors’ personal beliefs and institutional context factors can play either a role of restrictions or opportunities towards instructional change. Instructors make sense of the organizational contexts under the influence of their own beliefs in tailored ways as they make decisions about instructional practice.

A substantial body of research exists on HEIs that relates instructor beliefs to instructional practice. These tend to have been studied in isolation from other contextual factors of higher education institutions. Few HEIs researchers have explained the subtle interactions between institutional contextual factors and instructional practices in isolation from influence of instructors’ personal beliefs on instructional practice. Similarly, little experimental research exists that examines the specific mechanisms underlying the complex relation among personal beliefs and
organizational contextual factors and instructional practice in context of integration of EFS in instructional practices at higher education.

Instructors’ beliefs have a major influence on day-to-day decisions about what to teach, what to skip, and how much class time to devote to particular topic. Instructors’ beliefs have a powerful impact on the practices of teaching during their transformation into practice. But some studies have shown the relationship between instructors’ beliefs and their practices were not very strong. Inconsistencies between instructors’ beliefs and practices exist due to the complexities of classroom or institutional context, which may constrain instructors’ abilities to follow their beliefs and provide instruction.

In context of EFS, when instructor beliefs about sustainability was compared to instructional practice, it was found that instructors with a higher degree of awareness of issues of sustainability had greater integration of EFS in their teaching. Instructors who had less awareness of issues of sustainability had less integration of sustainability into their teaching. In general instructors had very limited understandings of sustainability, such as an “ongoing process”, and think of sustainability as a bit of a nuisance, and possibly an interruption towards the real course objectives (Reid and Petocz, 2006).

Instructors who demonstrate holistic, long-term thinking and a broader sustainability vision were a minority (Sammalisto, Sundstrom and Holm, 2015). Some research studies show that instructors have low awareness about sustainability and perceive their role as not so important (Derahim et al., 2012). And some research studies show that instructors have limited knowledge of sustainability but a strong positive attitude towards sustainability, and they understand their major role in EFS (Yuan et al., 2013).
The second part of the literature review was related to literature about the influence of institutional context on instructional practice. Contexts influence how individuals respond to change and can serve as either affordances or constraints. In HEIs, organizational structures interfere with or reinforce the instructional practices of instructors and produce different instructional practices. The organizational conditions/factors of HEIs which have been commonly examined by researchers include institutional policies, regulations, institutional policies regarding promotions, logistical factors, collaboration, and governance which are operating at institutional and departmental levels.

Policies in higher education institutions are not often focused on improvement of instructional practices. When policies are, many instructors are not aware of them. Many HEIs policies prioritize research productivity over teaching and service, which creates slow progress towards transforming of instructional practice. (Hora, 2012)

In the context of EFS, there was not enough data to analyze how institutional policy impacts the change in instructional practice for incorporation of EFS. Most research studies on sustainability policies mentioned the impact of signing sustainability declarations on the culture of an institution. But, there has been little research on the impact of HEI educational policies on instructional practice for EFS. Some institutions create policies for sustainability education initiatives but they lack monitoring, assessment and reporting, resulting in lack of implementation of sustainability instruction (Wright 2002, 2004). There were not many research study studies on the impact of “research intensive” status of university and instructional practice for EFS. One review (Wals, 2014) found that universities with a strong research focus tend to pay less attention to both EFS and sustainability in general.
Collaboration and communication culture of departments is also an institutional factor that can affect performance and skills of instruction, whereas the lack of communication and collaboration with colleagues lead to lack of consensus among instructors and it has been experienced as a constraint (Leibowitz, 2015). In the context of EFS, there were not enough studies to allow us to say anything about how collaboration among instructors impacts the change in instructional practice for incorporation of EFS.

The disciplinary boundaries of HEIs restrict inter and transdisciplinary instructional approaches. HEIs are frequently too rigid and firm to bring an interdisciplinary change in their departments and institutions. There is lack of interdisciplinary activities due to discipline and department-based silos, restricted curriculum, resistance to innovation and risk, and separated infrastructure (Klein & Martin, 2012). In the context of EFS, there is also not enough research to see how strict disciplinary boundaries affect instructional practice for EFS. In one research study, instructors reported that universities are discipline-centered, and instruction is allocated to subjects to indifferent discipline as if “they were arranged in tidy boxes.” Several instructors blame disciplinary boundaries for a range of problems in implementation EFS in instructional practice in the HEIs (Moore, 2004).

Interaction between all of the above-described influences helps to explain why instructional practices for EFS are not being implemented. These factors (Fig 1.1) influence instructors’ decisions about what to include, what not to include, what to emphasize, what not to highlight, what to alter, etc., with regard to their content and instructional choices for EFS. Though important work has been done to explore how faculty envision curriculum change for sustainability (specifically change towards EFS), little research to date has sought to explore how university faculty conceptualize sustainability and make a decision to teach about and how this may be
affected by organizational factors. It is important that relationships between these variables and instruction for EFS should be explored to understand what impacts instructional practice. If some of these beliefs and characteristics are related to each other then this may result in different effects on instructional practices. In addition to the prospects suggested above, there may be other factors that influence instructors’ practice about the teaching or not teach sustainability issues that have not been recognized. These factors demand further investigation about instructors’ thinking when they elect to teach for EFS and context of instruction. Understanding in in context of instruction gives insight on why instructors teach the way they do. This knowledge can then be used to effectively implement new instructional practices for EFS.

CHAPTER 3
METHODOLOGY

This study is a case study of the implementation of a general education program “Western Essential Studies” (WES) at Western Michigan University (WMU) that includes the incorporation of sustainability education in undergraduate programs. The purpose of this study is to explore the effects of WES institutional effort on education for sustainability and what kind of barriers and affordances it is facing from institutional and instructors’ perspectives within a bounded system at WMU. To accomplish this research, a case study approach has been adopted as a means of inquiry. This chapter provides a description and rationale for the methods used in this research.

3.1 Research Approach Rationale

A qualitative methodology is appropriate for this study for a number of reasons. First, this is an exploratory study in which I am gathering information from original sources in which the researcher is the vital instrument of data collection. The current study is focusing on gathering
information from primary sources and making observations about it, some of which may be subjective in nature and hard to quantify. Qualitative research seeks to “…make sense of, or to interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2000, p. 3). Secondly, I am collecting data from different sources, including groups and individuals on campus. It will be subjective data, including opinions, personal experiences, and feelings of participants.

I considered a number of qualitative approaches for this study. One was a straightforward narrative design, which seemed of value because the focus of the study is examining a specific area of research. However, narrative inquiry is generally used for capturing different life experiences or life “stories” of a single individual, or selected number of individuals but it does not typically extend to a broad range of experiences or rely on multiple sources of data. (Creswell, 2007; Merriam & Tisdell, 2015).

A phenomenological study was also considered as it focuses mainly on the meaning of a “shared” experience or phenomenon within a particular group, such as those who have shared a life-changing experience (Merriam & Tisdell, 2015). However, phenomenology also focuses on a particular experience, or “essence of that experience”, as the narrative approach does. It is not an agreeable research approach for research with a broader focus and does not generally draw on different sources of data.

The ethnographic research method could also be considered as it focuses on “collective” values, behaviors and beliefs of an entire cultural or social group. It usually involves a large number of participants and focuses on their “mutual” opinions and belief (Lambert, 2011). However, the ethnographic study can’t be conducted for current research as ethnography is not
typically employed to examine a specific issue or set of issues and it doesn't focus on different groups or a limited number of individuals from different groups.

3.1.1 Case Study Approach; Rationale

The case study approach is a good fit for my research. The case study involves the investigation of behavior through one or more studies in a “bounded system”, or particular setting or circumstance (Stake, 2008; Yin, 2009). The understanding of institutional change with regards to sustainability teaching practices and their relationship with different factors can best be served using a qualitative, case study approach because “_.… case studies are the preferred strategy when “how” or “why” questions are being posed, when the researcher has little control over events, and when the focus is on a contemporary experience within some real life context” (Yin, 2003, p.1). The need for case study research “arises out of the desire to understand complex social phenomena” (2003 p. 4). This is complemented by Stake (2008) who contends that the nature of the tool allows for an in-depth, context-rich investigation of the system under study.

The case study approach offers much to the current study. Unlike other approaches, it permits focus on a “bounded system” like a university campus and encourages the collection of data from different sources like documents, instructors and administrators. It also provides for identification of important themes or factors which impact sustainability education in WMU and allows for interpretive analysis to explain the significance of these in an institutional setting. For these reasons, a case study approach has been adopted in this research work. Therefore, case study research, as a research orientation, is epistemologically well placed to the complexity inherent in how the intersection between sustainability and the university is constructed by stakeholders, instructors, and administrators who created the new policy of curriculum change.
Case study research seemed the most robust way to facilitate the understanding of the implementation of institutional change towards sustainability education through the implementation of the redesigned general education curriculum (Everett & Aitchison, 2008). WMU was selected as a matter of convenience since it has started a new general education curriculum WMU Essential Studies (WES) in which sustainability is an important learning outcome.

3.2 Background of WMU Essential Studies

As mentioned in section 1.6.1, WMU is providing diverse educational opportunities related to sustainability through WES. WMU has been making an effort to revise their curriculum as closely as possible with the University documented mission vision and strategic plan by making it more learner centered. In 2016, after three years of self-study, a recommendation was sent to the Faculty Senate in the form of “Memorandum of action MOA-16/06 General Education Revision” that the general education curriculum be revised. It was mentioned in the memorandum that the current general education curriculum concepts were over 100 years old and needed to be revised. The new WES program targets essential intellectual skills, identified as learning outcomes, by integrating and applying them in content courses. The new curriculum has introduced five essential intellectual skills, identified as learning outcomes in courses: 1) diversity and inclusion, 2) global awareness, 3) critical thinking, 4) sustainability, and 5) real-world problems (https://wmich.edu/facultysenate/wmuesentialstudies-interactivemodel).

The Faculty Senate appointed an Ad Hoc General Education Design Committee to develop the WMU Essential Studies (WES) curriculum structure based on these WES program student learning outcomes. Each WES course had to go through several levels of review by both faculty and administrators: departmental faculty committee and department chair, college-level
curriculum committee (Faculty) and dean, university-level WES review (faculty) and vice-provost. During Fall 2018, faculty submitted course proposals to WES. In Spring 2019, the WMU Essential Studies Course Review and Approval Committee started reviewing the courses submitted.

3.2.1 Sustainability Learning Outcomes Within WES

The WES program is comprised of three levels: Foundations, Exploration and Discovery, and Connections. All levels are sequential, and students are supposed to take it as part of their undergraduate program. The WES program offers sustainability as a possible learning outcome among five learning outcomes at Level 2 and 3.

(https://wmich.edu/facultysenate/wmuessentialstudies-interactivemodel).

Each course is supposed to pick two WES learning outcomes. All students need to take the at least one class with “planetary sustainability” as an essential learning outcome.

How Learning Outcome Can be Implemented

WES has its own rubric (Table 3.1) for each learning outcome. All WES courses need to identity what kind of learning activities and assessment activities they will choose to address the WES learning outcomes. According to the WES criteria, the learning outcome of planetary sustainability can be incorporated in one of two ways:

- Explore and apply habits of mind that illuminate the interconnectedness of the human and natural world over time, space, and culture.

- Analyze actions of community that promote or disrupt the well-being of the human and natural worlds over time, space, and culture.
Table 3.1 Rubric for implementing WES learning outcome of “planetary sustainability”

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Exemplary</th>
<th>Proficient</th>
<th>Developing</th>
<th>Beginning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore and apply habits of mind that illuminate the interconnectedness of the human and natural world over time, space, and culture.</td>
<td>Critique and analyze the limits of individual actions as well as their foundational importance for the collective.</td>
<td>Explain in detail the unexpected factors that shape the environmental impact of individual thought and action.</td>
<td>Identify some relationships between individual choices and behaviors and their environmental impacts.</td>
<td>Show basic understanding of interconnectedness of the human and natural worlds and the concept of sustainability.</td>
</tr>
<tr>
<td>Analyze actions of community that promote or disrupt the well-being of the human and natural worlds over time, space, and culture.</td>
<td>Critique and analyze human actions in the context of the interconnectedness of the living and non-living world.</td>
<td>Be able to describe and discuss the state of the planet and articulate the consequences of their actions on multiple scales. Develop a deep understanding of the coevolution and interconnectedness of the living and non-living world over time, space and culture.</td>
<td>Identify the factors and processes that have created environmental impacts and decisions over time.</td>
<td>Show basic understanding of the human and natural worlds and the concepts of sustainability.</td>
</tr>
</tbody>
</table>

Learning Activities of courses who choose “Develop practices for Planetary sustainability” as essential learning come should meet the criteria within the rubric that is aligned with the student learning outcome.

3.3 Data Sources and Data Collection

It is important to identify “boundaries”, the “unit of analysis” as well as “units of observation” in case study research (Roy et al., 2015). In my research, the case study “boundary”
is drawn around a particular higher education institution, Western Michigan University (WMU).

The “unit of analysis” has been identified as the "WMU Essential studies" (WES) policy for sustainability education and practice of sustainability education in the classroom at WMU.

“Units of observation” consist of WES proposal for courses, syllabi, as well as interview responses provided by instructors and administrators at the university. Conducting a case study conferred a number of advantages for exploring stakeholders', instructors’ and administrators’ views about the implementation of sustainability teaching.

A goal of this case study was to gain insight into how WMU is implementing the policy changes focused on the incorporation of sustainability education and what challenges they face. I asked respondents to discuss their experiences of creating and redesigning the curriculum for WES at WMU. The data collection and subsequent analysis are focused on instructors and administrators that have played a role in the implementation of WES.

It is important in all data collection efforts for case studies to use multiple data sources. Since reality is multi-faceted, triangulation in qualitative research is often employed as a means of better capturing the complexity of the phenomenon being studied (Denzin & Lincoln, 2005, pp. 5). Thus, data in this dissertation came from semi-structured in-depth interviews, the review of syllabus and WES curriculum change proposals for each WES course. The purpose of choosing these data sources was to get an understanding of how sustainability education is being implemented via WES, and what challenges have been/will be faced during the incorporation of sustainability education in WES and its courses.

Data was collected from the following sources using specific criteria:
3.3.1 Written Documents

Planetary Sustainability is one of the five new learning outcomes of WES. Course instructors could only choose two WES learning outcomes from the 5 required WES learning outcomes (1. diversity and inclusion, 2 global awareness, 3. critical thinking, and 4. real-world problems, 5. planetary sustainability) at the second and third level of the WES course model. So, there was a possibility that some courses could have sustainability as a course learning outcome, but they did not have “Planetary sustainability” as a WES learning outcome. I selected two kinds of courses after reviewing WES course proposals:

*Group A courses:* WES courses that selected “develop practices for planetary sustainability” as a required learning outcome of their WES course.

*Group B courses:* WES courses that did not select “develop practices for planetary sustainability” as a WES learning outcome for their course, but where the WES proposal and course syllabi suggest that the course has a significant sustainability emphasis.

3.3.2 Interviews with Key WES Stakeholders

WES stakeholders include staff and faculty members from a range of disciplines, upper-level administrators, decision-makers and administrators who were not working directly on sustainability education initiatives, e.g., Deans, Associate Vice Presidents and Vice Presidents. Interview participants include key stakeholders who have some level of involvement with adding sustainability as an essential educational learning outcome into the WES program for undergraduate students. Stakeholders fall into two main groups: WES instructors and WES administrators. A list of WES courses as well as the actual course proposals and course syllabi were obtained from Director of the WES program, Mervyn Elliot. I divided the research
participants in three groups. The first two groups (A, B) included instructors and the third group (C) was comprised of administrators. Details and selection criteria of all three types of interview participants are given below:

3.3.2.1 Group A: WES Instructors

Instructors who were teaching WES courses with sustainability as a WES learning outcome. Group A included the instructors whose submitted the Group A (mentioned above in data source of (a) written documents) WES proposals and syllabi, i.e., instructors who choose “Planetary sustainability” as a required WES learning outcome of their WES course. The purpose of interviewing group A was to get an understanding why they choose “Planetary sustainability” as a required WES learning outcome, how they are teaching about sustainability as an essential learning outcome in their WES courses and what barriers / affordances they face in implementation of sustainability education in WES course.

Group A potential participants: WES documents (First draft of the WMU Essential Studies Program, June 2019) showed that there were 26 course proposals that identify “Planetary sustainability” as a WES learning outcome. So “Group A” contained 26 potential participants who were named in WES course proposals as the “course initiator”.

3.3.2.2 Group B: WES Instructors

Instructors who have learning outcomes related to sustainability, but do not have sustainability as a WES learning outcome. Group B included the instructors whose submitted the Group B (mentioned above data source of (a) written documents) WES proposals and syllabi; i.e; instructors whose WES proposal and/or course syllabi show that learning objectives are related to sustainability, but they didn’t choose “Planetary sustainability” as a required WES learning
outcome. The purpose of interviewing stakeholders from group B was to get an understanding about why these instructors chose not to select planetary sustainability as a WES essential learning outcome and what factors impacted that decision. I choose WES courses who fulfil the following requirement.

The distribution of learning outcomes among course models and categories in figure 3.2 shows that instructors can’t choose both “Planetary sustainability” and “diversity and inclusion”. So, when selecting instructors in Category B, I sought instructors who had course descriptions or learning outcomes related to sustainability, but they chose diversity and inclusion as a WES learning outcome since they can provide more information about not choosing “planetary sustainability”.

Group B potential participants: After reviewing WES course names, descriptions, proposals, and syllabi, I identified 50 courses in the WES documents (First draft of the WMU Essential Studies Program, June 2019) that had course descriptions or learning outcomes related to sustainability, but that did not identify “Planetary sustainability” as a WES learning outcome.

3.3.2.3 Group C: WES Administrators

This group comprised of administrators, change-agents, and decision-makers who were somehow responsible for adding sustainability content in WES (e.g., Deans, Curriculum Committee Members, Faculty Senate Representatives, Associate Vice Presidents and Vice Presidents). The purpose of interviewing group C was to get understanding about sustainability education at WMU and what challenges are faced in implementation of sustainability education. Some instructors who were part of group A, was also involved in initiation of WES, so they were also interviewed as part of group C.
Group C participants: With the help of the WES Director at WMU, I developed a small list (N=12) of administrators, change-agents, and decision-makers who were responsible for adding sustainability content to WES (e.g., Deans, Curriculum Committee Members Faculty Senate Representatives, Associate Vice Presidents and Vice Presidents). Thus, Group C contained 12 potential participants. Group C had some participants (N=5) who were also included in Group A.

3.3.3 The Interviews and Research Participants

A letter of invitation was extended to all potential interviewees in all groups (identified above) to participate in the research study. Up to two follow up invitations were made for non-respondents. Interviews were arranged with those who accepted the invitation. Since the unit of analysis of my case study is the higher education institution and its policy and I am not accessing any identifiable private information, the WMU IRB judged that this project did not require IRB review.

3.3.3.1 Selected Research Participant Details

For group A, the initiators of all 26 WES proposals that listed sustainability as a WES learning outcome were invited to participate in an interview. When those proposers were contacted, a few (10 out of 26 potential participants of group A) indicated that they were not teaching the course but that they submitted the WES paperwork from department. Out of those 10, 5 agreed to be interviewed. The other 6 participants in Group A were the course instructors.

For group B, I identified 50 courses. Initiators of the 50 course proposals were invited to participate in an interview. When those proposers were contacted, some (15 out of 50 potential participants of group B) indicated that they were not teaching the course but that they submitted
the WES paperwork from the department so they said they can not provide valuable information. From rest of the responders, 7 agreed to be interviewed.

For group C, a small list (N=12) of administrators, change-agents, and decision-makers was created with the help of the WES Director at WMU. Thus, Group C contained 12 potential participants. The 12 potential participants were invited for interview. Out of 12, 10 agreed to be interviewed. As mentioned before, out of these 10, 5 were also part of Group A and they agreed to being interviewed as an administrator of WES as well.

Participants were told that they would not be identified by name or position in the university. All interviews were semi-structured. Each participant committed to 30-60 min for the interview period. I created 3 different semi structured interview protocols for the three different groups of WES stakeholders (APPENDIX A, APPENDIX B, APPENDIX C).

3.3.3.2 Interview Questions

All interviews contained questions related to the research questions in the introduction (section 1.7 Research Questions). As mentioned before, participants were divided in groups and each group was questioned according to their involvement in WES. The first set of questions asked participants about their involvement in sustainability education. Participants from groups A and B were teaching sustainability as part of course, so the set of questions asked how the course become part of WES and why the participant decided for or against making “planetary sustainability” a WES learning outcome of the course. Participants from group A (who choose planetary sustainability as essential learning outcome for their WES course) were asked a set of questions related to modifying their WES courses according to WES criteria for addressing the WES learning outcome “planetary sustainability” and how they view those modifications. Participants from group B (who were teaching about sustainability but they did not choose planetary sustainability as
essential learning outcome for their WES course) were asked why they didn’t choose sustainability as a WES learning outcome for the course. Participants in Group C were asked about involvement with sustainability initiatives and what motivated them to become involved in policy making for WES and making “planetary sustainability” an essential learning outcome. Group C was also asked to speculate about why instructors in group B did not make sustainability a WES learning outcome for their course.

A second set of questions asked participants from all groups how they see WES efforts to implement sustainability education in WMU. These questions were asked to find out whether participants find the institutional effort helpful or not and what kind of barriers/affordances they think WES will face during implementation. A third set of questions sought information about significant challenges and accomplishments of WES for sustainability education. A final group of questions inquired about factors that can assist in promoting sustainability education on campus.

3.4 Data Analysis

Data analysis is comprised of three distinct components: description, analysis, and interpretation. It includes organizing data, development of themes, data interpretation, and report writing (Richards, 2014; Marshall & Rossman, 2014). Current research data was comprised of two data sources. First data sources involved WES course proposals and WES syllabi which was also used to check which WES courses are teaching sustainability as essential or non-essential learning outcome. WES course proposals were also used identify participants for second data sources “interviews”. Data collected during this research were ordered into three groups (mentioned in data collection section as well) to provide a structure and then data was coded to give meaning to descriptions of experiences provided by the participants from all groups (Marshall & Rossman, 2014). Details are explained below:
3.4.1 Analysis of WES Course Proposals and Syllabi

WES courses proposals and WES course syllabi were analyzed to understand how WES has affected the curriculum of WES courses. Group A and Group B proposals and syllabi were analyzed for different reasons:

Group A proposals and syllabi: Documents from Group A WES courses were analyzed to get insight about what curriculum changes have been proposed in WES courses to make sustainability a required learning outcome. In WES proposals, I looked for: 1) Instructor or course initiator contact information, 2) proposed improvement in the course related to sustainability; i) if the revised or proposed course learning outcomes have concentration on sustainability; ii) future assessment plan or informal assessment activities to assess the learning outcome of planetary sustainability according WES rubric (Figure 3.3).

Group B proposals and syllabi: Documents of Group B WES courses were only analyzed to see if they address sustainability in any way. Instructor or course initiator contact information was obtained from the WES course proposals. The next section on the analysis of the second data source “interviews” explains that group B instructors were asked about why they did not choose sustainability as a WES learning outcome.

3.4.1.1 Interviews Analysis

The audio generated from interviews was transcribed verbatim. To obtain insight about institutional change for sustainability education from instructors and administrators, transcripts were analyzed using using a general inductive approach as Merriam (2001) suggests for case study research. This is a common methodology for qualitative research and differs from deductive analysis because it does not begin with a hypothesis or theory. Thomas (2006)
describes inductive analysis as “approaches that primarily use detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data by an evaluator or researcher” (p. 238). So, I as a researcher, I looked for such responses (segments of text) in transcripts that inform the study’s purpose, and the meanings are made explicit by the participants themselves. I then coded these segments and combine them into groups on the basis of similarity to develop an initial set of codes (Thomas, 2003).

The purpose of data analysis is to provide more than just a description of what was said by participants or to produce themes whose contextual relevance sketch the different ways in which different stakeholders at the university engage with sustainability. Therefore, in this research project analysis was performed in multiple stages. During the first stage 10 random interview transcripts were selected for analysis. The qualitative research software HyperRESEARCH version 4.5.0 was utilized for coding and grouping of codes. I looked for frequent, dominant or significant responses inherent in the raw data which showed relevance to the research questions. Then I added the label/code to selected phrases or sequences of the text in the transcripts. Codes were applied to segments of transcripts that represent topics of the research or a specific research question such as instructor’s personal perspective about teaching/not teaching sustainability in their courses or how the instructors/administrators are experiencing the institutional change with regards to the implementation of education of sustainability at WMU. All codes were compiled into an initial code book that was revised many times as more and more codes emerged from following cycles of coding. Mainly, the coding scheme described how WES is bringing institutional change in sustainability education and how stakeholders are experiencing it. Similar codes were combined to generate groups of themes according research aims and objectives (Table 3.1).
### Table 3.2 Codes for research objectives

<table>
<thead>
<tr>
<th>Research Question 1:</th>
<th>What prompts WES instructors to incorporate sustainability education in their WES course?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1: WES Instructors’ Perspective on teaching sustainability in WES course</td>
<td></td>
</tr>
</tbody>
</table>
| **Themes:** | Instructor personal beliefs about sustainability  
Instructor attitude towards sustainability  
Instructor personal background with sustainability  
Instructors are already teaching sustainability as part of course |

<table>
<thead>
<tr>
<th>Research Question 2:</th>
<th>How is the WES institutional effort affecting education for sustainability within WMU?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 2: WES impact on education for sustainability</td>
<td></td>
</tr>
<tr>
<td>Category 2a: Course modification for sustainability after WES</td>
<td></td>
</tr>
</tbody>
</table>
| **Themes:** | WES policy is focused on teaching and assessing sustainability as learning outcome:  
  - WES added new sustainability-oriented learning activities in course  
  - WES added sustainability assessment in course  
  **Assessment methods:**  
  - Close response assessment: final exam, survey and feedback, survey students, i-clicker questions  
  - Open response assessment: Assignments/ projects/ essays, Discussion/arguments |
| Category 2b: Instructors’ views on courses modification by WES |
| **Themes:** | WES only made sustainability an explicit learning outcome  
WES only added explicit assessment of sustainability  
Close response assessment suits sustainability LO  
Open response assessment suits sustainability LO |
| Category 2b: Instructors’ views on impact of WES sustainability education in general |
| **Themes:** | Made teaching sustainability necessary  
Institutionalized sustainability instruction  
Sustainability was not focused in WMU courses before WES |

<table>
<thead>
<tr>
<th>Research Question 3:</th>
<th>What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 3: Instructors’ views barriers and Affordances on WES</td>
<td></td>
</tr>
<tr>
<td>Category 3a: Barriers offered by WES for teaching sustainability</td>
<td></td>
</tr>
</tbody>
</table>
| **Themes:** | Policy is Difficult to understand:  
  - Assessment Rubric is difficult  
  - Hard to understand sustainability concept  
  - Rubric Definition of sustainability is inadequate or confusing  
  - Restricted WES framework  
  Lack of collaboration among instructors when WES was created  
  - Policy was created without instructors’ input  
  Restricted disciplinary Boundaries  
  - Instructors don’t see sustainability as a part of course |
• Instructor see assessing sustainability as extra burden

<table>
<thead>
<tr>
<th>Category 3b:</th>
<th>Affordances of WES for teaching sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themes</td>
<td>WES Rubric’s definition of sustainability is adequate for designing learning activities</td>
</tr>
<tr>
<td></td>
<td>WES Rubric’s definition of sustainability is adequate for designing assessment</td>
</tr>
<tr>
<td></td>
<td>Support WES plan to assess sustainability</td>
</tr>
</tbody>
</table>

Subsequent interview transcripts were analyzed following the same procedure as the first 10 transcripts. Codes for interviews were compared and commonalities were noticed between the codes. To ensure the coding process's validity, four other trained coders independently coded a sample of transcripts, and the results were compared to establish percent reliability.

Conceptually related codes in each group from the final codebook were clustered further to describe emerging themes of the study. Themes were sorted and presented in an order to answer each research question in the results section. The following table (Table 3.2) shows an example, how transcripts were coded, grouped into categories and developed in themes. I have also mentioned the interpretation.
Table 3.3 An example of coding process using excerpts from interview

<table>
<thead>
<tr>
<th>Example quote from transcript</th>
<th>Theme</th>
<th>Category</th>
<th>Explanation/interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I’m, my grandfather was one of the founding members of the American Ecological Society, he was a professor, as well as my dad. This is something that’s always been an important piece for me and when I look at the issues with sustainability, how we design and make things is a, is a key piece of the equation.” A3</td>
<td>Passionate about sustainability</td>
<td>Instructors’ Perspective on teaching sustainability in WES course</td>
<td>instructor has explained how he is connected to topic of sustainability and he shows a positive attitude towards teaching sustainability as he is passionate about it</td>
</tr>
<tr>
<td>“it seems like a natural fit because it was. This wasn’t something I invented to meet that category, if that’s what you’re asking, right. So, this was something that this course was already doing and it matched during this (WES) transition, right. So, it’s not a new course that I created to meet that outcome,... course was already doing those things.” A2</td>
<td>Sustainability was already part of course</td>
<td>Instructors’ Perspective on teaching sustainability in WES course</td>
<td>instructor mentioned that their course has had a clear focus on sustainability. Instructors did not change their courses to make sustainability an essential learning outcome of their course.</td>
</tr>
<tr>
<td>personal nutrition course was already in existence. Because it was already a full curriculum so, so had to take out some things, revised it a bit and added the sustainability components so, that it would become part of WES program...We added several units, trying to bridge personal nutrition and make the sustainability component relevant to students. A1</td>
<td></td>
<td></td>
<td>instructor mentioned she had to remove something from the previous version of the course to add sustainability-related to content to make it part of WES program.</td>
</tr>
<tr>
<td><strong>WES requires it and then evaluating the objectives, that’s the really new thing, I need to put that requirement explicitly, such as what I put here, which assignments or how I assess the students. A7</strong></td>
<td>WES added sustainability assessment in course</td>
<td>Course modification for sustainability after WES</td>
<td>Instructor sees assessment as a new addition from WES and he added new clearly defined assessment</td>
</tr>
</tbody>
</table>
Table 3 - continued

| it already had sustainability content but I hadn’t really made that highlighted so that students and myself could see, okay, we have specifically addressed sustainability by doing such and such. Ah, the WES approval process forced me to do that” A9 | WES only made sustainability an explicit learning outcome | Instructors’ views on courses modification by WES | Instructor was already teaching about sustainability and WES helped him clearly stating the learning outcomes of course and made sustainability content more obvious |
| “..I don’t know but every student will at least know that they have to take a course with a sustainability outcome. So, in going through, in looking for courses they need to take, they will be aware that they have to take one with sustainability and diversity inclusion, so they will be aware that there is an emphasis on it.” C2 | made teaching sustainability necessary | Instructors’ views on impact of WES sustainability education in general | WES provide an opportunity to every student at the university to become aware of concepts of sustainability. |
| “I would say that’s our huge improvement. Gen-ed didn’t emphasize. WES does a better job than the previous system of incorporating sustainability trying to define it and make it a hallmark.”A6 | sustainability was not focused in WMU courses before WES | Instructors’ views on impact of WES sustainability education in general | WES is focusing on sustainability more than previous general education programs |
| I think it’s been a focus of people who are passionate about it and bring it in to their classes because they think it’s important. But I think with the university saying, this is now a university wide initiative, it will broaden exposure, right. In biological sciences we have a lot of faculty who have been passionate about | Institutionalized sustainability instruction | Instructors’ views on impact of WES sustainability education in general | sustainability has been taught before in classes because instructors are themselves passionate about it, but WES will be bigger push towards teaching |
Table 3 - continued

<table>
<thead>
<tr>
<th>Sustainability</th>
<th>Affordances of WES for teaching sustainability</th>
<th>Barriers offered by WES for teaching sustainability</th>
<th>Most instructors are not aware of concept of sustainability and so they find it difficult to teach as per WES rubric</th>
</tr>
</thead>
<tbody>
<tr>
<td>“the WES program and the outcomes, the way they were defined, in general, for all courses was very abstract and new. It is difficult to understand exactly, how to fit our courses into that framework. And, so we Restricted WES framework</td>
<td></td>
<td></td>
<td>Instructor finds WES structure inflexible. WES criteria is difficult to apply when it comes to use it as teaching tool to</td>
</tr>
<tr>
<td>I mean there are lots of people frustrated, we are huge university trying to transform our entire gen-ed curriculum. You know rubric is not easily understandable and instructors do not have any idea what that word (planetary sustainability) matter...or why would it be important to include it as a general education.”</td>
<td>Hard to understand sustainability education concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“a lot of the WES assessment rubric is, it’s confusing. So, if we have our own way, we would rather use our own way to assess students learning outcomes.”</td>
<td>Rubric is difficult</td>
<td></td>
<td></td>
</tr>
<tr>
<td>But we deliberately made the rubric very general, in sustainability to try and make sure that it wasn’t going to be hard for them to do it.”</td>
<td>WES Rubric’s definition of sustainability is adequate for designing learning activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All students about sustainability as it is a institutional initiative</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

C5:

sustainability for years and have been getting students expose to that material in our courses for major s and things. But, now making this part of our ES (Essential Studies) program says the university thinks that every student should think about this. (okay). I think it’s a good thing.”

C1:

But we deliberately made the rubric very general, in sustainability to try and make sure that it wasn’t going to be hard for them to do it.”

A4:

Rubric is difficult

WES rubric is very broad and every instructor can teach sustainability according to criteria mentioned in rubric.

A3:

I mean there are lot of people frustrated, we are huge university trying to transform our entire gen-ed curriculum. You know rubric is not easily understandable and instructors do not have any idea what that word (planetary sustainability) matter...or why would it be important to include it as a general education.”

A4:

Rubric is difficult

WES rubric is confusing which makes it harder for them to assess sustainability. Instructor prefer that it is better to have no rubric.
work with, the one that works that is easiest to fit, to accommodate. (okay). And, yeah, the sustainability courses weren’t particularly easy to accommodate to.” C7

“too much of those unnecessary kind of evaluations throughout the semester and because the instructors don’t have a lot of time to do the detailed work and people by people one person by person” B5

| work with, the one that works that is easiest to fit, to accommodate. (okay). And, yeah, the sustainability courses weren’t particularly easy to accommodate to.” C7 | assessing sustainability as extra burden | Barriers offered by WES for teaching sustainability | instructor might not choose sustainability as an essential learning outcome |

I answer my research questions (Chapter 4) by interpreting the appropriate codes (Khandkar, 2009). Adhering to my conceptual framework, I analyzed how the codes and interpretation can explain how instructors and institutions play roles in teaching sustainability at WMU, what barriers are faced and how the situation can be improved. After describing the results,

### 3.4.2 Validity and Reliability in Data Analysis

An important factor in the data-analysis portion of a qualitative study is that the researcher is the primary source for data collection. The direct involvement of the researcher in the data collection and analysis is one of the key challenges of qualitative research (Creswell, 2003), so steps must be taken to limit the impact. During each interview, I restated and summarized information, questioning participants on the accuracy of the information to increase the validity and reliability of the study results (Lincoln & Guba, 1985).

Multiple coders were also used to increase the credibility, validity, and transferability of the study results. Once the coding scheme was developed by the researcher/student investigator, the degree of inter-coder agreement was used to determine to what extent independent coders...
evaluate responses in the transcript and reach the same conclusion (Tinsley and Weiss, 2000). This process was employed during the course of data analysis. Five researchers (me and four other researchers with expertise in science education) independently coded a sample of transcripts, and the results were compared to establish percent reliability. Based on these results I made minor revisions to the coding scheme to create the final coding scheme. I used the final coding scheme to analyze all rest of all interviews. Intercoder agreement above 60 percent is typically considered acceptable (Campbell et al., 2013; Fico et al., 2005; Kurasaki, 2000). Intercoder comparison scored more than 70% agreement.

In addition, I shared my data analysis process with my advisor as well during the evolution of this study. Direction from the faculty advisor helped me focus on essential and relevant details that the study participants offered, which led me to develop themes from the data. Lastly, the data presented in this dissertation includes significant quotes from participants to allow readers to judge the conclusions of the study (Maxwell, 2005).

3.4.3 The Researcher (Reflexivity)

In qualitative research, it is often said, ‘The researcher is the research instrument.’ Therefore, to understand the findings and results of qualitative research, readers need to recognize who has conducted the research beyond his/her name and professional connections/association to include the researcher’s positionality in connection to what is being studied. This transparency and clarity are essential requirements for quality published qualitative studies (Dodgson, 2019). A brief description of my academic and professional background and experience relevant to the case study may help the reader understand the findings (Creswell, 2014).
Prior to my doctorate in Science Education, I have seven years of academic and professional background in environmental sciences; I did my master’s and bachelors in the Environmental Sciences. I have also worked in the area of environmental impact assessment for a few years. Being in the area of environmental sciences, and PhD student in area of education myself, I have my own perception of implementing education for sustainability.

In the world of being ‘environmentalist’/sustainability advocate and the politics of ‘sustainability”, I have encountered many people who didn’t worry, no matter how much information or how many obvious statistics they were given. I always believed that education was to change people mind about the environment and sustainability. I believe that my doctoral journey in science education played a role in my notions of success, competition, and ultimately how I learned to relate to other people and play my role in educating the society about environment and sustainability. During my undergraduate and master’s program, I found issues in my communication with others over the general, vaguely defined and controversial topic of environment and sustainability, which ultimately led me to. I tried to understand multiple perspectives over the respective subject. I learned that other people ideas are as important as mine. Understanding various perspectives helped me concentrate on myself and listen to people who did not have the same beliefs and views as me. I took several courses on research methods and science education, which helped me understand another way of thinking, writing, and learning. During my second year of the doctoral program, I found my way into the research studies on sustainability education, how to teach it and why it is not being taught the way it should be. Besides all these transitions, I had a burning question. Was there any way that I could make a difference in the situation of “Education for sustainability” through my dissertation?
I faced a lot of difficulty in my transition from science to social science. I felt like a stranger.

My academic transition from natural sciences to social sciences helped me with my understanding of difference of research in social sciences and natural sciences. In natural sciences research, I had research experience collecting data in laboratory settings, and it was always clear when I was collecting my data and when I was analyzing it. During my doctoral student life as a social scientist, I realized that my journey in social science research was also important as it helped me to explore ideas and experiences in depth.

Due to my diverse experience in area of environment and sustainability, I am able to relate with implementing sustainability education and problems with instruction for sustainability; Therefore, I am more likely than not to draw on my personal experiences and opinions when interpreting data collected from my participants.

On the one hand, it is helpful because I can understand the wide range of perspectives. Still, it may cause a bias in my interpretation because I may easily attribute behaviour to something that I have experience with, but participants have not. For example, one participant mentioned that institutional policies do not help as instructors do what they had been doing already. He perceived creating policies to teach sustainability as a valuable thing. However, my experience as a researcher tells me that institutional policies and regulations are beneficial if you want to implement one behavior at an institution-wide level. In this case, if I don’t bracket my own view, then there is a risk of bias incorporation in the interpretation of data. During the study, I was mindful of my bias and have coped with personal preference by bracketing my personal opinions in written memos/epochs before, beginning, during, and at the end of the research (Ridder, 2014).
3.5 Limitations

Findings from this study may be limited to the university and programs included in this study with a limited generalization to similar population at other schools. In addition, the researcher is fully aware that the research participants were biased strongly towards instructors with an interest in and commitment to sustainability, and most had some experience of teaching sustainability topics. Many (perhaps most) instructors are unlikely to be in this position, highlighting the considerable challenge of teaching sustainability in classrooms.
CHAPTER 4
RESEARCH FINDINGS

4.1 Overview Of Research Questions

During the course of this study a series of interviews were undertaken with instructors/initiators of courses that were part of the Western Essential Studies (WES) program and university officials who were involved in implementing WES. Interviews were conducted to obtain information about how sustainability education is being implemented through WES policy and what kind of affordances/challenges it is facing.

Interview questions were intended to gather information to answer the main research questions identified in chapter one:

- What prompts WES instructors to incorporate sustainability education in their WES course?
- How is the WES institutional effort affecting education for sustainability within WMU?
- What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?

4.2 Interview Participants Details

Respondents were interviewed for this study in July to December 2019. A total of 84 potential participants were invited to be interviewed, and 23 agreed. These 23 interview participants represented three groups involved in varying degrees in WES sustainability initiatives on campus:
• **Group A:** 11 instructors who proposed WES courses with sustainability as a WES learning outcome.

• **Group B:** 7 instructors who proposed WES courses related to sustainability but did not select sustainability as a WES learning outcome.

• **Group C:** 10 administrators involved with WES decision-making. Five of these administrators were also a part of Group A.

Participants from groups A & B were from diverse departments. These included Family and Consumer Sciences, Environmental Sciences, Geosciences, Geography, Engineering Design, Manufacturing and Management Systems, Civil and Construction Engineering, Human Performance and Health Education, Political Science, Biology, Physics, History, Psychology, philosophy and English. Occupations of Participants from group C included WMU Essential Studies Director, Associate Provost for Assessment and Undergraduate Studies, Faculty Senate Executive Board member and Dean of Education and Human Development. The length of time participants were associated with WMU ranged from a two years to more than fifteen years.

**4.3 Research Findings**

This section presents the results of the study arranged in order of the research questions. Themes that emerged from this study present a holistic picture about implementation of sustainability education by WES. As discussed in Chapter 3, during coding themes were created with specific relevance to the research focus, the research question, the research context, and the conceptual framework (Roberts et al., 2019). Similarly, this approach allowed themes to be both described and interpreted for meaning and provide answers for the research question.
One of the problems of writing up findings from a qualitative study is how to condense large amounts of data. In this particular instance I have chosen to present answers for each aspect of every research question separately and to organize the presentation of the findings in two stages. First, I briefly describe the interpretation of findings for each research question as an overview. I then present a number of excerpts from the interview material as a way of contextualizing the findings so that readers can judge the appropriateness of the analysis decisions.

4.3.1 Research Question 1: What Prompts WES Instructors to Incorporate Sustainability Education in Their WES Courses?

To answer the first research question, I asked all participants who were teaching WES courses (Groups A and B) if they are focusing on teaching sustainability in their WES course. I corroborated their statements about sustainability goals using the WES proposals and course syllabi. I also asked them why they decided to select or not select sustainability as a WES essential learning outcome for their course. I asked the administrators (Group C) why they thought instructors might choose or not choose to teach sustainability and make it an outcome for the WES course.

Following my conceptual framework, to understand the impact of institutional and instructor personal factors on teaching sustainability, I looked for reasons 1) why sustainability became or did not become a learning outcome of the WES courses, and 2) why sustainability was not chosen as an essential learning outcome of some WES courses even though sustainability was being taught as part of the course. During my data analysis, I identified from the interview responses reasons related to instructors’ personal choices as well as the role that WMU as an institution played in decisions to 1) teach sustainability and choose sustainability as a WES
essential learning outcome or 2) teach sustainability and not choose sustainability as WES essential learning of course.

**4.3.1.1 Sustainability as Part of Course Instruction; We Teach This Stuff Anyway**

Major Findings:

- Sustainability was a learning outcome of all courses; regardless of whether “sustainability” was selected as a WES learning outcome.

- Sustainability was a learning outcome of all courses before WES.

All participants who were initiators of WES courses indicated that their course already included sustainability before the WES initiative. All WES courses represented by Groups A &B (N=18) were previously part of the WMU “general education program” (the predecessor of WES).

Instructors or course initiators of Group A and B said the courses have included content about sustainability for a long time.

Views of participants from different groups are given below:

**Group A:** Instructors who chose sustainability as an essential learning outcome said that they did so because their courses were designed to teach about sustainability. For example, one participant was asked how he structured his class to address the WES sustainability learning outcome. He said his whole course is related to addressing the WES sustainability learning outcome and every topic of class teaches about it:

*It’s (sustainability is) embedded within the entire semester because the class in a nutshell looks at the impacts that humans have had on their environment and the impact that environment has had on humans. So, the whole course, the whole semester looks at that interconnectedness of people and the human conditions. So, as humans occupy the planet, how do we sustain that?*
How has it been sustained is a positive way, how has it been impacted negative way over time…So, the class itself begins with pre-contact native North America and the interaction of people with the land and the class ends in the present with interaction of people and the land. So, every assignment, every topic is geared at looking at how humans have interacted with the environment throughout human history.” A2

One instructor mentioned that he focuses on sustainability as it is part of the accreditation of the program that the course is a part of, so it is necessary for the course to teach about sustainability:

“And as a civil engineer sustainability, we have known sustainability stuff for 30-40 years, so that mean we already do that in our senior design project. It’s required for our accreditation as a matter of fact…So part of our accreditation is we have to have learning outcomes…sustainability is huge, it’s is one of our canons or fundamental ethics requirements, to practice sustainable engineering. So, we’ll teach this stuff anyway.” A5

All instructors in group A mentioned that sustainability was a course objective of their course before WES came into practice. Some instructors mentioned that their course has had a clear focus on sustainability for 10-20 years. Instructors said that “planetary sustainability” was a “natural fit” learning outcome of their courses and they did not change their courses to make sustainability an essential learning outcome of their course. For example:

“it seems like a natural fit because it was. This wasn’t something I invented to meet that category, if that’s what you’re asking, right. So, this was something that this course was already doing and it matched during this (WES) transition, right. So, it’s not a new course that I created to meet that outcome, you know, I would, I would say that the course was already doing those things.” A6
“developing practice for Planetary sustainability is one of the essential studies areas, this class is a direct fit and should be one of the course offerings for that area.” A5

**Group B:** Instructors of WES courses whose WES proposal showed that sustainability had not been chosen as a learning outcome also indicated that they teach about sustainability. For example, when one respondent was asked that much time of course is devoted to teaching sustainability learning outcome, he said whole class revolve around the concept of climate change which is a very important part of sustainability. The instructor explained that his course is teaching about climate change so it addresses the concepts about the implications of unsustainable living style and how it can be addressed:

“every single thing we do is about sustainability. Right, I mean everything about the climate change is about how we are living in an unsustainable way and where the unsustainability comes from. And how we have to try to address it. What it’s implications are? What happens in countries where there are suffering from climate change, things like that. So, I’d say 100% of the time.” B2

When another instructor from Group B was asked about how much his course is devoted to topic of sustainability, he said sustainability is pretty much inherent to his WES course and in all of the lectures he talks about the topic of sustainability, in one form or another:

*It’s an on-going theme throughout the course. I would say we touch on it every lecture. In the beginning of the course, we probably spend one or two lectures on just that….so we spend a couple of lectures on that (sustainability) upfront, plus we kind of follow that theme through”* B5

Other instructors provided said similar things:
“Yeah, the course is related to behavioral approaches for sustainability, the whole class is about sustainability.” B1

In short, results show that instructors in both groups reported significant focus of WES courses on teaching sustainability. WES didn’t really make a different to these instructors because they had already been teaching courses focused on sustainability prior to WES for a variety of reasons.

Group B Instructor’s Views About Not Choosing Sustainability as WES Learning Outcome

Major Findings:

1) WES structure is a reason to not choose sustainability as essential learning outcome of courses of Group B.

2) Sustainability is not the primary goal of courses of Group B.

As mentioned above, Group B participants reported addressing sustainability learning outcomes but did not select sustainability as the WES essential learning outcome of their course. Instructors gave different reasons for not choosing sustainability as a WES learning outcome. Some instructors (N=4) blamed WES. They mentioned that the WES policy limits the number of learning outcomes that can be selected, so they did not choose “planetary sustainability” as an essential learning outcome even though it was relevant.

“Yeah, I could have put this in for a sustainability course. Well, you have to choose between them, you can’t have both sustainability and diversity which I think is a flaw in the system.” B5

“I think this is a class about sustainability so I don’t understand why it would not be checked...I selected a whole bunch of other learning outcomes but then I was advised by a friend
of mine in the English department who was on that committee who designed the WES program and she said you should limit to only 2.. its hard for me to describe just 2.” B2

Although they taught about sustainability, some instructors (N=3) said that they did not select sustainability as a WES learning outcome because sustainability is not the primary goal of their course. Respondent B3 was teaching earth sciences and he choose “demonstrate and apply scientific literacy” and the “foundational knowledge” as the WES learning outcomes over “planetary sustainability” because he felt that they were more important learning outcome of his WES course:

“It (sustainability) is one of the learning outcomes, that’s not the only outcome....it is one of the focuses, its not mostly, essentially this is science and technology area, okay it’s in that area. But although in “science and technology area,” you can have other outcomes also. You know one outcome might be you know how to develop curiosity or something. Or how to develop data interpretation. It can be many other things.” B3

Similarly, another respondent, R4, was teaching about how social injustice is a reason behind environmental injustices. According to the instructor, justice is focused on including people, so she chose “diversity and inclusion” as a WES learning outcome instead of sustainability as it is not explicit focus of course.

“This course could be equally about either one but because the predominant theme of the course is really justice and injustice is mostly predicated on not having inclusion...so the course could fit either one, if you allowed to have both but if I have to choose one or the other, a course that’s about justice is to about how do we include people. Its about how do we overcome injustice in the way we deal with our environmental conditions. So that’s (diversity and
inclusion) is really the primary theme of the course. Sustainability is in the background all the time because it’s about the environment and so the issue that’s unjust, that we are trying to address is environmental conditions which is about sustainability” B4

When participants from group C, the administrators were asked why Group B participants might not choose “Planetary Sustainability”, a few of them held instructors’ personal choices responsible for it and some blamed the WES framework. For example, Respondent C5, who also submitted one course as an instructor in group A, said Group B instructors didn't choose sustainability as essential learning outcome as they did not want to assess sustainability a learning outcome so they didn't choose as essential learning outcome.”

“I think the challenge is some faculty didn’t, they perhaps didn’t take [planetary sustainability] seriously, oh, its not my thing, you know, or they don’t wanna do the assessment piece cause assessment is required which is a little bit, you know, I mean grading is different from assessment.” C5

Another respondent from group C who also submitted one course in group A as the course initiator said that it is hard to make sustainability a WES learning outcome due to the abstractness of the WES framework.

“the WES program and the outcomes, the way they were defined, in general, for all courses was very abstract and new. It is difficult to understand exactly, how to fit our courses in to that framework. And, so we work with, the one that works that is easiest to fit, to accommodate. (okay). And, yeah, the sustainability courses weren’t particularly easy to accommodate to.” C6
I share more research findings about problems in the WES framework in the discussion of research question 3 which is focused on the barriers and affordances of the WES structure for the incorporation of education for sustainability.

**Instructors Passion to Teach About Sustainability**

**Major finding:**

- Most Group A instructors decided to incorporate sustainability education in their WES course because they were passionate about teaching sustainability.

- Group B instructors were also passionate about teaching sustainability and incorporated it in their courses.

A majority of instructors in both groups, A and B are very passionate about teaching sustainability. Instructors wanted to make sure that the interconnection between human beings and environment is part of what students learn in their courses. While expressing their incredible enthusiasm for teaching sustainability, these instructors consider teaching sustainability with the goal of changing citizens' attitudes and values toward the natural environment. Their passion about the planet and incorporating sustainability as a learning outcome can be seen from the following excerpt:

“I was concerned in making sure that the interconnectedness between humans and their environment was really brought out within those learning outcomes, in terms of planetary sustainability, I have been throughout, you know, almost my entire career very concerned with looking at the human condition and the way that history impacts people but also the natural in the built environment, the world around them and how that interconnectedness kind of piggy backs, back and forth or plays off back and forth between people and their surroundings. So, in other words, it’s
very important to me that in that one essential studies area, that change over time and human impact was really a focal point.” A2

Similarly, respondent A3 stated his perception about teaching sustainability by dividing the responsibility into 3 parts, including regulations, role of general population and individual responsibility. He further explained that his role comes under individual responsibility, meaning what can he do related to making things that are better aligned with the environment/sustainability. His opinion and importance placed on sustainability is reflected as follow:

“basically, you’ve got, you’ve got, I think, 3 main issues, 1, what are the governments doing? You know what are the regulations, what are the laws? And I probably can’t affect that very much. 2nd, what is the population of the planet doing? And 3rd, what are, you know, what are we doing in terms of the kinds of things that are being made for the world….This is something that’s always been a, an important piece for me and when I look at the issues with sustainability, how we design and make things is a, is a key piece of the equation...” A3

As a passionate advocate for sustainability education, respondent A7 was teaching sustainability with a belief in the value of teaching about it and the positive impact his instruction has on students.

“A lot of students, people who if given the right information and given that information in a compelling way, they can change their minds and, I’m very hopeful that what I’m doing will, in some small way for a number of people, because I’m not just doing it in this course. I’ve added topics in to all of the courses I’m teaching now, and one of the things our department did was we actually change the manufacturing engineering technology major, first to put in a sustainable manufacturing course at..”
Respondent A5 mentioned having a family background in sustainability:

“I’m, my grandfather was one of the founding members of the American Ecological Society, he was a professor, as well as my dad. This is something that’s always been a, an important piece for me and when I look at the issues with sustainability, how we design and make things is a, is a key piece of the equation.”

Group B instructors did not choose sustainability as essential learning outcome, but they were also passionate about teaching sustainability. Instructors mentioned that they did not add sustainability as a new learning outcome in their WES proposal, but they were addressing course issues along with sustainability point of view:

“I mean see I didn’t specifically say, you know, I’ll change these chapters to address sustainability because already they’re included. So, when I teach, I don’t just talk about climate change, I discuss how climate is changed and this is how climate is changing now, I don’t stop there. Then I go into the human impact and how human impact is, has to be looked at from sustainability point of view.” B3

**Summary of Results for Research Question #1:**

*What prompts WES instructors to incorporate sustainability education in their WES course?*

Instructors in Group A and group B were teaching sustainability in their WES courses before WES. WES didn’t affect any instructor’s decision to incorporate sustainability in the instruction of their course. Most instructors were passionate about teaching sustainability. Group A instructors chose sustainability as the essential WES learning outcome for their courses because
sustainability is the main focus of their courses. Group B instructors didn’t choose sustainability as the essential WES learning outcome for their courses due to a two basic reasons. Some instructors mentioned that sustainability is not the primary focus of their course and some said they didn’t choose sustainability because WES has confusing criteria to choose sustainability as an essential learning outcome.

4.3.2 Research Question 2. How is the WES Institutional Effort Affecting Education for Sustainability Within WMU?

To better understand how WES is affecting education for sustainability (EFS) at the institutional level, all participants were asked about how WES will bring change in the teaching of sustainability at WMU. WES proposals that listed “planetary sustainability” as an essential learning outcome were examined to understand what kind of learning activities and assessments they propose to address the “Planetary sustainability” learning outcome (Table 4.1) Instructors in Group A were asked how WES changed the way they will be addressing the content of sustainability specific to their class, how they will make those changes and how they view it. All participants were asked about how they think WES will generally affect the teaching of sustainability at the institutional level. During interviews, instructors described their views about how they will approach planetary sustainability in their WES course, how they will assess it and how they view the changes WES has asked them to make in their course. In participant responses, I looked for different ways the instructors mentioned how the WES institutional effort affects the way sustainability will be taught at WMU, i.e how WES is/will affect/ing the teaching activities, learning activities, assessment activities or any other sustainability teaching activities.

WES proposals were also consulted to understand how courses have been changed with regards
to teaching sustainability after they became part of WES. The following findings show the way WES has impacted sustainability instruction in at courses’ level and institutional level.

4.3.2.1 WES Institutional Effort Affecting Teaching of Sustainability in WES Courses

Major finding: WES has made sustainability an explicit learning outcome of some courses.

As discussed in the first research question, when instructors were asked to describe their views about how they will approach planetary sustainability in their WES course, most instructors in group A (N=9) said that they were already teaching about sustainability and WES helped in clearly stating the learning outcomes of course and made sustainability content more obvious:

“Since it’s environmental law, it was already here addressing basically the trade-offs and the use of the legal system to protect the environment... I mean we modified the course somewhat. I think WES just made it clearer, made it more explicit and more-clear that this course was addressing what we think of as classic the trade-offs of sustainability.” A6

“it already had sustainability content, but I hadn’t really made that highlighted so that students and myself could see, okay, we have specifically addressed sustainability by doing such and such. Ah, the WES approval process forced me to do that.” A9

A couple of instructors (N=2) mentioned that they modified their course to address the PS learning outcome of WES. One instructor mentioned she had to remove something from the previous version of the course to add sustainability-related to content to make it part of WES program.

“personal nutrition course was already in existence. Because it was already a full curriculum so, so had to take out some things, revised it a bit and added the sustainability
components so, that it would become part of WES program...We added several units, trying to bridge personal nutrition and make the sustainability component relevant to students.” A1

“I assume, probably I will add more learning outcomes, such as this (WES) clearly defines student learning outcomes at the beginning of the course and also, throughout the semester I will gauge how students have been learning this material and understanding depends on using some (WES) criteria.” A6

A few instructors (N=3) from Group B contemplated the same view as Instructors from Group A; i.e., WES has “labelled” the sustainability content in courses, but it has not contributed towards adding sustainability content in courses:

“I think it will impact the number of courses that will be necessary to cover it. I think it might impact how things are labeled but I don’t that would necessarily change content much” B1

4.3.2.2 WES Impact on Assessment of Sustainability in WES Courses

Major finding: WES has made assessment an integral part of teaching sustainability for those courses with sustainability as a WES learning outcome

Assessment of sustainability as a learning outcome was a new thing introduced by WES. When instructors/initiators of WES courses in Group A were asked what modifications, they made to their courses in order to submit them as WES sustainability courses, most of them (N=9) responded that they added plans to assess sustainability. WES required instructors to have a clearly defined plan for assessing sustainability that met specific criteria. The following are some responses from Group A participants:

“I used to do in a traditional way, through assignments, through tests, through group projects and then to meet WES assessment requirement, as that’s part of the learning outcomes, I
just need to put that requirement explicitly, such as what I put here, which assignments or how I assess the students. Previously, I was thinking about assess student holistically. Right now, I have to use 1 assignment to assess that.” A4

“I don’t think there is anything new in the course itself. It’s just phrasing it in the way WES requires it and then evaluating the objectives, that’s the really new thing” A6

4.3.2.2.1 Assessment strategies to assess sustainability

Major findings:

(1) Instructors proposed different kinds of assessment methods (essays, quizzes, tests etc) in their courses.

(2) Most instructors will use open-ended assessments to assess sustainability.

As mentioned above, assessment of sustainability as a learning outcome was major change brought by WES. As WES requirement to teach sustainability was focused on assessing sustainability so it was important to see how instructors are changing their instructional process to add assessment of sustainability. Instructors’ responses showed that a common approach of WES courses to assess “planetary sustainability” was through a combination of open ended and closed assessments. WES proposals also have few details on how instructors are teaching and assessing sustainability. Assessment techniques mentioned by instructors and WES proposals show that WES courses are assessing sustainability through opened ended assessments like essays, reflection papers on readings, class discussions, projects, open ended questions and close ended assessments like quizzes, surveys and i-clicker question. (Table 4.2)

Table 4.2 Assessment of sustainability learning outcomes mentioned in WES proposals and instructors responses
In the following I have explained different kind of assessment mentioned by instructors and WES proposals:

4.3.2.2.1.1 Open ended assessments

Most instructors (N=7) mentioned that they are planning to assess sustainability through open-ended assessments. Open-ended assessments were typically represented by essay test e.g., assignments, reflection essays, projects and online/class discussion. A few examples are given below:

1. Essays:

Most instructors were planning to assess sustainability through essays, reflection papers or open-ended responses. Such assessments require responses in the form of paragraphs, sentences, or short composition. For example, the following is from the WES proposal of a course which is planning to do sustainability assessment through open ended response:

"One to three written response questions testing the ability of students to explore the interconnectedness of politics, society and the environment over time, space and cultures in Europe and to analyze how government policies promote or harm the well-being of their citizens and whether they are globally sustainable." A3
Some WES courses were planning to assess sustainability by asking students to write an essay based on data from a report/book/essay from an external source. The following is an example of such reflection essay-based assessment from WES proposal of one course:

“The students will read two essays by Bill McKibben about how climate change can only be effectively dealt with politically, that individual action can never be enough. Then they will each write an essay explaining their beliefs about the risks posed by climate change, how they propose to lessen the impacts of climate change, and what they think about McKibben’s suggestions. The essays will be assessed using a rubric designed for this criteria.” A4

The instructor of this course explained that the WES criteria for sustainability learning outcomes is focused on demonstrating an understanding across both physical and behavioral dimensions involving society and the environment. These criteria can be achieved in WES courses through asking students to read previous material about sustainability and write their own reflection:

WES criteria for sustainability assessment are to analyze actions of community that means collective people that promote or disrupt the well-being of the human and natural worlds over time, space and culture....so, that’s where we’ll get into, you know, can I stop using plastic bottles and the world’s gonna be saved? Probably not, probably gonna take more than that. It’s gonna take me getting together with like-minded individuals to change government programs, so that we have, actions, collective actions that will reduce greenhouse gas production and perhaps make a difference on the scale that has to be in order to reduce damage to humans and other species on the planet. So, what am I gonna do to assess that? Well, there will be this Bill McKibben, read 2
of his writing and then give me an essay. there’ll be questions on essay, we’ll discuss in class as well. So, all of those will be part of that assessment.” A9

2. Class Discussion:
Some instructors were using class discussion to evaluate student learning about sustainability and understanding of concepts.

WES proposal: “Required oral argument. Each student has opportunities to serve as lead counsel and present their argument (and the counterargument) in a mock trial atmosphere allowing for civil and evidence-based discourse of differing policy positions on legal solutions to environmental issues” A3

When the instructor was asked, she explained that the instructor can initiate the discussion by presenting students with an open-ended question. The goal of class discussion is to allow students to increase the breadth and depth of their understanding, build knowledge and develop critical and creative thinking skills about sustainability.

Instructor response: “So, we get in to lots of deep discussions about what it means, for example climate change, is that an existing harm that the law could and should address or is that a different problem. So I ask questions that don’t have answers and the students write yes or no to that and then we focus our discussion on how the laws related to the sustainability would need to change or what could happen” A6

Some instructors were planning to present a case study in class and assess sustainability learning outcomes either through specific questions or topics that require answers during class discussion.
“Well, there is a case study, I know there is a case study or a, okay, several different ways, each one had an online discussion board and so I believe how the person, like the number of times the person participates and the depth of their contribution to the discussion, um, counts and there were specific questions, given that people had to reflect on for each discussion board” A1

3. Project
A few instructors (N=3) were planning to assess sustainability by making it a part of the final project for the course. The WES proposal gave some information on assessment of sustainability through the project. For example, one instructor mentioned in the proposal that the final report of his course will do the job of assessment of sustainability. When the instructor was asked, he expanded how having a project on sustainability will help in the assessment of sustainability learning outcomes.

“The students take a 1 credit hour senior design proposal course in which we talk a little bit about sustainability. I shifted that content to this course because that’s the one they are actually practicing it, not just talking about it, and because it aligned up pretty well with WES. So, I modify the learning activity and they now they have to address sustainable options for their actual design projects.” A5

One course instructor was not interviewed but the course proposal mentioned having course projects on sustainability related topics:

“Interdisciplinary team project. Students will be placed in teams of 2-3 and select a topic important to planetary sustainability. Examples might include health care delivery, generation and distribution of energy, global food production, etc.” --Engineering Economy
4.3.2.2.1.2 Close-ended assessments

A few instructors (N=3) mentioned that they are planning to assess PS through close-ended assessments. Close-ended assessments were typically represented by quizzes with multiple choice question, final exams surveys and i-yellow anonymous questions.

1. Quiz/test

“We’re developing a test, that will assess that at the end of the semester”

Interviewer: okay, so is there one test with multiple choice or true false or short question answers?

“something like an multiple choice questions… it could be combined with the final exam but as a separate assessment so has different questions. This could be like a different part of the final exam.” A8

2. I-yellow anonymous questions

A few instructors (N=2) mentioned continual assessment of sustainability via i-yellow anonymous questions throughout the course:

“I’d have to add all sorts of new iclicker questions. I will engage students with polling questions of iclicker and one of the things that I’ve been inserting this semester are some polling questions related to “planetary sustainability.” A3

3. Surveys

Some instructors (N=3) mentioned that they will assess “planetary sustainability” learning outcome by surveying students about daily routine of sustainable activities.

“an overall project for the course is, doing an analysis of one’s personal diet like over 3 days and then giving feedback about improving the diet which also included that what could be
Some instructors (N=2) planned to use multiple methods to assess sustainability. e.g. a course of “Senior Design” was having a final project on sustainability issues and course was also having 3 quizzes at different times of semester. Out of 25, N=5 courses didn't mention any specific assessment activities to evaluate sustainability learning outcome in their proposal.

**4.3.2.3 WES Institutional Effort Affecting the Sustainability Instruction at the Institutional Level**

WES impacted the sustainability instruction in WMU at general level in following ways:

4.3.2.3.1 WES impact on institutionalizing sustainability instruction

Major finding:

- Sustainability was not required learning for all WMU undergraduate students before WES.
- WES incorporated sustainability at the institution wide level in WMU

Most instructors/initiators and administrators of WES (N=18/23) mentioned that WES is the first program at WMU to make sustainability a required part of the general education curriculum. According to all WES administrators (Group C), WES has institutionalized education for sustainability by requiring undergraduate students to take at least one course with clear learning outcomes on sustainability.

“It’s better that we got sustainability into the program, somehow, because I was on the university sustainability committee for a long time and you know the way of getting in, there was no other way of doing it. I cannot think of any other way, all the other ways, they thought about
doing it, like saying every student is gonna take 1 environmental-science class, too impractical.”

Most administrators hold the view that although WES does not focus on sustainability very deeply, it will provide an opportunity to every student at the university to become aware of concepts of sustainability. All administrators considered making sustainability a required learning outcome as a huge difference in previous system:

“This way people might say well it is not very deep, you know, intellectually, it’s not very deep, but it’s like no, it’s better than nothing. I think, you know, we can say we have made a difference from what the system was before. Yeah, because every student will have to look for one course that covers sustainability.” C4

“I don’t know but every student will at least know that they have to take a course with a sustainability outcome. So, in going through, in looking for courses they need to take, they will be aware that they have to take one with sustainability and diversity inclusion, so they will be aware that there is an emphasis on it.” C2

Most participants agreed (N=15/23) also agreed that that WES focuses on sustainability more than previous general education programs:

“I would say that’s our huge improvement. Gen-ed didn’t emphasize. WES does a better job than the previous system of incorporating sustainability trying to define it and make it a hallmark.” A6

“we never thought about, very much about sustainability and those issues with energy. WES is kind of a new thing and it takes a lot of effort to incorporate something that is just
developing now in to our courses. It’s is not in the tradition of how the courses are taught.” A8, C9

All participants from groups A, B and C agreed that WES has helped towards institutionalizing sustainability instruction at WMU. Many instructors believed that sustainability has been taught before in classes because instructors are themselves passionate about it, but WES will be bigger push towards teaching all students about sustainability as it is a “university wide initiative”:

“I think it’s been a focus of people who are passionate about it and bring it in to their classes because they think it’s important. But I think with the university saying, this is now a university wide initiative, it will broaden exposure, right. In biological sciences we have a lot of faculty who have been passionate about sustainability for years and have been getting students expose to that material in our courses for major s and things. But now making this part of our ES (Essential Studies) program says the university thinks that every student should think about this. (okay). I think it’s a good thing.” A11

Instructors from group B had similar views as those from group A. Two other instructors of group B also think that making one course requirement is a step towards improving EFS:

“it sounds good enough if they are gonna require to take at least 1 class, I guess it’s better than nothing.” B3

I think it was already implemented and taught different courses probably except it was not clearly or explicitly structured like right now, okay. B5
Some instructors (N= 4) from Group B also mentioned teaching sustainability at a general level will help students understanding the seriousness of this topic and connecting it to different parts of their life:

“I am glad they have added it as a category...adding a specified content which is an interesting shift.... I think before WES, sustainability was being taught Western, but it was siloed as an environmental topic. And what’s changing now is we are recognizing that it affects every topic, so that’s a good thing. We are recognizing that everybody has to deal with this issue because it effects all of our different fields.” B4

When one instructor from group B asked how sustainability was being incorporated at the institutional level prior to WES, she said there was no system or database at the institutional level to show how sustainability was being incorporated at the institutional level. Instructor has been quoted below:

“I think it’s from a student’s perspective, there was a lack of coordination of the information around about sustainability. ...it’s hard to answer like do we have enough sustainability in Western or do we have not enough because I feel like it’s piecemeal all over so it’s hard to get a general sense of how much is there ...because its so built in within niches in different departments, it is almost impossible for me to know without really spending sometime digging into it, like what are all the sustainability related study or courses be there.”B2

She commented on WES as strategic plan which has organized all the institutional efforts at WMU to teach about sustainability.
“I think the cohesive, building in cohesiveness has been part of the strategic plan for a while but it never seems like it’s institutionalized. I think this is a really good step, the WES really focusing on it.”

4.3.2.3.2 WES institutional effort affecting the awareness for sustainability

Major finding: WES will improve students’ awareness about sustainability

Most participants (N=20/23) had consensus on the opinion that teaching sustainability through WES will help to increase students’ consciousness about sustainability. Most participants hold the view that when every student will take at least one WES course with sustainability as an explicit learning outcome, it will improve the students’ understanding and awareness about sustainability issues, which can ultimately improve students’ behavior towards sustainable practices.

“But as a general study or WES, as in 1 course and you teach it really well, design really well, cover all those topics regarding to sustainability and student can get understanding of that and in their real life they can do simple things like recycle or use less vehicles and walk more and things like that and as a citizen they can behave correctly and also may be educate their peers, their family members to behave correctly and then goal of sustainability is achieved I think.”

One participant from Group C commented that he thinks that WES is not just making teaching sustainability a requirement, but he see WES as an initiative to change students’ behavior towards sustainability:

“So, the question is, how can those of us teaching the sustainability courses do it in a way that the climate change deniers actually buy in to the fact that there is a change and what they do matters in some tiny way. Because that’s the real intent of putting this in. Not just to give students another requirement but to make them think about what they are doing in a way that they change
their behavior. (so, WES will help with that)? Well, that’s the intention of what it is supposed to do. And I think, eventually for a high proportion of students, I get faith that we will change some minds and change some behaviors. C3

4.3.2.4 Summary of Findings for Second Research Question 2

How is the WES institutional effort affecting education for sustainability within WMU?

All Group A courses included sustainability before the WES program. But WES has affected the way learning outcomes for sustainability will be addressed in the courses and how it will be assessed. Many instructors mentioned that WES has made sustainability an explicit and required learning outcome of their course. And, of course, all proposals in Group A (N=26) have introduced sustainability as an essential learning outcome for their courses.

WES has made assessment of learning outcomes necessary as well. Many instructors mentioned that assessment of learning of sustainability is a new thing introduced in their course due to WES. They indicated that, although they were teaching students about sustainability in their course prior to WES, they were not always explicitly assessing sustainability as a learning outcome. So, because of WES, students will not only learn about sustainability, but they will be assessed as well. Instructors have designed assessment strategies following the WES rubric. Instructors are planning to assess the sustainability learning outcome through different kinds of open ended and close ended assessments including essays, assignments, reflection papers, quiz, project, clicker and class discussions.

Most of the research participants see WES as a tool to institutionalize the teaching and assessment of sustainability all over campus. All instructors mentioned that prior to WES, there was no institutional policy that tried to implement sustainability education in WMU, so WES has
definitely impacted the implementation of sustainability education in WMU. WES is also making sure that sustainability will be taught in class, and students will learn about it by making assessments necessary.

4.3.3 Research Question 3: What Are The Barriers and Affordances of the WES Structure For the Incorporation of Education for Sustainability?

This section will explain how WES and its structure are seen to be benefiting and limiting the implementation of EFS in WMU courses. As mentioned in the introduction (section 1.6.2.1) WES follows a framework and rubric/criteria for teaching and assessing sustainability learning outcomes in WES courses.

All interviewees involved in developing WES (Group C participants) regarded WES as one of the university’s most distinctive and successful whole institution change programs. Improvements attributable to WES included institutionalizing EFS and improving EFS by making sustainability an essential learning outcome of undergraduate courses and assessing it. However, at the instructor level (Group A and B participants), there were variable views about WES’s role in the incorporation of sustainability in courses. Some felt that WES did support the embedding of sustainability in the curriculum, but others felt less positively. I will explain below how different participants view how WES will benefit the implementation of EFS and what kind challenges if will face and being face during implementing EFS.

4.3.3.1 Affordance of WES Structure for Incorporation of Sustainability in Education

Participants found WES structure useful in incorporation of EFS in the following ways:
4.3.3.1.1 WES supports implementation of education for sustainability

Major finding: Most participants said WES criteria assures the implementation of education for sustainability in WES courses.

The WES criteria for designing learning activities for sustainability instruction has impacted the way instructors are approaching the concept of sustainability while teaching about it. Most participants (N=18/21) commented that the WES rubric has helped increased the teaching of sustainability and improved the implementation of EFS by making learning outcomes of sustainability clear in course objectives and required assessment of sustainability. Examples from different group participants are quoted below:

“So, I think before WES there was no structure, there was no requirement. It (WES) certainly would make sustainability more explicitly stated across the campus. It has done that in a subtle way. If you have an explicit learning objective set, that carries through the whole development of the course. So, I think that would help in implementation of sustainability in classrooms.” A4

A few instructors (N=2) reported that sustainability was also being taught by previous general education programs in some capacity, but the WES structure has emphasized making sustainability an explicit learning outcome.

“Was it addressed, absolutely, because there were courses that focused on you know, environmentalism and sustainability that are part of the gen-ed requirements...I think it was already implemented and taught different courses probably except it was not clearly or explicitly structured like right now.” A2 C7
4.3.2.1.2 WES Rubric will help in teaching sustainability in courses

Major finding: Most administrators and half of instructors said WES provides a flexible rubric with adequate criteria to add sustainability in courses.

Most administrators of WES (Group C) N=7/10 believe that the WES rubric will help instructors in teaching sustainability as the rubric will requires different departments to design their learning outcomes according to same general criteria.

“I don’t think it’s any harder than anything else, but I mean the rubrics were already developed by the faculty, so they just have to, they don’t have to develop any rubrics or anything, they’ll be given the rubric. Now they were, they could have seen the rubric ahead of time.” C2

All Group C participants thought that the rubric is very easy to use and understand and that every instructor can teach sustainability according to the rubric criteria.

“But we deliberately made the rubric very general, in sustainability to try and make sure that it wasn’t going to be hard for them to do it.”C1

“The idea of “planetary sustainability” is important for students to be aware of and they should consider it as an essential learning outcome through their undergraduate experience.”A2

Instructors (N=4) also mentioned that the WES rubric was very useful for connecting sustainability with course topics to fulfil the requirement of WES.

“I looked at what the rubric is, the PS and see sustainability as interconnectedness between human and natural world and well-being of the human in the natural world over time, space and culture, so, what I wanted to do is to utilize, take advantage and try to find different ways that students can see the connection between the behaviors and choices that they make at this
point in their life and how they can make an impact in their health, in there, one of their
dimensions of health and see the connection that’s PS has in all other dimensions.” A7

A few participants (N=3) indicated that the WES rubric to design learning outcome of sustainability helped instructors connect their course topics with sustainability. One instructor from group A, who was also a part of group C, was asked how WES has changed her course, she mentioned that she has connected her course contents with sustainability as “planetary sustainability” is an essential learning outcome of her WES course:

“I modified my course for WES as it addresses the sustainability learning outcome. So, I added several units having to do, trying to bridge personal nutrition and make it relevant to students, make the sustainability component relevant to students, so for example we look specifically at fish, fisheries and fishing techniques around the world and how some of those commercial techniques are merely destroying the oceans and the ecology of the oceans and another example has to deal with protein, choosing vegetable protein, what kind of have the pros and cons of choosing vegetable protein over animal protein and the degree to which especially cows, beef contribute to methane production and CO2, in the atmosphere. So, those are the different areas and again, you know we are trying to bridge to make, make it relevant to individuals in other personal eating habits.” A1 C6

4.3.3.2 Barriers in WES Structure

Although most participants felt that WES increased the implementation of sustainability, different instructors and administrators also identified potential problems in the WES structure. These barriers might have contributed to only 26 instructors choosing sustainability as an essential learning outcome, a low number that WES administrators think is insufficient:
“we have got about 26 (courses on sustainability). Students can choose one of 26 courses, you know, out of 26 courses, they’ve got to choose one that has sustainability content and I don’t really think we know, how many courses you need to make sure that one student can find one, but, you know, when it comes to diversity inclusion, we got about 70 courses, so, right now, we got about only 26 sustainability courses and I think that’s not enough, otherwise, students will find it, like a bottleneck.” C1

Participants from group A, B and C identified problems in the WES rubric, WES structure and other issues with WES that might have limited the number of instructors who tried make sustainability an essential learning outcome or even prevented the incorporation of sustainability learning outcome by different courses.

4.3.3.2.1 WES rubric pose problem in teaching sustainability
The WES rubric poses problems when used as an instructional tool for teaching sustainability as a required learning outcome

Major finding: Half of the instructors disagree with the WES rubric as an instructional tool for sustainability

As mentioned earlier in the affordance section, some instructors find the WES rubric for sustainability incredibly helpful for fulfilling the criteria for teaching sustainability and considered it as a great institutional effort for supporting sustainability education. However, over half of instructors from group A (N=6/11) found the WES criteria cumbersome to apply when it was used as a teaching tool to measure sustainability as a learning outcome.

The words instructors used to comment on the rubric were “rigid”, “non-flexible”, and “non-understandable”.

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“It’s sort of ethereal, it’s sort of not well defined. it’s kind of rigid and a little hard to follow. So, it’s not gonna be easy” A1

“I mean there are lot of people frustrated, we are huge university trying to transform our entire gen-ed curriculum. You know rubric is not easily understandable and instructors do not have any idea what that word (planetary sustainability) matter...or why would it be important to include it as a general education.” A6

Some instructors (N=4) also suggested that it would be better if WES let instructors create the rubric for learning outcomes of sustainability according to their own choice; as instructors would create rubrics that would make sustainability more relatable and understandable for students:

“but I wish they were given more flexibility to each individual instructor. I think it says a lot to students, that’s too abstract. You know, if I were there, I would have somehow described it differently, using the way easier to understand the languages and probably some examples to explain to students, so they will understand exactly what we are trying to do.” A7

4.3.3.2.2 The WES rubric poses problems when used as assessment tool for sustainability learning outcome

Major finding: Half of instructors said WES rubric did not help them in assessment of sustainability in WES courses.

While some instructors overall believed that WES rubrics have been useful for assessment of sustainability (N=5/11), almost half of instructors from group A (N=6/11) did not find the WES rubric as a useful grading tool for assessment of sustainability. They said that the WES rubric is confusing which makes it harder for them to assess sustainability:
“a lot of the WES assessment rubric is, it’s confusing. So, if we have our own way, we would rather use our own way to assess students learning outcomes.” A4

A few instructors from group A (N=4/11) doubted that the WES rubric to assess sustainability will be able to achieve its objective. Instructors believed that the WES requirement of learning-outcomes assessment is challenging as it does not seem to have any consequential effects on student learning of sustainability through WES course:

“Well, the students are required to take it, is not a problem. The challenge is gonna be assessing in the way that the rubric expects us to do it; that WES expects us to assess. we’re already very busy at the end of semester when we collect all the assessments, so we do not have time. We will do it as it is required but will it actually be a kind of assessment what WES expect us to do?” A7

A few instructors (N=4/11) suggested that WES should have let instructors assess sustainability according to their own criteria instead of designing one general criteria:

“Maybe make it simpler and easier to understand for the students as well as for the faculty members, I respect their assessment rubrics, but I wish there were given more flexibility to each individual instructors.” A8

4.3.3.2.2 The WES rubric reduces instructors interest in choosing sustainability as an essential learning outcome

Major finding: Most instructors from group B mentioned that WES rubric was one of the reasons they did not choose sustainability as learning outcome.

Most participants from group B (N=4/7), and group A (N=7/11) said the WES rubric for teaching sustainability is very vague and hard to understand. Some instructors reported that the way WES has defined “learning outcomes” seemed more like learning activities and confused
instructors. The confusing rubric was a reason instructor in group B did not choose “Planetary sustainability” as an essential learning outcome of their WES course.

“I think it will be helpful in WES as for WES to work on identifying what are actual learning outcomes versus what are activities that happen in class that help lead to those outcomes and not have it all mixed together. I think it got really confusing because process and output or outcomes were treated as if they were the same thing, but they are not, one’s process, one’s outcome… may be if the rubric were more around what is it that we think students should be able to do after they have taken class in sustainability.” B3

When another instructor from group B was asked why he didn't choose planetary sustainability as a WES learning outcome even though he teaches about sustainability in his course, he blamed the WES rubric. He said the rubric does not explain the learning outcome clearly:

“So I think that the titles of learning outcomes and the rubric of essential learning outcomes is very misleading about when its actually addressing sustainability or it doesn’t. B1

4.3.3.2.3 WES requirement to assess sustainability is hard to fulfil
Major finding: Most instructors from Group A and B mentioned that it is very hard to assess sustainability as per WES requirement.

Results showed that most instructors find assessment of sustainability hard in classrooms. Instructors in both groups (Group A: N=5/11, Group B: 4/7) indicated that the WES requirement to assess sustainability makes it harder for them to choose sustainability as an essential learning outcome. Different instructors provided different reasons about why it is hard to choose sustainability.
When one participant from group A was asked why some instructors do not choose to select sustainability as essential learning outcome; he said that assessing sustainability itself is very difficult and many instructors are not sure how they will do it so they do not choose sustainability as an essential learning outcome:

“these learning outcomes are somewhat, nebulous, a little bit fuzzy and they (instructors) may have looked at that and said ‘how could I assess that?’ They (instructors) might have said, you know, I teach about sustainability but, but, but gosh how do I assess that so they did not choose it as essential learning outcome.” A9

One instructor mentioned that assessing sustainability as a learning outcome is itself impossible:

“I mean whether they’ve, there has been a change to their frame of mind in regards to sustainability, is very, very difficult to assess. They will answer what we, what we want them to answer, it doesn’t mean that they will actually follow what they have” A6

A few instructors in group B (N=3/7) mentioned that an instructor might not choose sustainability as an essential learning outcome because WES has added so many evaluations for sustainability, which seem like a lot of extra work for the instructor. Consequently, instructors from group B might avoid making sustainability an essential learning outcome because they would need to create a new assessment for it. They prefer not to do the extra work for it:

“too much of those unnecessary kind of evaluations throughout the semester and because the instructors don’t have a lot of time to do the detailed work and people by people one person by person” B5
A few administrators (N=2/11) also mentioned that instructors might not have chosen sustainability as an essential learning outcome because they did not want to assess it. One participant noticed that science and technology courses in WES choose science literacy and foundational knowledge instead of sustainability. Instructors weren’t thinking beyond these two learning outcomes as they are most effortless for them to assess:

“**And I think the fact that the learning outcomes have to be assessed, is a challenge for faculty who might be teaching sustainability but they might not be thinking about how to make an assessment that they them have to report as part of WES…. So, you know, science with a lab course or a science and technology course which nearly fell under one of those two areas, it was very easy to pick science literacy as one of your learning outcomes and that leaves you only one other and I think in almost every single case they picked increased foundational knowledge of the discipline. Because it seemed to them that, that was the easiest learning outcome to design an assessment for.**” C5

4.3.3.4 Sustainability can’t be taught as an essential learning outcome by WES courses

Major finding: A few administrators think that instructors choose other learning outcomes as essential learning outcomes because they find sustainability is hard to teach.

A few participants from group C (N=3/10) thought that instructors might not have chosen sustainability as an essential learning outcome because instructors find it hard to make sustainability an essential learning outcome of a general education class. Instructors find other WES learning outcomes like "science literacy" or "foundational knowledge" more comfortable to teach than "planetary sustainability". One administrator termed other learning outcomes as "low hanging fruit."
"so I worked with one particular department on putting in a few of their WES proposals. They were trying to make the process as painless for themselves as possible, so my sense was they were picking learning outcomes that were kind of low-hanging fruit, easy ones." C10

Some administrators also believed that some instructors had not chosen sustainability as an essential learning outcome of WES courses because sustainability is a complicated learning outcome that cannot be taught in big classes of a general education program like WES.

“I think it’s just one of these things that some of the professors just don’t feel as comfortable as they might feel just by doing one of the other outcomes and we gave them choice. So, I don’t think we have yet exhausted the number of professors who could do sustainability. A lot of them are very interested in the subject, a lot of them know a lot about it but they maybe have a big course of 200 people and they just felt, it’s easier to do another, one of the other outcomes.” C1

4.3.3.2.5 Lack of WES courses’ instructor’s involvement in developing WES

Major finding: Most instructors from both Group and B said it is hard to teach sustainability through the WES program because WES instructors were not involved in developing WES.

As mentioned in the introduction (1.6.2), WES was an effort of the faculty senate, but few instructors who will be part of teaching and assessing sustainability in WES courses were involved in formulating WES policy. Instructors from both Groups A (N=9/11) and B (N=6/7) complained that WES created its rubric and framework without consulting instructors:

“I wish that WES, the committee composition, there were more faculty members who actually taught gen-ed courses and they would knew the specific issues they face; rather than just based on what are they are thinking.” A6
When one instructor was asked to expand on why she sees sustainability instruction as a challenge in the WES program, she said that university-wide most instructors are unaware of why sustainability teaching or its assessment is important:

“It is hard to transform the whole curriculum as most instructors would not have any idea what that word matter, why would we assess it or why would it be important to include it as a general education.” A3

4.3.3.5 Summary of Findings for Third Research Question

Research Question” What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?

WES has provided its own structure, criteria and rubric to assist instructors with implementing sustainability instruction. Most instructors agreed that the WES rubric has helped improved the implementation of EFS by making sustainability learning outcomes clear in course objectives and requiring assessment of sustainability learning outcomes. Some instructor see the WES rubric to teach sustainability as too general and vague. Most WES administrators said the rubric is general enough to help instructors from variety of different departments in designing their learning outcomes. But very few instructors said that WES rubric helped them connecting their course topics with sustainability.

A few instructors from Group A and all instructors from Group B see the WES rubric as a barrier to making sustainability an essential learning outcome. Instructors mentioned that rubric is inflexible and non-understandable which made it impossible for them to make sustainability essential learning outcome. Some instructor view WES requirement to assess sustainability as
extra burden on instructors and they are not sure how they will do it. Most instructor saw assessment as a barrier to make sustainability an essential learning outcome.
CHAPTER 5
CONCLUSION AND DISCUSSION

This study was conducted to understand how WMU Essential Studies (WES) institutional efforts and instructors' personal factors impact the teaching of sustainability at Western Michigan University. Instructors who were teaching sustainability as an essential or non-essential learning outcome of their WES course and administrators who were responsible for creating the WES program were interviewed to answer following research questions:

• What prompts WES instructors to incorporate sustainability education in their WES courses?

• How is the WES institutional effort affecting education for sustainability within WMU?

• What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?

In addition to interviews, WES course proposals and syllabi were also reviewed. By interpreting the findings generated from interviews and review of WES course proposals and syllabi, several conclusions about the role of instructor and WES institutional efforts towards teaching sustainability at WMU were drawn. These conclusions will be discussed and compared to previous studies.

The themes in this discussion chapter will be discussed in terms of the factors described in the theoretical framework in Chapter two (figure 2.1): 1) instructors’ personal beliefs and 2) institutional factors.
In this section I focus on the main interview data that answers the research questions and sheds light on the factors that affect sustainability instruction as per the theoretical framework (Figure 5.1). According to the theoretical framework two types of factors impact instructional practices for sustainability: 1) Instructor’s beliefs and 2) institutional context. In the following I summarize how findings of the research questions shed light on both type of factors:

The finding from the first question “What prompt WES Instructors’ for teaching sustainability in WES courses” provides insight about the first factor; impact of instructors’ beliefs (Fig 5.1) on instructional practice for sustainability.
The findings from the second and third research question explain the impact of “institutional context” (Figure 5.1) on instructional practice for sustainability. The findings from the second research question, “How WES institutional effort affecting education for sustainability within WMU?” has highlighted the strengths of WES on broad institutional level and sheds light on how the WES will change instructors’ approach to teach sustainability in their WES coursework, which connects to the effect of WES institutional efforts on instructional practices for sustainability. Furthermore, the third research question “What are the barriers and affordances of the WES structure for the incorporation of education for sustainability?” offers further insight into the how WES program as an institutional factor facilitates or create hurdles in teaching sustainability, which also answers the how institutional context can impact instructional practices for sustainability.

5.1 Role of Instructors’ Personal Choice for Teaching Sustainability in WES Courses

Prior research shows that instructors beliefs and attitudes play an important role in how they teach sustainability. All instructors who participated in this study had been teaching sustainability in their courses for 5-15 years and they were doing it because of their own choice and passion. Some instructors decided to choose sustainability as an essential WES learning outcome, and some didn't. All WES courses whose instructors chose “planetary sustainability” as an essential learning outcome, chose sustainability as an essential WES learning outcome because they were already teaching it. The WES structure did not ask any instructor to make sustainability an essential learning outcome. It was solely an instructors’ choice to make sustainability an essential learning outcome for their course. Many course instructors didn’t choose sustainability as a WES essential learning outcome for their course even though they were teaching about sustainability.
For the instructors, an important aim behind teaching sustainability was to make students feel that they could ‘take action’ and ‘make a difference’. Several of the instructors explicitly mentioned that they are teaching sustainability because they are passionate about it and it is their personal choice to teach about it. They mentioned that when course was created, teaching about “sustainability” was a part of it. WES policy will not make any difference about sustainability instruction in their classroom as they are already doing it. Many instructors mentioned that they are teaching sustainability to improve the students’ understanding of values contributing to their beliefs and judgements about different perspectives of sustainability. These findings are consistent with limited available literature in this area. Summer, Corney, & Childs (2003) conducted research on issues which arise for teachers when planning and teaching sustainability under guidance of revised curriculum which sets out learning outcomes for sustainability. They found that eight of the nine instructors were already teaching about particular course-related issues of sustainability in their classrooms prior to guidance from the revised curriculum. Instructors were committed to their involvement in teaching sustainability. Instructors had a huge range of teaching strategies for sustainability at their fingertips while they recognized the potential for controversy within the topics of sustainability and they still chose to teach sustainability in classrooms.

5.2 Role of Institutional Effort of WES in Teaching Sustainability

As mentioned before, all instructors were teaching sustainability in their courses because of their own passion to teach about it. WES emphasizing the institutionalizing of teaching of sustainability in several ways: 1) WES allows students to know what courses include sustainability content; 2) WES made it mandatory for all students to take at least one course on sustainability. Previous research shows the external initiative to teach new content like
sustainability impacts the incorporation of sustainability in curriculum. One research study (Nicholls, Hair, Ragland, & Schimmel, 2013) on teaching ethics, Corporate Social Responsibility, and Sustainability Education in business courses and how these three topics are incorporated into their curriculum showed that ethics appears to have been most embedded among all three topics in the marketing curriculum because the accreditor, the Association to Advance Collegiate Schools of Business International (AACSB), has emphasized ethics for several decades.

Another difference WES made for sustainability instruction, is that WES asked instructors to assess sustainability along with teaching about it. Most instructors mentioned that assessing sustainability as a learning outcome is a new thing for them and they are not sure how they will do it practically, even though they have guidance from the WES rubric.

These results matched previous research studies about assessing sustainability related learning outcomes. Research shows that academics found these higher order outcomes to be most problematic (McNeill, 2011). University mission statements and unit outlines may support the value of higher order skills; however, instructors were unsure of how to design tasks to target these types of learning outcomes and how to allocate marks to student work. Research shows there are difficulties associated with assessing learning outcomes beyond basic skills and knowledge (Sandri, Holdsworth, & Thomas, 2018), for example Allen and Van der Velden (2005) mentioned in research on assessment activities in classroom that “one of the reasons why instructors focus so strongly on aspects like literacy and numeracy is that such skills are relatively well-defined and accessible to measurement under controlled conditions, while many components of key competencies that belong to the non-cognitive domain are conceptually more diffuse and more difficult to measure.” That's why many educators are comfortable with teaching
processes that emphasize a willingness to listen, to discuss and to acquire information. But, they may not be comfortable with a teaching and assessment for higher order learning outcomes relating to opinions and behaviors (Shephard, 2008; Lemkowitz et al. 1996). As sustainability itself is a concept that is shared by many individuals and organizations who demonstrate this value in their policies, everyday activities and behaviors (United Nations General Assembly, 2013) so it makes sustainability a higher learning outcome as well (Vermeir & Verbeke, 2008). Research shows that instructors find it hard to assess sustainability-related learning outcomes.

When it comes to assessment, most instructors consider sustainability as part of high order learning outcomes such as critical thinking, problem solving and creativity. They prefer to assess the learning outcomes which are more related to their discipline because are easy ones and it is less burden for instructors to assess them; e.g., if instructor is teaching science/technology related subject with a lab course, then it is very easy to pick the “science literacy” related learning outcomes for assessment as it seemed to instructor that it was the easiest learning outcome to design an assessment for.

5.3 Obstacles and Opportunities Offered by Institutional Structures of WES to Teach Sustainability

WES is a new kind of institutional policy for all the instructors as it is not just focusing on instruction of learning outcomes, but it is also focusing on assessing them and making it a requirement. So, instructors who teach sustainability as a WES essential learning outcome will not just teach about sustainability; there is a massive job of assessing the learning outcome and they have to assess it according the criteria mentioned in WES rubric. Most instructors had their own prior understanding of teaching about sustainability, but they did not like how the WES
rubric defined “sustainability” as a learning outcome and asked them to assess. Several instructors pointed out that the WES rubric itself is not much help.

According to most instructors, the WES rubric also did not provide much guidance about how to teach sustainability; it is a highly general definition that provides little exemplification in terms of specific topics about sustainability that can be taught in the classroom. Some instructors showed concern that without the university helping them understanding the concept of sustainability, it is not at all clear how they will be able to translate the WES vision into classroom practice; although all instructors see WES as a first institutional initiative to increase sustainability instruction broadly at the university level.

The literature also shows that the definition of sustainability is almost always confusing. The meaning of sustainable development is complex and contested (Bonnett, 1999, 2002). Many instructors said the WES definition of sustainability is very general and it can mean anything. Their view matches prior studies in which researchers pointed out that sustainable development is such a prevalent and successful concept precisely because it can mean all things to all people (Sauvé’, 1996). It is important to note that WES does not have a succinct, unified definition of sustainability. Instead, WES provides guidance regarding what courses should consider teaching about sustainability when they are teaching it as essential learning outcome. Individual WES courses are then required to tie their individual learning objectives and outcomes to the WES rubric of sustainability learning outcome. Hence, courses have the latitude to interpret the WES rubric and use their own definitions of sustainability in meeting the WES criteria.

5.4 Concluding Remarks and Recommendation

The WES policy to make sustainability an essential and required learning outcome to be taught and assessed is an institutional endeavor to strengthen the position of sustainability
education in the university’s curriculum. It is a positive step forward toward bringing holistic thinking and sustainable living to the world through a college campus.

The university system provides the context for a major transition within most students’ lives and that will have lasting effects on the choices they make through their lives. Understanding that education for sustainability must have a local focus in university, implementation of sustainability education in a university requires collaboration, cooperation and agreement between administrators, instructors and other stakeholders at higher education institution. Institutional approaches seeking to implement sustainable initiatives across campus can face considerable pushback if they did not first engage stakeholders for input and try to build consensus around the project.

The most critical challenge to sustainability initiatives is gaining consensus and buy-in from the community. Changes in attitudes, ways of thinking, and lifestyles do not occur easily for anyone. There is no universally effective message for getting the population of the world to understand the severity of the issues we face and the necessity of change, but there are also many stories of success in overcoming these challenges that must be properly communicated. Successful campus sustainability initiatives require a well-defined vision backed up by a combination of leadership and commitment from top administration, comprehensive understanding by faculty and staff. Involvement of all stakeholders will help in developing general policy and plan that will have a level of adaptability and flexibility within it which will make eventually teaching and assessment of sustainability easy.

This study has been conducted before the implementation of WES policy in classroom. It will be beneficial to conduct another study after implementation to see how this policy has worked out and how it can be improved.
APPENDICES

A. Interview For Group A

instructors who chose “sustainability” as an essential WES learning outcome

I see that you have a WMU Essential Studies (or WES) course called [Course Name] that addresses the “develop practices for planetary sustainability” student learning outcome. I’d like to understand more about this course and how you created or adapted it to meet the sustainability student learning outcome for WES.

How did your course become part of WES?

If it is existing course or old course?

[if needed] Is this an existing course that you chose to be included in WES?

How long you have been teaching this course prior to WES?

if needed: Was it part of gen edu?

What prompted you to propose “develop practices for planetary sustainability” PS as a learning outcome for this WES course?

How did you modify your course, if at all, to address the WES learning outcome “PS”?

If it is newly created course or old course?

[if needed] Is this a newly created course for WES?

When you created the course, did you intend for it to address the WES learning outcome PS “develop practices for planetary sustainability”?

If yes, Why or if not why not?
How are you planning to teach your class to address PS learning outcome of WES?

I see from your WES proposal that you plan to assess the sustainability learning outcome by [XYZ] way.

Can you explain more about your assessment method that how you plan to assess the sustainability learning outcome under WES.

Possible follow up: What assignments/quizzes/project or any other things will students complete as the required assessment of WES learning outcome PS “develop practices for planetary sustainability”?

Did you think about other ways to assess the PS learning outcome?

Do you think it will be difficult to assess PS as a learning outcome?

If yes, what difficulty might you face in assessing PS as a learning outcome of your WES course?

If talk about rubric or framework: Do you think that the WES rubric/framework can restructured to make assessment of PS easier?

To what extent does the definition of sustainability you use in your class match with the way WES has titled and defined the criteria of the sustainability learning outcome in its rubric?

(possible follow up: If yes why? if not why not?)

How do you think WES rubric/framework could be changed to improve the education for sustainability?
In the next part of this interview, I would like to find out more about how you view the current status of sustainability education at WMU. I'll also ask you about how including a required sustainability course in WES might impact sustainability education at WMU.

When WES is implemented, students will be required to take at least one course that includes the sustainability learning outcome. Is this sufficient or do you think there should be more requirement?

Before we started WES, do you think sustainability was sufficiently emphasized in WMU undergraduate study?

Potential follow up:

Why do you think sustainability is not being taught more in WMU?

Do you think sustainability will be sufficiently emphasized in the new WES program? Why or why not?

Can you think of anything that WMU or your department could do to increase the teaching of sustainability?

Are there other important things that along these lines we haven’t talked about yet?
B. Interview For Group B

Group B: instructors who has “sustainability” as course learning outcome in syllabi but they didn’t choose “sustainability” as an essential WES learning outcome

I see that you have a WMU Essential Studies (or WES) course called [Course Name] that addresses the “sustainability” as a learning outcome in your course syllabi. I’d like to understand more about this course and how you created or adapted it to meet the sustainability learning outcome.

Based on your course proposal and syllabus that you submitted to WES, your course has learning objectives focused on sustainability. Was I reading that correctly? Do you agree that your course includes a focus on sustainability?

What are the current learning outcomes/ topics of your course which are related to sustainability?

So your course is in “XYZ” section of WES and has following WES LO:

(Can you please tell me how you selected the required WES learning outcomes (X, Y) for your course?

(if instructor says he/she is teaching about sustainability)

Do you think the sustainability concepts you are teaching in your course matches WES learning outcome PS “develop practices for planetary sustainability”? If Yes:

Did you think about making PS “develop practices for planetary sustainability” a required WES learning outcome of your course?
If yes, possible follow up:

Why you did choose not to include PS “develop practices for planetary sustainability” as a required WES learning outcome of your course?

If “no” possible follow up:

Do you think PS “develop practices for planetary sustainability” would be an appropriate WES learning outcome of your course? Why or why not?

In the next part of this interview, I would like to find out more about how you view the current status of sustainability education at WMU. I’ll also ask you about how including a required sustainability course in WES might impact sustainability education at WMU.

When WES is implemented, students will be required to take at least one course that includes the sustainability learning outcome. Is this sufficient or do you think there should be more requirement?

Before we started WES, do you think sustainability was sufficiently emphasized in WMU undergraduate study?

Follow up: If not, Why not?

Potential follow up:

Why do you think sustainability is not being taught more in WMU?

Do you think sustainability will be sufficiently emphasized in the new WES program? Why or why not?
Can you think of anything that WMU or your department could do to increase the teaching of sustainability?

Are there other important things that along these lines we haven’t talked about yet?
C. Interview For Group C

I understand that you were involved in the process of creating the WMU Essential Studies (or WES) undergraduate program. I’d like to understand more about that program with regards to a new learning outcome “develop practices for planetary sustainability” and how it was decided to create or adapt the courses it to meet the “sustainability” learning outcome for WES.

1. What is your involvement in WES?
2. How does your work with WES fit with your role as an administrator or other position at WMU?
3. Do you anticipate that the WES program as a whole might encounter any challenges when students are required to take at least one course that includes planetary sustainability as a learning outcome?
4. There are courses which seem related to sustainability but their instructor didn’t choose (PS) sustainability as WES learning outcome? What challenges, if any, do you anticipate instructors who didn’t choose (PS) sustainability as learning outcome might encounter as they implement their WES courses? e.g it could be with instructor implementing courses, course availability, course assessment?

In the next part of this interview, I would like to find out more about how you view the current status of sustainability education at WMU and how including a required sustainability course in WES might impact sustainability education at WMU.

5. When WES is implemented, students will be required to take at least one course that includes the sustainability learning outcome. Is this sufficient or do you think there should be more requirement?
6. Before we started WES, do you think sustainability was sufficiently emphasized in WMU undergraduate study?

   a) Follow up:
   
   b) If not, Why not?
   
   c) Potential follow up:

   a. Why do you think sustainability is not being taught more in WMU?

7. Do you think sustainability will be sufficiently emphasized in the new WES program?

   Why or why not?

8. Can you think of anything that WMU or your department could do to increase the teaching of sustainability?

9. Are there other important things that along these lines we haven’t talked about yet?
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