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The Use of Personality Type to Improve Team Collaboration within Design Studios

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THE USE OF PERSONALITY TYPE TO IMPROVE TEAM COLLABORATION WITHIN DESIGN STUDIOS

by

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This study surveyed third year interior design students on satisfaction levels after participating in a 7-week team project where the Myers-Briggs Type Indicator® (MBTI®) personality assessment was used to help inform team formation. The literature review explored all aspects of team collaboration, the difference between group work, team work and collaborative work, common barriers found in team work, team development processes, successful team building strategies, and the design studio collaborative project in regards to student perceptions of learning. The portion of this study explored and measured in-depth is how students perceived their collaborative team experience using the MBTI to inform the creation of mixed personality teams.

Acknowledgments

This work is about collaboration, and I truly believe all things in life are a form of collaboration, formal or informal. With that said I would like to thank my collaborators. First, the Western Michigan University Interior Design graduating class of 2017 for their corporation as the subjects for this study. My family and friends for more than just support but for being integral discussion partners and editors.

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Research Problem

The design studio, whether academic or professional, is a critical place to develop design thinking. In academia it is the place where interior design students learn the design process, develop their skills, and most, importantly learn to think. One of the most important skills critical to have in a design studio is the ability to collaborate. An interior design collegiate curriculum, accredited by the Council for Interior Design Accreditation (CIDA), has the responsibility to give students successful teaming experiences and prepare them for the collaborative work life they will find after graduation. The intent of CIDA 2017 professional standard 5 (Collaboration) is to ensure graduates from accredited programs are prepared to be contributing team members, including effective leaders. One of the learning expectations for student understanding uses the example of "aligning individual personality traits and skills with leading or contributing roles on a team and team work that involves both inter-dependent and independent focus" (CIDA, 2016, p. II-17). Collaboration is a pluralistic team process in which individuals with different backgrounds generate unique solutions while working closely together (Wagenknecht-Harte, 1989) to enhance their workforce outcomes.

This researcher came to academia after 25 years of professional practice, where working in collaborative teams was the norm. In the profession, where the success of a project often depends on how well a team works together, there is an expectation that collaboration is taught and practiced in academia. Based on discussions with design educators and professionals in the field, instructors often avoid collaborative team projects in their classrooms, perhaps to sidestep disgruntle students. It is essential to facilitate better the formation of collaborative teams in

academic design studios. This is the underlying purpose for this study: to see if utilizing a personality inventory such as the Myers-Briggs Type Indicator® (MBTI®) might in fact enhance the collaborative. Used for over 50 years, the MBTI is considered by academia and business as the most valid and reliable personality inventory. "The MBTI is by far the most reliable instrument for determining personality type and one the students will encounter most often in the business world" (Berry, Wood, & Thornton, 2007, p. 15), therefore, the reason for choosing this method. Neil Frankel states,

> Students graduating from interior design programs need to be critical thinkers and adept at problem solving. One way of becoming a better problem-solver is to be well versed and knowledgeable about one's own learning and personality style assessment and how to use the information to solve problems. (cited in Volpe, 2000, p. 13)

In professional practice, the MBTI is utilized to provide key information regarding strengths and weaknesses of team members, and their potential contributions to success. It seems viable then to apply the same inventory to explore and define elements of personality in academic teams to enhance team collaboration.

There is very little empirical research that addresses studio education in the field of interior design (Hill, 2007; Peggram, 2007), and no studies on how to form teams within the interior design studio. Hence, there is a need to expand the review of literature and studies to other, similar areas of design, such as architecture. Architectural school studios are project-based, similar in size and instructor interaction to interior design studios. The topic of studio collaboration came up in reference to the related areas of architecture and engineering, but the focus was on interdisciplinary teamwork, rather than teamwork within a single discipline. Review of business management literature reveal extensive research related to the process of the formation of teams including project-based collaboration.

Interior design is a mix of business, art, and science. The field of interior design is young and often specialized; careers are constantly developing and changing, open to the creative initiative of the new professional (Russ & Weber, 1995).Therefore, the more students learns about themselves during their academic training, including personality preferences, the more they can explore different aspects of design that could lead to deep domain expertise within the field of interior design. Scott (personal communication, June 2, 2016) identified collaboration as the ultimate type of teamwork, defined as a repetitive process of working together toward common goals. In successful design firms, creative ideas of quality result from collective thought found in true collaboration. Yet it is also important for each member to bring their expertise to the collaborative effort. Because specialization is increasing, there is even a greater need today for deep domain expertise in areas like sustainable material selection, lighting, and alternative energy sourcing. Harnessing the power of these areas of expertise through collective interactive teams can only be enhanced by knowing more about the individual strengths and weaknesses of each team member. Collaboration is a process that moves us toward collective thought, so the more we know about the people we are collaborating with, the better the outcomes should be, whether academic or professional. “Administering the MBTI and using the type information to form teams is a major step in this process of forecasting stronger team outcomes in the classroom” (Berry et al., 2007, p. 19). The experience Berry et al. refer to, although based on studies of business school classrooms, sets the background needed for my study of the design studio setting.

The design studio has its own unique classroom climate that influences team collaboration. The design studio is similar to a family system (Hill, 2008): due to interior design programs being sequential in nature, students advance through the program simultaneously,

spending large blocks of time together. So, as in a family, this can bring out all emotions, the good, the bad and even the ugly. Combine this family-like studio system with the curriculum's requirement for teamwork, instructors in interior design programs have a difficult role in creating successful studio collaboration. "The benefits of teamwork are experienced when the project is well formed and well-managed by both students and instructors" (Webb & Miller, 2006, p. 2). This study endeavors to contribute to the literature of interior design education, specifically exploring how knowledge of personality preferences can be used to create well-formed teams and well-managed projects, and enhance the overall educational outcomes for students.

Literature Review

Introduction

A review of literature reveals there is a need for additional study of personality type to inform the formation of teaming academic or professional within interior design studios. It revealed that the future of teaming is more collaborative. The literature provided evidence that knowing the personality traits of the people we collaborate with contributes to the overall success of solving complex problems. Further study into interior design studios should include other collegiate institutions to create a scientific sample, using a validated and reliable survey to measure students' perceived satisfaction and possibly performance.

Team Formation

Team work starts with a team forming. This is a critical first step of group work that is often acknowledged in literature as being important, but is not found in literature as being studied within the interior design studio. Michaelsen summarizes types of team formation as follows:

> Common options [in the literature on how to best divide students] are self-selection, random selection, or instructor selection based on some criteria such as grade point averages, expressed skills, common course schedules, personality types, or demographic diversity. There is no consensus in the literature, except that self- selection for teams while easiest on the instructor is the least effective. (as cited in Estes, Nuttall, Nelson, McDonald, & Starzyk, 2013, p. 6)

Having instructors select teams for projects is similar to professional business practice (Hansen, 2006) where supervisors generally select team members rather than allowing teams to self-form. In an additional reference regarding team formation, O'Reilly (2015) argues the following:

> Creating good working teams requires solid organization; and the first step in the organizational process is determining how to assign students into teams. Herein lies the paradox. Students want choice in picking teammates, while instructors want performance. When students pick their friends, they are happy with their choice, but often struggle with effectiveness (the homogeneity effect). When instructors pick teams, students often lack team buy-in. Either way, instructors can become bogged down refereeing conflict between team members and navigating the murky waters of social loafers, inadequate skill sets amongst teams, and lackluster buy-in for team activities and assignments. (p. 2)

As cited by Chung and Meneely (2012), Sawyer states, "Research shows that when solving complex, non-routine problems, teams are more effective when composed of people who display a variety of skills, knowledge, and problem-solving styles" (p. 26). The Myers & Briggs Foundation (2014) claims that "a mixture of [personality] types is best for a work group or team because many views are represented" (Myers & Briggs Foundation, 2014, "My MBTI Personality Type" tab). The professional interior design studio solves complex problems. The classroom attempts to mimic the professional studio environment.

In Bradley and Hebert's (1997) article, they examined the personality type make-up of information system teams in relationship to effective team performance. In their summary they acknowledged that team performance "is at least partially related to the team's personality-type composition. [It is] a reminder to managers to consider carefully personality type in determining team composition" (p. 351). Throughout business management literature, optimal team selection is supported as being paramount to successful project outcomes. However, there are no specific processes identified to aid in this important task.

Collaboration

An important goal for students and instructors in an interior design studio is to achieve shared learning though collaboration. "Students who are exposed to working on collaborative projects will be more qualified as they enter the workforce" (Russ & Dickinson, 1999, p. 52).

According to McCorkle et al. (1999), “Group work, when done properly, should assist in the development of important support skills such as teamwork” (p. 114). In a presentation titled *Collaboration: The Ways We Work Together*, John Scott (personal communication, June 2, 2016) defined several different types of interactive teamwork. He defined the ultimate type of teamwork as being collaboration. He defined collaboration as a repetitive process of working together toward common goals.

Today, more importance is put on collective thought and on the importance quality creative ideas. Yet, as specialization is increasing, there is a greater need for deep domain expertise. There is a growing awareness that everyone does not work the same way. In addition to different personality types, the workplace now includes workers who entered the field before the development of the internet, and those who entered after. Technology has affected the way we work, including the way we collaborate. Augustin (2014) stated the following regarding collaboration:

> Humans have been collaborating since the first set of hunters headed off to catch dinner. People are still working together so that they can eat dinner, but the joint work is now not as directly linked to eating—intermediary processes of cashing paychecks and going to the grocery store now intervene. (p. ix)

Oseland, Marmot, Swaffer, and Ceneda (2001) learned via a literature review and surveys that groups of people gather together for five different reasons. These include sharing information with colleagues, making decisions, generating ideas, resolving problems (e.g., conflict issues), and socializing (e.g., chatting) (p. 54). Other researchers have found that meetings are held for the following similar reasons: information sharing, training, brainstorming, problem solving and decision making, and socializing. Social scientists define workplace collaboration as people working together to achieve common professional objectives, often as members of a team. Heerwagen, Kampschroer, Powell, and Loftness (2004) state, “Collaboration

is defined as a system of behaviors that includes individual, focused work, as well as interaction. To be effective team members, individuals must have the time, space and tools to do work" (p. 544). Collaboration may happen face to face, online, and via phone or video, but workers who reached adulthood around the year 2000 often prefer face-to-face interactions, especially while performing complicated and context-specific tasks often found in creative projects (Augustin, 2014, p. xi).

Both Scott and Augustin agree: Collaboration is people working together and sharing information—truly communicating. Collaboration happens in business, including the business of interior design. Classroom collaborative projects are assigned to prepare students for similar collaborative projects done in the design profession. According to Peggram (2007), "Understanding characteristics unique to each personality type provides insight on how they influence an individual's way of communicating and interacting with others" (p. 36). "Students learn more through collaborative group work because they teach each other, becoming active rather than passive learners and assuming the responsibility for their own learning" (Williams, Beard, & Rymer, 1991, p. 47). "Team projects also represent an opportunity for developing many group participation skills, as well as a variety of technical skills" (Williams et al., 1991, p. 46).

Group Work

One of my main roles as an instructor is to devise projects that develop skills students will need in order to work effectively in the profession. The instructor needs to provide teams with communication tools to create a dynamic learning community. Instructors need to provide a clear project process and timeline. "The benefits of teamwork are experienced when the project is well formed and well managed by both students and instructors" (Webb & Miller, 2006, p. 2).

"A wide range of educational research demonstrates that team projects—if designed to foster cooperative learning—will increase student achievement more than individual assignments" (Williams et al., 1991, p. 47). Cooperative learning in groups during long-term projects can leave participants with a feeling of accomplishment and improved self-esteem (Slavin, 1980; Williams et al., 1991). Students should be given both individual and collaborative components to the project for evaluation. Hillier and Dunn-Jensen (2012) suggest the following tools to create an interactive team process: team charters (contracts), goal setting and tracking (spread sheets), team feedback (multiple times), and formal team assessments.

Barriers and Team Success

A lack of full participation of all student team members, for any reason, means that some students may learn less than if they had to do the project on their own. Moreover, other students may shoulder an inequitable share of the workload, often with much anxiety and frustration (Burleson, Levine, & Bainter, 1984). A pitfall of group work occurs when a student does less than their share. This is the *free-loader* or *free-rider* effect (Slavin, 1980).

> Limited participation frequently stems from a simple desire to avoid the effort and responsibility demanded by the project. Other causes may be more complex. To avoid creating interpersonal conflict, students may merely "go along" with a dominant personality or, lacking self-confidence, may limit themselves to trivial tasks. . . . Sometimes . . . the person supposedly taking the free ride is actually a victim, ostracized by the other members from the decision-making process and the substantive work. (Williams et al., 1991, p. 48)

Literature on team work often mentions a social condition that hampers successful collaborative results. It is referred to in a number of different ways: *free-loader, free-rider,* or *social loafer*. O'Reilly (2015) mentions team members exhibiting this social condition detrimental to team collaboration as *social loafers* in her discussion of team formation above.

> One of the major problem in all group project activities is the fact that some students simply do not pull their own weight happens when one or multiple student team members

> don't contribute, forcing other team members to pick up the slack. This causes resentment among the more productive students who often feel that they are being made suckers or fools for carrying the slackers. (McCorkle et al., 1999, p. 108)

Scott (personal communication, June 2, 2016) talked about other barriers to successful collaboration. He mentioned budgets, schedules and conflict within groups and cross functional units. My experience as a studio instructor is that two of these same "barriers" are often found in the studio classroom: scheduling challenges and group member conflict. Understanding that conflict or rivalry can result in positive as well as negative outcomes when doing creative work is critical to keeping projects on track.

> The conflict dimension of rivalry creates an urge to challenge the existent: an urge to experiment, reconfigure and redefine etc. which is not found (at least to the same extent) within learning processes through mere harmonious relations of co-operation. In the same way, any trial of strength or dynamic relation of rivalry can be seen as a learning-process that to a greater extent than learning through only co-operation challenges the existent and thus promotes change and innovation. (Lotz, 2010, p. 207)

Even though we often think of rivalry negatively, co-operation and rivalry are interwoven. Competitive rivalry can sometimes trigger the learning processes within team communities. Team success can often be motivated by balancing rivalry and cooperation.

Team Development Through Stages

Key to creating this balance is the ways in which teamwork is developed and supported by a leader or instructor. It can also be argued that collaboration may just have a natural progress through which it must proceed. Russ and Dickinson (1999) surmise, "Many of the problems associated with teaming result from the natural progression of stages that teams often encounter" (p. 54). Bento (1997) proposed the following four stages of team development. Through his research and study he identified four stages of team development. The first stage is termed "forming" as team members devote much of their energy in becoming acquainted with one another. In this stage of the project, morale tends to be high, while productivity is low. The

second stage is termed “storming.” During this phase, different personality styles are revealed, goal, opinions, and ideas of solutions emerge. Morale is often low during this stage. If any communication problems between team members can be worked out, and if conflict can become a tool between team members, and not a barrier, then productivity can be higher during this phase. Design ideas tend to occur during this stage. Team members define ways to approach task to complete projects during the third stage, “norming.” If these norms are functional, the team will move on to the final stage Bento calls “performing” where typically high productivity and morale are accomplished. Similarly, Lencioni (2007) describes five facets of a successful team process: trust, conflict, commitment, accountability, and results. Both Bento’s stages and Lencioni’s behaviors guide successful results. They suggest processes that are required by, or inherent in successful teams. There is value in recognizing and addressing these processes, and risk of failure if they are ignored.

Building a Successful Team

The more familiar team members are of a process, the better they can apply that process to a project, then the higher the chance of a successful project—done on time. This relates directly to studio design projects. Studio design projects need to fit into a 15-week academic semester. Currently in the Western Michigan University Interior Design curriculum, students are asked to design two projects of equal importance within the 15-week academic schedule. A difficult task to begin with but made even more difficult if students do not have prior knowledge of a teaming processes. This raises the question, can students expedite the first stage of Bento’s four-stage process forming, having knowledge and understanding of the MBTI? Berry et al. (2007) state, “In the business world today, the biggest missing element in teamwork is trust, and teaching about differences in personality domains in the classroom can be a small part of

recreating trust through understanding the gifts of personality types" (p. 15). The idea of creating a workplace with a culture of trust and understanding which is psychological safety was the topic of a recent The New York Times Magazine article, titled "What Google Learned from Its Quest to Build the Perfect Team." The author, Duhigg (2016), wrote about a five-year journey Google took to find the key to having the perfect team. Duhigg states,

> Some groups that were ranked among Google's most effective teams, for instance were composed of friends who socialized outside of work. Others were made up of people who were basically strangers away from the conference room. Some groups sought strong managers. Others preferred a less hierarchical structure. (para. 16)

According to Duhigg (2016), Google loves data with patterns. Sadly, Google could find no strong pattern in the research they had done in their search for the perfect team. They narrowed in on "group norms," which are traditions, behavioral standards, and unwritten rules that govern how we function when we gather. They figured out which norms were most critical. Research on psychological safety lead them to communication and empathy—the building blocks of forging real connections and something they could measure (para. 33). Good team members are empathic; that is, they listen to one another and show sensitivity to other team members. Most Americans are taught empathy—an important social norm—in kindergarten, as part of the social and group norms needed for positive social interaction. Knowing personality types of individuals and selecting groups to provide a mix of personalities can possibly lead to more empathic interaction, according to Myers Briggs research. According to Bradley and Hebert (1997), empathy between team members is important to avoid infighting. Conformity to the group norm increases with the level of cohesion (p. 340). "The most important thing that one learns is an appreciation of our differences—and that they are valid and can be viewed as positive strengths" (Rome, 1990, p. 47).

Personality Type

This study examines the literature on personality type to inform team formation, hoping to enhance team communication, and cooperation for better member satisfaction and project outcomes. Russ and Weber (1995) describe personality type as "the kind of person you are and how you prefer to interact with people, data, and ideas are components of a person's personality and psychological profile" (p. 31). According to Culp and Smith (2001), "Type is for understanding, not excuses. It should never be used to prejudge your own or another's ability to do anything" (p. 30). Peggram (2007) considers, "Where a student stands in regard to temperament and level of development is reflected in characteristic patterns of behavior, that is, in his or her personality" (p. 25). Determining patterns of behavior is assessing personality type. The most valid and reliable personality inventory is the MBTI "and one the students will encounter most often in the business world" (Berry et al., 2007, p. 15).

The MBTI. Used for over 50 years, the MBTI is considered by academia and business as the most valid and reliable personality inventory. The Myers-Briggs Type Indicator meets and exceeds the standards for psychological instruments in terms of its reliability. Reliability is the degree to which an assessment tool produces stable and consistent results—time and time again, and therefore is the reason for choosing this method. According to the Myers & Briggs Foundation, "On retest, people come out with three to four type preferences the same 75% to 90% of the time" (Myers & Briggs Foundation, 2014, "My MBTI Personality Type" tab). The MBTI is a self-reporting instrument which makes it less intimidating and typically self-affirming. The MBTI assessment not only indicates your preferences, but also the relative *clarity* of your preferences. Relative *clarity* is how resounding you were to expressing your preference for a particular pole over its opposite. This information is given to each participate on their report

in the form of the *preference clarity index*, or pci (see Appendix A). There are no good or bad personality types, and there is great variety with each type. Knowing "our" MBTI only gives us insight into how WE take in information, not necessarily how others do so. Personality type is only one aspect of behavior and personality (Clinebell & Stecher, 2003).

The MBTI was developed by Isabel Briggs Myers, and her mother Katharine Briggs. They had two goals in creating this instrument or indicator. Their first goal was to align that test with Jung's (1923) theory of psychological types (Myers & Briggs Foundation, 2014, "My MBTI Personality Type" tab).

> Type development is the process of gaining comfort and command of your preferred way of taking in information, and your preferred way of coming to conclusions. Jung believed that all the functions are largely unconscious and undeveloped in infants. As we grow and develop, the different functions develop. The timing of this development has been the subject of considerable study. It is generally believed that the dominant generally develops up to age 7, the auxiliary up to age 20, the tertiary in the 30s and 40s and the inferior or fourth function at midlife or later. As you develop your type, the way you see the world and the way you behave tends to change and broaden. Comfort with your dominant and auxiliary functions forms the basis for much of your self-esteem. (Myers & Briggs Foundation, 2014, "My MBTI Personality Type" tab)

Jung's theory includes four mental processing types: sensing, intuition, thinking, and feeling. His theory proposes that all people possess aspect of these mental types. Some are more dynamic than others within a person. Jung further proposed that people have an attitude, introversion or extraversion, through which they express their dynamic type. McCaulley's collaborative work with Myers added preferences of judgment and perception (McCaulley, 1987).

> In normal development, members of each type are motivated to use the processes they are disposed to prefer; through practice they develop expertise in the activities for which their preferred processes are particularly useful. Skills and increased interests grow from "specializing" in preferred functions and lead to characteristic habits, attitudes, and traits associated with the type. (Peggram, 2007, p. 7)

There are approximately three extraverts (E) for every introvert (I), and three sensing (S) types for every intuitive (N) type in the general population (Myers, 1962). McCaulley (1974) found

that using the MBTI improved outcomes in team performance. An examination of the literature on use of the MBTI suggests that team building is enhanced by personality diversity within the team (Hammer & Huszczo, 1996). A study by Bonner (1989) sets a precedent for utilizing the MBTI to study interior design education. She found that persons of all personality types chose interior design as a major. There are four categories: Traditionalist (SJ), Troubleshooter (SP), Catalyst (NF), and Visionary (NT). Intuition is supposed to represent an interest in the possibilities of experience and relatively free access to unconscious aspects of current experience (Child, 1965, p. 494).

> In a study at the Institute of Personality Assessment of Berkeley, 40 architects were selected to participate in a weekend retreat of testing and assessment. The results showed that 50% of the architects were intuitive-feeling (NF) and 50% of architects were intuitive-thinking (NT). (Russ & Weber, 1995, p. 32)

In a Russ and Weber (1995) study,

> Of the 234 respondents (junior and senior interior design students), 40.2% were in the catalyst type (NF). The troubleshooter type (SP) comprised 21.4%, the traditional type (NT) had 16.2%, and the visionary type (NT) had 22.1%. These results differed from the aforementioned studies on creative types. Although 62.3% of the sample was intuitive, the researchers expected a much larger percentage to fall within the visionary category. Previous studies found a large percentage of the Visionary (NT) type involved in the creative profession. (p. 34)

Diehl (1992) found evidence of a link between creativity and personality type. Every personality type was found in the Interior design students. Interestingly, a large percentage being NFs and NTs, two categories that are found least often in the general population. Peggram (2007) points out this dichotomy between the general population and interior designer population in her review of literature. A large percentage of interior designers are NFs and NTs and the overall general population has a small percentage of NFs and NTs (p. 43). “The variable of personality type is inherent in the way one see's the world, draws his or her inspiration, approaches a problem, and solves the problem” (Diehl, 1992, p. 6). What could be more relevant to solving complicated

spatial problems with a team than knowing yourself better and having knowledge of your team members' personality preferences?

The Design Studio: Learning and Student Perceptions

The design studio is the collaborative center for learning interior design. The review of literature on design studio learning and student perceptions hopes to contribute to this study of how to improve collaboration within the interior design studio. Kim, Ju, and Lee (2015) state in their abstract on collaboration that the design studio is a critical educational place for students to develop design thinking and other skill (p. 102). Researchers have argued that group collaboration fosters higher level learning outcomes such as those outlined in Bloom's taxonomy of cognitive domains (Bloom & Krathwohl, 1956). Critical thinking, at the top of Bloom's hierarchy of intellectual processes, is called upon when designing. Design involves a process of discovery, learning, and research (Lawson, Bassanino, Phiri, & Worthington, 2003).

> Students graduating from interior design programs need to be critical thinkers and adept at problem solving. One way of becoming a better problem-solver is to be well versed and knowledgeable about one's own learning and personality style assessment and how to use the information to solve problems. (Frankel, as cited in Volpe, 2000, p. 13)

Team collaboration within the design studio is meant to mimic collaborative environments found in today's interior design practice. As Webb and Miller (2006) state in their introduction, "Interior design educators and professionals must find ways to effectively educate young designers for effective workplace transition. Experiential activities in the interior design studio are a primary way for this preparation to occur" (p. 1). Designing is widely recognized as a problem-solving process (Bowman & Cooper, 1994; Cross, Dorst, & Christiaans, 1996). Major research supports that personality is key to team performance and that type diversity is important to team success and problem solving.

According to Bradley and Hebert (1997), heterogeneous teams are needed to solve complex problems. They concluded that for complex problem solving projects need a variety of personality types with different skill sets, perspectives, and knowledge (p. 340). Bonner (1989) states, “Heterogeneity is valued by MBTI theorists because they feel each type has important and unique contributions to make in any field” (p. 21). And, although heterogeneous teams generally demonstrate greater levels of disagreement, including a reduced common understanding of goals and processes and a stronger tendency to undergo process-based and relationship-based conflicts, “successful teams tend to perceive conflicts as creative opportunities instead of personal attacks. Teams that can acknowledge personal differences and respect conflicting views can channel this conflict into a positive force to drive a better solution” (Chung & Meneely, 2012, p.41).

If heterogeneous design teams can move through conflicts and welcome all team members’ input, higher-level thinking and more creative solutions can result. Research often acknowledges the important for team members to have empathy for one another. Personality informed collaboration can reduce conflict and improve communication. MBTI information about students provides an advantage to understanding individual differences among the students. Knowledge of personality types can provide a way to predict communication difficulties which may arise among the different types in a classroom situation (Bonner, 1989). According to personality type theory, individuals may experience fatigue because they are using the less-preferred processes of their personality type. This team formation mismatch can also cause discouragement because greater expenditure of effort is required and the work product is likely to be of lesser quality than if the preferred processes had been utilized (Myers & McCaulley, 1985; Williams, Armstrong, & Malcom, 1985). Working outside your natural style or dominant process is often necessary in higher education and the work environment. Research

acknowledges that working outside your dominant personality process requires a greater expenditure of effort and more fatigue. Even though we sometimes have to perform task outside our dominant process, realizing when we are doing so can help ease the detrimental effects. According to Webb and Miller (2006), "The benefits of teamwork are experienced when the project is well formed and well managed by both students and instructors" (p. 2). Having knowledge and understanding of our own and others MBTI can only enhance the teaming experience. Bonner (1989) states, "Knowledge of the Type attributes allows instructors (and team members) to foresee misunderstandings that may result simply from communication barriers due to Type differences" (p. 45).

The instructor is ultimately responsible for the overall management of the classroom. If the instructor provides good project and teaming guidelines, and then moves into a facilitator role, more student learning can occur. Webb and Miller (2006) made the following statement in the discussion portion of their paper in the *Journal of Interior Design,* "Successful Studio Collaboration."

> Although the design process provides a sequence of events, students still indicate that they need help distributing workload and utilizing one another's strengths. Tools that help students develop and set goals, distribute work, and manage conflict may provide the necessary structure for success. Furthermore, these tools may facilitate the shift of the faculty role from referee to design instructor. As projects become more complex, collaboration becomes more critical and studio preparation will continue to grow in importance. (p. 8)

Hill (2008) describes classroom climate as a collection of variables: individual personalities, subject area, physical environment, group make up including gender, and policies. Classroom climate is extremely relevant in interior design education because of the studio setting, the sequential nature of the major. Both bring challenging factor to deal with regarding group dynamics. Anthony's idea (cited in Hill, 2008) that the design studio is like a university

campus sorority or fraternity, or “family like.” Fostering the best and the worst behaviors. She also explains that the sequential nature of the curriculum also brings with it the likelihood of the same classmates (possible teammates) for every studio experience. The curriculum at WMU has a sequential nature and this researcher as studio instructor agrees with Anthony and Hill that a curriculum with a sequential nature creates a family-like familiarity that has ramifications—good and bad.

Student collaboration within an interior design studio is complicated. “The interior design studio differs from the standard classroom in size, in familiarity between students, and in having a clearly established design process” (Webb & Miller, 2006, p. 8) Many aspects come into play during a design studio collaborative project, team member personalities, level of experience in design and teaming processes, and ability to resolve conflict that often is based in poor communication. Other reoccurring factors found in research on student group work that are relevant to instructor management are time duration, specialization of labor, and fairness of assessment.

Having enough time to solve complicated design problems, whether in academia or professional practice is always an issue. Limited time impinges upon established functional working groups; members can’t establish task interdependence and efficiency. In academia, the 15-week semester doesn’t allow for team development. This time truncation usually happens during the “norming” stage and doesn’t allow for conflicts to be worked through (Clinebell & Stecher, 2003). This limitation doesn’t allow for a true teaming process to occur. To complicate this time problem is the scheduling aspect; typical college students are taking other classes and are often employed off-campus while enrolled. Therefore, each team member has limited time to give to a project. “At any single goal level, then, we can expect that each student will attempt to

minimize inputs, within reason, to obtain his or her goals—whether collectively or individually" (McCorkle et al., 1999, p. 109). Solving, or at least accommodating, this lack of time becomes the instructor's role. Many instructors solve this time problem by encouraging or even assigning students with team roles (specialization of labor). Assigning students different roles should streamline the process, resulting in team efficiency and better dynamics. However, what often happens is that students stop collaborating and focus in on their instructor-assigned or self-selected role. Students then learn only their own aspect of the project, whether conceptual or functional (McCorkle et al., 1999).

> This behavior [specialization of labor] by team members dilutes the purpose of having student teams, because there really is little or no teamwork involved in the completion of the project. If the purpose of forming student teams is to have the students also learn about working in teams while completing a project, specialization of labor must be kept to a minimum. (Clinbell & Stecher, 2003, p. 378)

For the course work used in this study, Studio III students were assigned job roles. This specialization of labor was informed by the MBTI results. This researcher, as instructor, tried to solve the problem of limited time as many instructors do with specialization of labor, but with the added knowledge of the students' personality preferences. Students were more heavily assessed in the area where they had their team role. McCorkle et al. (1999) had the following to say on assessment of group projects:

> Group productivity also may be affected if group members do not feel that they will be adequately rewarded for their efforts. Grading schemes that do not take into consideration individual efforts as well as group efforts may lower the overall effort that individuals in the group are willing to make. Designing effective grading schemes is problematic. (p. 108)

A discussion of assessment often leads into a discussion of student perceptions. Both are topics often found in research on teaming, collaborative work and teaching design studios. Students come to college often obsessed with grades. Their perceptions of an assessment system

may have the greatest influence on their studies and perception of their educational experience (Smith, 2013).

> One of the complexities in assessing design work is that judgements of quality are often based on unquantifiable dimensions which do not fit well within point-systems perhaps more suited to assessing problems with right and wrong answers. Instead, design projects are largely assessed on a connoisseurship model, informed by expertise developed over years of experience. (Smith, 2013, p. 211)

Clinebell and Stecher (2003) suggest in their conclusion that an important component of a student's grade should be based on the use of teaming process tools. They used the example of requiring a team meeting journal that would be graded. The students in this study were not assessed on how well they teamed.

Methodology

It is standard practice for students in the Interior Design Studios courses at Western Michigan University to work in teams. In the fall 2015 semester, Interior Design Studio II teams formed without consideration of personality types. The instructor, who was not the researcher, formed five teams of 3 students each informed only by student preferences. She asked each student to provide her with the names of two other classmates they would like to be teamed with, she then took those suggestions under consideration when she formed them into teams. Studio II is a pre-requisite for Studio III, so the same students are in spring 2016 semester, Studio III, that were in the fall 2015 semester, Studio II.

In the spring 2016 semester, this researcher was the instructor for Interior Design Studio III. I teamed students the same as Studio II but with on important variation. The difference between fall and spring semesters was that teaming for spring 2016 semester, Studio III was informed by the MBTI. As part of standard classroom practice for Studio III students took the MBTI, attend a MBTI interpretation session given by a trained person from WMU Career and Student Employment Services, and complete two surveys. *Interior Design Studio Team Experience Survey 1* (Appendix B) administered at the beginning of spring 2016 semester, assessing student satisfaction with the previous semester's team experience. *Interior Design Studio Team Experience Survey 2* (Appendix C) was administered at the end of the spring 2016 semester, assessing student satisfaction of their informed team experience. The surveys query the students for the purpose of turning qualitative information, e.g., opinions, feelings, and beliefs into measureable bar charts.

All students were informed of study verbally and in writing at the end of the spring 2016 semester. All the students consented to participate in this study, granting access their MBTI personality typing and survey results. To protection the student subjects' rights, this researcher did not access the surveys until after the spring 2016 semester Studio III grades were posted. At the end of the spring 2016 semester students were given an Informed Consent Document. The document explained the research project and states that students would not be penalized if they did not sign the consent form.

Description of Research

The first study group consisted of 15 third-year interior design students enrolled in Design Studio II, fall semester 2015 at Western Michigan University (WMU). One of the projects required for this class was done as a group. Five teams of three were formed. The MBTI was not administered to the students nor was any instruction given regarding personality types as it pertains to team formation of collaborative work. The Studio II instructor took students uninformed by MBTI preferences into consideration when she assigned them into project teams. This researcher was not the instructor for this Studio II class but was for a connected class: Lighting for Interiors. In Lighting for Interiors, the same student teams created a lighting design for their Studio II project.

The second group (Interior Design Studio III) included the same students who participated in the first course (Interior Design Studio II), with the exception of one student, who did not enroll in the second course. This researcher was the instructor for Interior Design Studio III. Student collaborative teams were formed similarly to the previous class by asking students to give the instructor/researcher their recommendations. The difference this time was that the students were informed of each other's MBTI results. Later, based upon the MBTI results one of three roles was assigned to each team member by the instructor. As part of standard classroom practice, Studio III students took the MBTI and attended a MBTI interpretation session given by a trained professional from WMU Career and Student Employment Services. They then participated in a lecture/discussion given by the instructor/researcher on personality types and their impact on team formation and project outcomes. No student chose not to share their MBTI

results with the group or the instructor. The Studio III teams were then formed by the instructor/ researcher, informed by student recommendations. The instructor/researcher chose to consider student recommendations secondarily to personality type. The teams were formed to be heterogenic, more varied in personality type. This instructor/researcher also assigned each team member one of the following roles: project coordinator, design coordinator, or technical coordinator.

In addition, both student groups completed two surveys: *Interior Design Studio Team Experience Survey 1* (Appendix B), assessing student satisfaction with the Studio II team experience, and *Interior Design Studio Team Experience Survey 2* (Appendix C), evaluating the second team experience in Studio III. Both surveys were identical with the caveat that Survey 2 requested their MBTI results. The surveys queried the students for qualitative information: e.g., opinions, feelings, and beliefs about their recent studio team project experience. Survey II also collected the MBTI result for quantitative purposes. Both surveys used a Likert scale: 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree.

Human Subjects Institutional Review Board (HSIRB) approval (Appendix D) was secured prior to the administration of the surveys. All students were informed of the researcher's thesis study verbally at the start and in writing at the end of the spring semester 2016.

Findings

Of the 16 MBTI personality types possible, 8 are represented in this study of 14 interior design students (see Figure 1).

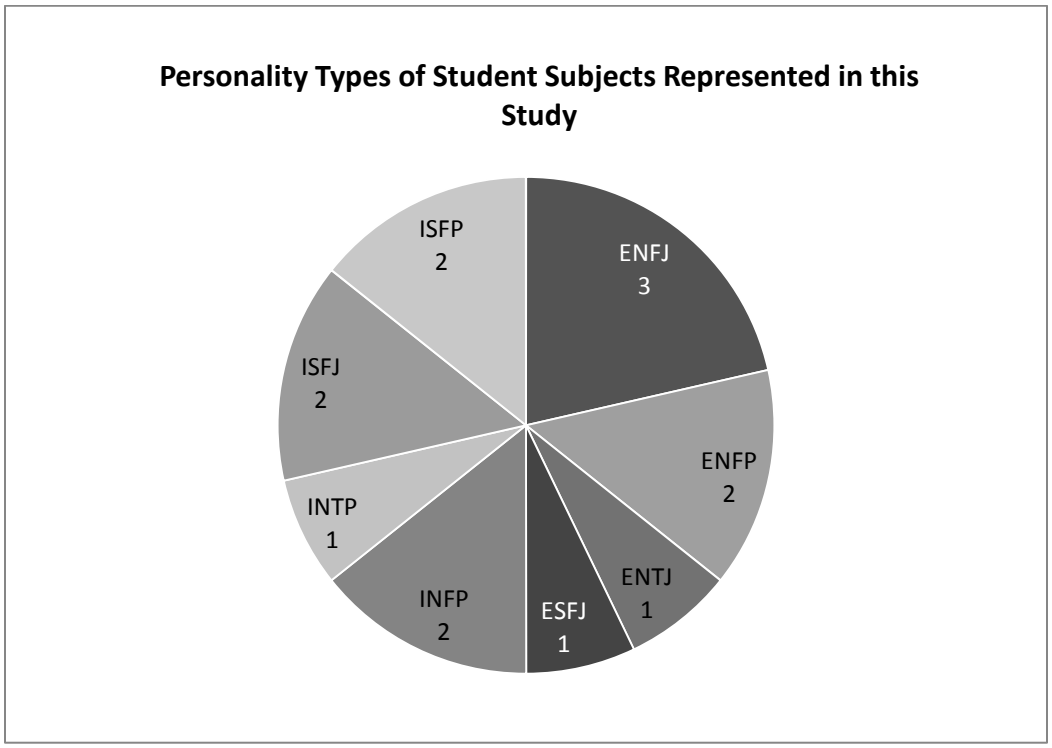

Figure 1. Personality types of student subjects represented in this study.

These results move in the same direction as Bonner's (1989) research that all personality types choose interior design as a major. Yet 9 of the 14 students have an intuitive (N) personality orientation (64%). This supports studies that indicate the intuition (N) preference to creativity, visioning, and artistic interests. This study echoes Russ and Weber's (1995) study: having 7 of

the 14 students being (NF) Catalyst type personalities and 1 (NT) Visionary type personality. Peggram (2007) points out the dichotomy between the general population and interior designer population. A large percentage of interior designers are NFs and NTs and the overall general population has a small percentage of NFs and NTs (p. 43). “The variable of personality type is inherent in the way one sees the world, draws his or her inspiration, approaches a problem, and solves the problem” (Diehl, 1992, p. 6).

Collaborative team projects within design studios are experiencing two processes at the same time: the design process and a teaming process. The more knowledge students and instructors have about each other and these different processes the more satisfied students are of their collaborative experience. Team formation is the first step in the teaming process; knowing your own and the personality styles of the people in your class that you could possibly team with can help all stakeholders achieve better teaming experiences. This study surveyed students after completing a team project not having personality type knowledge and then again after completing a teaming project having personality type knowledge. All but three questions on the survey deal with student satisfaction (1, 2, 4–7, and 10) (see Figure 3). Students were asked these same seven survey questions related to student satisfaction after each collaborative project. The overall average of the Likert scores for the seven student satisfaction questions on the survey were 0.14 of a point higher on the survey taken after the MBTI informed collaborative project experience. On a 5-point Likert scale this 0.14 increase in student satisfaction after being teamed with personality type knowledge gives this study merit and further study on this topic relevance (see Figures 2 and 3).

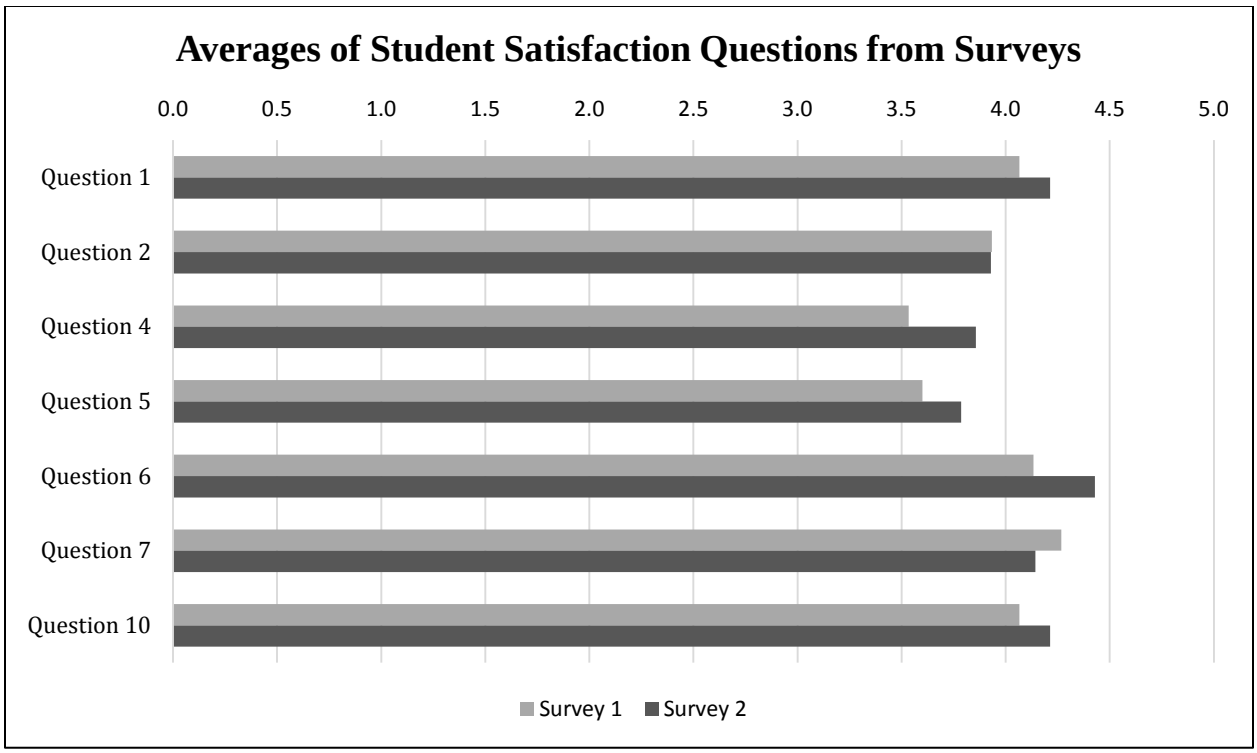

Figure 2. Averages of student satisfaction questions from surveys.

Actual Student Satisfaction Questions with averages between Survey 1 and Survey 2	
Question 1 - I believe the way groups were assembled for this project was done fairly.	0.15
Question 2 - My ability to learn was enhanced by how teams were assembled for this project.	0.00
Question 4 - The dynamics within my group allowed me to contribute to the project outcome to my satisfaction.	0.32
Question 5 - The workload was evenly distributed among all team members for this project.	0.19
Question 6 - The number of times my team met was adequate for positive collaboration.	0.30
Question 7 - I believe working in a team enhanced my learning experience.	-0.12
Question 10 - After this experience I am eager to collaborate on a design solution again.	0.15
Total Average Change Between Survey 1 and 2	0.14

Figure 3. Actual student satisfaction questions with averages between Survey 1 and Survey 2.

Survey 2's results only dipped below Survey 1's results for question 7—*I believe working in a team enhanced my learning experience* (see Figures 2 and 3). The teams for the Studio III team project were composed by the instructor to be more varied, or heterogeneous, to promote better learning outcomes. This variation in the results of question 7 could possibility speak to the presences of conflict often found in heterogenetic teams.

The research supports that greater levels of disagreement are found in heterogeneous teams. Teams with varies personality teams have a stronger tendency to conflict both process-based and relationship-based. Process-based conflict can push team thinking and create better outcomes. Relationship-based conflicts can derail team focus and interaction with anger.

Discussion

A person with an interior design degree are expected to be able to apply what they have learned in academia to the work performed in an architectural or design firm, a corporate or hospital facility, or a furniture dealership (just to name a few). The field of interior design draws many personality types because of the variety of professional directions available within the field (Bonner, 1989, p. 5). The results of this study support the following research done regarding personality type and interior designers. Of the 14 students/subjects in this study, 9 of the 16 MBTI personality types were present. Yet within these 9 personalities a common perception is found. The Intuitive perception (N) was found in 64% of the student personalities. Intuitive people are interested in future possibilities, implicit meanings, and symbolic or theoretical patterns suggested by insight (McCaulley, 1990). Intuitive personality types think in big pictures, see information as patterns, and concentrate on upcoming opportunities (Hammer & Huszczo, 1996). The literature supports a relationship between the intuitive personality and artistic, creative, and visionary interests.

> As Diehl (1992) also verified in his study: evidence indicates a link between personality type and creativity in interior design students. Gender and age had no impact on personality types. These findings indicate that interior design students occupy all personality types according to the MBTI, with a large percentage being NF's and NT's, which is interesting due to the fact that those two categories are a smaller percentage of the genera l population. (Diehl, 1992, p. 108)

Peggram (2007) also points out the dichotomy between the general population and interior designer population. A large percentage of interior designers are Catalysts (NF) and Visionaries (NT) and the overall general population has a small percentage of NFs and NTs (p. 43). Seven of the 14 student subjects demonstrated Catalysts (NF) attitudes. Reinforcing their

alignment with in interior design population, and their difference from the general non-design population.

In the general population 1 out of 3 people introvert (I) (Myers, 1962). In this research study 1 out of 2 students were introverts. An MBTI introvert (I) attribute is defined as valuing concepts and ideas (McCaulley, 1990). This is further verification of the presents of visioning being a common personality trait found in students majoring in interior design. It was important to find verification of previous research in this study, giving validity to the following outcomes.

This study asked the question: Does the use of the MBTI to form collaborative teams affect student perceptions of their studio project experience? Seven out of 10 of the survey questions asked students' perceived satisfaction question. The overall average of the student satisfaction questions (1, 2, 4–7, 10) from the Studio III survey, where the MBTI was used to form teams, were a .14 of a point higher out of the Likert score of 5 than those from the Studio II survey, where the MBTI was not used to form teams (Figure 2). For the Studio III team project, students were given two presentations to help them understanding the MBTI and how it can be used during team collaboration. Both studio instructors gave clear project process direction, deadlines, and had class time allocated for project review (check-in points and desk top critiques).

The Studio III teams were formed by the instructor/researcher, informed by student recommendations. The instructor/research chose to consider student recommendations secondarily to personality type. The teams were formed to be heterogeneous. Disagreement/ conflict is found more often in teams that are out of heterogeneous and have more mixed personality types (Chung & Meneely, 2012; Lotz, 2010).

The answer to question seven on Survey 2 was the only student satisfaction question that fell below the results on Survey 1. Question seven reads, *I believe working in a team enhanced my learning experience.* Conflict is often present in heterogeneous teams. Conflict without the background on how to respect personality differences, found in heterogenetic teams, and knowledge on how to channel that conflict into a positive team solution can result in negative outcomes. Even though a student's perception effects their learning outcomes, often learning is happening when students perceive it is not, especially if conflict is present.

Conflict and the social conditions of *free-riding, social loafing*, or *free-loading* (McCorkle et al., 1999; Slavin, 1980; Williams et al., 1991) are often reported happening together, as in the following example. During the team project in Studio II, a student came to me as the instructor for a connected course (Lighting for Interiors) with high anxiety and frustration, a similar reaction that was outlined in the problem statement. The student reported that other team members were not carrying their share of the work load (*free-riding*). This report of *free-riding* was not reported during the Studio III project where students were teamed using the MBTI and given knowledge and some tools to help facilitate a team process. The more we know about ourselves, and others the more adept we will be at turning group work into team work and then at making teams truly collaborative.

Conclusion

This study supports the need for a separate course on teaming process to improve collaborative learning within interior design studios. A team process class should be a prerequisite for design studio classes were collaboration is asked of the students. At Western Michigan University, the interior design program has a number of business course included in the curriculum. Many programs could benefit from a stand-alone course on team process. Hillier and Dunn-Jensen (2012) support this idea—that more needs to be done at the collegiate level to give students better team skills. Their article regarding Instructional Innovation in the *Journal of Management Education* addresses teaching teaming in business schools. In their paper, Hillier and Dunn-Jensen (2012) proposed a model. Their "model of team learning aims to generate easy-to-use, rigorous application tools to build teams that learn so the students can not only improve team performance but add an important tool to their managerial toolbox"(p. 721). Per Hillier and Dunn, this model should include "readings on team dynamics, peer and self-assessment, and both individual and group Myers-Briggs Type Indicator" (p. 721).

In Studio III contracts, and time management charts were introduced as team project tools. Hillier and Dunn-Jensen (2012) suggest creating an interactive team process using team charters or contracts, goal setting and tracking tools, giving team feedback multiple times throughout the project, and formal team assessments. Even though the students were given some project management tools, there is always room for improvement. The introduction and use of additional teaming tools could help increase the overall satisfaction average. An example of one of these tools is the use of meeting notes done by a rotating secretarial position within the team.

Further study of team formation and team process within interior design studio for better collaborative studio experiences is recommended. Further studies should include other collegiate institutions for a more extensive student sampling, using a validated and reliable survey to measure student perceived satisfaction as it relates to performance.

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Appendix A

MBTI PCI Example

mbti. **Myers-Briggs Type Indicator®**
Career Report

Summary of Your MBTI® Results

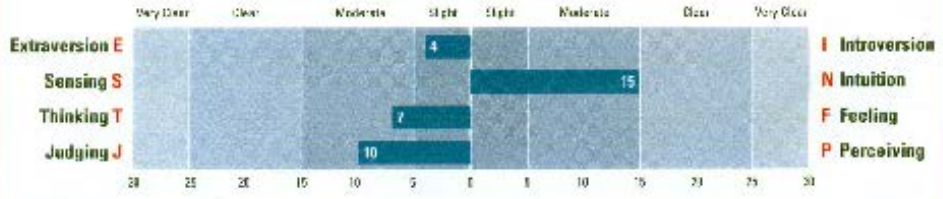
Your responses on the MBTI instrument indicate that your reported type is: **ENTJ.**

Reported Type: ENTJ

Where you focus your attention	E	**Extraversion** People who prefer Extraversion tend to focus on the outer world of people and activity.	I	**Introversion** People who prefer Introversion tend to focus on the inner world of ideas and impressions.
The way you take in information	S	**Sensing** People who prefer Sensing tend to take in information through the five senses and focus on the here and now.	N	**Intuition** People who prefer Intuition tend to take in information from patterns and the big picture and focus on future possibilities.
The way you make decisions	T	**Thinking** People who prefer Thinking tend to make decisions based primarily on logic and an objective analysis of cause and effect.	F	**Feeling** People who prefer Feeling tend to make decisions based primarily on values and on subjective evaluation of person-centered concerns.
How you deal with the outer world	J	**Judging** People who prefer Judging tend to like a planned and organized approach to life and want to have things settled.	P	**Perceiving** People who prefer Perceiving tend to like a flexible and spontaneous approach to life and want to keep their options open.

Your responses on the MBTI assessment not only indicate your preferences; they also indicate the relative *clarity* of your preferences—that is, how clear you were in expressing your preference for a particular pole over its opposite. This is known as the *preference clarity index*, or pci. The bar graph below charts your pci results. Note that a longer bar suggests you are quite sure about your preference, while a shorter bar suggests you are less sure about that preference.

Clarity of Reported Preferences: ENTJ



PCI Results Extraversion 4 Intuition 15 Thinking 7 Judging 10

Appendix B

Survey 1

2015/16
Western Michigan University

Interior Design Studio Team Experience Survey 1

Please select the number that best represents how you feel about your recent studio team project experience. **5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree**

	5 - 1
1. I BELIEVE THE WAY GROUPS WERE ASSEMBLED FOR THIS PROJECT WAS DONE FAIRLY.	
2. MY ABILITY TO LEARN WAS ENHANCED BY HOW TEAMS WERE ASSEMBLED FOR THIS PROJECT.	
3. HAVING A TEAM LEADER WOULD HAVE ENHANCED MY LEARNING EXPERIENCE FOR THIS PROJECT.	
4. THE DYNAMICS WITHIN MY GROUP ALLOWED ME TO CONTRIBUTE TO THE PROJECT OUTCOME TO MY SATISFACTION.	
5. THE WORKLOAD WAS EVENLY DISTRIBUTED AMONG ALL TEAM MEMBERS FOR THIS PROJECT.	
6. THE NUMBER OF TIMES MY TEAM MET WAS ADEQUATE FOR POSSITIVE COLLABORATION.	
7. I BELIEVE WORKING IN A TEAM ENHANCED MY LEARNING EXPERIENCE.	
8. MY TEAM FOLLOWED THE DESIGN PROCESS OF INFORMATION GATHERING, PROGRAMMING, PRELIMINARY DESIGN, AND DESIGN DEVELOPMENT.	
9. I BELIEVE THE WAY TEAMS WERE CREATED FOR THIS STUDIO PROJECT REFLECT HOW TEAMS ARE FORMED IN THE FIELD OF INTERIOR DESIGN.	
10. AFTER THIS EXPERIENCE I AM EAGER TO COLLABORATE ON A DESIGN SOLUTION AGAIN.	

Appendix C

Survey 2

2015/16
Western Michigan University

Interior Design Studio Team Experience Survey 2

Please select the number that best represents how you feel about your recent studio team project experience. **5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree**

	5 - 1
1. I BELIEVE THE WAY GROUPS WERE ASSEMBLED FOR THIS PROJECT WAS DONE FAIRLY.	
2. MY ABILITY TO LEARN WAS ENHANCED BY HOW TEAMS WERE ASSEMBLED FOR THIS PROJECT.	
3. HAVING A TEAM LEADER WOULD HAVE ENHANCED MY LEARNING EXPERIENCE FOR THIS PROJECT.	
4. THE DYNAMICS WITHIN MY GROUP ALLOWED ME TO CONTRIBUTE TO THE PROJECT OUTCOME TO MY SATISFACTION.	
5. THE WORKLOAD WAS EVENLY DISTRIBUTED AMONG ALL TEAM MEMBERS FOR THIS PROJECT.	
6. THE NUMBER OF TIMES MY TEAM MET WAS ADEQUATE FOR POSSITIVE COLLABORATION.	
7. I BELIEVE WORKING IN A TEAM ENHANCED MY LEARNING EXPERIENCE.	
8. MY TEAM FOLLOWED THE DESIGN PROCESS OF INFORMATION GATHERING, PROGRAMMING, PRELIMINARY DESIGN, AND DESIGN DEVELOPMENT.	
9. I BELIEVE THE WAY TEAMS WERE CREATED FOR THIS STUDIO PROJECT REFLECT HOW TEAMS ARE FORMED IN THE FIELD OF INTERIOR DESIGN.	
10. AFTER THIS EXPERIENCE I AM EAGER TO COLLABORATE ON A DESIGN SOLUTION AGAIN.	

My four letter MBTI personality assessment results are ___ ___ ___ ___.

Appendix D

Human Subjects Institutional Review Board Approval Letter and Informed Consent

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: December 16, 2015

To: William Charland, Principal Investigator
Beth Jarl, Student Investigator for thesis

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 15-12-13

This letter will serve as confirmation that your research project titled "Team Formation for Improved Collaboration within Group Projects" has been **approved** under the **expedited** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study***)." Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: **December 15, 2016**

1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
CAMPUS SITE: 251 W. Walwood Hall

Western Michigan University
Department of Art

Principal Investigator: William Charland
Co-Principal Investigator: Beth Rolston Jarl
Title of Study: Team Formation for Improved Collaboration within Group Projects

You have been invited to participate in a research project titled *Team Formation for Improved Collaboration within Group Projects*. This study will serve as Beth Jarl's thesis for the requirements of the Master of Arts in Art Education. This consent document will explain the purpose of this research project and will go over all of the time commitments, the procedures used in the study, and the risks and benefits of participating in this research project. Please read this consent document carefully and completely. Please ask any questions if you need more clarification.

What are we trying to find out in this study?
Primary thesis question: Do student teams that are deliberately composed of different personality types lead to greater team-member satisfaction than teams formed without consideration of personality types?
Secondary thesis question: Do student teams that are deliberately composed of different personality types more effectively solve design problems than teams formed without consideration of personality types?

Who can participate in this study?
Western Michigan University (WMU), College of Education and Human Development, Department of Family and Consumer Sciences, Interior Design Program students who took Fall '15 Semester Studio II and are enrolled in Spring '16 Semester Studio III.

Where will this study take place?
The surveys and interpretation session were held on Western Michigan University's Campus in N. Kohrman Hall, room # 3320 as part of standard classroom practice for FCS-3590, Studio III. The MBTI, Form M was taken online and overseen by the WMU Career Center and Student Employment Services. The taking and sharing of the MBTI personality test was part of standard classroom practice for Studio III course work. Access to this Informed Consent Form and the Interior Design Studio Teaming Experience Surveys will be after the completion of Spring '16 Semester, Studio III after grades are posted.

What is the time commitment for participating in this study?
Only the time you will take to read and consider this Consent.

What will you be asked to do if you choose to participate in this study?
As a participant in this study you will be asked to give me (Beth Jarl) as Co-Principal Investigator, access to your MBTI results and surveys to compare and analyze to inform this study. I will not use any names in the writing of this thesis.

What information is being measured during the study?
The surveys and MBTI will provide qualitative information; e.g. opinions, feelings, and beliefs that will be turned into quantitative information (statistics).

What are the risks of participating in this study and how will these risks be minimized?
Risks of participating in this study are minimal. The only risk is that your MBTI result and surveys will be shared with Beth Jarl as Co-Principal Investigator (Researcher). All students are given the opportunity to opt-out at any given point of the study without prejudice or penalty.

What are the benefits of participating in this study? A benefit is that you may be contributing to improving aspects of pedagogy in team-based design education. Another benefit may be shared knowledge of the study's findings.

Are there any costs associated with participating in this study?
There are no costs to participating students.

Is there any compensation for participating in this study?
There is no compensation for participating in the study.

Who will have access to the information collected during this study?
Beth Jarl, Co-Principal Investigator will have access to the information collected during this study. Access to the surveys and the Informed Consent Forms will take place after the completion of Spring '16 Semester, Studio III and grades have been posted. Willian Charland, Principal Investigator will only have access to your information after it has been made anonymous or been coded.

What if you want to stop participating in this study?
You can choose to stop participating in the study at any time for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study.

Western Michigan University
H.S.I.R.B.
Approved for use for one year from this date:

DEC 16 2015

HSIRB Office

The investigators can also decide to stop your participation in the study without your consent. Should you have any questions prior to or during the study, you can contact the student investigator, Beth Jarl at (269) 330-8030 or beth.jarl@wmich.edu or primary investigator, Bill Charland at 269-387-2436 or williamcharland@wmich.edu. You may also contact the Chair, Human Subjects Institutional Review Board at 269-387-8293 or the Vice President for Research at 269-387-8298 if questions arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

_____

Please Print Your Name

_____ _____

Participant's signature Date

Appendix E

CPP Permission Agreement

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CPP Permission Agreement #19566

This *CPP Permission Agreement* ("**Agreement**"), dated as of October 7, 2016 ("**Effective Date**"), is between CPP, Inc., a California corporation ("**CPP**"), and the licensee described below ("**Licensee**"):

Licensee Name:	Beth Rolston Jarl
Licensee Address:	2526 Ridgeview Dr., Kalamazoo, MI 49008
Licensee Email:	beth.jarl@wmich.edu

Accordingly, the parties agree as follows:

1. **Definitions**. For purposes of this Agreement and any associated Licensed Use, the terms below are defined as follows:

   1.1. "**Agreement**" means this *CPP Permission Agreement*.
   1.2. "**CPP Trademarks**" means any CPP trademark, service mark, certification mark, or similar indicator of source.
   1.3. "**Effective Date**" has the meaning assigned to it in the preamble to this Agreement.
   1.4. "**Formats**" means the medium or media in which you may use the Licensed Content:

Format
print and electronic

   1.5. "**Languages**" means the following language(s):

Language
U.S. English

   1.6. "**Licensed Content**" means the following CPP content:

Specific Content	Source Work *(for informational purposes only; CPP grants no license in the larger work under this*	Page Number(s)	Product Code

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	Agreement)		
Page 3 summary of MBTI® Career Report	MBTI® Career Report	3	262153DL

1.7. "**Licensee's Publication**" means Licensee's upcoming publication, the tentative details of which are reproduced below:

Tentative Publication Title	Publication Author(s)
The Use of Personality Type to Improve Team Collaboration within Design Studios	Willaim J. Charland and Beth R. Jarl

1.8. "**Permission Fee**" means:

Permission Fee:	no fee

1.9. "**Restricted Instruments**" means the MBTI®, CPI 260®, Strong Interest Inventory®, and FIRO® instruments, as well as future instruments that CPP may, in its sole discretion, deem to be a Restricted Instrument

1.10. "**Taxes**" means all applicable federal, state, and local taxes, duties, fees, charges, surcharges, or other similar exactions, whether such exactions are imposed directly upon Licensee or upon CPP.

1.11. "**Territory**" means the following geographic location(s):

Territory
the United States of America

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Limited Number of Copies:	5

3. **Fees & Payment Terms**.

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3.1. **Permission Fee**. The license granted under this Agreement shall not become effective unless and until Licensee has paid the Permission Fee to CPP. Licensee shall pay to CPP the Permission Fee and any applicable taxes that apply to the transaction no later than thirty (30) days after the execution of this Agreement.

3.2. **Taxes**. Licensee shall be responsible for all applicable Taxes imposed on or with respect to the transactions contemplated by this Agreement, whether such Taxes are imposed directly upon Licensee or upon CPP. For purposes of this section, Taxes do not include any taxes that are imposed on or measured by the net income of CPP.

3.2.1. **Tax Exemption**. If Licensee is tax-exempt, Licensee may provide duly-executed documentation evidencing such tax-exempt status to CPP for consideration prior to the execution of this Agreement. If the documentation is accepted, CPP shall exempt Licensee from taxes arising under this Agreement. Licensee shall keep all tax exemption documentation accurate and current.

4. **Licensee's Representations & Warranties**. Licensee represents and warrants as follows:

4.1. **Eligibility**. If the Licensed Use implicates administration of one or more of CPP's Restricted Instruments, Licensee represents and warrants that Licensee has all necessary qualifications or certifications to administer such Restricted Instruments.

4.2. **Authority**. Licensee has full power and authority necessary to execute this Agreement.

5. **Intellectual Property**. Other than the limited grant of license contemplated by this Agreement, no transfer of rights is intended by this Agreement. CPP reserves all rights in the Licensed Content and CPP's other intellectual property. Licensee's acknowledges CPP ownership of the Licensed Content and Licensee shall not challenge CPP's ownership of the Licensed Content and shall take no action inconsistent with or detrimental to CPP's proprietary rights in the Licensed Content.

5.1. **Assignment of Unauthorized Derivative Works**. Should Licensee create any works that are derivative of the Licensed Content in violation of the terms of this Agreement, then Licensee agrees that such unauthorized derivative works shall be considered "works made for hire" and the copyright in such works shall automatically vest in CPP. If such unauthorized derivative works cannot or are not deemed to be "works made for hire," then Licensee hereby automatically and irrevocably assigns in perpetuity all copyright and other proprietary rights Licensee would have in such unauthorized derivative works, and Licensee forever waives any "moral rights" Licensee might have in such unauthorized derivative works.

6. **Term & Termination**. Details of the term and termination of this Agreement are as follows:

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6.1. **Term**. This Agreement and its associated license shall be valid during the life of the **current edition** of Licensee's Publication. Without limitation, if Licensee wishes to make use of the Licensed Content in a revised or new edition or a different work entirely, then Licensee must seek separate, prior, written permission from CPP.

6.2. **Termination**.

6.2.1. **By CPP for Material Breach**. If, in CPP's sole discretion, Licensee materially breaches this Agreement, then CPP may terminate this Agreement by providing Licensee with thirty (30) days' written notice.

6.2.2. **By Licensee for Convenience**. Licensee may terminate this Agreement for any reason by providing CPP with written notice.

6.3. **Effects of Termination or Expiration**.

6.3.1. **Halt Use of Licensed Content**. If this Agreement becomes terminated or expired for any reason, then Licensee shall immediately stop making all use of the Licensed Content.

6.3.2. **No Refunds**. If this Agreement becomes terminated or expired for any reason, CPP shall not offer a refund of the Permission Fee in any part.

7. **General Provisions**. The following additional provisions shall apply to this Agreement:

7.1. **Offer Expiration**. If Licensee has not accepted CPP's offer to enter into this *Permission Agreement* within thirty (30) days after it has been presented to Licensee, then CPP's offer to enter into this *Permission Agreement* shall expire and Licensee will need to submit a new request for permission.

7.2. **Electronic Signatures**. This Agreement may be executed by electronic signatures.

7.3. **Severability**. If any provision of this Agreement is illegal or unenforceable, that provision is severed from this Agreement and the other provisions remain in full force.

7.4. **Governing Law**. This Agreement is to be governed by and construed in accordance with the laws of California, without regard to its conflict of laws principles. However, if Licensee is a governmental agency or public educational institution that is prohibited by law from agreeing to this choice of governing law, then this Agreement shall be governed and construed in accordance with the laws of the state of relevant jurisdiction for that governmental agency or public educational institution.

7.5. **Modification**. This Agreement may only be modified by a writing signed by both parties.

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7.6. **Venue**. All court actions arising out of or relating to this Agreement will be heard and determined in the state or federal courts of Santa Clara County, California, and each party submits and agrees to the exclusive jurisdiction and venue of such courts for such actions. However, if Licensee is an educational institution that cannot agree to this choice of venue, then all court actions arising out of or relating to this Agreement will be heard and determined in the state or federal courts of the state of relevant jurisdiction for that educational institution.

7.7. **Entire Agreement.** This Agreement, including all exhibits, schedules, and attachments hereto, contains the entire agreement between the parties hereto relating to Licensee's use of the Licensed Content. All prior or contemporaneous written or oral agreements, representations, warranties, statements, or understandings by and between the parties, whether express or implied, with respect to the subject matter contained herein, are superseded by these terms.

7.8. **Anti-Delegation**. This Agreement is personal to Licensee. Licensee may not delegate any of its duties, or sell, transfer, assign, sublicense, or otherwise dispose of the license granted by this Agreement without CPP's prior consent, whether by operation of law, merger, or by the sale or transfer of all or substantially all of its assets or voting securities in any other manner. Any purported assignment or transfer of this Agreement made without CPP's prior written consent shall be null and void.

7.9. **LIMITATION OF LIABILITY.** IN NO EVENT SHALL CPP'S LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT, WHETHER IN CONTRACT, TORT, OR UNDER ANY OTHER THEORY OF LIABILITY, EXCEED IN THE AGGREGATE THE TOTAL AMOUNT PAID BY LICENSEE UNDER THIS AGREEMENT.

7.10. **NO EXPRESS OR IMPLIED WARRANTY.** THE LICENSED CONTENT ARE PROVIDED "AS-IS." CPP MAKES NO REPRESENTATION OR WARRANTY REGARDING THE LICENSED CONTENT OTHER THAN THOSE SPECIFIED IN THIS AGREEMENT. TO THE FULLEST EXTENT PERMITTED UNDER APPLICABLE LAW, CPP DISCLAIMS ANY IMPLIED OR STATUTORY WARRANTY.

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7.11. **Surviving Provisions**. The following provisions shall survive any termination or expiration of this Agreement:

7.11.1. Section 1, *Definitions*;

7.11.2. Section 3, *Fees & Payment Terms*;

7.11.3. Section 5, *Intellectual Property*;

7.11.4. Section 6.3, *Effects of Termination or Expiration*; and

7.11.5. Section 7, *General Provisions*.

To evidence the parties' agreement to this Agreement, they have executed and delivered it on the dates indicated below:

LICENSEE: BETH JARL	**CPP, INC.**
_____	_____
Signature	Signature
_____	_____
Print Name	Print Name
_____	_____
Title	Title
_____	_____
Date	Date