

THESIS

MILLENNIAL INTERIOR DESIGN STUDENTS' PERCEPTIONS
CONCERNING GAME-BASED LEARNING IN A LIGHTING DESIGN COURSE

Submitted by

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ABSTRACT

MILLENNIAL INTERIOR DESIGN STUDENTS' PERCEPTIONS CONCERNING GAME-BASED LEARNING IN A LIGHTING DESIGN COURSE

The purpose of this research study was to assess the attitudes and perceptions of Millennial interior design students concerning game-based learning in a lighting design course. Research indicates Millennial students do not respond well to traditional lecture-based courses (Crittenden, 2002; Jones, 2012; Thaler, 2013). Several higher education disciplines, including interior design education, are modifying their teaching methodologies to accommodate Millennial learning styles (Prensky, 2001). Game-based learning is one of several teaching methodologies that may be effective in boosting Millennial learning (Jones, 2012; Skiba & Barton, 2006; Thaler, 2013).

To assess perceptions of Millennial interior design students who have participated in game-based learning experiences, a phenomenological study was conducted with interior design students enrolled in a junior-level lecture-based lighting design course within a four-year university located in northern Colorado. Each student enrolled in the lighting design course had the opportunity to play three games, which were developed specifically for a lighting design course by the course instructor. The instructor's goal was to "flip the classroom" in part through the implementation of game-based learning. Each of the three games developed by the instructor for the lighting design class were developed based on course content and modeled from the revised cognitive process dimension of *Bloom's Taxonomy of Objectives*. This taxonomy was designed to promote retention and transferability and six categories were developed as a result:

Remember (retention), Understand, Apply, Analyze, Evaluate, and Create (all of which relate to transfer) (Anderson & Krathwohl, 2001).

Students were selected for the study based on their (1) enrollment in the lighting design course, (2) age and inclusion in the Millennial generation, and (3) participation in three educational games developed specifically for a lecture-based interior design course. Qualified participants completed a demographic survey and answered open-ended questions during focus group sessions. The data was analyzed using Interpretive Phenomenological Analysis.

Four major categories, with themes and subthemes, emerged from the findings of this study. The categories included: (1) perceptions concerning lecture-based courses, (2) perceptions of previous game-based learning experiences, (3) perceptions of game-based learning experiences in a lighting design course, and (4) strategies for creating effective game-based learning experiences. Themes and sub-themes emerged within each major category.

Themes from category one, perceptions concerning lecture-based courses, included (1) previous experiences with lecture-based courses, and (2) perceived strategies for improving lecture-based courses. In the second category, perceptions of previous game-based learning experiences, three themes emerged. These themes included (1) high school experiences, (2) college experiences, and (3) value of game-based learning based on previous experiences. Within the third category, perception of game-based learning experiences in lighting design, six themes emerged with related sub-themes. The six themes included (1) peer influences, (2) emotional and motivational factors, (3) retention of information, (4) game mechanics, (5) transferable skills learned from game-based learning, and (6) overall impressions of game-based learning. Within the fourth category, strategies for creating effective game-based learning experiences, three

themes emerged with related sub-themes. These themes included (1) develop quality games, (2) implement games properly, and (3) post-game follow-up.

This study provides an exploratory foundation into the use of game-based learning for Millennial interior design students. Additionally, the study offered insight into students' perceptions of lecture-based courses, retention and transferability of information as a result of game-based learning, and student strategies for game-based learning. Understanding how Millennial interior design students perceive game-based learning can offer insights for interior design educators who may be interested in developing new curriculum in their lecture-based courses.

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DEFINITION OF TERMS

The following terms are defined to frame the context for this study.

- Andragogy – The art of teaching adult learners.
- Baby Boomers – Individuals born between 1946 and 1964.
- Digital natives – Individuals who have grown up with technology and have never known a world without it.
- Digital immigrants – Individuals who have grown up seeing the emergence of technology.
- Game-based learning – A type of learning that involves the use of games to assist educational purposes.
- Gameplay – the real-time act of playing games.
- Gamification – the use of game mechanics/thinking to engage individuals to solve problems.
- Generation X (Gen X) – Individuals born between 1965 and 1981.
- Generation Y – Another term for the Millennial Generation.
- Generation Z – Individuals born after Generation Y. Currently this date is being debated and has not been made official.
- Millennial generation – A group of individuals born after 1982. Currently the date ending this generation is being debated and has not been made official.
- Millennial student/ Millennial – A student/person who is a member of the Millennial Generation.

- Retention – The ability to recognize, understand and recall information and knowledge in the same way it was presented.
- Transferability – The ability to use and understand what was learned in order to solve new problems.

CHAPTER I

INTRODUCTION

“I never try to teach my students anything. I only try to create an environment in which they can learn” ~ Albert Einstein

The year 1982 was an exciting and eventful year. Michael Jackson dominated the airwaves with his album “Thriller”, the Epcot Center opened at Disneyworld, Princess Diana gave birth to Prince William, and the first CD player was made available to the public by a Japanese company called Sony. The Commodore 64, one of the first public personal computers, also hit the market changing the way people lived and interacted with each other. In fact, *Time* magazine named “the computer” as “Man of the Year” for 1982 because of how it was revolutionizing everyday life (Denning E-solutions LLC, 2013). It is ironic that while “the computer” was named *Time* magazine’s 1982 “Man of the Year” it is also the year that birthed a new generation of digital natives, better known as the Millennial generation.

To understand the Millennial generation, it is important to first understand the characteristics of generations that came before them. Each generation commonly shares historical, social, and cultural characteristics which make them distinguishable from each other (Evans & Forbes, 2012). For instance, the Baby Boomers (born 1946-1964) are one of the largest generations as a result of high birth rates at the end of World War II (United States Census Bureau, 2006). They are known for optimism, idealism, and their competitive entrepreneurial instincts which built the foundations for successful businesses in the 1980’s. They are known for questioning authority because they took part in political and economic events like the war protests of the 60’s, the acceptance of sex, drugs, and rock n roll, the assassination of JFK and MLK Jr., as well as civil rights and women’s movements (Trower, 2009).

Generation X (born 1965-1981) is considered to be more cynical than Baby Boomers but more resourceful overall (DiGiacinto, 2010). They were known as the Latch Key generation, because their Baby Boomer parents were typically single parents and/or worked late hours, which meant that Generation X (Gen X) children had to use their own keys to get into their empty unsupervised homes. Often times Gen X turned to television and video games for entertainment when their parents were away (Trower, 2009). As a result Gen X came to understand technology and built the computer empire we know today. Needless to say, members of Gen X are best known as independent, problem-solving multi-taskers (DiGiacinto, 2010).

The Millennial generation is the largest generation since the Baby Boomers, numbering about 100 million people or nearly 20% of the population in the year 2000 (Howe & Strauss, 2000). This was the same year they first entered the doors of higher education at the age of eighteen. Millennial students are known for their use of technology, and their sense of entitlement. They expect immediate communication and results, prompt feedback, questions answered immediately, and instant gratification (Evans & Forbes, 2012; Feietag & Berge, 2008; Williams, Beard & Tanner, 2011). They do not learn well when they are asked to read (Feietag & Berge, 2008; Jones, 2012; Thaler, 2013) and will rebel against traditional teaching, including lectures, tests, and discussions (Jones, 2012; Oblinger & Oblinger, 2005). They are visual and active but they are also impatient when it comes to learning (Skiba & Barton, 2006; Thaler, 2013; Tucker, 2006). “It is clear that the (educational) methods used for Gen X and Baby Boomers will not work” (Nimon, 2007, p. 40). Knowing and understanding who Millennial students are and what they need can lead to an understanding of how to teach them (White & Kiegaldie, 2011).

Several higher education disciplines, including interior design education, are modifying their teaching methodologies to accommodate Millennial learners. Historically speaking, interior design education has consistently and successfully taught design using four basic formats including fundamental courses (e.g. lecture-based), artistic classes (e.g. sketching and 3D models), technological courses (e.g. AutoCAD and Adobe Creative Suite) and studio classes (Demirbas & Demirkan 2007). Design studios are ideal classroom environments for Millennials as they encourage the interaction, experiential learning, and hands-on engagement that Millennials prefer (Evans & Forbes, 2012; Feietag & Berge, 2008; Skiba & Barton, 2006). But, interior design education consists of more than just studio classes. Because lecture formats are prevalent in current interior design education, and because Millennial students do not respond well to traditional lectures (Crittenden, 2002; Jones, 2012; Thaler, 2013), some design educators are looking for additional ways to reach Millennial students when using lectured formats.

Research reveals several teaching methodologies that have proven beneficial for Millennial learning styles. Feietag and Berge (2008) suggest that using adult learning theories is one of the best practices a teacher can have when developing curriculum. Theories like Constructivism and Problem-Based Learning are useful when teaching Millennials (Feietag & Berge, 2008). Skiba and Barton (2006) suggest experiential learning activities where feedback is given in real-time. White and Kiegaldie (2011) believe that face to face interactions between learners and teachers can improve the quality of interaction for Millennials.

Technology is another tool that educators can utilize to enhance Millennial student learning. Jones (2012) believes technology is a vital teaching tool for Millennials so long as teachers use it to foster learning and not entertainment. This can include developing curriculum into things like blogs, simulations, eBooks, iPods, virtual learning, YouTube videos, or even

smartphone applications (Jones, 2012). In addition to these suggestions, Jones (2012) mentions the possibility of using educational games as a means to assist Millennial learning (Jones, 2012). When one considers both the academic needs of Millennials, and the suggested teaching methods of Millennial students, game-based learning may provide a rich opportunity for engaging Millennial student learning.

Game-based learning fosters learning through the use of games. Games are a series of interactions (Kapp, 2012) that provide challenges and goals, which keeps players actively motivated (Callaghan et al., 2013; Koster, 2005; Garris, Ahlers & Driskell, 2002; Tuzun, 2004). In addition to the opportunity for success, game play combines learning with fun (Lee, Jeong, Park & Ryu, 2011) and students do not realize they are learning academic subjects because they are so immersed in game play (Prensky, 2005). Games can stimulate real-time brainstorming (Bonk & King, 1998) and can also introduce or help students discover new concepts and knowledge (Burgos et al., 2007). Games have the potential to promote interest in a topic that can be difficult to have an interest in (Watson et al., 2011), to encourage active participation, and give students achievable yet challenging goals (Callaghan et al., 2013). “This process is accelerating as educators learn to make effective use of the most appealing features of computer games e.g., active participation, intrinsic and prompt feedback and challenging but achievable goals” (Callaghan et al., 2013, p. 575).

A review of literature revealed only a few research studies concerning the teaching of the Millennial generation within interior design education. One study, conducted by Peterson (2011), indicated that Millennial design students worked well with computer simulations. A second study, conducted by Sickler (2009), suggested that Millennial interior design students responded similarly to studio and lecture-based materials. However, Sickler’s study indicated

the lecture-based instructor used more hands-on learning experiences to engage her students. Gibson (2009) studied the perceptions of interior design educators towards Millennial students. Her findings indicated and it is evident that design educators perceived a difference between the Millennial generation and those that preceded it.

Game-based learning shows great potential in fostering learning of Millennial students. The rationale for using game-based learning as the andragogy for this study is based on research. Millennials thrive well with experiential, problem-based, game-based, constructive, and participatory learning methodologies because they are able to immerse themselves in their work (Feietag & Berge, 2008).

Generation N's learning style is hands-on and not necessarily linear in fashion. Forget instruction manuals, tech tips and lecture-based lessons; this is a generation that plays to learn. Many of today's video games are based upon trial and error and Gen N sees it as a metaphor for learning (Feietag & Berge, 2008, para. 5).

Games have the potential to help students work towards goals, make decisions, and experience the consequences of those decisions with judgment in a learning environment (Trybus, 2012). For example, Trybus (2012) mentions that individuals who used flight simulators in addition to flying planes "consistently produced training improvements" compared to individuals who learned from only flying planes (para. 8). Games are also low-risk, cost-effective, and virtually unlimited in possibilities (Trybus, 2012). In addition to the few numbers of research regarding Millennial interior design students, a review of literature indicates there is also a lack of studies regarding game-based learning in interior design education. Currently, there are no published studies regarding student perceptions of game-based learning within interior design education.

CHAPTER II

LITERATURE REVIEW

The purpose of this literature review is to analyze current literature and identify gaps in research concerning the following topics: the Millennial generation, current interior design andragogies, Millennial interior design students, and game-based learning. The identification of the purpose and limitations of the proposed study concludes this chapter.

Understanding Millennials

Dates and Names

Millennial is the term used to describe the generational demographics of persons born after Generation X. The literature shows some discrepancies regarding the exact dates that the Millennial generation actually starts and ends but most researchers believe this generation begins in 1982 (Atkinson, 2004; Williams et al., 2011) and ends around 1991 (Oblinger, 2003; Thaler, 2013) with others saying we have not yet seen the newest generation, Generation Z, surface yet (Feietag & Berge, 2008; Jones, 2012; Sternberg, 2012). Still others suggest that the Millennial generation ends in the late 1990s (White & Kiegaldie, 2011), at 2002 (McAlister, 2009), or in the years 1994, 2000, 2002, and 2003 (Shaw & Fairhurst, 2008). It is clear there is not a consensus.

There also seems to be a discrepancy as to how the Millennial generation is referred to among researchers. They are known as the “Millennial generation”, or as “Millennials” (Bland, Melton, Welle & Bigham, 2012; Shaw and Fairhurst, 2008; Tucker, 2006; Young, 2012), Generation “Y” or “Gen Y” (Shaw & Fairhurst, 2008; Sternberg, 2012; Thaler, 2013; White & Kiegaldie, 2011), “Net Generation” or “Generation N” or “NetGen” (Evans & Forbes, 2012; Feietag & Berge, 2008; Skiba & Barton, 2006), “Digital Natives” (Thaler, 2013; White & Kiegaldie, 2011; Williams et al., 2011), “Echo Boomers” (Feietag & Berge, 2008, Tucker,

2006), “Generation Me” or the “Me Generation” (Shaw & Fairhurst, 2008; White & Kiegaldie, 2011), “Dot-Coms”, the “IGeneration”, “Generation D” (digital), the “Nexters” (Shaw & Fairhurst, 2008), the “Nintendo Generation” (Frاند, 2000), “Generation Why”, and the “Point and Click Generation” (White & Kiegaldie, 2011). For purposes of this literature review, this generation of students will be referred to as Millennial students and will be assumed to be born from 1982 to present day as Generation Z has not yet been officially defined.

Differing Opinions Concerning Millennials Related To Education

Millennial students not only look differently than previous generations, but they behave and think differently as well (Shaw & Fairhurst, 2008). “Our students have changed radically. They are no longer the people our educational system was designed to teach” (Prensky, 2001, p. 1). Educators are concerned about these changes, and the impact they are having on higher education (Oblinger, 2003).

Some researchers believe that current educators are speaking an outdated language that is not appreciated or understood by Millennial students (Feietag & Berge, 2008). Educators seem to have difficulty captivating the attention of newer generations because they use traditional methods (Feietag & Berge, 2008). On the flip side, educators are equally frustrated because they feel forced to shorten lectures and increase group discussion while ignoring students who are texting or multi-tasking in the front row (Feietag & Berge, 2008). In addition, instructors are concerned about plagiarism and academic dishonesty because Millennial students believe the Internet is a credible academic source of reliable information (Jones, 2012). For these and other reasons, educators are concerned their students are not being properly educated (Feietag & Berge, 2008; Jones, 2012).

How should educators teach and respond to the Millennial generation? Should educators accommodate Millennial attitudes and learning styles? What andragogical methods should they turn to? These are difficult questions to answer. Understanding Millennial characteristics may be the key to finding the answers to these questions.

Characteristics

Millennials are the largest generation since the Baby Boomers, numbering about 100 million people or nearly 20% of the population (Howe & Strauss, 2000). This generation has grown up in small, middle-class, tight-knit families where both parents work and bring in higher incomes than previous generations. Parents are actively involved in mentoring their children's lives and quality of education (Howe & Strauss, 2000). Also known as the "Baby-on-Board" generation, Millennials are one of the most protected, wanted, and nurtured generations to date (McAlister, 2009; Rickes, 2009; Tucker, 2006) because both parents and government consumer-safety mandates have aggressively controlled much of what they can see and do (Jones, 2012). This is in conjunction with increased standards for child-care, preschools, and after-school programs (Weston, 2006).

Family is important to the Millennial generation. One study shows 75% of Millennials identify closely with their parents' values and around 97% have good relationships with their parents (Jones, 2012). They are regularly consulted with when families make decisions and have discussions (Tucker, 2006).

The parents of Millennials are quick to defend their children, and will step in to solve any issues their child may be experiencing (Bland et al., 2012; McAlister, 2009; Sternberg, 2012), which has led this generation to be more dependent than previous generations in some aspects and more independent in others. Millennials have been protected so aggressively from childhood

pangs and have not experienced much negative reinforcement. They generally receive positive reinforcement from parents and other authorities (McAlister, 2009). Millennials have a hard time comprehending the consequences of making wrong choices (Nimon, 2007). They are also not used to being judged, especially by parties outside of the family (Sternberg, 2012). The amounts of nurturing and protection these children have received have also led them to experience prolonged adolescence (Ryan, 2007) and low maturity (McAlister, 2009). Millennials will delay marriage and live with parents longer (McAlister, 2009). They also lack problem solving skills as well as patience (Howe & Strauss, 2000). Millennials appear highly demanding, entitled, and confident to the point of narcissism (Howe & Strauss, 2000; Ryan, 2007).

On the other hand, Millennials are looked upon as being better educated and more ethnically diverse than previous generations (Howe & Strauss, 2000). They are highly social and cooperative (McAlister, 2009). Millennials have strong, firm attitudes about their political views and social justices (Jones, 2012). One of their infamous characteristics is their ability to multi-task in both work and play (Evans & Forbes, 2012; McAlister, 2009; Thaler, 2013; Tucker, 2006; White & Kiegaldie, 2011). They are also ambitious, entrepreneurial, and hope to benefit society (White & Kiegaldie, 2011). Millennials tend to be emotionally and intellectually open and like to express themselves freely, but they also prefer anonymity (Tapscott, 1998).

Pressures and Stress

It is important to note that even though Millennials have been raised and protected by strong and loving families, they have been raised with high expectations to study hard, avoid risks, to take advantage of every opportunity, and to excel (Howe & Strauss, 2000; Jones, 2012; Ryan, 2007). This generation has witnessed great man-made tragedy and traumas at early ages. However, this makes Millennials resilient, but it also overloads them with the stress and worries

of the world (Jayson & Puente, 2007). These kinds of stresses affect their academic performance in complex ways.

Millennial students who move to college can struggle with the changes in their structure and social situations. Previously, they had the guidance of their parents or other authority figures. Once their previous advisors are not there, their former coping mechanisms are no longer effective (Donnelly, Eburne, & Kittleson, 2001). Pressures can cause increased stress and thereby cause students to engage in fewer activities, take short cuts, and possibly be tempted to cheat (Jones, 2012).

A study conducted by Bland, Melton, Welle, and Bigham (2012) indicated that Millennial students were most stressed about:

- Pressure to do well in school (83.3%)
- Changes in living conditions (82.1%)
- Beginning college (74%)
- Identifying a major career choice (69%)
- Moving/transferring (67.8%)

Additional academic stresses include:

- Tests (87.8%)
- Procrastination (82.9%)
- Lack of sleep (80.1%)
- Assignments/papers (80.4%)

Common coping mechanisms for Millennial students include:

- Surfing the internet (81.1%)
- Participating in internet social networks (86%)

- Calling mom (78.6%)
- Prayer (67.9%)

It is interesting to note that their findings indicate that calling friends and parents, using social networking, praying or using substances to cope with their stress are considered to be avoidant coping strategies. In actuality, Millennials believe these methods help alleviate their stress. Neutral activities, which do not impact stress tolerance positively or negatively, include reading a book, having quiet time, writing in journals, partying, having sex, or surfing the internet. A protective factor includes feeling supported by those around them (friends, family, and teachers) (Bland et al., 2012).

Technology Use

Perhaps the most talked about characteristic of Millennials is their use of technology. These “digital natives” grew up with technology and view it as a part of daily life as opposed to other generational groups (“digital immigrants”) who view it as an innovation; useful but not essential (Nimon, 2007; Prensky, 2001; Rickes, 2009). Millennials are considered to be “techno-savvy” (McAlister, 2009) because their technological understanding seems to be effortless and natural (Pardue & Morgan, 2008). Cell phones, computers, text messaging, email and internet are the cornerstones of their world (Feietag & Berge, 2008; Papp, 2010).

Millennials use technology not only to access information and services (Frاند, 2000) but to stay connected and interact with friends, family, and the world around them (Oblinger & Oblinger, 2005; Sternberg, 2012). “Today’s students expect to use technology in their everyday lives for accessing information, make college decisions, choices on a major or career path as well as everyday communication with peers, family, and college faculty” (Evans & Forbes, 2012, p. 398). They are “more visually literate than previous generations and easily integrate text, sound,

and images” (Frاند, 2000 p. 399). Research indicates it is not the device itself that matters most to this generation, but simply the action or activity of it (Feietag & Berge, 2008). Millennials use technology as a tool to master academic content as opposed to traditional methods (Jones, 2012).

Understanding Academic Needs of Millennials

Knowing how this generation was raised, what stresses them, and how they use technology leads into understanding the academic needs and learning styles of the Millennial student. The following section discusses Millennial student expectations, their preferred learning styles, and teaching methods that foster learning.

Student Expectations

Millennial students focus intently on their grades and extracurricular activities (Brown, 2000; Oblinger & Oblinger, 2005; Prensky, 2001; Tapscott, 1998) because academic success is a personal fulfillment (Goldgehn, 2004; Nimon, 2007). Students perceive studying and education as being “cool” (Shaw & Fairhurst, 2008). Needless to say, they are achievement oriented and have a great sense of their personal and career goals (Evans & Forbes, 2012). They view academics as a means to an end; a pathway to their aspirations for their dreams and career. They understand the value of a college education (Jones, 2012).

Due to perceived importance of formal education, Millennial students have many expectations about their learning and how it should be administered to them. They expect barrier-free communication, egalitarian environments and a say in the process. They want to learn as fast as possible with the least amount of hassle (Feietag & Berge, 2008; Jones, 2012). They expect immediate communication and results, prompt feedback, questions answered promptly, and instant gratification (Evans & Forbes, 2012; Feietag & Berge, 2008; Williams et al., 2011). They expect high grades to validate their achievements (Jones, 2012) and they

believe that any work they submit deserves a passing grade (Nimon, 2007). Receiving a “B” on a project is perceived as average and unacceptable. They expect the same support they had in high school from college faculty and staff, and demand accountability in all educational settings (Jones, 2012). They expect rewards and awards, and they want to be challenged (McAlister, 2009). They want to express their views and incorporate experiences into learning without isolation (Tapscott, 1998).

Millennial Learning

Millennials want to learn in their own time on their own terms and to learn about real-life issues that matter to them (Evans & Forbes, 2012; Tucker, 2006). Millennial students may love to learn, but only when it suits their style. They respond well to individualized, structured guidance with adequate feedback. They prefer laid out goals, step-by-step methodologies and the least amount of hassle as they have little patience for delays (Evans & Forbes, 2012; Feietag & Berge, 2008; Jones, 2012; Skiba & Barton, 2006). They learn best when they are able to use hands-on learning to discover, actively engage, and immerse in their studies through inductive reasoning and non-linear pathways (Evans & Forbes, 2012; Feietag & Berge, 2008; Jones, 2012; Skiba & Barton, 2006).

Mentorship from teachers is highly important to Millennial students (Evans & Forbes, 2012) because the feedback, structure and guidance they receive from mentors are reflective of their upbringing (Feietag & Berge, 2008). The guidance and encouragement they receive help take the task to a deeper level where they can be more creative and conceptualize ideas (Jones, 2012).

Millennials do not learn well when they are asked to read (Feietag & Berge, 2008; Jones, 2012; Thaler, 2012) and will rebel against traditional styles of learning, including lectures, tests,

and discussions (Jones, 2012; Oblinger & Oblinger, 2005). Millennial student reading habits consist of reading too quickly and not reading enough. It is difficult for them to comprehend textual sources beyond superficial levels (Thaler, 2013). They also do not respond well to traditional lectures and prefer interactivity with others (Crittenden, 2002; Evans & Forbes, 2012; Feietag & Berge, 2008; Jones, 2012; Skiba & Barton, 2006; Thaler, 2013; Tucker, 2006). It is clear that the methods used for Gen X and Baby Boomers will not work for Millennial students (Nimon, 2007).

Teaching Millennials

Millennial students are visual and active but impatient learners (Skiba & Barton, 2006; Thaler, 2013; Tucker, 2006). The best way to teach them lies within adult learning theory (Feietag & Berge, 2008). They thrive well with experiential, problem-based, game-based, constructive, and participatory learning methodologies because they are able to immerse themselves in their work. Simulations, eBooks, virtual learning, games, modeling, student discussions, group projects, YouTube videos, classroom wikis, online data bases, podcast lectures and PowerPoint, visualizations, case analyses, blogging, pause and clarify strategies, interactive websites, clickers, internships, and community engagement provide real-time feedback and the interaction that promotes deeper learning in this generation than traditional methods of lecture and testing (Dede, 2005; Jones, 2012; McAlister, 2009; Skiba & Barton, 2006; Thaler, 2013; White & Kiegaldie, 2011; Williams et al., 2011).

Thaler (2013) equated Millennial students to sprinters, individuals who move and want answers quickly, but may need to be trained like marathon runners. Therefore it is important to depict to this generation the end goal, or the big picture, so they can understand the practical use of their studies (Thaler, 2013). It is clear that Millennial students prefer curriculum developed to

match their learning style. Curricula should engage students in the construction of knowledge and help them take charge of their learning instead of gaining knowledge for knowledge sake (Jones, 2012; Oblinger & Oblinger, 2005).

Once the curriculum is in place the instructor needs to understand the educational preferences of the Millennial and how to teach them according to those needs. Instructors should expand their roles from intellectual authorities into learning facilitators and mentors who can not only deliver successful experiential andragogies but also give the kind of support their Millennial students need. This reduces stress and steers students into deeper forms of learning (Bland et al., 2012; Evans & Forbes, 2012; Rickes, 2009). The instructor should provide a supportive mentorship environment where open-door policies are set in place and the students can feel respected but also encouraged to rely on themselves instead of their parents or other authority figures. It is important for the instructor to move students away from avoidant coping mechanisms discussed earlier (Bland et al., 2012). Instructors should set expectations from the beginning and define acceptable response times for activities and deadlines (Feietag & Berge, 2008). It is important to use examples they can relate to and invite them to use their own examples when covering material (Tucker, 2006).

Millennial students need individual attention (Thaler, 2013). Curriculum should be designed to promote learner/learner and learner/teacher interaction with a wide range of activities that are suitable for all students (White & Kiegaldie, 2012). Instructors should promote high standards with Millennial students and establish new traditions in the classroom. Instructors should also stick to the syllabus and emphasize that hard work by itself will not give the students high grades. Offer concrete examples to show Millennial students what is expected of them and

provide them with multiple paths and opportunities to maintain and improve course grades (Williams et al., 2011).

Teaching Millennials with Technology

Some assume that Millennial students are technologically savvy and that technology should play an important role in the classroom. The literature suggests that instructors should embrace learning *with* technology and not necessarily *from* technology (Jones, 2012). Instructors should develop curriculum with the content they want students to master and then figure out which technologies would best assist that content (Skiba & Barton, 2006). Technology will then become a tool to be used to foster learning and to improve mundane tasks (Jones, 2012; Skiba & Barton 2006). Prensky (2001) stated that it is the educator who must embrace technologies in order to engage Millennial students in fundamental concepts like reading, writing, and arithmetic.

Opposing Views

As previously stated, not everyone is in agreement about Millennials and how educators should approach their academic needs. Some researchers believe that while there are some differences to be found in the Millennial generation from previous generations, the difference is not significant enough to warrant a change in andragogy.

Researchers Bennett and Marton (2010) have looked extensively into the beliefs about Millennials and have found that many of the assumptions being made about the academic needs of Millennials are driven by poorly developed and largely unrepresentational studies on Millennials. White and Kiegaldie (2011) suggest that most beliefs regarding Millennials actually stem from and are re-circulated by Western marketing companies. Sternberg (2012) suggests that “the Gen Y student is largely positively constructed within higher education literature” (p.

574), which paints them to be ideal students while also constructing them to be problematic. According to these researchers, the hype that has been created as a result of such statements are equivalent to a ‘moral panic’ (White & Kiegaldie, 2011, p. 265). Sternberg (2012) calls it “a massive hype”, which is causing “a sense of impending crisis” (p. 571). These researchers are concerned that higher education will respond to these so called crises and make andragogical changes that could actually hinder learning for this and future generations.

The Millennial generation’s use of technology is one category receiving the most controversy. Where some researchers believe that Millennial students need technology (Evans & Forbes, 2012; Feietag & Berge, 2008; Papp, 2010) others suggest that not all members of the Millennial generation use technology at the same capacity. Bennett et al. (2008) points out that researchers like Prensky (2001) talk about the immersion of technology experienced by Millennials and showcasing their need for emerging technology in education, but a survey conducted by Kvavik, Caruso, and Morgan (2004) shows that Millennials are actually immersed in word processing, emailing, and internet surfing when using technology. Only a small percentage of Millennials actually go beyond these applications. These are not necessarily the types of technology usage that warrants major andragogies changes.

Many people in older generations may incorrectly assume that Gen N (another term for the Millennial generation) understands and uses all computer applications when, in reality, the opposite is true. Typical of human nature, members of Gen N know what they need (or want) to know and little else. (Feietag & Berge, 2008, p. 459).

Understanding Interior Design Education

The overarching goal of design education is to prepare students for professional practice by facilitating their learning (Hill, 2008) and enhancing their understanding about how people live, grow, mature, and prosper (Guerin & Asher Thompson, 2008). When discussing

Millennials and their educational needs in interior design, it is important to appreciate the role and place of interior design practitioners in society.

Interior Designers

Interior designers are problem solvers who use a design process to find solutions for a given design problem (Nussbaumer & Guerin, 2000). Each design solution for a client is a hypothesis based on acquired design education and past experience in the field or in education (Guerin & Asher Thompson, 2008). Interior designers can work on many design problems at the same time. They communicate their designs by drawing, drafting, or sketching out floor plans, elevations, sections, details, as well as three-dimensional representations of spaces (Nussbaumer & Guerin, 2000). “Interior designers are sometimes described as artists using the interior space as their canvas” (Russ & Weber, 1995, p. 30).

Interior designers must be knowledgeable in many human-centered areas related to the built environment including construction and building components (Carmel-Gilfilen & Portillo, 2012), knowledge of visual organization (Wong, 1993), and artistic, scientific, and social sensitivity (Akbulut, 2010). Designers also have working knowledge of sustainable and universal design, codes, structures, and mechanical systems (Guerin & Asher Thompson, 2008). Designers in the 21st century are expected to be competent in problem-solving and critical thinking. They are interdisciplinary, highly motivated, technically competent, and mentally prepared to deal with professional issues (Demirbas & Demirkan, 2007; Guerin & Asher Thompson, 2008; Myers, 1982). Many higher education courses and programs have been developed across the country to facilitate these needs (Demirbas & Demirkan, 2007). These interior design programs can be accredited by CIDA, the Council for Interior Design Accreditation, which “assures the public that interior design education prepares students to be

responsible, well-informed, skilled professionals who make beautiful, safe, and comfortable spaces that also respect the earth and its resources” (CIDA, 2013).

Interior Design Education

Hildebrandt (2011) estimates “that there are close to 400 Interior design programs of higher learning within North America. These programs operate at various scales and engage in the academic process at various levels” (Hildebrandt, 2011, pg. 255-256). CIDA has listed 178 programs that have chosen to seek accreditation (CIDA, 2013).

All students have experienced the built environment in one way or another because they are users and inhabitants of the environment. Design education uses these experiences as a starting point to educate students about the relationship between people and space, about the design process, and about the spaces that are to be designed (Smith, Hedly & Molloy, 2009). Design may be an art, but design education integrates art and technology together (Demirbas & Demirkan, 2007).

Demirbas & Demirkan (2007) suggest that contemporary interior design education can be divided into four categories: fundamental courses, technology-based courses, artistic courses, and design studio courses. Fundamental courses help students develop and construct design knowledge and are typically more theoretically based than project based (Demirkan & Demirbas, 2008). These courses would include most lecture-based courses.

A study conducted by Canestaro and Carter (1992) showed lecture courses were considered to be one of the least innovative courses available (according to educators) and that “Any predominantly lecture class seems less interesting to design students” (Canestaro & Carter, 1992, p. 32).

Technology based interior design courses provide scientific knowledge about design and can be both theoretical and practice based (Demirkan & Demirbas, 2008). Typically one would think technological courses would teach software programs like AutoCAD, Revit, Sketchup, and Adobe Creative Suite. It could however include courses like color and lighting due to the technical nature of the topic.

Artistic courses are any courses that provide the foundations for expression and design, like presentational techniques (Demirkan & Demirbas, 2008). Courses that involve sketching, modeling, portfolio, and even 3-D computer graphics could be considered artistic.

The one category that has received extensive attention in the literature is the studio classroom, which is considered to be the foundational backbone of design education (Akbulut, 2010; Cikis & Cil, 2009). In fact, design education differs from other education because of how it uses design studios for project-based and reflective learning (Sipahioglu, 2012). Design studios allow students to create real-world projects (floorplans, elevations) in a student-centered environment (Kurt, 2011).

Smith, Hedley, and Molloy (2009) explain that studios serve two purposes; the first is to learn how to design according to a process or by using certain methodologies. The second purpose is to “reveal knowledge about concepts and/or situations through the act of designing” (Smith et al., 2009, p. 14). Students will usually begin to develop ideas by sketching, diagramming, or modeling (Carmel-Gilfilen, 2010) based on the concept of “learning by doing”. The studio environment encourages visual, verbal, tactile, and written forms of communication and representation when finding viable solutions for design problems (Cikis & Cil, 2008; Demirkan & Demirbas, 2008). Students are exposed to different courses within a design program and because studio brings all of these courses together, every learning style has a role to

play within the studio learning environment (Demirbas & Demirkan, 2007; Smith et al., 2009). Additionally, design students can work independently or in groups, as the project mandates, but they are generally free to share and process information with each other and their instructors as part of their learning process (Demirbas & Demirkan, 2007; Demirkan & Demirbas, 2008; Kvan & Yunyan, 2005).

Instructors of studio environments primarily work with the student more to oversee the development of projects and as a type of mentor that students can rely on for information and guidance through the design process (Carmel-Gilfilen, 2010; Demirbas & Demirkan, 2007) Kucko and Caldwell (1995) noted in their study that the studio instructor typically works with students independently, which contrasts to educators who teach in more traditional classrooms.

In addition to studio, fundamental, technological, and artistic courses there are other means of learning, which the ID student can experience. One such learning experience includes service learning projects, which allow students the opportunity to connect with the community around them while engaging in academic work (Bruce-Davis & Chancery, 2012). Students meet with clients in the community, and then design solutions for their particular clients' design problems. These kinds of projects illustrate first-hand what real-world projects actually entail from meeting with clients, job site visits, creating floor plans, to creating proper construction documentation. Students study and decipher these design problems in the classroom or out in the community while under the direct supervision of an instructor (Flanery, 1993).

Another opportunity employed by interior design education is the internship. Students are given academic credit for working in professional practices (Black, 2000). Internships are considered high-quality learning experiences that most design programs employ. Students learn

how business and design work together in a professional environment, which in turn, leads to professional expertise (Matthew, Taylor, & Ellis, 2006).

Though these alternative experiences are used and work well to educate design students, some believe they are not enough in preparing students for professional practice. Black (2000) points out that the internship program he studied provided an experience for students that education could not reproduce, but lacked the opportunity for students to process their experiences beyond informal conversations. Flannery (1993) stated that service learning projects are developed to meet the specific objectives of the curriculum itself, and that perhaps it did not always reflect project development in its entirety. Hill (2008) points out that instructors in design studios serve as facilitators and for some students this may be “disconcerting, confusing, and frustrating” in part because learning becomes more exploratory in nature and therefore less meaningful (p. 39).

The Millennial Interior Design Student

The review of literature indicates a few publications specifically related to Millennial interior design students. Honey (2009) listed a description of Millennial characteristics and recommended various teaching strategies such as articulating desired outcomes, establishing clear expectations, and identifying goals that matter to students. Miller, Sattar, and Gentry (2006) addressed how to engage the learning styles of Millennium students while simultaneously increasing critical thinking in the studio environments. Their suggestions included reflective writing, service learning, course journals, feedback, and self-evaluations (Miller et al., 2006). The following studies are specific to Millennial interior design students.

Studio vs. Traditional Instruction

Sickler (2009) studied the learning preferences of Millennial interior design students in two classes with the purpose of understanding “if instructional methods currently used within two identified interior design classes appeal to these new and different learners” (p. 3). The first class Sickler chose to study was a sophomore design studio that included a combination of lecture and hands-on experiences. This class offered a variety of instructional methods to the students. The second class was “Social/Psychological aspects of interior design”, which is primarily a lecture course about the “social use of space, proxemics, special analysis and the effects of the environment on human behavior” (Sickler, 2009, p. 33). She classified course activities into two categories: millennial-preferred techniques and traditional techniques. Millennial-preferred techniques refer to learning strategies generally preferred by Millennial students (e.g. learning on their own terms, instant communication).

The results of Sickler's study surprisingly showed that participants favorably preferred the instructional methods of both courses. Millennials do not typically respond favorably towards lecture-based courses (Jones, 2012). She did note that the instructor for the lecture-based course delivered materials in a variety of ways that may indicate why participants were so favorable of the lecture-based materials. In fact, Sickler states that the results of her study were in contradiction to the research that built her study but perhaps it is not the research that is incorrect, that perhaps Millennial interior design students are different when compared to the general Millennial student population. Sickler also points out that while one class may deliver materials in a traditional lecture format, the next class will have them engaged in hands-on learning activities.

In summary, Sickler stated that interior design education is a unique and diverse discipline that has enough variety to keep millennial students virtually satisfied and that instructors should not worry so much about generational differences, but focus on retention of knowledge. Her study was conducted at Florida State University and was limited to researching two classes with instructors who used varied teaching techniques. Other classes in other schools with different instructors could produce different results if researched using the same framework.

Traditional Instruction vs. Simulation

A dissertation written by Julie Peterson (2011) studied how Millennial interior design students learned and engaged in business ethics when using traditional classroom “pen-and-paper” instruction compared to a computer simulation. The computer simulation was comprised of case studies to “address the professional responsibility and ethical conduct of an interior designer based on various realistic design-related scenarios” (Peterson, 2011, p. 51). The simulation was built using Interactive Scenario Builder, which is an experiential web-based program. Students could interact with virtual people and construct a course of action for the virtual person to follow. This program was not a game; it was merely a simulation of real-world scenarios.

Peterson hypothesized that the computer-simulation group would show higher post-test results over the traditional pen-and-paper group, which would indicate an increase in learning. Both groups scored higher in the post-test than they did in the pre-test, but the pen-and-paper group had a higher mean score than the computer simulation group, but not significantly higher. Her study did reveal higher levels of engagement within the computer simulation group, but again the difference was not significant. In summary, “the findings of this study showed that although interior design students found computer simulated ethics case studies a positive

learning experience with relatively high levels of engagement, this did not necessarily equate to higher levels of achievement when compared to other instructional strategies” (Peterson, 2009, p. 109).

Perspectives of Interior Design Educators

Gibson (2009) investigated Millennial students through the perspectives of interior design faculty and hiring practitioners. Her objective was to understand their views about any potential changes they see in Millennial students as compared to previous generations. Gibson was particularly interested in what changes have taken place in design education and professional practice as a result of Millennials, and what faculty and practitioners foresee happening with interior design and design education in the year 2030.

The results of Gibson’s qualitative study indicate three themes regarding noticeable changes in the millennial generation of interior design students: a lack of intellectual curiosity, perceiving school and education as simply a means to an end, and Millennial students feel entitled to their viewpoints. Faculty and practitioners feel design students are distracted with digital devices and preoccupied with responsibilities they have outside of class. Moreover, they sense their students’ motivation as lacking compared to previous generations; school is all about getting the degree and less about actually learning the subject. According to Gibson’s research, the overall perspectives of faculty and practitioners are generally negative towards the changes they see in students. These statements support what other researchers have said regarding the attention span (Pardue & Morgan, 2008; Tucker, 2006), entitlement and expectations (Feietag & Berge, 2008; Ryan, 2007), and motivations and patience of Millennial students (Jones, 2012; Skiba & Barton, 2006).

In terms of the changes happening in design education three themes emerged from research: a rise in parental influences, “an increased demand to narrow teaching towards standards” (Gibson, 2009, p. 5), and a broader educational experience. Responses to this question seemed to also lean negatively in terms of perceptions. Faculty and practitioners also shared three themes for changes they see happening in practice to include: intensified speed and competition, increasing professional visibility, and more interdisciplinary work. Where the previous two questions seemed more negative in responses, the responses faculty and practitioners had for this question remained relatively balanced.

Lastly, faculty and practitioners predict that in the year 2020 collaboration and globalization will be greater, commitments to social and ethical responsibilities will be renewed, and leadership and innovation will foster. Basically, practitioners and faculty felt interior design will be more innovative, with new markets and models, it will be driven by technology, and will be more responsible for social and environmental issues. This category showed hopeful, positive perceptions for the future despite the negative perceptions faculty and practitioners had regarding the Millennial generation.

Games in Education

“In order to engender learning in this generation, educators must employ different methods and techniques – approaches that meet students where they are and gently move them toward lasting and meaningful change” (Honey, 2009, p. 338). For those interior design educators who teach courses other than design studios, and for those who may want to transform their andragogy to better suit Millennial generations, there are several suggested methods. One method, game-based learning, shows great potential for improving engagement and deeper

learning of Millennial students. It is important, however, to understand what games are and what they do in order to understand how they can benefit classroom learning.

About Games

Games come in many shapes and sizes from card games, board games, sports, trivia games, digital games, game shows, and even games like “hide-n-seek”. Game play has evolved into more sophisticated digital console and arcade games, online games, and basic stand-alone computer games (Lee, Peng, & Park, 2009). Game play includes everything from action, adventure, fighting, role-playing, strategy, sports, trivia and simulation to name a few (Gros, 2007).

Video gaming is the most economically powerful industry in entertainment today (Dominguez, Saenz-de-Navarrete, Fernandez-Sanz, Pages, & Martinez-Herraiz, 2013). This is due, in part, to a tremendous growth spurt in the last 20 years. In 2008, approximately 170 million people played computer and video games (Trybus, 2012). The video game “World of War Craft” boasts 11 million subscribers who play the game 23 hours a week on average (Trybus, 2012). Wii consoles and Facebook games also report millions of users around the world (Dominguez et al., 2013).

Schools and worksites are filling up with students and workers who have never known a world without video games. Between 2006 and 2010, one in five workers were expected to retire and be replaced by 18-40 year olds who grew up with video games (Trybus, 2012). The Entertainment Software Association (2011) reported that 72% of Americans play digital games and 53% of them are between the ages of 18 and 45 with an average of 12 years of experience in playing digital games. Personal computers can be found in 98% of all gaming households with 62% of that population using the computer solely for games. Gaming consoles (e.g. Xbox,

PlayStation, and Wii) are found in 63% of gaming households while 43% are using mobile phone games (Forsyth, 2012). This data shows that individuals have grown up playing games, and these individuals are now, and have been, entering into higher education and the workforce.

Game-Based Learning

Game-based learning is a type of learning that involves the use of games to assist educational purposes. The goal of educational games has more to do with learning than the actual entertainment most games are designed for (Michael & Chen, 2006).

Many educators and researchers would argue that learning should not be about memorization. Encouraging the retention and transferability of knowledge are two central goals of education (Anderson & Krathwohl, 2001). Retention is the ability to recognize, understand and recall information and knowledge in the same way it was presented (Anderson & Krathwohl, 2001). Transferability is the ability to use and understand what was learned in order to solve new problems (Anderson & Krathwohl, 2001).

Retention and transferability are two attributes that can influence the type of learning one can achieve. Learning can be categorized into three areas: no learning, rote learning, and meaningful learning (Anderson & Krathwohl, 2001). No learning occurs when a person is unable to recall information or apply knowledge to a new problem. Rote learning is where a person can recall information, but is not able to apply the information towards solving issues. Meaningful learning is where a person can recall information and apply new knowledge towards solving new problems (Anderson & Krathwohl, 2001). Meaningful learning assists with problem-solving, which is an important aspect of education, and especially important in interior design education.

Furthermore, learning is about “acquiring the skills and processes needed to respond appropriately under pressure, in a variety of situations” (Trybus, 2012, para. 5). Often times methods such as lectures, videos, online reading, and textbooks can lose target audiences because meaningful learning is not necessarily achieved by these tasks. Traditional lecture/test-based methods tend to drill students on procedures and then evaluate student memory. While a student may have the ability to recall information, their behavior and skill remains untested in such learning environments (Trybus, 2012).

When it comes to game-based learning, games are a series of interactions (Kapp, 2012) that provide challenges and goals, which keeps players actively motivated (Callaghan et al., 2013; Koster, 2005; Garris et al., 2002; Tuzun, 2004). They also give students better memory retention (Oblinger, 2003), and mental engagement (Prensky, 2001), along with an enhanced ability for visual-spatial perception (Greenfield, Brannon, & Lohr, 1994).

The literature suggests a variety of reasons why game-based education can be a useful tool in the classroom. The use of games in the classroom is growing (Callaghan et al., 2013) because games motivate the cognitive, emotional and social areas of students (Lee & Hammer, 2011) making them ideal channels for learning (Trybus, 2012). Motivation can certainly benefit the learning process (Huang, Johnson, & Han, 2013) because it can determine, direct, and even sustain what students do to learn (Trybus, 2012).

One such motivating factor is the concept of success and failure (Dominquez et al., 2013). According to Kapp (2012):

In most instructional environments, failure is not a valid option. Learners are objectively scored, and they either get it right the first time or fail and do not pass. Few people enjoy failing in traditional learning environments and most will do everything they can to avoid failing. This means that most learning environments do not encourage exploration or trial-and-error-learning. Learners have little insight into the real consequences of wrong answers or incorrect decisions other than being told they are not correct. Answering a

question wrong to “see what happens’ is frowned upon in most learning situations. Games however, encourage failure (para. 15).

Because classroom games allow students the opportunity to make mistakes and take risks through simulation and experimentation, students can actively learn the correct procedures that can easily transfer into real life situations. They can also re-enact the same scenario multiple times and explore the consequences of different actions (Trybus, 2012). One can overcome failure by having multiple opportunities to perform the same task until it has been mastered (Kapp, 2012). In fact, this kind of learning environment could be advantageous for the Millennial student who is fearful of making mistakes, failing at something, or of being judged.

In addition to the opportunity for success, game play combines learning with fun (Lee, Jeong, Park, & Ryu, 2011) and students do not realize they are learning academic subjects because they are so immersed in game play (Prensky, 2005). Games can stimulate real-time brainstorming (Bonk & King, 1998). They can also introduce or help students discover new concepts and knowledge (Burgos et al., 2007), promote interest in a topic that can be difficult to have an interest in (Watson et al., 2011), encourage active participation, and give students achievable yet challenging goals (Callaghan et al., 2013).

Games also allow teachers to engage with students in ways that traditional media cannot (Johnson, Adams, & Cummins, 2012). “This process is accelerating as educators learn to make effective use of the most appealing features of computer games e.g., active participation, intrinsic and prompt feedback and challenging but achievable goals” (Callaghan et al., 2013 p. 575).

Prompt feedback is a critical element in learning. If the feedback happens frequently and targets the key learning concept, then learning becomes more effective (Kapp, 2012). Some educators indicate that computer simulations can assist with in-depth learning because games can allow students to explore easily, experiment rapidly, and combine ideas unexpectedly (Li,

Cheng, & Liu, 2013). Games have a variety of benefits to choose from and as a result, games have the potential to change traditional brick-and-mortar education (Prensky, 2001).

The Future of Games and Game-Based Learning

Gaming is not exclusive to the world of children, students, or entertainment. Many industries are recognizing that games, digital or not, can play a more serious role. Games are being used in health campaigns, business training, and to help people exercise more (Lee, Peng, & Park, 2009). Games can simulate real-world environments and some organizations require games and simulations in order to practice real-world applications and lessons. Mock trials in law school are well-known role-playing simulations where a court case is presented in class and students role-play the parts of lawyers, judges, witnesses and defendants. Students who participated in a specific study conducted by Daly and Higgins (2010) felt they had gained transferable skills after participating in a mock trial, and that they had engaged in course materials more so than they would have otherwise. These students wanted more opportunities to participate in simulations in their studies (Daly & Higgins, 2010). Other work based simulations include those conducted by medical students to understand the pressures and decision making strategies of real-world healthcare and emergency environments (Parekh & Thorpe, 2012), as well as simulations international relations officers use to practice decision making tactics and test strategies for specific political situations (Taylor, 2012).

The mechanics of gaming are familiar to 18-40 year old individuals and because of this fact “gamification” is starting to be used in professional industries to improve employee engagement. Gamification is the use of game mechanics to engage employees (Callaghan et al., 2013; Kapp, 2012; Swan, 2012) to promote learning, solve problems, and to motivate individuals into action (Kapp, 2012). “Like video games, gamification is still based on technology, and it’s

almost always applied on desktop, web or smartphone applications” (Dominguez et al., 2013 p. 381). It is a participation-and-reward system where rewards can range from physical rewards like merchandise, discounts, or access to special events to more virtual rewards such as points or badges (Swan, 2012). By the year 2015 it is estimated that over 50% of companies will gamify their management of innovative processes (Swan, 2012). It is clear that games will be a part of the Millennial students’ future.

Disadvantages of Game-Based Learning

Some research suggests that digital game-based learning is not the answer to every situation. First, technology should be used in a way that enhances the subject material instead of distracting from it (Callaghan et al., 2013). For the game to be effective for learning environments, it must be structured for learning (Trybus, 2012). The game must have a clear problem, allow for reflection, and allow the students to observe the final outcome and consequences of the action they took (Li et al., 2013). By simply introducing certain elements of gaming, like the freedom to fail, story-telling, and feedback into traditional andragogical methods, one may not need to develop a full-fledged learning game (Kapp, 2012).

Secondly, some educators have used games out of context of the subject they are teaching just for the sake of using technology in the classroom. When the game and the subject do not match, true learning and application of the desired skills becomes difficult to achieve (Kapp, 2012). Some educators either have technological challenges of their own, or lack the understanding of how to effectively design games. Others may not wish to explore this area and desire to use standard technologies in their educational practice (Callaghan et al., 2013).

Purpose of the Study

The purpose of this study is to understand the attitudes and perceptions of Millennial interior design students concerning the effectiveness of game-based learning within a lecture-based course format. Understanding how Millennial interior design students think of and respond to game-based learning may offer insights for interior design educators who may be interested in modifying curriculum to match preferred teaching styles of Millennial students.

Limitations

This study is a qualitative, phenomenological study that focuses on Millennial interior design students registered for a lighting design course offered at the junior level. Additional research would be required before conclusions from this study could be generalized to the entire population.

Research Questions

The following questions frame this study:

- 1) What perceptions do Millennial students have regarding lecture based courses?
- 2) Do Millennial interior design students perceive that game-based learning activities can assist them in retaining concepts and knowledge discussed in typical lecture format courses? If so, in what ways?
- 3) Do Millennial interior design students perceive that game-based learning activities may assist them with the transferability of knowledge offered in lecture-based courses? If so, in what ways?
- 4) What pros/cons do Millennial interior design students have about the effectiveness of game-based learning in retention of knowledge and transferability?

- 5) What suggestions do Millennial interior design students have for interior design educators who may want to implement game-based learning in their courses?

Researcher Perspective

The researcher is a late Generation X member, who is four years shy of being a Millennial generation member. The researcher has grown up with games being an important part of her life. In addition to playing the typical childhood games of hide-n-seek, board games, and card games, she played video games in arcades in the early 1980s and acquired her first Atari system at the age of six. She has witnessed the evolution of games over time into more technologically advanced systems and has enjoyed game play at every level imaginable. Educationally speaking, games helped this researcher develop typing skills, understand how cities are built and managed, and understand what it was like for pioneers trying to cross America on the Oregon Trail. She is an advocate for educational games, and believes games can help students understand difficult or unexciting concepts if they are designed correctly.

The researcher is also a student-centered interior design graduate student, who believes the teacher should accommodate as many student learning styles as possible. Her background in sales has taught her that in order to sell someone on ideas, products, or services, you must first understand the motivations and desires of the person you are trying to sell to. The researcher has related this to teaching. If a teacher wants her students to learn concepts and skills, the teacher must first understand the motivations and desires of the students they are trying to teach and then connect student motivation with learning outcomes.

The researcher also believes that every student, and every class, is different. She also believes that every generation of students is different from previous generations. She believes students need to memorize and retain information, but that andragogies and teaching

methodologies can and should evolve as technology and student learning evolve. She also believes that learning should be fun and evoke excitement and engagement in students.

The researcher has developed a rapport with the participants in this study. She served as a graduate teaching assistant in three of their design classes during the Fall 2012 and Spring 2013 semesters. As a result, the researcher believes that the trust and rapport she has established previously with the participants will help gather data that may not otherwise have been offered in this research study.

CHAPTER III

METHODOLOGY

The purpose of this qualitative study was to assess the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based lighting course. Understanding how Millennial interior design students perceive and respond to game-based learning may offer insights for interior design educators who may be interested in modifying curriculum to match preferred teaching styles of Millennial students. This chapter outlines the qualitative research methods, sampling techniques, data collection, and data analysis methodologies that were used in this study.

Qualitative Phenomenological Methods

Qualitative, phenomenological research is an appropriate method for capturing the perceptions and attitudes of Millennial interior design students. Qualitative research is defined as “a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (Creswell, 2009). Unlike quantitative research, qualitative research is exploratory, inductive, and inquisitive using interviews, focus groups, observations, and/or photographs as main methods for collecting data (Creswell, 2009). Data is typically gathered from more than one source for reliability and is analyzed inductively by building themes and categories from general to more specific details (Creswell, 2009). A holistic approach is encouraged in qualitative research so that the entire story is told, and identifies as many factors involved in the study as possible (Creswell, 2009). Qualitative studies are subject to change in terms of questions and data collection as the problem being studied emerges through research (Creswell, 2009).

The qualitative researcher wants to make sense of a specific situation, and through observation, interpretation, and data collection becomes the main instrument of the research study (Creswell, 2009; Glesne, 2011). Often times the researcher collects data in the field as the phenomenon takes place in order to see participants behave within the context of the situation. Any bias regarding the problem or issue being studied should be acknowledged as the researcher remains focused on clarifying participant experiences and viewpoints.

Phenomenological research is a qualitative strategy where the researcher is able to describe the phenomenon through the perspectives of the people who experience it (Creswell, 2009). The goal of the phenomenologist is to distinguish the appearance or perspective of reality (phenomena) from the way things really are (noumena) (Willis, 2007). The primary means of data collection include interviews and questioning (Willis, 2007).

Focus groups, as one type of interview methodology, are “a selected set of people gathered by a researcher with the purpose of facilitating a discussion on a particular topic” (Glesne, 2011, p. 280). This provides the researcher the opportunity to understand how a group discusses an issue while eliciting multiple viewpoints at the same time (Glesne, 2011).

The purpose of this study was to understand the use of game based learning through the perspective of Millennial interior design students. The objective of this phenomenological study was to interpret the meanings of the participants’ experience with the phenomenon in order to distinguish between participant perceptions and reality (Creswell, 2009; Willis, 2007). It is for this reason that the researcher of this study chose qualitative phenomenological research using focus groups to collect data. The details of the focus group sessions were recorded in a reflective journal to ensure descriptive accuracy.

Procedures and Research Questions

Participant Selection

The participants were selected from a fall 2013 junior-level, lecture-based lighting design course in an interior design program located in a university in northern Colorado. There were 32 students enrolled in this course. The majority of these students were members of the Millennial generation.

The students in the lighting design course were notified of this study during class time via a participation letter from the researcher (See Appendix A). To be eligible for the study, student participants had to have been (1) enrolled in the lighting design course, (2) born between January 1, 1982 and present day, and (3) played all of the games offered during the course. To determine which students were able to participate, a brief pre-qualifying survey was given to all students in the class to determine their birthdates and participation with the games (See Appendix B). Students were notified at that time that participation in the study was voluntary as was the decision to fill out the pre-qualification survey. Once pre-qualified, student participants were invited to sign a consent form which indicated that involvement in the focus group study was voluntary and that no monetary compensation would be offered (See Appendix C). Additionally, each participant was notified that a summary of the findings would be available to them if desired. Participants were also invited to complete a demographic survey (See Appendix D). The information participants provided in this demographic survey brought context to the data gathered during the focus group sessions.

Focus Group Questions

Focus group questions using qualitative methods are generally open-ended, in-depth, unstructured questions that encourage participants to discuss their experiences, opinions, and

viewpoints (Creswell, 2009). Three forty-five minute to one-and-a-half hour long focus group sessions were conducted in a private classroom to ensure confidentiality. Each participant was invited to share in-depth information about their experiences with game-based learning in the lighting design course.

Participants in the focus groups were asked about their experiences before, during, and after participating in the game-based learning opportunities (See Appendix E). The first set of questions asked about participant perceptions concerning lecture-based courses and the subject of lighting in general. The second set of questions asked students to share their experiences while playing the educational game sessions. The last set of questions asked the participants about their final overall perceptions of the games and what strategies they may have for creating effective game-based learning experiences. At the end of the focus group session, the researcher offered participants the opportunity to make additional comments or suggestions regarding game-based learning in the lecture-based lighting design course.

Sampling Technique

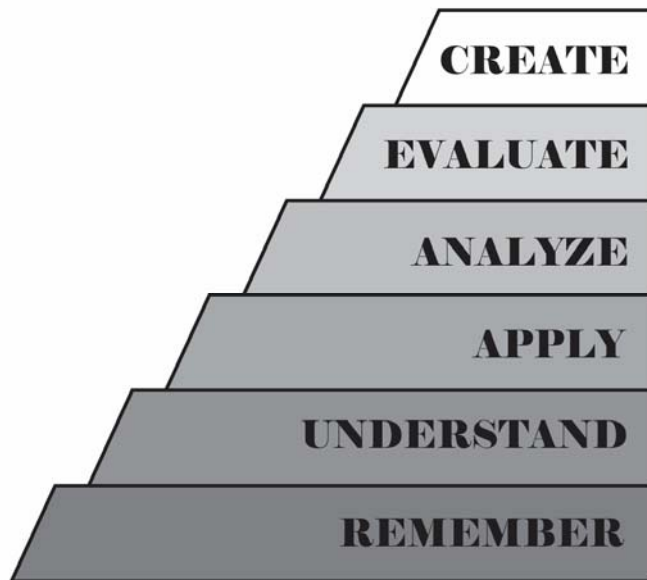
A small participant sample was purposely selected for this qualitative phenomenological study in an attempt to understand the identified phenomenon. Participants were selected based on their registration in the lighting course, their birthdates, and their willingness to participate in playing all three educational games developed to assess student learning for the course.

Participant anonymity was ensured to protect participants' confidentiality. Pre-qualification surveys and signed consent forms were the only documents in this research study that contained identifiable personal information. Any questions asked during the focus group sessions were designed to exclude identifying information related to student names.

Model for This Study: Revised Bloom’s Taxonomy

The model for this study is the revised cognitive process dimension of *Bloom’s Taxonomy of Objectives* (See Figure 1). It “represents a continuum of increasing cognitive complexity – from remember to create” (“A Model of Learning Objective”, 2011, para. 4). Two important educational goals for students, and especially for Millennial students, are knowledge retention (ability to recall information) and transferability (to make sense of and use what was learned to solve new problems) (Anderson & Krathwohl, 2011). This taxonomy was designed to promote retention and transferability and six categories were developed as a result: Remember (retention), Understand, Apply, Analyze, Evaluate, and Create (all of which relate to transfer) (Anderson & Krathwohl, 2001).

Bloom’s Taxonomy (Revised)



Based on an APA adaption of Anderson, L.W. & Krathwohl, D.R. (Eds.) (2001)
Drawn by Jessica R MacKenzie, October (2013)

Figure 1. The Revised Cognitive Dimension of Bloom’s Taxonomy

The first category in the cognitive process dimension of Bloom's Taxonomy is "Remembering" in which individuals are able to recognize and recall information they have learned in their previous lessons. Next is "Understanding" where students interpret, classify, summarize, compare and explain meanings of things previously learned. Individuals are able to construct meaning into oral, written and graphic communication. The "Applying" category describes when individuals execute, implement, carry out or use a procedure to help solve a new situation or problem. Once they have applied the knowledge they can "Analyze" the materials which distinguish between presumptions and facts. "Evaluating" is where individuals are able to judge, critique, and check the value of the materials and ideas they have learned in order to make choices and solve problems. The last category in this taxonomy is "Create" where individuals generate, plan, and produce a whole new structure to demonstrate their full understanding of the material ("A Model of Learning Objectives", 2011; Anderson & Krathwohl, 2001).

Selection of the Course and Process of Game Development

The concept to utilize game-based learning in the lighting class was conceived by the course instructor. Funding was procured spring 2013 by the instructor from a campus-wide grant. Such funding allowed access to an instructional designer to assist in the development of games. The instructor's goal was to "flip the classroom" in part through the implementation of game-based learning.

Each of the three games developed for the lighting design course was developed using course content. To enhance learning, the games were developed based on the revised cognitive process dimension of *Bloom's Taxonomy of Objectives*. The instructor gave permission to this researcher to use this course and the developed games for this study.

The researcher collected the perspectives of the students after they finished the entire series of educational games. A reflective journal was kept to record the researcher's bias, observations and perceptions throughout the study. The intent of the research study was to capture the experience of the students concerning how the games affected their learning.

Data Collection and Analysis

The purpose of this qualitative study was to understand the attitudes and perceptions of Millennial interior design students concerning the effectiveness of game-based learning within a lecture-based lighting design course. The focus group sessions were audio-recorded, transcribed, and analyzed using the Interpretive Phenomenological Analysis (IPA) system. This method breaks down the process of qualitative research analysis into four stages (Willig, 2001).

During the first stage of IPA the interview transcripts are read individually by the researcher and initial perceptions and observations are noted. In the second stage the researcher categorizes, identifies and labels the transcripts using recorded concepts and phrases. Next the researcher analyzes the findings by connecting emerging themes together, which ultimately reflects the information provided by the participants in the original interview. In the fourth and final stage all of the interview themes are merged and the researcher creates a summary table, which illustrates the phenomenon the participants experienced (Willig, 2001). This research is considered exploratory in nature with the intention to find emerging themes that could be studied in greater detail through future research.

Trustworthiness of the Study

Reliability and validity are important characteristics of a holistic qualitative research study. The reflective journal used by the researcher acted as both a self-reflection tool used throughout data collection as well as a method to cross-reference data analysis. This allowed the

researcher to record reactions of the experiences and perceptions of the participants and allowed the opportunity to journal the researchers' questions, speculations, and interpretations (Creswell, 2009). The reflective journal is a record of the thought processes and experiences of the research and helps peer review committees and other researchers understand the key findings and the final conclusions (Willis, 2007).

Interview questions were open-ended and allowed the results to emerge from the participants' own words. The researcher refrained from drawing conclusions and making judgments until after the data was analyzed and conclusions were found (Creswell, 2009).

CHAPTER IV

FINDINGS

The purpose of this qualitative study was to assess the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based course. Understanding how Millennial interior design students perceive game-based learning can offer insights for interior design educators who may be interested in developing new curriculum in their lectured-based courses. In addition, the study also offered insight into Millennial interior design student perceptions about lectured-based courses, student perceptions of retention and transferability of information as a result of game-based learning, and student recommendations and strategies for game-based learning.

Context

This research project focused on the infusion of game-based learning into a lectured lighting design course at a four year institution in Northern Colorado. Taught at the junior-level, the course content included standard topics such as lighting vocabulary, physics of light, light and color interaction, lamps and fixtures, biological and psychological aspects of day lighting strategies, light controls, writing, lighting trends, and the development of reflected ceiling plans. The course had a one hour lab component that was used to observe the application of light in a lab, or to work in class on mini exercises such as lamp identification.

The concept to utilize game-based learning in the lighting class was conceived by the course instructor. Funding was procured spring 2013 by the instructor from a campus-wide teaching and learning grant. The funding allowed access to an instructional designer to assist in the development of the games and a graduate teaching assistant to research additional

information concerning the content of the games. The instructor's goal was to create games based on the revised cognitive process dimension of Bloom's Taxonomy and then to use the games to assess student learning of that specific portion of the semester coursework. Another goal was to "flip the classroom", in part, through the implementation of game-based learning. The researcher's goal was to assess the perceptions of the Millennial-aged interior design students concerning their use of game-based learning in the lighting design course.

The three games developed were *The Hundred Thousand Dollar Pyramid*, *Who Wants to be a Lighting Designer*, and *The Illuminating Race*. The first game students were exposed to was *The Hundred Thousand Dollar Pyramid* based on the television show from the 1970's and 1980's. This game was constructed to assess student learning based on the first two phases of the revised cognitive process dimension of Bloom's Taxonomy: "Remember" and "Understand". The game questions assessed the rudiments of lighting design such as vocabulary definitions and basic concepts. Students were instructed to come to class on "game day" having viewed the video clips of how to play the game and having read selected textbook chapters. On "game day" students were divided into four teams, but during gameplay students were paired into teams of two. Students were then introduced to the game rules by the game host.

The second game, *Who Wants to be a Lighting Designer?* simulated the television show *Who Wants to be a Millionaire?* Similar to the first game, students were instructed to come to class on "game day" having watched another video on how to play the game, and having read additional textbook chapters and course materials. On "game day" students were placed into four teams and then introduced to the game rules by the game host. Game questions were developed to assess student learning in regards to the "Applying" and "Analyzing" portions of the revised cognitive process dimension of Bloom's Taxonomy. In addition to having read new chapters,

students had to remember and understand the material from the previous game. They also had to analyze the question and multiple choices answers before selecting the correct answer. The goal of this game was to allow students to apply what they knew about lighting to new concepts in order to answer questions correctly.

The third game, *The Illuminating Race*, mimicked the reality television show *The Amazing Race*. Similar to previous games, students were instructed, in class and by email, to read new textbook chapters and course materials in preparation for “game day”. Students were placed into six teams and gameplay began when the instructor gave out a card with a specific task each team had to complete. The students had to perform the task identified on the card before they were able to receive the next card and start the subsequent task. Each team was given a celebrity and a lighting concept to begin with. Additional tasks involved finding lamps and light fixtures online, and developing a lighting plan for their celebrity’s home. *The Illuminating Race* evaluated students concerning their ability to “Evaluate” and “Create” - the top components of the revised cognitive process dimension of Bloom’s Taxonomy. Gameplay included evaluating clients’ needs, selecting appropriate lamp and fixture choices, and creating an appropriate reflected ceiling plan.

Selection of Participants and Process

Students were selected for the study based on their (1) enrollment in the lighting design course, (2) age and inclusion in the Millennial generation, and (3) participation in three educational games developed specifically for a lecture-based interior design course. The researcher served as a graduate teaching assistant to the student participants in previous semesters, which allowed the researcher to develop a comfortable, working-relationship with participants prior to the focus group sessions. The direct, personal experiences of these students

informed the central research questions concerning student perceptions of game-based learning in interior design lecture-based courses (Creswell, 2007).

The researcher sought student participation for this study at the end of the semester of the lighting course. A prequalification survey was given to thirty-nine students for two purposes (1) to identify potential participants born between January 1, 1982 and the present day, and (2) to determine who participated in all three games offered for the course. Based on responses, seven of the thirty-nine students did not qualify for participation in this study. The thirty-two students who did qualify were given an informed consent form, which requested voluntary participation in the study. Of the thirty-two students invited to participate, ten (thirty-three percent) agreed to do so. This number was lower than anticipated and may have been impacted due to the timing of the study. A sign-up sheet was provided that indicated the time, place, and date for each focus group. Students could select a session that best fit their schedules.

For accessibility and timing, the three focus group sessions were held on the same day on campus. Upon arrival, participants were assured of confidentiality. The researcher requested they fill out a short survey that gathered demographic data, solicited their previous experiences and preferences for lecture-based courses, as well as any game experiences they had in previous courses. The survey also asked for demographic information.

Focus group sessions lasted from forty-five minutes to an hour and thirty minutes. Sessions were audio taped and transcribed by the researcher. The participants were asked to voice their perceptions in a series of open-ended questions concerning (1) lecture-based courses and educational games, (2) aspects of their learning related to the games, (3) the retention and transferability of the information they gained as a result of the games, and (4) any strategies they perceived could benefit others who are developing game-based learning modules.

Demographic Findings

The ten participants in this study were junior-level female interior design students representing an age range from eighteen to twenty-three years (see Figure 2). Eight of the ten participants had attended college for three years, and two had attended college for five years (see Figure 3).

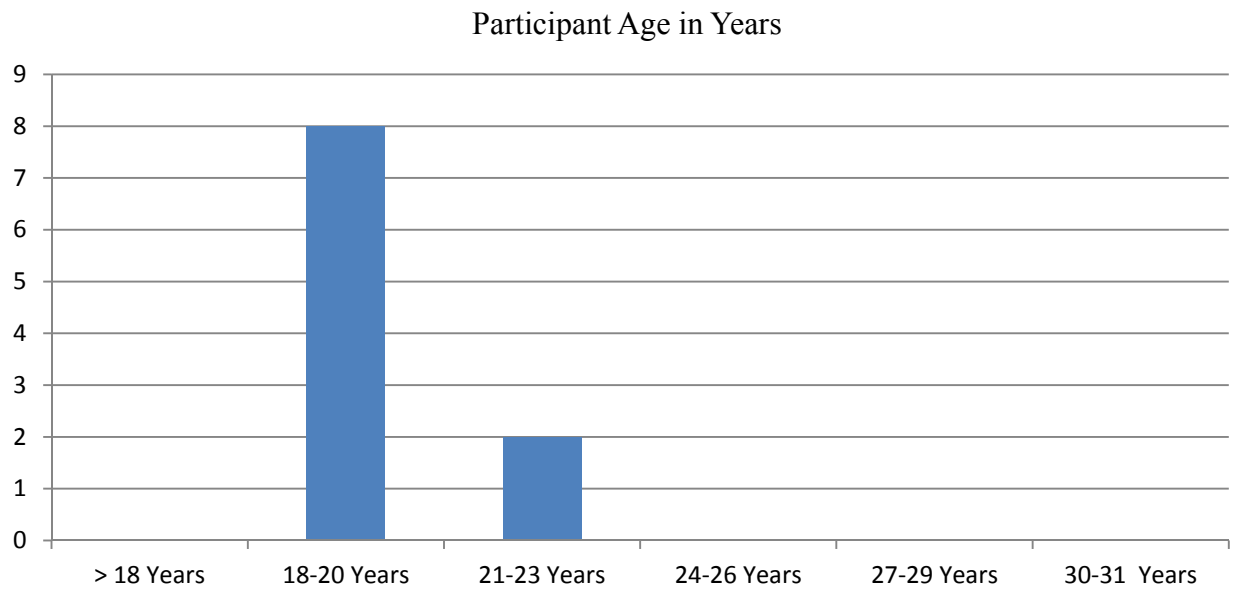


Figure 2. Demographic Findings: Participant Age in Years

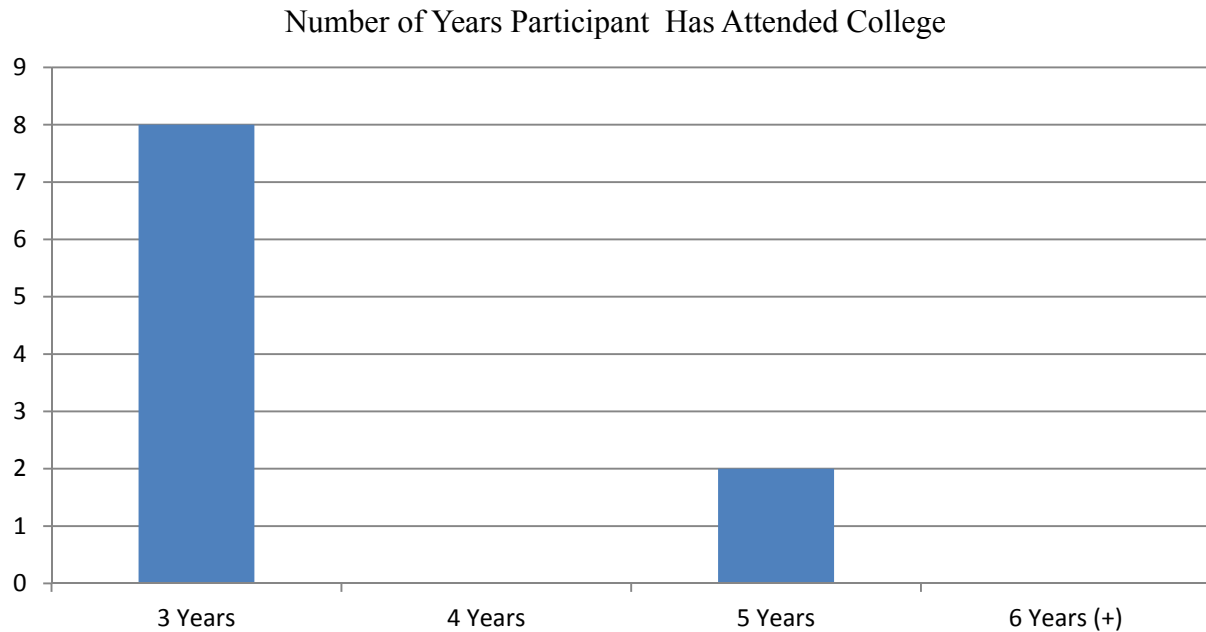


Figure 3. Demographic Findings: Number of Years Participant has Attended College

Participants were asked to rank their favorite type of interior design courses in order from most to least favorite. The types of interior design courses listed were based on Demirbas and Demirkan's (2007) classification of interior design classes which included (1) fundamental courses (lecture and information-based courses), (2) artistic courses (sketching and rendering courses), (3) technology courses (CAD, Revit, Photoshop), and (4) studio courses (Demirbas & Demirkan, 2007). Though preferences remained consistent throughout most of the categories, it is clear that the participants' responses indicated Fundamental Courses were their least favorite courses to take (see Figure 4).

Participant Preference Ranking for Interior Design Course Types

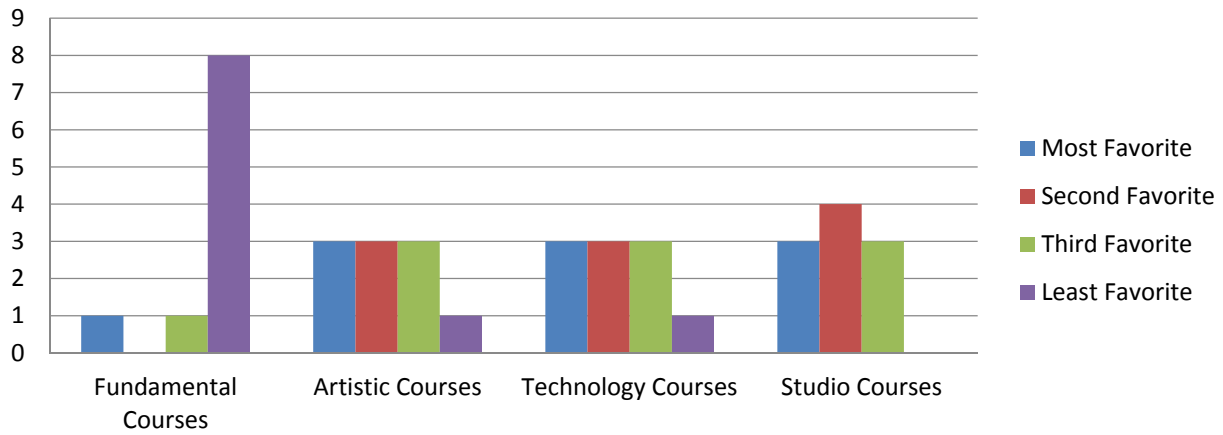


Figure 4. Demographic Findings: Participant Preference Ranking for Interior Design Course Types

When asked how many hours a week they spent playing games outside of the classroom, the responses ranged from zero to over ten hours a week (see Figure 5). Their responses indicate that even though the number of hours they play games seems relatively low, the vast majority of these students are playing games outside of the classroom.

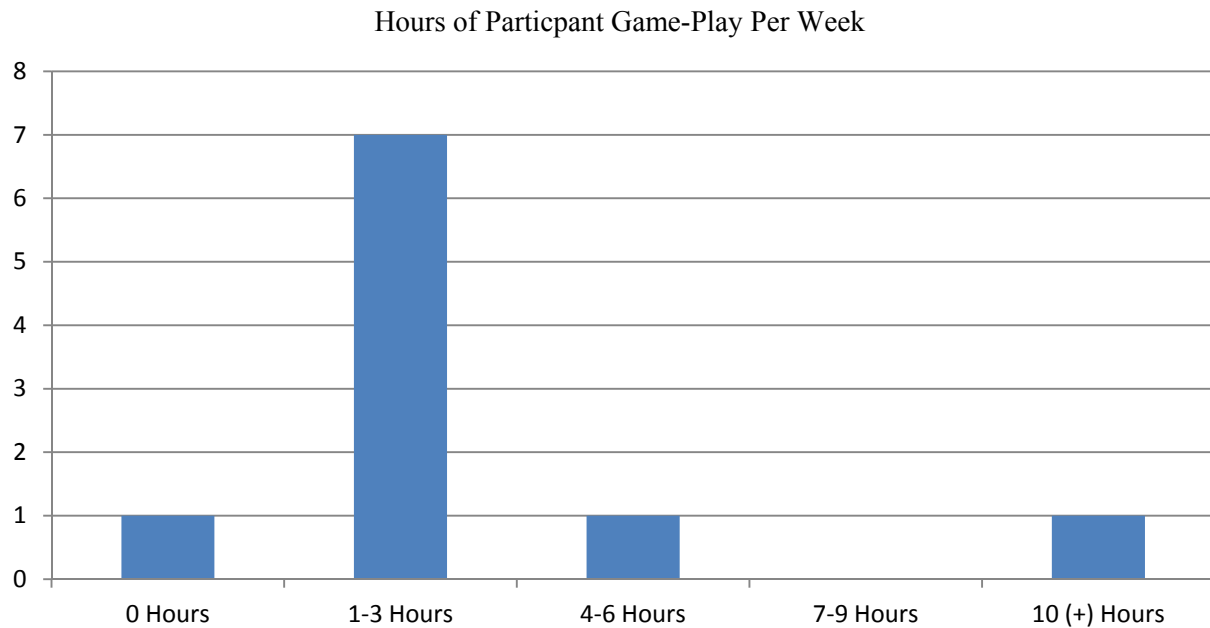


Figure 5. Demographic Findings: Hours of Participant Game-Play per Week

When asked about how many times they played educational games in college, the responses ranged from never to having played games in college to having played games four to five times in college (see Figure 6). Participants were also asked if they played games in a college course, and how well the games assisted them in learning the course material. Their responses ranged from “The games did not help at all” to “Games helped me learn course materials a great deal” (See Figure 7).

Previous Participant Experience with Educational Games in a College Classroom Setting

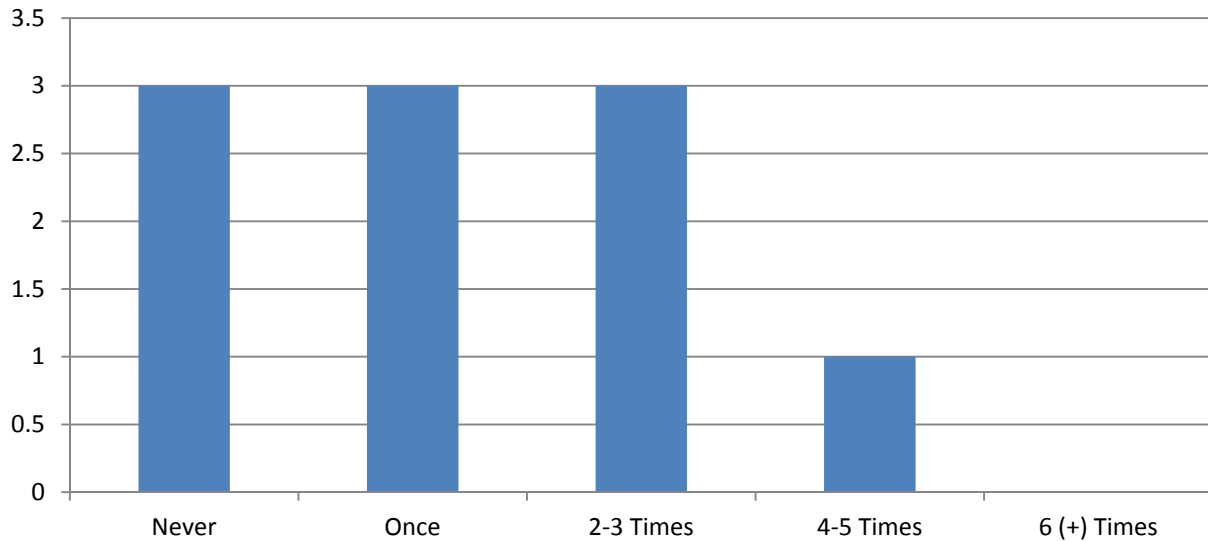


Figure 6. Demographic Findings: Previous Participant Experience with Educational Games in a College Classroom Setting

Participant Perception Regarding How Well Previous Games Assisted Their Knowledge of Previous Course Subject

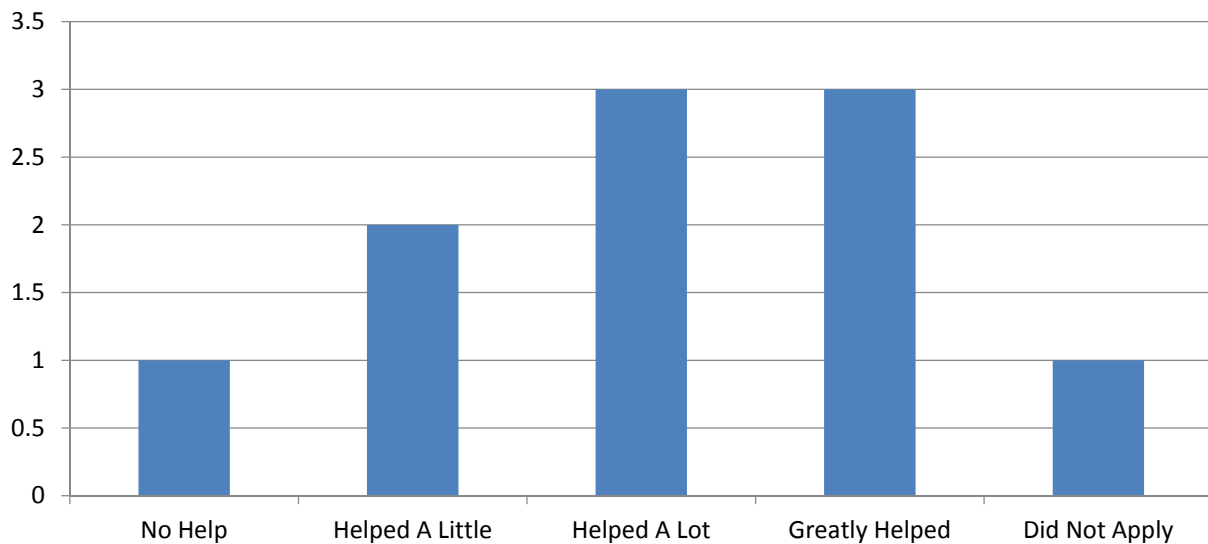


Figure 7. Demographic Findings: Participant Perception Regarding How Well Previous Games Assisted Their Knowledge of Previous Course Subject

Coding and Analysis

Interpretive Phenomenological Analysis (IPA) is the general framework used by the researcher to code and analyze participant perceptions of game-based learning in a lectured course. This method breaks down the process of qualitative research analysis into four stages. During the first phase, the researcher read each focus group transcript thoroughly and recorded initial thoughts in a reflective journal. The researcher also documented transcriber notes during the process of analysis. In the second phase, the researcher began organizing the transcripts into sixteen tables. Each table addressed a single question asked during the focus group sessions followed by the responses to that question from each focus group. The researcher identified key terms and concepts found in participant responses and integrated thematic coding into the table. Additional tables were created to organize and analyze thematic codes in relation to each other. In the final stage, the researcher merged all participants' focus group themes into a final table to capture participant experiences concerning the studied phenomenon (Willig, 2001).

Several diverse themes emerged from participant discussions. Some participants provided detailed responses, which required multiple codes to fully describe their experiences and perceptions. Other participants were more direct with their responses. Once the coding was complete, dominant themes were identified and then placed in a summary table to better capture the participant's experience with the phenomenon (Willig, 2001).

Themes of Study

Four major categories shape the findings of this study: (1) perceptions concerning lecture-based courses, (2) perceptions of previous game-based learning experiences, (3)

perceptions of game-based learning experiences in lighting design, and (4) strategies for creating effective game-based learning experiences. Themes and sub-themes emerged within each major category.

Within the first category, perceptions concerning lectures, two themes emerged with related sub-themes. The two themes included (1) previous experiences with lecture-based courses, and (2) perceived strategies for improving lecture-based courses. Within the theme previous experiences with lecture-based courses, five sub-themes emerged. These sub-themes included (a) interaction with instructors, (b) interest in topics, (c) ability to learn, (d) environmental issues, and (e) advantages and disadvantages. Within the theme of perceived strategies for improving lecture-based courses, two sub-themes emerged. These sub-themes included (a) learning strategies and (b) classroom strategies.

Within the second category, perceptions of previous game-based learning experiences, three themes emerged. These themes included (1) high school experiences, (2) college experiences, and (3) value of game-based learning based on previous experiences.

Within the third category, perception of game-based learning experiences in lighting design, six themes emerged with related sub-themes. The six themes included (1) peer influences, (2) emotional and motivational factors, (3) retention of information, (4) game mechanics, (5) transferable skills learned from games, and (6) overall impressions of game-based learning. Within the theme peer influences, three sub-themes emerged. These sub-themes included (a) teaming, (b) distractions and focus, and (c) preparations. Within the theme emotional and motivational factors, five sub-themes emerged. These sub-themes included (a) competition, (b) winning and prizes, (c) alignment with learning styles, (d) fun and excitement, and (e) pressures and stresses. Within the theme retention of information, five sub-themes

emerged. These sub-themes included (a) creating memories, (b) getting the wrong answer, (c) receiving feedback, (d) active class participation, and (e) difficulties retaining information.

Within the theme game mechanics, two sub-themes emerged. These sub-themes included (a) the game itself and (b) gameplay. Within the theme of transferable skills learned from games, three sub-themes emerged. These sub-themes included (a) terminology, (b) team work, (c) speed, and (d) ability to communicate lighting design.

Within the fourth category, strategies for creating effective game-based learning experiences, three themes emerged with related sub-themes. These themes included (1) develop quality games, (2) implement games properly, and (3) post-game follow-up. Within the theme develop quality games, three sub-themes emerged. These sub-themes included (a) plan and prepare and (b) consider the audience. (See Table 1).

Table 1. Themes of Study: Table of Themes and Sub-Themes.

Category	Theme	Sub-Theme
Perceptions Concerning Lecture-Based Courses	Previous Experiences with Lecture-Based Courses	Interaction with Instructors
		Interest in Topics
		Ability to Learn
		Environmental Issues
		Advantages and Disadvantages (outcomes as a result of lectures)
	Perceived Strategies for Improving Lecture-Based Courses	Learning Strategies
		Classroom Strategies
Perceptions of Previous Game-Based Learning Experiences	High School Experiences	
	College Experiences	
	Value of Game-Based Learning Based on Previous Experiences	
Perceptions of Game-Based Learning Experiences in Lighting Design	Peer Influences	Teaming
		Distractions and Focus
		Preparations
	Emotional and Motivational Factors	Competition
		Winning and Prizes
		Alignment with Learning Style
		Fun and Excitement
		Pressures and Stresses
	Retention of Information	Creating Memories
		Getting the Wrong Answer
		Receiving Feedback
		Active Class Participation
		Difficulties Retaining Information
	Game Mechanics	The Game Itself
		Gameplay
	Transferable Skills Learned from Games	Terminology
		Team Work
		Speed
		Ability to Communicate Lighting Designs
	Overall Impressions of Learning	
Strategies for Creating Effective Game-Based Learning Experiences	Develop Quality Games	Plan and Prepare
		Consider Audience
	Implement Games Properly	
	Post-Game Follow-Up	

Category 1: Participant Perceptions of Lectures

Participants discussed their perceptions, opinions, and experiences with lecture-based courses taken prior to their experience in the lighting design course. Two themes emerged in this category: (1) previous experiences with lecture-based courses, and (2) perceived strategies for improving lecture-based courses.

Theme 1: Previous experiences with lecture-based courses.

Each of the ten participants shared their previous experiences with lecture-based courses as well as the outcomes of their experiences. Five sub-themes emerged from this theme comprised of (a) interaction with instructors, (b) interest in topics, (c) ability to learn, (d) environmental issues, and (e) advantages and disadvantages.

Participants shared insights as to what they believe lectures are and how they value them. Participants seemed to perceive lectures as the standard way instructors deliver college-level information. Participant F2-S3 shared, “I mean, to a point they’re (lectures) pretty fundamental. Usually what they teach you is the basics, you know?” Participant F1-S2 said lectures are, “helpful in classes like history. It’s nice that everything is kind of laid out pretty clearly.” Participant F1-S3 added that she felt lectures were all about “the concentration of information. It’s just a lot of education that you’re getting in a lecture-based class.” Participant F3-S3 said, “They’re (lectures) very analytical based. It’s a very different mindset than interior design.”

Interestingly, when participants described or explained lecture-based experiences, they never referred to courses in interior design. All examples participants shared were taken from general education or courses in their minor.

Interaction with professors.

One of the most prevalent topics participants shared about lecture-based courses involved the kind of interactions they had with professors. It seems their approval of lecture-based courses depended on how well the instructor presented the subject or themselves during class. Participants indicated they struggle with lecture-based courses when teachers are monotone, do not interact with the class, are unable to get information across, are repetitive and redundant, or if they show no enthusiasm for the subject. Participant F1-S2 explained one of her least favorite instructors:

I've taken a principle of micro economics and he was a terrible, like, lecturer. He was really monotone, and he couldn't get the information across really well. And it's like a lot of like charts and graphs and....eeehhhh it was bad. He, like, knew all the information but he didn't know how to relay it to us (in a way) that was clear and made sense 'cause I'm pretty sure he's a really smart guy but maybe too smart to, like, teach us in the right way.

Participant F1-S1 added, "Some courses might know a lot of information but how they present it...it has no enthusiasm no emotion behind it. It just...doesn't do anything for you to help retain the information." Participant F1-S3 agreed, "even if it's interesting information, it's really easy to present it in a very boring way."

Some participants shared characteristics of instructors they found favorable. Participant F2-S1 stated, "My art history teacher is enthusiastic about every subject. So unless she really didn't get any sleep, it's hard to fall asleep in that class." Participant F2-S2 said, "Also if the teacher is interactive with you and asks you questions or just also is excited about it and you can tell that they are so intrigued by the subject, it also helps me as a learner/student/person be more attentive to the lecture." Participant F3-S3 explained, "I have some professors that are more story based and some professors that are more, like, strictly book based and I realize I do better with the story-based professors."

Interest in topics.

Having an interest in the topic was also an important component in the participants' perceptions of lecture-based courses. If they felt bored they often felt unfocused or unmotivated to learn lecture-based materials. Participant F3-S4 explained, "It just depends if I'm really interested in the subject or not. Because if I find it interesting and fascinating for me then I'm going to focus more versus, nah. So, it's just, it very much depends."

Other participants shared similar sentiments. Participant F1-S3 said, "I had like, one psychology class that was actually interesting that I looked forward to going to the classes. All the rest of them have been just pretty....pretty boring." Though in a different focus group, Participant F2-S2 said, "It's boring. It's really boring to sit there every day and know that you're just going to sit there again and listen to the same person again say the same things."

Ability to learn.

In addition to instructors and interesting topics, participants also shared that some lecture-based courses can be difficult because they are not set up to optimize learning.

Participant F1-S1, in particular, was able to explain this concept more clearly:

In other subjects, where you're learning about something more hands-on...I have friends who take computer programming and it's set up as a lecture-based course. They say how hard it is because you're not actually in front of a computer, like, going through with the professor. You're just supposed to be sitting there taking notes.

Additionally, participants believed lecture-based courses did not match their learning preferences. Participant F3-S1 stated:

I know for me I'm very much an interactive learner. So, um, lecture based courses (sighs) I don't necessarily like as much just because I don't get as much out them as I do say a studio class. Or some other kind of class.

The participants spoke often about their learning styles and how they would like to learn more experientially in their lecture-based courses. Participant F1-S1 said, “They’re not my favorite. I prefer hands-on. Something where I can, like, get out there and trial-and-error and see what’s working and see what’s not ‘cause lectured-based courses, you can trial and error in how you study, but that’s about it.” Participant F3-S2 said, “I also learn better by doing things rather than by listening....you’re taught more information in a lecture-based class versus like a studio or like the one on one where you have to, you know, like do it and then go through it. But I feel like I retain the information better in, like, studio classes where I’m actually doing things.” She felt torn between knowing the purpose of lectures and knowing how she typically liked to learn. She went on to say, “It’s one of those things where, well, do I want to learn more information or do I want to learn the information that I’ve learned better?” Participant F3-S3 expressed, “I’m definitely a type of hands-on person. I don’t get a lot out of lecture based courses.”

Participant F3-S1 described how her learning would be more effective, “I’m very like interpersonal with the way I learn. If someone were to just sit down with me and tell me the lecture I feel like I would absorb it a lot more because it’s a lot more casual/one-on-one, that kind of thing.” Likewise, participant F3-S3 stated, “I’m definitely a type of hands-on person. So like I’m learning something new I would rather be doing it with the professor than being showed how to do it and then go back and do it on my own.”

Environmental issues.

During the focus group discussions, a few participants pointed out that it’s not always the instructor, the topic, or the learning that makes lecture-based courses enjoyable or unsatisfactory. Some of it has to do with the environment in which the lecture-based course takes place.

Participant F3-S3 explained, “I don’t get a lot out of lecture-based classes. Especially if it’s like a really large class. Like, I do well like with some of my anthropology classes. It’s a smaller class and I do well in those.” Participant F1-S1 indicated that a bad experience for her was a class scheduled during a specific time or day of the week. “Depending on the day of...like time of day and week it can be really hard staying awake. Even like the most interesting subject can put you to sleep.”

Perceived advantages and disadvantages of lecture-based courses.

Participants explained that they could see both advantages and disadvantages to having lecture-based courses in their curriculum. Several participants expressed they liked having lecture-based courses in their curriculum because it helped balance their workload in interior design. Participant F3-S2 explained:

A lot of your lectured based classes are strictly – you don’t have as many projects if even any. And so being interior design, all of our classes have a lot of labor intensive projects. And so those lecture classes we have outside of them, as our minors, or just as our, you know, fun classes, it offers a break from all of that work that we have to do.

Other participants agreed for various reasons. For instance, Participant F3-S1 said, “I agree with (Participant F3-S2) just that it’s a nice break and I mean it does help you spread your wings a little bit to have a different kind of class, you know? Lectured-based rather than studio.” Participant F3-S3 stated, “It’s like my breath of fresh air every semester. It’s like going to those classes where I don’t have to sit and think about design. I can think about other things that I’m interested in.” Participant F1-S2 said, “I kind of like having the balance of, like, interior design courses and then, kinda like, sitting in a classroom and not having to like draw or sit in front of the computer and just listen.” Participant F1-S3 added, “It’s nice to have those (lecture courses)

sprinkled in especially with my interior design classes so I'm getting the credits but I'm not having to work as hard, essentially."

Several participants shared a dislike for studying, citing difficulties with reading and focusing on study materials for long periods of time. The outcome of good lecture-based courses, from their viewpoint, meant receiving direct, pertinent information, which resulted in less studying overall. Participant F1-S2 stated lectures are, "more like bullet points and boom boom boom what you need to know for the tests."

Additionally, it seemed participants were eager to share their dislikes for lecture-based courses more than they wanted to share what they liked about them. Participant F1-S2 came right out and said, "I have a lot of negatives (about lectures)!" Her statement was followed by laughter and agreement by other participants in the focus group. Other participants made comments like "I don't get anything out of lectures" or "I don't like lectures."

Reasons they gave for disliking lectures included they become bored, tend to fall asleep, they lose motivation, don't attend class, or may find it difficult to retain the information they are supposed to learn. Participant F2-S1 stated, "I'm really attempted fall asleep in most of those classes (lectured classes) or I don't have any motivation." Participant F3-S1 stated, "I just don't get as much out of them (lectures)." Participants implied that boredom and loss of motivation affects their ability to perform in lecture-based courses, and ultimately leads to poor attendance or poor/ undesirable grades as a result.

Other participants indicated that they require more motivation to simply go to class and listen to lectures. A lot of times, they believe they can learn the subject better on their own when given certain materials. Participant F2-S3 explained, "It's really hard to get up and go. Especially when the notes are online, you know? Like, what are you gonna learn, what's the

point of me going 'cause I already have all the information right in front of me. So, if I can't learn it myself, I don't know that I get a better an understanding of it by just going to class."

A few participants believed that lecture-based courses were unnecessary for their goals. Participant F2-S2 shared, "I don't think they are typically as applicable. I mean they are probably good just to help you be a more well-rounded student, but I mean, I don't know. Like, I have art history and I don't feel like I'm going to use most of that information." Participant F2-S1 added, "In life, we're not going to have lectures, we're going to be doing projects constantly so there's no point in really having a lecture it seems like."

Theme 2: Perceived Strategies for Improving Lecture-Based Courses.

Most participants indicated they simply wanted to be engaged during lecture-based courses. They want their teachers to be enthusiastic about the subject they lecture on. They want course subjects that are interesting or fascinating to them, or subjects they believe are applicable to their goals or their future. Some participants wanted lectures to match more of their own personal needs, including smaller class sizes, for lectures to be held on certain days, and during certain times.

Interestingly, students indicated they wanted to keep lecture-based courses in their interior design curriculum. Lecture-based courses, in their opinions, have low workloads and having them mixed into their design curriculum helps them manage their time and efforts a little easier. It is still obvious, however, that participants do not enjoy lecture-based courses.

Participant F2-S3 tried to come up with a solution for making lecture-based courses more engaging and enjoyable. In the end she said,

I don't know, like I don't have any other suggestions of how would you teach a lectured class really to make it more interactive other than, I don't know, having your discussions because at a certain point the teacher does just need to get information out. You know. It's kind of like what the class is.

Category 2: Perceptions of Previous Game-Based Learning Experiences

Participants were asked about their previous experience with game-based learning in order to understand if they were accustomed to playing games in their academic curriculum. Participants discussed their perceptions, opinions, and experiences with game-based learning they experienced prior to their experiences with game-based learning in the lighting design course. Three themes emerged in this category: (1) high school experiences, (2) college experiences, and (3) value of game-based learning based on previous experiences.

Theme 1: High School Experiences.

Nine out of the ten participants shared they played games in high school classes. Participants described game-based learning in high school as generally positive, fun experiences, which broke up the monotony of their daily classroom life. Many believed the games were designed primarily for reviewing materials for tests. None of the participants could remember any specific questions, answers, or materials related to the games other than the general topic, or unique features about the game. Participant F3-S4 explained the most memorable moment of a game she played in high school, “We had *Jeopardy*, but it wasn’t flashcard related, it was technology related where we had the buzzer and you literally had to go BAM and hit the buzzer in the center of the table.” She went on to describe how the kids were more interested in hitting the buzzer instead of having an answer for the question.

Jeopardy was obviously the one game participants played most in high school. Participant F3-S3 shared, “It was just *Jeopardy* for the most part. I don’t think we really played anything else. It was just – it was more of a review for a test.” Participant F1-S1 had a different opinion of the game. She explained:

We played a lot of games in high school, but the one we always played was *Jeopardy*. I’m not the greatest fan of *Jeopardy*. And I just remember we always

used it in...I remember specifically, my junior year in chemistry class. Chemistry and *Jeopardy*, I thought, was not a good idea. I'm not great at science, especially chemistry. I feel like there might have been better games to start off with.

When asked why *Jeopardy* was played more than any other game, participants explained that it is mostly because it is an easy game to play. Participant F2-S3 stated, "I think it's pretty easy for the teacher to create, or whoever, and easy 'cause you have categories and stuff. So, I mean, it's pretty (much) just (an) easy application for everyone. Everyone knows how to play."

Jeopardy was not the only game participants played in high school. Participant F1-S1 experienced a role-playing game which involved her whole class. The game centered on the medieval ages in Europe, and each person played a specific role from queen, to archbishop, to noble, to peasant during class time. It was a game that taught the students about the use and abuse of power. She said, "And so it was very informative and it was fun at the same time. You could relate to it without just watching a video or seeing others portray (it). You actually, in a sense, got to somewhat participate."

Theme 2: College-Level Experiences.

Several participants recalled playing games in high school, but only five out of ten participants recalled playing games in college. Their perceptions of the experiences they had with game-based learning in college differed greatly from the experiences they had in high school. For instance, Participants F2-S2 and F2-S3 both shared a theater class in which the teacher had them present their homework in a type of game-like atmosphere. Participant F2-S3 said, "We brought in our homework and then, we, I don't know, shared it with our partner basically as a game somehow?" She went on to say, "It was just such a fun way instead of saying 'this is my project', you know, and kind of a different presenting along those types I guess." Participant F2-S3 added, "It made it more interesting than her just lecturing. But it was,

because it wasn't as, like – it wasn't explained well at the beginning or she just made it up as she went. It was really confusing.” Participant F2-S3 chimed in saying, “I mean, like, I was standing up and moving around and talking to people. I almost felt like she just made it up as we went along sometimes in class. It's like...that's stupid.”

The same two participants explained a game they played for an interior design course that was actually developed to be more of an ice-breaker than a means for learning. F2-S3 explains,

The one with the tennis ball, where we threw it around the group and had to get in a certain order as fast as we could. It wasn't really – it was more like an icebreaker game of like learning a set, you know, of knowledge. Or something. So there was a few games like that. I mean we played, but just (as an) icebreaker/get-to-know you game. As far as material we are going to learn by playing this game, I don't think we really had any experience with that

In focus group three, participants explained the same interior design class, where the class was divided into teams and each team had to construct a game for another team to play. The game was then played by each team while the other teams watched them play it. Participant F3-S1 explained, “In this particular instance it was really awkward,” but was unable to explain how it was awkward other than saying it was awkward to play a game while everyone in the entire class watched them play it. She explained that the other teams, the ones watching on the sidelines, did not know what the game was that was being played, and it seemed to create a confusing atmosphere for the participants.

Jeopardy was mentioned several times when participants talked about games they played in high school, but it was only mentioned once when a participant talked about a *Jeopardy* game that was developed by her peers for a study group. *Jeopardy* was not described as being used by a college instructor. Other college games they described centered on developing team-work.

Theme 3: Value of Game-Based Learning Based on Previous Experiences.

In addition to merely describing the types of games they played in high school and college, participants shared insights which helped describe their experiences during gameplay. Participant F1-S3 explained, “I guess (games are) a very low pressure situation, so, while you’re having fun with your friends in class you are learning things and they stick better.” Participant F3-S1 said, “I think it’s kind of a fun way because, like, in that moment you get all that adrenaline. If you’re prepared it’s fun.” Participant F3-S2 added:

I always look forward to them and I thought it was something cool ‘cause it was a break from the norm and so it was exciting and it was this way that we could see how much we were, you know, how much knowledge we were accumulating. And so I thought that was really cool.

Participant F3-S2 went on to say, “It’s something that hypes up everyone and everyone gets really stoked for them and you just learn a lot.” Participant F3-S4 said she enjoyed games because, “It brought the technology out and it was all something new and then everyone freaked out (because they were excited to play).”

Other students felt that when the games were presented as a review, it took away some of the value of playing games in class. Participant F3-S3 said *Jeopardy* is not the kind of game you create memories from. “It’s more of just like testing your knowledge. It was like, this is just the test in verbal form. So, like, yeah, I never really enjoyed *Jeopardy* but I can see how some people do.” Participant F3-S4 added,

When we did play games it was interesting, for sure. But I could also just remember it’s just review. It wasn’t trying to go over information and it wasn’t for like anything fun. It was more like ‘okay, we’re like going to maybe play this game, and then we’re going to over this.’ So yeah, that’s what we’re doing next class. So no one got excited. In other words, it was just like a whole other review for a test which was kind of boring.

Category 3: Perceptions of Game-Based Learning Experiences in Lighting Design

Participants discussed their perceptions, opinions, and experiences with game-based learning utilized in the lighting design course. Six themes emerged including (1) peer influences, (2) motivational factors, (3) retention of information, (4) emotional responses, (5) game mechanics, and (6) transferable skills learned from games.

Theme 1: Peer Influences.

Participants shared several perceptions about how their peers affected their enjoyment and learning from the game. Three sub-themes emerged from this theme comprising of (a) teaming, (b) distractions and focus, and (c) preparations.

Teaming.

Participants shared the games helped them realize how much they enjoyed learning together as a group. More specifically, they shared they greatly enjoyed being actively engaged and interacting as an entire group. Participant F2-S3 said, “It’s definitely just... more engagement where everybody would (be) just all learning together.” She went on to say, “I think that was really interesting to do, you know, to kind of (have) many answers and pick the best guess and try to figure (answers) out as a group.” Participant F2-S1 said about her favorite game, *The Illuminating Race*, “I liked the process and I liked how our teams had to work together more than the other games because it wasn’t just one question. It was like a process. I liked the process.”

Others explained that the games allowed them the opportunity to converse and learn with each other in a way they do not normally when in a lecture. Participant F3-S2 stated:

I also think it was really good for us because, you know, it’s a chance for us to interact with one another and I mean, we see each other every day but you sit in a lecture class with the same forty people and you don’t really get a chance to talk. And so when you play these games it’s like a really good chance to interact and

hang out with each other and have fun. So, I think on top of the educational thing it also helped a lot social wise with us.

Participant perceptions of their experiences with teams and peers during gameplay were not always so optimistic. Several participants shared frustrations towards their peers, most specifically during *The Illuminating Race*. Participant F1-S1 said:

I was in a very indecisive group. No one wanted to step up and just do something. And so it delayed everybody and – ‘well we need this, this, and this,’ and the communication wasn’t there and so it was frustration and that level of - people aren’t going to personally judge you if you get this wrong. Get over that. We’re trying to do this, this is supposed to be fun. You’re supposed to be learning, just go for it.

Personality differences also seemed to affect team decisions during gameplay as well.

Participant F3-S2 explained:

I know half of my group wanted to go one way, and half of my group wanted to go the other way, and then it caused some disparity between everyone because they’re like ‘well we should do this’ and the other part was like ‘well we should do this’ and we didn’t really have time to argue. And so, it was kinda like, well, whatever.

Distractions and focus.

Participants were quick to point that whenever you combine people into teams and groups, distractions are more likely to happen and you can lose focus quickly. Each focus group expressed disappointments with their peers during game play, which, in turn, affected their enjoyment of the game. One of the biggest frustrations participants shared was when their peers distracted them during the game. Participant F1-S3 said, “It was really frustrating when my classmates would just start having conversations about something else. It happens in lecture classes too when other people just start having random conversations.” Participant F2-S3 stated, “Yeah it was easy to lose focus. Somebody would say something and then we’d all be laughing at that and then, like, forget about the game.”

Participant F1-S1 was frustrated because of how loud her peers were during game play.

She explained:

It happens in any college class where you do something out of the norm and everyone gets loud but it's also frustrating for those who actually want to retain some of the information. You just want to get the information you don't wanna hear someone's conversation about the breakfast they had.

On the other hand, a few participants observed that when the entire class was engaged in playing the games, as opposed to one team member playing at a time, there is actually less distraction and more learning takes place. Participant F2-S2 explained this realization when she talked about her favorite game, *Who Wants to be a Lighting Designer?*

It keeps everyone engaged at the same time instead of just the two people that are up there and everyone else just like eh hhhh I'm not gonna pay attention. 'I'm not up there so I don't have to pay attention.' But it's like oh well, actually, I might know what's going on.

Preparations.

Some participants pointed out that their peers might have become distracted during the games in part because they came into the games unprepared. Most of the students were not familiar with *The Hundred Thousand Dollar Pyramid* game. The show aired on television before most of the participants were born and they have no memory of it. Though a video showcasing how the game is played was sent to them the night before, most of the students did not watch it. Therefore, they entered the game not knowing how to play it. Participant F2-S2 was one of the participants who hadn't prepared as much for the games. She explained:

I don't think I cared for the Pyramid, because I didn't know how to play it and since most people didn't know how to play it they got more distracted, I thought. I mean, it definitely helped us learn, but, I think it took a really long time to get into it. It was kind of wasted at the beginning because everyone was confused and/or distracted.

Participant F1-S3 felt she had prepared accordingly for the games. She said:

I had watched the video beforehand, I think a lot of people didn't. So, and that was the other thing I think that made it sort of, um, a little bit slower as far as, you know, the pick-up of information and how to play the game.

Participant F1-S3 echoed this statement when she said she liked *The Hundred Thousand Dollar Pyramid* game least because of, “the way that people weren't familiar with it so it seemed that it (gameplay) was sort of halted. It could have gotten better if people had educated themselves.”

Theme 2: Emotional and Motivational Factors.

Participants expressed several types of emotional and motivational factors that inspired their interest in the games. Five sub-themes emerged from this theme comprising of (a) competition, (b) winning and prizes, (c) matching up learning styles (d) fun and excitement, and (e) pressures and stresses (see Table 3).

Competition.

Being competitive with each other seemed to be an important part of gameplay that created many memories for some of participants. In some instances competition seemed to equate into having fun with each other. Participant F3-S1 described a fun moment during *The Illuminating Race*, “Another student and I tripped over each other and we biffed it. And we were running, like, really fast. However, to me that's a good thing because that means that we're – we were both obviously really into it and competitive.”

Participants who talked about competition explained it as a positive, healthy, and motivational way to play the games. For instance Participant F2-S2 explained, “All the teams were competitive, but it wasn't...most of the time it wasn't in like a mean, bad kind of way. It was just to help the competition.”

Winning and prizes.

Participants did not talk about winning or prizes as much as originally anticipated. But when they did, their perceptions seemed to correlate or relate to other emotions and motivational factors. For instance, Participant F1-S1 correlated winning to some of the social dynamics of teaming. She said, “I had the most fun with the amazing race. Um – just the team dynamic and also that was the only game that my team won (Everybody laughs).” It seemed winning and receiving prizes was treated more like an extra bonus by several participants instead of the goal.

Surprisingly, not everyone felt that winning and prizes were motivational. Participant F2-S2 felt prizes actually hindered motivation to play, “I think our class is too prize oriented? So if they know they are going to lose, they just kind of give up half way through. They’re a little too competitive in that regard.”

Alignment with learning styles.

During the focus groups, some participants shared perceptions of how their skills and learning styles aligned with certain games. This alignment seemed to give participants a sense of satisfaction and confidence which, in turn, motivated them to excel in gameplay. Participant F3-S3 described such a moment:

I’m good at games like ‘Catch Phrase’ and stuff, like getting around what you’re not allowed to say, I’m pretty good at those. (She laughs.) So, um, that was a game I personally enjoyed because when I was giving the information I felt like I was doing a pretty good job at it.

Other participants indicated that actually playing the games or even just observing others play the games added to their learning. Participant F3-S3 shared:

I know for me it helped a lot when, like, especially with the game *The Hundred Thousand Dollar Pyramid*, when you’re the person telling the other person – like, describing the item - you have to think on your feet about how to describe it. It helps you think of other ways to describe this one thing other than just, like, its name, which gives you a broader vocabulary when talking about lighting.

Participant F1-S1 explained her process and experience of learning as she observed others playing the game:

It was easier to pay attention to other teams and other people going up there and trying to describe it, I think, it helps you as well as helps the other person 'cause then you're trying to trigger your own memory on like, 'How do I describe this? What is this?' And they're trying to figure out what you're trying to describe and so it helped me both ways even just sitting on the side.

Fun and excitement.

Every participant agreed that they enjoyed game-based learning because they had fun. They enjoyed competition because it made the experience fun. They enjoyed winning, because winning was fun. Playing a game you are good at was also fun. Having fun while they learned seemed to be an important experience. Participant F2-S1 said, "It was fun! I think there was a lot of...laughing and learning together as a group." Participant F3-S1 said, "It was so fun. (She laughs) So fun." She went on to explain, "It was just funny to watch how people would describe these types of lights or these lighting terms. It was really interesting!" Participant F3-S2 said,

I think a lot of us look back on hundred thousand dollar pyramid the most fun 'cause that was the first time we'd done something like that and it was really cool and also I had never even heard of that and so for me it was a completely new thing 'cause I don't really watch game shows but we all know, you know, like who wants to be a millionaire and amazing race and so that was fun. And I liked that one because it was really cool.

Participant F3-S4, on the other hand, was familiar with all of the games. She said:

Personally I enjoyed it (the experience) 'cause I actually knew all three of the games. I used to watch lots of game shows. But, it was really fun 'cause I always wanted to play 'em and when they had them on the TV I played along at home, obviously. So I was super excited to play them and see how they applied them to the lighting design course.

Participants also explained that the excitement of the games helped counter their usual experiences and opinions of lectures being boring. Participant F1-S2 said:

When I heard that we were playing game(s) the next class I was like, ‘Oh, this class will be fun. I will definitely go to this one.’ Not that I wasn’t going to go but just that it’s more, like, something to, like, look forward to and it breaks it (the class) up a little bit. It’d be just boring if there weren’t any games or anything.

Participant F2-S2 said that without the games, “I think it would have just been a really generic, boring course. I wouldn’t have remembered very much about it.” Participant F3-S4 stated, “The games – without the games it wouldn’t have been as exciting. Yes.” Participant F1-S3 seemed to concur:

Um, I feel like I probably would have just checked out ‘bout, I don’t know, three quarters into the semester and I might have just not gotten as much from it. But it did sort of refresh the information and made it easier to retain and to apply.

Pressures and stresses.

A small number of participants indicated the games evoked feelings of being pressured, which caused unwanted stress during game-play. Both *The Hundred Thousand Dollar Pyramid* and *Who Wants to be a Lighting Designer?* games required students to participate as individuals, or as a small team. Having the sole responsibility of answering correctly in front of the entire class, or possibly letting their team down when they got an incorrect answer was a difficult scenario for some participants to handle. Participant F3-S1 explained what made her uncomfortable, “When you’re in front of everyone and you get something wrong that you think in your head that everybody else knows, you’re slightly embarrassed.” Participant F2-S2 explained:

I’m definitely not a competitive person. So, I mean, in situations like (this), I don’t know, it makes me nervous, or I’m like worried I’m not gonna give the right answer, and then my team won’t get the point, you know, and then it’s like, I don’t know, I’m a little bit – not that I was really affected with that because we’re all friends and we know each other but, you know, it wasn’t really *that* much of a pressure. But, you know, it’s just (that I) don’t want to let ‘em down, you know?

Theme 3: Retention of Information.

Overall, most participants indicated that the games helped them remember lecture materials. Some participants felt like certain games assisted their information retention more than others. More importantly, participants shared not only what they remembered from the games, but also how they remembered information. Five sub-themes emerged from this theme comprising of (a) creating memories, (b) getting the wrong answer, (c) receiving feedback, (d) active class participation, and (e) difficulties retaining information.

Creating memories.

Participants stressed the best way they retain information is when they created memories. The best memories that assist retention of information, according to the participants, were memories associated with funny, awkward, and other unique occurrences that happened during the game. Participant F1-S1 explained, “So, if it’s any sort of extreme emotion, for me (it) helps me remember things. So, like if I was embarrassed that I couldn’t get something, or if I was pissed because I am competitive and I didn’t get something (I remember that).” Participant F3-S1 said,

Like, it - it was just funny to watch how people would describe these types of lights or these lighting terms. It was really interesting. So then what was great about it was that it was funny, and in my mind I’m like “oh that’s funny I’m going to remember that” so then I did remember it so I learned it. That really helped.

Participant F3-S4 explained she liked *The Hundred Thousand Dollar Pyramid*, “because it helped retain the information the most in my opinion. It was a lot funnier than everything else.” Participant F3-S2 described a moment where she and another team-mate had to try to describe the term “Parabolic Aluminized Reflector” to other teammates. She felt bewildered the first moment she saw that word.

The ridiculous ones you really remember and you probably otherwise would have no idea what they are just because they are such difficult terms to remember. And so in that way it has like an adverse effect so it's not something you're ever going to forget. So I really appreciated that and I thought that was a really cool effect.

In addition to awkward or emotional occurrences, sometimes simply having a new experience triggered memorable moments. F3-S1 explained:

My favorite (game) was hundred thousand dollar pyramid. Um, mainly because it was new and we hadn't done a game before. And so I think in that respect it was very memorable because it was kind of like 'Oh we've never done this before this is a new experience' whereas, with the other ones, it wasn't a new experience.

Wrong answers.

In addition to unique situations happening in the game, some participants indicated wrong answers created memorable moments. Often times they did not remember the questions they got correct. It was mostly about the questions they got wrong. Participant F1-S2 explained, "When I like got it wrong or like other people, like, majorly got it wrong I remember that. Like, 'Oh. So-and-so got that wrong' and then I remember to like not get it wrong on the test." Participant F3-S4 recalled instances that combined funny, awkward moments with getting the wrong answer. "It does help you retain the information and it's hilarious watching everyone like, no offense, but FAIL and then just watching the, like, blank stare(s)." Similarly, Participant F3-S2 correlated getting wrong answers with feeling pressured. She said, "Like, if you don't get something the first time you're going to make sure you get it right the second time. Especially if it's in front of people. Like, you're never gonna make that mistake again."

Receiving feedback.

Participants shared that getting feedback on missed questions also seemed to help them remember materials better. Participant F3-S4 shared,

It definitely helped because we were able to go over the questions again and figure out what we missed and why we missed it. And what was correct about it,

I guess. So I mean that definitely helped for sure with retaining the information versus us having to go out on our own and try to – I mean I don't mind doing that, but I know personally if you get extra explanation for why the answer is that it definitely helps you retain the information then versus at home.

Participant F2-S3 felt the games would have been enhanced if they had adequate feedback. She stated, “We didn't really have feedback at the end, you know, like if the teacher would have come around and been like, ‘Oh you should not put that there, this would be a better thing’. (I wish) we could have talked to her about it or something.” Participant F2-S2 replied, “I agree with F2-S3, we should have had some sort of feedback. Maybe even the next class period we would still have remembered (the information).”

Active class participation.

Some participants said the actual experience of playing the games, or watching others play the game created memorable moments. Participant F3-S3 explained, “When I was giving the information I felt like I was doing a pretty good job at it. And I was, like, going through the mindset of figuring out how to describe (terms). Those (experiences) helped me retain what that was even more.”

Participant F2-S2 said,

We did get in trouble for being too loud in the hallways but, it's kind of what made it fun. You could actually get up and move and go somewhere and you had to do things quickly so you had to make decisions quickly. So I liked that process and I liked how our teams had to work together more than the other games because it wasn't just one question. It was like a process. I liked the process.

Participant F1-S1 said,

I felt like it was set up well and that like it was easier to pay attention to other teams and other people going up there and trying to describe it I think helps you as well as helps the other person ‘cause then you're trying to trigger your own memory on like, ‘How do I describe this? What is this?’ And they're trying to figure out what you're trying to describe and so it helped me both ways even just sitting on the side.

Difficulties retaining information.

Sometimes participants would describe the difficulty they had remembering anything from the games, or even the games themselves. Participant F1-S2 said that even though everyone seemed to know how to play *Who Wants to be a Lighting Designer?* and that they picked up information better in that game, “I don’t remember what we went over in that game.” Participant F2-S1 had similar feelings about the same game. “I don’t remember anything really from that game. Like I had to even try – I had to put my brain to be like, ‘What did we do for that game?’ You know? It just wasn’t very memorable for me and I didn’t learn anything from it. It wasn’t as memory stimulating.”

Participant F1-S2 explained her thoughts on *The Illuminating Race*, “I think amazing race was good in terms of, kind of showing us how fast, like, we can do like a plan but I didn’t really, like, learn any new material from it.” Participant F3-S2 said, “I definitely think (*The Illuminating Race*) was my least favorite part. It was just, you know, the chaos of it and the lack of information that we gained.” Participant F3-S4 added that she didn’t like *The Illuminating Race* as much either:

It didn’t help retain information. It was like (Participant F3-S2) said, just like a repeat of like a shred of what you know and how fast you can do it and how fast you can actually work with your group, per say, in a good coherent way.

In contrast, other participants said they would not have retained the information without the games. Participant F1-S1 said, “I think if it was a very much (field) trip oriented learning, that we just went to a lot of different places and observed the lighting, it wouldn’t have retained as well or if it was just ...all lecture and reading from the book it wouldn’t of retained as well.” Participant F3-S2 shared, “I feel like a lot of the stuff that I would have read in the book, and

stuff that I would have learned from lectures - I necessarily wouldn't have held on to as much as I did through those games.”

A few participants indicated they would need a little more than just the games to help them retain information. Participant S3-S4 said, “I mean I'll definitely personally still will always have to go back and look at stuff. And that's because my brain has a hard time retaining information period. But the games definitely helped retain it a lot better than not.” Participant F1-S1 said, “Yeah, I thought the games were very helpful in combination with the PowerPoints, and the lectures, and classes and the field trips, all of it together was very helpful.” She went on to explain,

We had done a few trips and we had – had to do case studies and read from books and such and other classes routines you interior design, but doing a game on top of them – then it's just one more level of, ‘Oh yeah we did this in lighting and lighting I learned this this this and this so now I can apply these skills into a design’ versus just, ‘well we saw this place but it was cool’.

Theme 4: Game Mechanics.

Some participants explained that the way the game was designed and the way it was implemented in class could affect how they learned lighting material from the games. Two sub-themes emerged from this theme comprising of (a) the game itself and (b) gameplay.

The game itself.

Participants were quick to point out when the game itself had flaws. It did not necessarily discredit the game in their eyes, but it distracted them enough to hinder their learning. One flaw participants mentioned included questions being too hard to answer. Participant F1-S1 said, “Some of the terms were like hard to describe like “coefficient of utilization” like... what?? (Everyone laughs) I didn't even know what that was!”

One of the biggest issues seemed to be that they thought the games were not designed as well as they perhaps could have been. As mentioned before, the games were constructed in conjunction with an instructional designer from The Institute of Teaching and Learning (TILT). Some participants believed that because the instructional designer did not know lighting design, she may not have designed the games as well as the instructor would have. They believed there were many miscommunications between the instructor and the game-maker in the development of the games. For instance, Participant F3-S1 explained her perspective:

I would get a little frustrated because, um, it seemed almost like the people who came from TILT, to kind of put on the games, sometimes they weren't – they hadn't completely like communicated the teacher (about) like how the game was supposed to go in detail so that like everybody was on the same page. So then if one thing was said and then someone in the audience missed it then it kind of created like a bunch of like confusion just among us so then it's a little frustrating in that respect, being confused about what's going on.

Participant F3-S2 said in agreement, "I think there were a couple of flaws here and there about like, you know, the differentiation - like the terms, versus saying words that are kind of similar, that maybe needed to be sorted out with the people at TILT." When pressed to explain this point further, Participant F3-S2 said,

I know, like, there were would be words that were kind of similar but you know didn't quite carry across the exact same meaning and they would count them because they sounded similar and they were like 'Yeah, sure, definitely that's right' and it wasn't necessarily correct.

Participant F3-S4 agreed further when she said, "I think it was a mixture that was definitely with words that were terminology with it and also the one question that stands out was the fact that there was no correct answer on one of them."

Several participants indicated that despite some of these more technical flaws in the games, they thought the overall quality and organization of the games was done well. Participant F1-S1 stated:

I gave (the games) probably an 8 out of 10. I'd say they were executed well and they were organized well and they were um applicable to the point in the semester that they were presented to the amount that we had learned thus far and um you know had the information we had been given. And the quality of the games themselves were good.

Participant F1-S2 added:

They were, like, organized well and I feel like maybe some other reasoning that it's not given like a 10 out of 10 is kind of like um our side of like our classmates and people just not being prepared. But, I thought this was like – they're actually like really trying to do this not, like, randomly put up notecards or something like cheap and hokey. But like you actually thought about it which I thought was good.

Gameplay.

Some participants pointed out that was not necessarily the way the game was developed or constructed that assisted or hindered their learning. It was also about how well the games flowed, and the way the games were managed during gameplay.

One focus group said they felt the way the games were introduced was a little rough. Participant F2-S2 said that it took them a really long time to get into *The Hundred Thousand Dollar Pyramid* game because most people were not familiar with how to play it. Though they reasoned that part of the problem was the fact their peers were distracted and came into the game unprepared, Participant F2-S3 also said, "I think just the directions were lacking".

Another issue with gameplay that participants talked about had to do with the activity and movement required for *The Illuminating Race*. Prior to this issue, participants explained that they really enjoyed the active movement the game allowed for. However, they seemed to enjoy it up to a certain point. Participants received task cards in one room, but the cards instructed them to run down the hall to the computer lab to complete the tasks. This caused them, from their perspective, to disrupt other classes and the people who were trying to work in the computer lab. Apparently a class was taking place in the back room of the computer lab, and

there were limited computers to use in the front portion. Participant F3-S3 explained further, “We were annoying everybody in there, and um...you could definitely see it on their faces. It was just - like it caused disrespect to other people in the lab as well as like, it was difficult running back and forth.”

In addition to the ordered chaos and disruption the participants felt they had caused, they also felt there was not enough time to complete some of the game tasks, especially during *The Illuminating Race*. Participant F2-S1 explained:

I felt like we didn't have enough time and we were really, really rushed at the end. It would have been nice to have a lot more time for that last – well not like a lot, but at least a good 10 more minutes probably would have been way better. When we presented we had a minute or to get through like five people. One group managed to do it, but they spoke so fast. So we were just laughing the (whole) time like ‘Wow, they’re actually, you know, getting through people’ and like, it’s good that they pretty much got the point across. But at the same time I wasn’t really paying attention to what they were saying ‘cause it was sooo fast. So it would have been - even just another minute would have been better (she laughs).

In another focus group, Participant F3-S2 explained some of these same frustrations:

We had so little time we didn't have a chance to really, maybe, make our case, like, based on what the concept was. It didn't probably go together as well as it could (have) because we didn't have time to settle down and work together and come up with a solid strategy to go off of.

Participant F3-S1 added:

What I didn't like about it was that like we really had no time to organize our teams like whatsoever and that kinda drove me nuts because half of the time I was running around and I was like What are we doing? You know? So that was frustrating.

Despite some of their frustrations, the participants indicated that they did appreciate the time, effort, and work that was put into the games, even during gameplay. Participant F1-S2

I'd like to add that the level of effort that you guys went to present the games to us with the power points and you dressing up as like a game host and stuff - that was definitely, um, very helpful to get us involved you know. And um especially

for such a big group that can be really hard to sort of manage – I’d say kudos for that.

Participants also seemed to be understanding that games will have flaws and may not be perfect. Participant F2-S1 said, “I mean, every game has its flaw, and it also depends on the group of people that’s doing it. So, it’s gonna vary every single time it like, it gets used.”

Participant F2-S3 stated, “Anything (you) do for the first time, there’s gonna be, you know, some problems and things that, you know, could definitely (be) made better the next time.”

Theme 5: Transferable Skills Learned From Games.

Several participants shared their perceptions regarding how they may use the information they learned as a result of the games after the lighting design course. Four sub-themes emerged from this theme comprising of (a) terminology, (b) team work, (c) speed, and (d) ability to communicate lighting design.

Terminology.

Every participant seemed to agree that the games increased their general understanding of lighting. More specifically, they felt they learned lighting terminology more than any other material. Participant F1-S2 shared:

I’d say I’m more familiar with lighting really in an overall sense. I’m more familiar with the terminology and the applications of the lights – like you’d never want to use a sodium chloride light inside. So it helped with the familiarity of the subject and the applications for when I can go into putting together a lighting plan. I feel a lot more confident now that I have a good, you know base knowledge to draw from and I know where to get resources if I have questions. So I’d say the games sort of started all of that you know with teaching me the terms and stuff like that. And there were concepts that were, um, defined and identified as well, and just, those kind of all came together and definitely enriched the experience.

These sentiments were shared across focus groups. Participant F2-S3 stated, “Yeah I think that some of the, you know, extra terms and your names of stuff, or categories, or facts,

you know, that is really helpful to have ‘em nailed down and really remember them.” Participant F2-S1 agreed, “And I definitely learned some of like the general terms, like she was saying, more so than I knew before.” Participant F3-S2 said, “I feel like my terminology and my language as a lighting designer has drastically increased after those game. Now I have, you know, that kind of stuff in my arsenal to use when talking about lighting in general.” Participant F3-S3 said, “I completely agree. It was all supposed to expand our vocabulary about lighting.”

Team Work.

Earlier, participants described how teaming and social dynamics was a large part of the game-based learning experience. For instance, Participant F1-S3 said, “The thing that stuck out to me the most was the difference in our class between people and the way that we interact.” Despite the perceived importance of social factors like teaming, Participant F3-S4 was the only participant to mention that the games, particularly *The Illuminating Race*, could prepare her for how to work on a team in a professional setting. She said,

With the amazing race we had to deal with the team work – team socialization. That will help later on when you actually have to work in groups and teams at a firm. I mean, everyone’s gonna have a different work format that each person follows. And each person’s gonna have their own different personality and one might take over or two might take over and they might butt heads a little but you gotta get past it quickly to move on and get the project done. And you gotta learn how to just respect everyone’s wishes but yet still...diplomatically debate the correct answer to some extent and figure out the solution versus arguing massively and getting in a huge fight and having a big old fiasco throughout everything.

Speed.

One participant in each focus group pointed out that *The Illuminating Race* may not have taught them about course materials, but it did teach them how to complete projects quickly. Participant F1-S2 pointed out, “I think amazing race was good in terms of kind of showing us how fast, like, we can do a plan. But, I didn’t really, like, learn any new material from it.”

Participant F2-S2 agreed when she said, “You had to do things quickly so you had to make decisions quickly and I really hate when people are deliberating over one problem for a long time.” Participant F3-S3 explained, “Um, for (*The Illuminating Race*) it allowed us to not necessarily learn a new skill, but (we learned) how to utilize a skill we already have, but in a more efficient way.”

Ability to communicate lighting design.

Universally, the participants indicated that when it comes to using what they learned from the games on future problems, they would most likely use their knowledge to communicate with future clients or other professionals. Participant F1-S2 said,

When you, like, talk to like a client you want to sound, knowledgeable. You wanna know that, like, it’s called like a lamp and not a light bulb, you know? I think they would appreciate that. They might not understand everything, but just the illusion of, like, ‘I know what I’m doing!’

F3-S3 stated, “If I have someone who wants something and I’m trying to explain to them, like, not necessarily dumb it down, but I can use simpler terms now because I know how to get around using the words they don’t understand.” Participant F3-S4 explained,

I know personally how to talk to clients and how to work with other co-workers is definitely what we got out of it versus how we can do a lighting plan and other stuff ‘cause what helped me personally learn that more was the projects versus (*The Illuminating Race*).

During the discussion, Participant F1-S3 had a revelation, “That was actually probably the goal, wasn’t it? Teach us to universally (laughing) describe things so anybody could understand it, to enhance our understanding?” Other students nodded and agreed that it probably was.

Participant F2 was the only participant who disagreed. She did not think the materials she learned from the games would be useful with clients. She explained:

I don't know that that kind of information would come up with a client specifically. Um, unless you had to explain in detail what and why you are choosing something and then you know they probably wouldn't know what you're talking about. But I mean, if you are, you know, talking to a lighting designer, or an electrician, or whoever is putting it in, you know, that would be more helpful.

Theme 6: Overall Impressions of Game-Based Learning.

At the end of each focus group session, participants shared some of their overall impressions of game-based learning from their point of view. Participant F2-S3 explained that despite some of the flaws and frustrations she experienced, "I think we still got a lot out of it (game-based learning) and we're still really, you know, happy and fun and excited, you know, to do it. It was a good interactive element to add, for sure." Participant F2-S3 added, "Even the games we didn't enjoy very much, we still learned from them and so they weren't pointless." Participant F2-S2 was able to summarize what the other participants and herself believed about game-based learning:

I mean just even from listening to like what everyone's saying we really don't have anything negative to say. It OBVIOUSLY wasn't a waste of our time. We learned a lot from them and I think everyone benefited in some kind of way from them. Overall I think they were a great success

Category 4: Strategies for Creating Effective Game-Based Learning Experiences

Participants discussed several preferences and strategies for creating game-based learning experiences that were beneficial to their learning. Three themes emerged in this category: (1) develop quality games, (2) implement games properly, and (3) post-game follow-up.

Theme 1: Develop Quality Games.

Some of the participants shared some of their insights about how games should be developed in order to best assist game-based learning experiences. Two sub-themes emerged: (a) plan and prepare and (b) consider the audience.

Plan and prepare.

A few participants pointed out that the games in the lighting design course came across as organized and well planned. According to some of the participants, the games themselves should be developed in accordance with the course material and other needs of the course. In order to develop the games, participants indicated instructors should research a little more about how to make the courses and games work well with each other. Participant F1-S2 said, “Cater your games to like the subject. I feel that makes a lot of difference.” Participant F1-S1 concurred, “Do something relevant you know? You want to make it like relevant to the course.”

Participant F1-S1 also said instructors should not only consider what game type is best to present class materials but to also, “as an instructor, going in and doing the research on how this will flow, and how it might help retain the information, versus just, ‘Well, students know *Jeopardy*, or students know this. So we’re just going to play this’.” She implied that teachers should not implement a game just to have a game played in the classroom. The instructor should choose the type of game carefully. She went on to say:

I would start off with a game that people know. I’m not a fan of *Jeopardy*, (but) something like that ‘cause it’s easier to, like, get people interested in a game that they know. I feel like if people initially know it then they want to play.

A couple of participants thought it was important for the instructor to know the ins and outs of the games before the entire class plays. Participant F2-S2 said, “Like, just know all the rules, know all the answers to the questions that are on there, um, be prepared to answer weird questions that relate to the questions that are on there.” Participant F2- S3 agreed, “Know what’s, like, set up in the computer too. It was a little bit distracting sometimes when we were all on different – when you guys were all on different pages.”

Participant F3-S3 thought it was important for instructors to plan and prepare for specific needs or situations during the game. Even though she liked the activity of *The Illuminating Race*, she thought the activity disrupted other classroom environments and caused a lot of issues. She suggested, “If you had like 6 or 7 people check out laptops and then have them in the room we’re working in, we don’t have to like run back and forth for the amazing race (and disrupt other people).”

A couple of participants liked the idea of having multiple games in a course, but not too many. Participant F3-S2 said, “Don’t have too many, but find a good medium, like, a different kind for each section (of the lecture). Because different sections are going to benefit from a game that applies to it in a different way.” Participant F3-S3 agreed, “Just like find a happy medium between what’s a good amount of games and what’s not because you obviously still have to get the lectures in. It’s finding a happy medium.”

In addition to these direct perceptions, participants also implied strategies for the planning of games used for game-based learning through their descriptions of personal preferences. Each theme and sub-theme found earlier in this chapter hints to preferences participants had. For instance, participants indicated they wanted to play the game with peers they collaborated well with (Teaming). They wanted to have minimum peer distractions during gameplay so they could focus (Distractions and Focus), they wanted games to create a fun, competitive environment that matched their learning styles and strengths with minimum amounts of pressures or stress (Emotional and Motivational Factors). They also wanted games that were developed well and gameplay that ran smoothly (Game Mechanics).

Consider audience.

Several participants suggested the key to developing games for effective game-based learning was to know who you were developing the games for. Some participants pointed out that professors need to better assess the learning happening in their classes. Other participants suggested using multiple types of games to accommodate multiple student learning styles.

Participant F2-S3 feels that professors are:

Just stuck in their ways 'cause they do this (lectures) every time and that's how they do it, you know? They don't really, you know, look for feedback and, you know, see 'Is this is working? Are my students passing? Do they understand what I'm trying to tell them?' You know?

Participant F3-S3 stated, "I think just like paying attention to like how your students learn, um, because if you do see that like your students are struggling then maybe putting in a game and seeing if that helps would work." Participant F3-S2 agreed, "If your students are having difficulties with a certain thing time and time again then a game to change up everything might be the best thing. Because obviously a lecture's not doing it."

Additionally, participant F3-S4 pointed out that students have multiple learning styles. She said, "There's different people, different learning habits, and I think the games help cater to the other aspects that help people. Like the more active learners versus passive learners." Participant F2-S3 thought similarly, "Games (are) another helpful way to get more people involved, to get other types of learners on the same page and understand what you are saying."

In addition to knowing how students learn, participants indicated it is important to know what students need or want. Participant F1-S3 said, "I recommend to know your audience. Because you guys know what we like, and you were able to motivate us with good prizes and make us laugh. I think that was really helpful." When asked if prizes are necessary for games, she said prizes were not of utmost importance but, "it was definitely helpful like at the beginning

of the game when you're like 'You guys are gonna get this whole bucket of candy!' It was a great way to just sort of, you know, lure us in a little bit." Participant F2-S1 shared similar sentiments, but offered a unique solution about how to use winning and prizes to motivate everyone, even when they are losing. She said:

I think like with the competition and how we are, I think it would be cool to keep people engaged the whole time as if you basically like there was like four teams so if you did 1st, 2nd 3rd and 4th place everyone in the end still gets a prize but maybe make the prizes different for each level and then it like encourages them to be like "oh , I can still get higher" and so they will still not want to be last place but at least they're still getting something in the end. It's not a total loss.

Theme 2: Implement Games Properly.

In addition to developing games, participants indicated the way the games are managed during gameplay is important as well. Participants shared few direct responses involving how to implement games better. Instead it seemed their advice was implied in some of their approval or disapproval of certain aspects of gameplay. For instance, Participant F2-S3 pointed out that one of the reasons there was a lot of confusion at the beginning of *The Hundred Thousand Dollar Pyramid* game may have been because of the lack of directions. It seems she, and other members of her focus group, felt it was important to minimize confusion by delivering proper instructions prior to playing the game.

Participant F1-S2 stated earlier that, "The level of effort that you guys went to present the games to us with the power points and you dressing up as like a game host and stuff - that was definitely, um, very helpful to get us involved." Her perspective implies that if the instructor takes the games seriously, the students will also take the game seriously.

Theme 3: Post-Game Follow-Up.

A couple participants indicated that what happens after the game can be just as important as what happens before or during the game. A few participants felt that because these games

were new, they had flaws that hadn't been attended to. Participant F2-S3 said, "It's definitely just small glitches that are gonna, you know, make themselves better and remedy themselves over time." It seemed as though some of the participants assumed that instructors would fix any technical flaw, or gameplay issue once the game had been played.

Another issue some participants brought up was the need for feedback. Participant F2-S3 described why feedback would have been important during *The Illuminating Race*, "We didn't really have feedback at the end, you know? Like, if (the instructor) would have come around and been like 'Oh you should not put that there, this would be a better thing' we would have talked to her about it or something. Maybe it could have been a little bit (more conducive) for learning." It seemed that her, and members of her focus group, wanted more feedback to help them retain information and make the learning more effective.

Last, but not least, participants wanted instructors to know they didn't want them to forget about using games in lectured courses. Participant F3-S3 said, "Don't write them off. Don't forget them." Participant F3-S4 stated, "Try doing a game. It might actually help your students more and get you better results on the tests versus just lectures." Participant F2-S3 said, "At least try something new. Don't just (have a) one-track mind."

Summary of Findings

The purpose of this qualitative study was to assess the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based lighting design course. Understanding how Millennial interior design students perceive game-based learning can offer insights for interior design educators who may be interested in developing new curriculum in their lectured-based courses.

Participants indicated that lectures, from their perspective, are the fundamental method that college-level instructors use to deliver information. Participants had more negative experiences and opinions about lectures than positive. Participants explained that they enjoyed lecture-based courses when they are (1) structured and designed well for learning and test-taking, (2) when they cover an interesting topic, and (3) when they are taught with an engaging teacher. They preferred having lecture-based courses mixed into their interior design courses because such courses, from their perspective, have small workloads. Lecture-based courses, therefore, gave the participants “a break” from what they perceived to be intense interior design course work-loads.

However, participants also shared they felt that lectures are generally boring, non-motivational, and are usually taught by teachers who are unable to deliver information in a way that would assist in their learning. As a result, the participants struggle with attendance and grades because they are unable to retain the information. Participant prefer lectures only when they include engaging coursework, enthusiastic teachers, interesting topics, and when they understand how lecture-based courses fit into their goals for their future.

Game-based learning played a significant role in their high school years, particularly with the game *Jeopardy*. However, college has provided fewer opportunities for game-based learning in the classroom. Often participants described game-like activities in college have been more about team-work, and ice-breakers than learning. The few opportunities they have had to play other kinds of games have been awkward and/or unmemorable.

Participants shared several perceptions concerning game-based learning for a lecture-based lighting design course (See Appendix F). Participants indicated greater learning as a result of the games, as well as a chance to interact with their peers, and have fun. They also indicated

they liked game-based learning because the games that were developed for the course were implemented well and fit their learning styles. Participants also shared what they liked and disliked about each game (See Table 2). Overall the participants believed game-based learning to be a valuable contribution to the class and to their learning and understanding of lighting.

Table 2. Themes of Study: Table of Participant Likes and Dislikes Concerning Each Game

Game	Likes	Dislikes
The Hundred Thousand Dollar Pyramid	<ul style="list-style-type: none"> • Setup well • Easier to learn from • Easier to pay attention • More memory triggers • Learned about social dynamic of class • Fun to watch others play • Learned how to describe 	<ul style="list-style-type: none"> • Unfamiliarity with game • Peers were unprepared • Difficulty describing lighting terminology
Who Wants to be a Lighting Designer?	<ul style="list-style-type: none"> • Familiar with game • Received the most feedback • More familiar with the information 	<ul style="list-style-type: none"> • Game did not trigger many reference points • Distracting side conversations from peers
The Illuminating Race	<ul style="list-style-type: none"> • Got to run around • Refreshed memory on reflected ceiling plan layout • Learned how quickly they could produce a reflected ceiling plan • Learned how to work in a diverse team environment 	<ul style="list-style-type: none"> • Did not learn any new lighting concepts • Embarrassed about disrupting computer lab

Participants indicated game-based learning was not as effective when they had issues during gameplay with their peers, encountered flaws with the game and implementation of the games, when they found it difficult to learn from the games, and when they experienced unwanted pressures and stresses as a result of playing the games. However, participants indicated they preferred game-based learning when they were able to collaborate with friends or

with people they communicate well with and who are well prepared. They also enjoy having the entire class involved as opposed to only part of the class involved. They prefer having plenty of time to complete game tasks, and would like feedback during and after gameplay. Participants preferred playing games they were familiar with, that got them active, and games with little to no distractions and flaws. The more the game-based learning experiences related to lecture materials and tests, the more the participants liked them.

Participants demonstrated a variety of opinions when it came to how game-based learning helped them retain lighting course materials. Most participants agreed that game-based learning helped develop and strengthen their lighting terminology whereas others felt they learned how to work and communicate better in teams. Some participants felt they did not remember any specific information as a result of game-based learning. All participants shared beliefs that game-based learning assisted their general understanding of what lighting design is all about.

Participants generally agreed about the transference of information, or the ability to use retained information in the future. The majority of participants indicated they felt more confident about speaking to clients and other professionals about lighting design. Game-based learning helped them not only learn and retain vocabulary, but also taught them how to communicate within a diverse group while designing.

Participants shared several strategies for developing game-based learning activities that benefit student learning. They suggested that instructors should plan and prepare for the games properly. From their perspective, instructors should choose games carefully so that they smoothly integrate course materials.

They should also consider the audience when developing games. This includes assessing the level of learning in the classroom, knowing what your students need and like, encouraging

student participation and motivation, and to be sure to develop games that can accommodate multiple learning styles. Instructors should try to illuminate flaws and distractions, and also know all of the questions and answers. They suggested it may help for the instructor to play the game before class, and try not to improvise during gameplay. The fourth insight was to find the happy-medium of just the right amount of games to play in the course.

Participants also indicated that instructors should fix any issues or flaws that the game may have, and should also offer plenty of feedback during and after gameplay. The last insight participants expressed was to simply not forget to use games in lectured courses. Instructors, they feel, may overlook opportunities for fun and engaging experiences in lectures because they have lectured the same way for several years. Participants believe if a teacher throws in a game, or an experiential activity, it can greatly assist student learning.

In summary, the participants of this study seemed to value the use of game-based learning in the lighting course. The participants felt they would not have been able to understand the topic as well had game-based learning not been implemented so well into their course. Despite some frustrations they encountered during game-based learning, the participants seemed understanding and offered suggestions to enhance game-based learning in the future.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this qualitative study was to assess the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based course format. Understanding how Millennial interior design students perceive and respond to game-based learning may offer insights for interior design educators who may be interested in modifying curriculum to match preferred teaching styles of Millennial students. Three focus groups were held with junior-level interior design students at a four-year institution in northern Colorado. Students were selected for the study based on their (1) enrollment in the lighting design course, (2) age and inclusion in the Millennial generation, and (3) participation in three educational games developed specifically for a lecture-based interior design course.

The objective of this phenomenological study was to interpret the meanings that participants experience with the phenomenon in order to distinguish between participant perceptions and reality (Creswell, 2009; Willis, 2007). Focus group sessions were used to collect data, as they provide the opportunity to understand how a group discusses an issue while eliciting multiple viewpoints at the same time (Glesne, 2011). The data was analyzed using the Interpretive Phenomenological Analysis method, which connected emerging themes together from the focus group sessions.

Four major categories shaped the findings of this study which include perceptions: (1) concerning lecture-based courses, (2) previous game-based learning experiences, (3) game-based learning experiences in lighting design, and (4) strategies for creating effective game-based

learning experiences. Underlying themes and sub-themes emerged, which provided an empirical foundation to enhance the knowledge and understanding of this subject

Discussion of Findings

In order to understand the Findings of this study, it is important to place it in the context of game-based learning. The following section is a discussion concerning how this study fits into the existing body of knowledge related to such.

Category 1: Perceptions Concerning Lecture-Based Courses

Theme 1: Previous experiences with lecture-based courses.

Research indicates that Millennial students, in general, are perceived to rebel against traditional styles of learning, which include lectures, tests, and discussions (Jones, 2012; Oblinger & Oblinger, 2005). Similarly, Canestaro and Carters (1992) claim that lectures seem less interesting to design students. Not surprisingly, participant responses in this research study seemed to agree with their research. Participants indicated, in both the demographic survey and in responses to focus group questions, that they had relatively negative experiences with lecture-based courses. Though a number of participants shared a preference for individual lectures, the majority of the participants indicated that lectures were boring and uninteresting, which resulted in poor attendance or falling asleep in class.

Interior design education is known for experiential, hands-on, kinetically-oriented learning opportunities (Demirkan & Demirbas, 2008; Smith et al., 2009). Studio courses encourage interior design students to share and process information with each other and their instructors as part of their learning process (Demirbas & Demirkan, 2007; Demirkan & Demirbas, 2008; Kvan & Yunyan, 2005). Kucko and Caldwell (1995) noted in their study that the studio instructor typically works with students in a more independent, one-on-one process,

which contrasts to educators who teach in more traditional lecture-based courses. The literature also indicates that Millennials learn best when they are able to use hands-on learning to discover, actively engage, and immerse in their studies through inductive reasoning and non-linear pathways (Evans & Forbes, 2012; Feietag & Berge, 2008; Jones, 2012; Skiba & Barton, 2006).

Participants from this study indicated preferences to learn hands on, or with more one-on-one guidance from their instructors. Lectures, from participant viewpoints, are a structured, linear means for receiving information, in which, they sit day in and day out listening to the same person say the same things over and over (Participant F2-S2). Participants shared they typically are not given opportunities to interact with instructors or peers, and nor are they able to engage in hands-on activities. On average, a lecture comprises of an instructor speaking about a topic to a group of students who take notes on the lecture. Therefore, the findings indicate that the participants' needs and preferences in this study demonstrate a close association to the Millennial academic needs indicated in Chapter 2. Based on the responses and perspectives of participants in this study, lectures could benefit student learning, specifically interior design student learning, if they could incorporate more hands-on, experiential opportunities into the curriculum.

Participants of this study may have viewed lectures in a more negative context because kinetic and experiential learning is a dominant methodology used in interior design education. Any other learning method they experience such as reading, testing, and memorization requirements may be difficult for them to engage in. Most participants explained that lectures require less work and therefore they do not have to do anything more than take notes, download notes, and sit and listen to someone deliver a lecture. In their own words, lectures “gave them a break” from the intensity they often experience from having to create and develop multiple

interior design projects in a semester. Despite their many frustrations with lectures, they believed it helped balance the workload of their interior design courses.

Millennials often want to find balance between the chaos of their school work and with experiencing high amounts of stress (Howe & Strauss, 2000; Jones, 2012; Ryan, 2007) as well as trying to find ways to avoid coping with stress (Bland et al., 2012). The participants may actually be viewing lectures as a sort of “built-in protection”, which allows them to take courses that do not require the same work and stress that project-driven courses can produce while still earning their degree. It could also be possible that students, especially interior design students, who are accustomed to using kinetic or hands-on experiences in their curriculum may be “conditioned” to learn best from those same experiences. The more hands-on learning experiences they are exposed to, the more they may expect to learn from those experiences as they advance through design education. Further research is needed in this area to support this notion.

When participants spoke about lecture-based courses, they did not speak about lecture-based courses from the interior design curriculum. They only described lecture-based courses in their minors or general education. Prior to the lighting design course, participants completed approximately four to five lecture-based interior design courses. It could be possible that interior design students do not view lecture-based interior design courses as “actual” lectures. Participants suggested they enjoyed lecture-based courses when lecturers are more engaging, when they enjoy the topic of the lecture, or when they experienced more engagement and activity in their lectures. It is possible that interior design instructors are more engaging and entertaining and enthusiastic about interior design. Students may also be more interested in the lecture topics of interior design courses. Sickler (2009) conducted a study to determine if Millennial interior design students preferred studio or instructional courses. Participants in her study actually

avored instructional courses. However, Sickler pointed out the instructor for the lecture-based course delivered materials in a variety of ways that may indicate why participants were so favorable of the lecture-based materials. This concept could be true in the current study as well. Further research into these values could reveal a deeper understanding of participant perceptions of interior design lectured courses specifically.

Theme 2: Perceptions concerning lecture-based courses.

In addition to engaging teachers and interesting topics, the participants of this study indicated they did not want to be bored during class, and desired a learning environment that promoted experiential, kinetic, hands-on learning opportunities. Participants indicated that it is difficult to focus during lecture-based courses. Participant F3-S3 illustrated this point when she said:

It's very easy in a lecture class to just glaze over and stare off into the distance or there's a computer right at your hand/fingertips on your little phone right there with Facebook. There's so many distractions that are readily available, even sitting in a lecture class that it's like hard to pay attention sometimes. So maybe, not even necessarily throwing in a game but just throwing in some sort of activity that will facilitate learning other than straight lecture.

Even though this participant said any sort of activity would be helpful in lectures, research indicates that games have great potential for fostering both learning and engagement in course materials. If lectures are losing their target audience because meaningful learning is not being achieved (Trybus, 2012), then it should be the responsibility of the educator to do as Honey (2009) suggested and “employ different methods and techniques – approaches that meet students where they are and gently move them toward lasting and meaningful change.” Participants of this study indicated they play games often outside of the classroom (see Category 2 below for more details). Bringing engaging and familiar activities into lecture-based courses,

like game-based learning, may spark a deeper, more meaningful engagement for students in lecture-based course material.

Category 2: Perceptions of Previous Game-Based Learning Experiences

Theme 1: High school experiences.

Focus group questions about previous game-based learning experiences were used to better assess participant perceptions about game-based learning. For example, when participants were asked to describe their previous experiences with game-based learning, every participant indicated they played a variety of games in their high school classes. The most popular game, according to the participants, was *Jeopardy*. In their eyes, *Jeopardy* had some fun moments, but it may have been a bit overused and perhaps not taken as seriously as it could have been. Some participants explained that the games were used mostly as a review for tests and not necessarily as a learning tool. Participants were not keen on the idea of game being used solely for review. In fact, some participants said that when games were introduced as review, it took away some of the fun, and they weren't as motivated to play.

Thaler (2013) said it is important for the Millennial generation to know the end goal, or the big picture, so they can understand the practical use of their studies. The purpose of the game, therefore, should not only be shared with Millennial students but it should also be more meaningful than simply reviewing for a test. Millennial students want to know why something is important and how it relates to tests and/or their future. Educators should design games used for game-based learning with a clear goal and purpose.

Theme 2: College-level experiences.

Five out of ten participants explained that when they came to college they participated in educational games during class. However, educational games were few and far between

compared to high school. The games they played in college, up until the lighting design class, seemed to be oriented more towards team-building activities, and were rarely about learning course materials. However, participants still seemed excited to play these games and enjoyed reliving the games as they described them.

Theme 3: Value of game-based learning based on previous experiences.

The Entertainment Software Association (2011) reported that 72% of Americans play digital games and 53% of them are between the ages of 18 and 45 with an average of 12 years of experience in playing digital games. These participants are part of a generation where playing games is a part of everyday life. In addition to descriptions of game-based learning in class, nine out of ten participants indicated in the demographic survey that they actively play digital games for entertainment purposes in their spare time. They played games from anywhere between one hour to over ten hours a week. This data helps to validate the participants' interests in playing games because they do so for several hours a week.

Findings of this research study indicated that students are playing games despite their descriptions of having intense work-loads in their major. This behavior could be contributed to, but not limited to, two thoughts including (1) games are an important part of these participants lives, and/or (2) participants of this study may be exhibiting what Bland, Melton, Welle, and Bigham (2012) suggest which is that games could be a type of avoidant coping mechanism for the pressures and stresses they experiences as interior design students. If either of these two thoughts are accurate, game-based learning may be a welcome addition to the classroom.

Category 3: Perceptions of Game-Based Learning Experiences in Lighting Design

Theme 1: Peer influences.

Lee and Hammer (2011) said games motivate the cognitive, emotional and social areas of students. Surprisingly, the social area of game-based learning was particularly important to the participants of this study. Their happiness with and preference for game-based learning depended a great deal on the actions and interactions with peers. They shared strong desires to interact with each other during class time, because they rarely get the opportunity to do so in most lecture-based courses. However, they indicated they wanted to interact with peers under certain conditions. One focus group believed the games would have gone much differently, and would have been more effective for them, if they were able to pick their own teams. If they had been given the freedom to choose their own teammates, according to the participants, they would have selected individuals they knew and collaborated well with, and therefore their learning and the outcomes of the games would have been very different as a result. These types of thoughts and preferences are reminiscent of research indicating Millennials want to learn on their own terms (Evans & Forbes, 2012; Tucker, 2006).

Interior design students in this particular interior design program attend classes with the same group of students for four years of their education. Interior design students can form a tight-knit family-like structure during the four years they are with each other in college. The concept of family, as discussed in Chapter 2, is highly important to the Millennial. Tucker (2006) stated Millennials are regularly consulted with when families make decisions and have discussions. McAlister (2009) also pointed out that Millennials are highly social and cooperative. Millennials also tend to cope with pressures and stresses by seeking support from those around them (i.e. friends, family, and teachers) (Bland et al., 2012). Perhaps it is possible that interior

design students share the same expectations of their conjugal family with the family-like peer structure that develops in their interior design program. If so, it may lead to a better understanding as to why the social dynamics of gameplay seemed to weigh so heavily on the minds of the participants.

Most participants expected their peers to come to class prepared to be successful at playing the game and to actively contribute towards gameplay. Participants indicated that some of their peers did not do the homework, nor did they come to class prepared. Unprepared peers distracted those who did prepare for the games with side conversations or what prepared peers deemed to be inappropriate behavior. The participants seemed to equate these negative experiences to the overall experience of the game. This “all-or-nothing” kind of attitude seems reminiscent of what other researchers have said regarding the Millennial generation: Millennials tend to exhibit a sense of entitlement and expectations (Feietag & Berge, 2008; Ryan, 2007), little to no patience (Jones, 2012; Skiba & Barton, 2006), and perhaps even waning attention span (Pardue & Morgan, 2008; Tucker, 2006). This attitude toward distractive peers may also relate to the academic needs of Millennials; to be achievement oriented (Evans & Forbes, 2012), and to learn as fast as possible with the least amount of obstacles (Feietag & Berge, 2008; Jones, 2012). If peers are distracting them, or if peers come to the game unprepared, this lessens their chance of learning from and/or winning the game.

Theme 2: Emotional and motivational factors.

In this study, participants explained that they enjoyed and preferred game-based learning when it matched their own personal learning style, which resulted in having more fun playing the games. When participants described how they enjoyed the games, they were describing instances they felt confident and motivated to use their talents and strengths to play the games

and answer questions correctly. For instance, Participant F3-S3 said she really enjoyed *The Hundred Thousand Dollar Pyramid* game because she was good at describing terms quickly and efficiently. These statements link to previous research showing that Millennials enjoy learning when it is on their own terms (Evans & Forbes, 2012; Jones, 2012; Tucker, 2006) and when they can take charge of their learning (Jones, 2012; Oblinger & Oblinger, 2005). Participant motivation can also benefit the learning process (Huang, Johnson, & Han, 2013) because it can determine, direct, and even sustain what students do to learn (Trybus, 2012). The participants seemed motivated to play the games and to play them well.

When students described wanting to learn according to their strengths, their descriptions were reminiscent of Howard Gardner's (1983) Theory of Multiple Intelligences. His theory states that intelligence should be measured not by one modality, like IQ, but instead by nine modalities (see Figure 7). Gardner believes that if students are taught using their favored ways of knowing, then their learning will be much more effective (Gardner, 2000).

To illustrate the connection between participant responses and Gardner's theory, Participant F3-S3 said she enjoyed games like *Catch Phrase*, where you have to describe a word without using certain terminology. According to Gardner's Theory for Multiple Intelligences, this participant could be naturally strong with words, indicating she would fit into the verbal/linguistic modality. When participants described the importance of relationships with peers during gameplay, those participants could relate well to people, indicating they may fit into the interpersonal modality. When participants described enjoying being able to get out of their chairs and move around, those participants could enjoy learning through physical activity and may fit into the bodily-kinesthetic modality.

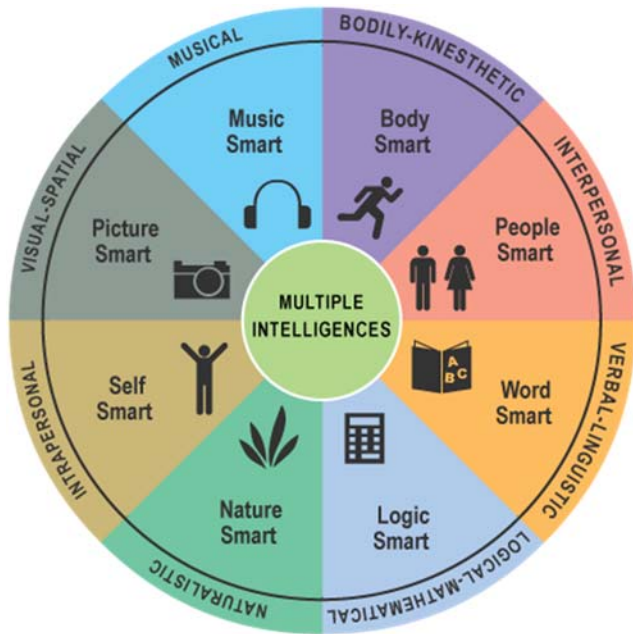


Figure 8. Howard Gardner Theory of Multiple Intelligences (Hermawan, n.d.).

This study did not focus directly on interior design student learning styles, or Howard Gardner’s Theory for Multiple Intelligences. However, participant responses indicate there may be interesting parallels between interior design student learning styles, preferences for game-based learning, and the modalities of multiple intelligences. Game-based learning may also be developed to assist more than one modality and therefore be highly effective in teaching multiple learning styles at a time. Further research comparing the three could reveal interesting insights into the development of game-based learning to maximize the effectiveness of game-based learning in lecture-based courses for interior design students.

Theme 3: Retention of information.

The instructor of this course wanted to set important educational goals for her students. She believed if game-based learning activities were developed according to the revised cognitive process dimension of Bloom’s Taxonomy of Objectives (See Appendix F) the experiences would strengthen her students’ knowledge retention and transferability of information (Anderson &

Krathwohl, 2011). One of the positive aspects participants shared about game-based learning was how much they learned from these experiences as a result. Most of the participants expressed a deeper, more meaningful understanding of lighting design because of how well game-based learning was implemented into their curriculum.

Participants said their lighting vocabulary and terminology improved substantially. This is not surprising because two of the three game (*The Hundred Thousand Dollar Pyramid* game and *Who Wants to be a Lighting Designer?*) were based on learning and knowing how to apply terminology. What was surprising was how they actually remembered information. The participants were expected to discuss how game-based learning helped them study better, or how the games acted as a review for the test (similar to how it worked for them in high school). Participants did talk about these methods briefly, but they described a variety of additional triggers that made the course materials memorable for them.

Any moment that was odd, strange, ridiculous, new, emotional, weird, awkward, funny or unique created a type of trigger for participants to remember information associated with that moment. For instance, Participant F3-S2 described an awkward moment during *The Hundred Thousand Dollar Pyramid* game when she saw the word “Parabolic Aluminized Reflector” flash on the screen. Her job was to describe it to her team-mate without using any of the words of the object. How do you describe such a unique phrase/object to someone? She explained she never would have picked up on that phrase because it would not have stood out in the reading or notes. But, when the moment came to describe it in front of everyone, she said the act of having to describe such an awkward phrase made it memorable for her.

Other participants mentioned a memory was triggered for them when they simply observed a strange or unique moment that someone else was experiencing. Once the memory is

triggered, participants indicated whatever course materials that was associated with that moment in a much stronger way than they ordinarily would have through reading, studying, or memorization.

Participants also indicated they never remembered any of the questions they answered correctly. They only remembered the questions and answers they guessed incorrectly. Participants commented that often times they remembered those moments because it triggered an emotional response. For instance, participants described observing a classmate getting a wrong answer, and being thankful it was not them that answered incorrectly. They also described watching the reactions of other people when they gave the wrong answer, and they also described instances when they themselves got the answer wrong and they felt embarrassed or angry about the situation. Observation, as it turns out, can be just as important for the participants in their learning as actually playing the game can be.

Research indicates Millennials expect high grades to validate their achievements (Jones, 2012). Research also indicates that Millennials do not like to be judged by people (Sternberg, 2012). When participants got incorrect answers during the game, they felt embarrassed, upset, and even judged. They did not seem to enjoy having those emotions, especially in front of a large group of people. Perhaps when they got the answer wrong, it may have triggered the student to want to find out why they got the answer wrong so that the embarrassment or anger they experienced does not happen again.

Some participants expressed they did not learn anything, or learned very little from the game-based learning experience. These same participants did not share any kind of unique moments experienced during gameplay that might have triggered memories. It is possible that because these participants did not experience any specific memory triggers and could not,

therefore, have remembered the games or course material used in the games as well as those who did describe having memory triggers. Creating meaningful memories seems to be an essential key to successful game-based learning for Millennial students.

Participants also explained they remembered information better when the teachers and game-makers gave them feedback during gameplay. Feedback is also another highly important process for Millennial learning (Evans & Forbes, 2012; Feietag & Berge, 2008; Williams et al., 2011) and Millennials tend to look to their instructors to receive guidance and encouragement (Feietag & Berge, 2008). Feedback helps Millennials take learning to a deeper level where they can be more creative and conceptualize ideas (Jones, 2012). Learning may have become more meaningful to the participants because they received answers for their questions, especially WHY something was the way it was. Knowing the answers to WHY seems important in their comprehension and understanding of course materials.

Overall, the participants displayed varying degrees of learning as described by Anderson & Krathwohl (2001). Some participants felt they did not learn anything from some or parts of the games. Others described meaningful learning, where they will never forget certain aspects of the course material because of game-based learning. It was clear that all of the participants experienced rote learning, where they believed they would be able to talk about lighting to future clients or to other working professionals. Each participant also expressed they could take their newly found negotiation and compromising skills into their future careers; deeming it possible to work with individuals on a project whom they do not agree with or have personality conflicts with. Participants believed they could build upon and enhance the positive cooperative skills they learned from game-based learning in hopes of having similar experiences in the workplace.

Theme 4: Game mechanics.

Participants indicated their enjoyment of game-based learning related to how well they thought the games themselves had been developed. The more authentic the game looked and behaved like the television show it was modeled after, and the more the games followed what they had been studying in lecture, the more the participants seemed to value the game. However, participants expressed some frustrations with technical flaws and with how the game was implemented during class. These frustrations may have lessened the value and positive perceptions they placed on game-based learning. It also seemed that the more participants noticed technical flaws, the less they believed the instructor or game-makers were attentive to their learning. However, participants understood this was the first time the games were implemented, and that mistakes were going to happen. They also expressed that they believed the instructor would have those minor flaws corrected by the next time the games were played, and the next class would have a better game-based learning experience. In summary, the overall perception of the game relates to their overall perception of the instructor's investment in their learning.

Theme 5: Transferable skills from game-based learning.

Participants indicated they learned more about team dynamics, and how to complete a project quickly as a result of the game-based learning experience. Participants explained their peers have varying degrees of personality and opinions which can cause conflict from time to time, especially when working together on group projects. During *The Illuminating Race*, in particular, they were forced to put their differences aside and develop a viable lighting plan for their celebrity client. They also mentioned that *The Illuminating Race* helped them realize that a lighting plan did not have to take a few days to finalize. This came as a surprise to the

participants because a typical interior design class project can take several days for them to complete. This finding was not necessarily one of the intended goals of adding game-based learning to the lighting design course. But, participants explained that the tasks in *The Illuminating Race* added to their understanding of how to work professionally and efficiently. A few participants shared they might not have learned these skills if their game-based learning experiences had not forced those kinds of opportunities to happen.

Trybus (2012) said that while a student may have the ability to recall information, their behavior and skill remains untested in learning environments like lectures. Learning should instead be about “acquiring the skills and processes needed to respond appropriately under pressure, in a variety of situations” (Trybus, 2012, para. 5). The game-based learning experiences in this study were designed in a way that allowed participants to test some of their newly found knowledge and skills during gameplay. As a result, the participants indicated they would be able to take the information they learned from these game-based learning opportunities, and apply it towards any issue they may face in their careers as professional interior designers.

Theme 6: Overall impressions of learning.

Each participant indicated the course may have been another boring, generic course, and they would not have learned the course material as meaningfully as they did without the implementation of game-based learning. Participants seemed genuine in their desire to learn from lecture-based courses. They simply seem to require additional engagement to draw them in and help them understand material beyond testing and memorization. The game-based learning experiences implemented in this lighting design course allowed students to engage in materials and concepts in ways they otherwise may not have engaged in.

Category 4: Strategies for Creating Beneficial Game-Based Learning Experiences

Theme 1: Develop quality games.

The participants seemed to feel a bit disconnected from some of their lecture-based course instructors. Some participants indicated that instructors do not know their students as well as they perhaps should. As a result, the participants believed instructors who do not know their students are not able to foster the kind of learning their students really need. Participants explained they want instructors to take responsibility for when their students are not learning by doing something to assist the learning, rather than ignore it.

Some researchers agree with the participants' sentiments. Feietag & Berge (2008) believe that current educators are speaking an outdated language that is not appreciated or understood by Millennial students and they have difficulty captivating the attention of newer generations because of their use of traditional lecture-based methods (Feietag & Berge, 2008). Both participants and research (Feietag & Berge, 2008; Jones, 2012; Prensky, 2005) suggest that educators should add something motivational into lecture-based curriculum.

Theme 2: Implement games properly.

Participants suggested that instructors should be more thoughtful about how they implement motivational activities, like games, into their curriculum. They suggested that instructors should conduct proper research to ensure the games are successful and beneficial. Instructors should answer questions like 'What will it take to motivate specific classes?' and 'How do I match the correct game with the correct materials?'

Participants also indicated that instructors should know the questions, the answers, and all the technicalities of the games themselves. Participants somehow related the quality of the games and the gameplay to the attentiveness of the instructor towards student learning. The

more serious the instructor took the games, the more they wanted to participate and learn as a result.

Some participants suggested that instructors should use an appropriate number of games in their lecture-based courses. One game might be too little to assist learning, but too many could be a type of distraction and keep them from learning the subject. Participants seemed focused on creating a balance between fun and learning because they felt balance was highly effective for their learning. They also suggested that the total number of games played during a course should depend on how the class is structured and what the topic happens to be.

Theme 3: Post-game follow-up.

Participants indicated that what happens after game-based learning is important and should not be overlooked. First, participants expressed the importance for instructors to correct any flaws that occurred in the games themselves, or during the implementation of the games. Participants indicated they wanted better directions in the beginning and better flow through gameplay. Participants suggested that feedback would be highly effective for their learning if it was given during or after gameplay. Lastly, participants did not want instructors to forget to use game-based learning in their courses. A few participants pointed out that it did not necessarily need to be a game. Any activity that got them engaged and excited to get involved with the course materials would add excitement and motivation to the classroom. They encouraged instructors to simply try it.

Millennial students want to have a say in the classroom (Feietag & Berge, 2008). They are accustomed to having their voices heard at home (Tucker, 2006), and would like the same opportunity in their educational settings (Feietag & Berge, 2008). They want to express their views and incorporate experiences into learning without isolation (Tapscott, 1998). These

participants relished the idea that someone wanted to hear about their experiences and viewpoints about their learning. They were sincere and modest when they made suggestions for anyone who may be interested in developing game-based learning experiences for lecture-based courses.

Summary

Based on this study, interior design educators – and educators in general - should consider implementing game-based learning into their lectured courses. Self-evaluation of teaching methods, and evaluations of student learning and motivation for learning should also be considered. Encouraging the retention and transferability of knowledge are two central goals every educator should strive for. The more Millennial students are able to develop their skills in educational settings that provide supportive and explorative environments, the more likely they will develop into professional designers who are independent and capable of making informed design decisions. The health, safety, and beauty of tomorrow's built environments depends entirely on the students of today. If instructors are willing to listen to students, instructors may find fun new ways to impart deeper meaning into their learning.

Implications

Understanding the effectiveness of game-based learning in lecture-based interior design courses can be useful in many ways. First, interior design educators would have a better understanding concerning the motivation of their students to learn, what perceptions their students may have regarding their own learning, and what their Millennial students need to be successful in lecture-based courses as well as other interior design courses. Secondly, understanding how Millennial interior design students think about and perceive their education would help instructors develop game-based curriculum for teaching. Further research into the

characteristics of generational learning could inform and prepare interior design instructors for the academic needs of the ensuing generation, Generation Z. Understanding the values and attributes Millennial interior design students have about their learning can assist educators to teach for all types of learning styles.

The disconnect some instructors and some Millennial interior design students feel towards each other may decrease through the increased use of activities like game-based learning. New andragogy and curriculum based on game-based learning may be adopted by interior design educators as well. These additions to lecture-based curriculum could potentially yield positive and long-term effects in terms of increasing Millennial student learning, motivation, and understanding of the world of design. Instructors may find an increase in student morale by simply allowing Millennials the opportunity to interact more with their peers, to problem-solve during class, and to explore concepts and theories in a non-threatening, fun, and stimulating environment.

This study is potentially useful for educators in other disciplines as well as for practicing interior designers who work with members of the Millennial generation. Understanding Millennial perceptions and learning needs would provide insights for training, communication, as well as insights about the collaborative and motivational needs of newly hired or entry-level Millennial designers.

Future Research

This study was designed to explore the perspectives of Millennial interior design students concerning their learning and experiences surrounding game-based learning in a lecture-based lighting design course. The participant sample was small and limited to one specific class. Participants in this study were registered for the same class, in the same region of the country,

and shared similar demographic information. Therefore, this study cannot be generalizable. For these reasons, there are several opportunities for future research about game-based learning for Millennial interior design students:

- 1) A mixed-method comparative study could be conducted with students in an interior design lecture-based course. The class could be divided in half, with the first half established as a control group. Students in the control group would experience the lecture-based course using traditional lecture-based methodologies. The second half of the class would experience game-based learning throughout the lecture-based course. Test scores could be compared between the two groups of students to determine if any differences exist in their grades. Students could also be interviewed to determine if any differences exist in their attitudes and perceptions towards their lecture-based experiences.
- 2) A quantitative research study could be conducted with interior design educators across the nation who use game-based learning in their lecture-based courses. This study would be conducted before and after the interior design educator added new games to their courses. Pre and post surveys would be used with selected, eligible participants to understand the phenomenon related to game-based learning.
- 3) A quantitative research study could be conducted with Millennial interior design students across the nation to compare their game-based learning preferences with Howard Garner's Theory of Multiple Intelligences. Students would be tested to assess which modalities of intelligence they associate with most. Pre and post surveys would be used with selected, eligible participants to better understand the phenomenon related to game-based learning.

Conclusions

The findings in this study provide a foundational understanding of Millennial interior design student perceptions concerning game-based learning in a lecture-based lighting design course. Prior to this study, research indicated that students do not learn well in lecture-based courses. This study supports previous research. However, participants also shared surprising preferences for learning. Though it was clear most of the participants in this study were dissatisfied with lectures and welcomed the opportunity for game-based learning, the findings revealed participants do value the use of lectures in their interior design curriculum. Lectures, from their point of view, helps them balance the intense work-loads of interior design coursework because lectures do not involve as much work.

Participant preferences indicated they wanted lectures to complement their personal learning styles and assist their need for interaction. From their perspective, educational games provided a fun, motivational way to learn course material and as a result they are able to retain course material at a deeper level. Participants encouraged interior design instructors to use games in lecture-based interior design courses, and to do so with their academic needs in mind. Millennials seem to prefer receiving course information in a straightforward manner, but want to be engaged and motivated more during lecture-based courses. Millennials want to truly understand the topic and to understand why it is important for them to know the information.

Game-based learning, in conjunction with lectures, can be a powerful tool to foster engagement and motivation in Millennial interior design students if they are designed and implemented well. Instructors should not replace lectures. Instructors should enhance their lecture-based courses by utilizing game-based learning activities.

As design educators continue to work with new generations of students, they should strive to promote problem-based, constructive, and experiential activities which immerse Millennial students in course materials. Encouraging students to trial-and-error, engage, and explore design concepts assists and strengthens skills and abilities Millennials need to develop. Game-based learning encourages these engagements by granting Millennials the freedom, entertainment, and motivation they need to be successful.

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APPENDIX A

PARTICIPANT LETTER

(Date)

Dear (Student Name),

You have been selected to participate in a qualitative research study that will assess your perceptions of game-based learning and the educational games used in INTD 330 Lighting Design in the Fall 2013 semester. The research is particularly interested in viewpoints of Millennial interior design students towards game-based learning and educational games. I received your name because you are registered for this course and you had the opportunity to play all of the educational games offered in this class to include:

- \$100,000 Pyramid
- Who Wants to be a Lighting Designer
- The Illuminating Race

This letter is requesting your participation in a focus group session that will last between one hour and one and one-half hours in a location and date to be determined in Aylesworth Hall. Three focus groups will be conducted consisting of five to eight of your fellow classmates. Questions will be asked about your perceptions and experiences with the learning you experienced as a result of the educational games mentioned above. The focus groups will be digitally audio-recorded, transcribed for data analysis, and then destroyed once the study is complete. Your name will be known only to the researcher and any documentation will contain a changed name to protect your identity and confidentiality. The researcher will also keep a reflective journal regarding the focus group proceedings as a means for data analysis. The results of this research will be used as the basis for the co-researchers thesis at Colorado State University.

The following is an informed consent document that, if signed, indicates your willingness to participate in this study. If you have any questions or would like to speak further about this study, please contact either one of us by mail, telephone, or E-mail. Thank you in advance for your cooperation and participation.

Sincerely,

Jessica R MacKenzie

Stephanie A. Clemons, Ph. D
Principal Investigator
158 Aylesworth Hall, SE
(970) 491-5639
clemons@cahs.colostate.edu

Jessica R MacKenzie
Co-Investigator
251 Aylesworth Hall, SE
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APPENDIX B
PRE-QUALIFYING SURVEY

MILLENNIAL INTERIOR DESIGN STUDENT PERCEPTIONS
CONCERNING GAME-BASED LEARNING

PRE-QUALIFYING SURVEY FOR
THESIS RESEARCH STUDY
BY JESSICA R MacKENZIE

The purpose of this research study is to understand the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based course. Of particular interest is the retention and transferability of concepts as a result of the educational game activity. Understanding how Millennial ID students think of and respond to educational games may offer additional insights for ID instructors who may be considering changing curriculum to better meet their Millennial student's needs.

This survey is pre-qualifying in nature. Its purpose is to determine student name's eligibility to take part in a research study regarding Millennial interior design student perceptions concerning game-based learning in a lecture-based course. Please answer all questions honestly.

1) Were you born on or before January 1st, 1982?

Yes

No

2) Did you participate in **ALL** of the games mentioned below?

- \$100,000 Pyramid
- Who Wants to be a Lighting Designer
- The Illuminating Race

Yes

No

APPENDIX C
CONSENT FORM

COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

TITLE OF PROJECT: MILLENNIAL INTERIOR DESIGN STUDENT PERCEPTIONS CONCERNING GAME-BASED LEARNING

NAME OF PRINCIPAL INVESTIGATOR: Stephanie Clemons, Ph.D. Professor

NAME OF CO-INVESTIGATOR: Jessica R MacKenzie, Graduate Student

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/CONCERNS: Jessica MacKenzie, (720) 404-8366

SPONSER OF PROJECT: N/A

PURPOSE OF THE RESEARCH:

You have been selected to participate in a qualitative research study that will assess your perceptions of game-based learning and the educational games used in INTD 330 Lighting Design in the Fall 2013 semester. The research is particularly interested in viewpoints of Millennial interior design students towards game-based learning and educational games. You were invited to participate in this research study because you are registered for this course, are born on or before the year 1982 (and are part of the Millennial generation), and had the opportunity to participate in all of the educational games offered in this class to include:

- \$100,000 Pyramid
- Who Wants to be a Lighting Designer
- The Illuminating Race

PROCEDURES/METHODS TO BE USED: The first step in this research project includes the collection of demographic information (general background) through a form submitted to the participant, along with the consent letter. The information gathered may be used in describing the sample of participants within the thesis documentation. This consent letter is requesting your participation in one of three focus groups that will last between one hour and one and one-half hours. Questions will be asked regarding your perceptions about your experiences and learning as a result of the educational games used in INTD 330 Lighting Design during the Fall 2013 semester. The focus groups will be digitally audio-recorded, transcribed for data analysis, and then destroyed once the study is complete. Your name will be known only to the researcher and any documentation will contain a changed name to protect your identity and confidentiality. The researcher will also keep a reflective journal regarding the focus group proceedings as a means for data analysis. The results of this research will be used as the basis for the co-researchers theses at Colorado State University.

RISKS INHERENT IN THE PROCEDURES:

There are no known risks involved in this study. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential unknown risks.

BENEFITS:

There are no known benefits to participants in the study. The participants may be able to offer insight for interior design educators who want to change their teaching methods to better suit the needs, desires, and expectations of Millennial interior design students as well as future generations.

CONFIDENTIALITY:

The names of student participants will be known only to the researcher. The names will be changed when the documentation is written in thesis form to protect the confidentiality of the participants.

LIABILITY:

The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

Questions about subjects' rights may be directed to RICRO (Research Integrity and Compliance Review Office) director Kathy Partin at 970-491-1563.

PARTICIPATION:

Your participation in this research is voluntary. If you decide to participate in the study you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

Participant Name (Printed)

Participant Signature

Date

Investigator or co-investigator signature

Date

APPENDIX D
DEMOGRAPHIC SURVEY

MILLENNIAL INTERIOR DESIGN STUDENT PERCEPTIONS
CONCERNING GAME-BASED LEARNING

DEMOGRAPHIC SURVEY FOR
THESIS RESEARCH STUDY
BY JESSICA R MacKENZIE

The purpose of this research study is to understand the attitudes and perceptions of Millennial interior design students concerning game-based learning within a lecture-based course. Understanding how Millennial interior design students think of and respond to educational games may offer additional insights for interior design instructors who may be considering changing curriculum to better meet their Millennial student's needs.

This survey is demographic in nature. Its purpose is to gather initial data that will provide context to the subsequent focus group interview data. Please circle the correct answer.

- 1) What is your gender?
 - a. Male
 - b. Female

- 2) What is your age range?
 - a. < 18 years
 - b. 18-20 years
 - c. 21- 23 years
 - d. 24-26 years
 - e. 27-29 years
 - f. 30 years or over

- 3) How many years have you attended college?
 - a. 3 years
 - b. 4 years
 - c. 5 years
 - d. 6 years or more

- 4) Please rank the following classroom types in order of which class types you least enjoy taking to the classes you enjoy taking the most:
 - a. Fundamental courses (lecture and information based courses)

- b. Artistic courses (sketching and rendering courses)
- c. Technology courses (CAD, Revit, 3DS Max, Adobe Photoshop)
- d. Studio courses

Most Favorite: _____

Least Favorite: _____

5) How often do you play games in your spare time?

- a. Never
- b. Rarely
- c. Occasionally
- d. Often
- e. All the time

6) How many hours a week do you spend playing games?

- a. 0 hours
- b. 1-3 hours
- c. 4-6 hours
- d. 7-9 hours
- e. 10 hours or more

7) Please name or describe the games you typically play: _____

8) Outside of the INTD 330 Lighting Design Class, how many times have you played educational games in a college classroom setting?

- a. Never
- b. Once
- c. 2-3 times
- d. 4-5 times
- e. 6 or more

9) If you played an educational game in a college classroom setting, please name and/or briefly describe the game.

10) If you played an educational game in a higher educational classroom setting, please indicate how well you believe that educational game assisted your knowledge of that course subject.

- a. It didn't help me understand the subject at all
- b. It helped me understand the subject a little
- c. It helped me understand the subject a lot
- d. It greatly helped me understand the subject
- e. Does not apply

APPENDIX E
FOCUS GROUP QUESTIONS

MILLENNIAL INTERIOR DESIGN STUDENT PERCEPTIONS
CONCERNING GAME-BASED LEARNING

FOCUS GROUP QUESTIONS FOR
THESIS RESEARCH STUDY
BY JESSICA R MacKENZIE

Thank you to everyone for taking the time to participate in the focus group today. As you know, I'm writing a thesis about game based learning in interior design education and I'd like to discuss your experiences with the games you recently played in your lighting class and how you learned about lighting as a result of the games. This discussion is designed to understand how you, the millennial interior design student, viewed the games, how you felt about the games, and about your learning about the topic of lighting as a result of the games. I want to know your honest opinions! There are no wrong or right answers, so please feel free to share your point of view even if it differs from others. I am interested in hearing everybody's perspective on this topic.

As you can see, this conversation is being recorded. I am not able to write fast enough to catch what everyone says, so I'm recording this session because I don't want to miss any of your comments. We will be on a first name basis during this focus group session, but I will not use your names in any of my reports to protect your confidentiality. These recordings are helping me form the data collection analysis portions of my thesis. Please try to allow one person to talk at a time. I will guide the discussion by asking questions, and may ask you to clarify an answer! Please try to respond as clearly as possible!

Does anyone have any questions? If not – let's begin!

- 1) I know we're here to discuss the games used in lighting class, but first I'd like for you to take me back before you entered this class and tell me about your experiences with lecture-based courses.
 - a. Has everyone taken a lecture-based course, where the main methods of teaching include lectures and tests?
 - b. Tell me about any positives and negatives about lecture-based courses in your opinion?
 - c. Do you like having lecture-based courses in your curriculum? Why or why not?
- 2) Prior to your experience in this class, have you ever had a class that implemented educational games into the curriculum or during class-time?
 - a. If so – what was the class, what were the games, and can you describe them and what was your opinion of them?
 - b. Explain your engagement with the games? Were you excited? Bored? Really into it? Competitive? Why did you feel this way?
 - c. How would you describe your learning as a result of the games?

- 3) Now tell me a little about your thoughts about the lighting class:
 - a. What kinds of expectations did you have for this class before you actually started it?
 - b. Tell me your opinions about the lecture portion of this class before you played the first game?
 - c. How much did you know about lighting prior to your first lecture in this class?
 - d. What feelings did you have about the lighting class before you registered for it?

This next set of questions specifically addresses your experiences with the games played in your lighting design class.

- 4) Tell me about any positive aspects you experienced while playing the games?
- 5) Tell me about any negative aspects you experienced while playing the games?
- 6) Which game was your favorite and why? Which was your least favorite and why?
- 7) Now imagine that the games were not available for you to play in class. Tell me how your learning of lighting might have been different compared to when you got to play the games?

The next set of questions specifically addresses your overall viewpoint of the games and how they were used in class?

- 1) Please explain your final overall impressions of the games that were played?
- 2) Explain how well you feel you know the subject of lighting as a result of the games?
- 3) Do you feel you can take the knowledge you learned in the games and apply it towards solving new problems?
- 4) What additional comments or suggestions do you have regarding game based learning in lecture based courses?

APPENDIX F

TABLE OF MILLENNIAL INTERIOR DESIGN STUDENT PERCEPTIONS CONCERNING
GAME-BASED LEARNING IN A LIGHTING DESIGN COURSE

Table of Millennial Interior Design Student Perceptions Concerning Game-Based Learning in a Lighting Design Course

Theme	Sub-Theme	Summary
Peer Influences	Teaming	<ul style="list-style-type: none"> • Want to be engaged as entire group as opposed to individually or one team at a time • Want to be teamed with people they communicate and collaborate well with
	Distractions and Focus	<ul style="list-style-type: none"> • Easy to lose focus when peers are disengaged and disruptive to gameplay.
	Preparations	<ul style="list-style-type: none"> • Students who are prepared for gameplay disliked students who were unprepared therefore causing frustrations with game-based learning • Unprepared students knew they were unprepared but did not express emotion about it, but did express frustration with learning from game
Emotional and Motivational	Competition	<ul style="list-style-type: none"> • Competition was deemed motivational, fun, and helpful for gameplay.
	Winning and Prizes	<ul style="list-style-type: none"> • Winning and prizes were described more like secondary benefits as opposed to the overall goal • Participants mostly described winning and prizes as motivational • One participant felt peers were too prize-oriented which hindered game-based learning
	Alignment with Learning Style	<ul style="list-style-type: none"> • Participants enjoyed game-based learning most when games aligned with learning styles and skill strengths • Observation of others engaged in gameplay was important to personal learning
	Fun and Excitement	<ul style="list-style-type: none"> • Game based learning was fun when participants experienced competition, winning, and being engaged with peers

		<ul style="list-style-type: none"> • Most participants looked forward to the games because it would provide a break from the monotony of lecture
	Pressures and Stresses	<ul style="list-style-type: none"> • A few participants described feeling unwanted pressured to provide the correct answer for the team • A few participants described feelings of embarrassment when they provided the wrong answer for their team
Retention of Information	Creating Memories	<ul style="list-style-type: none"> • Participants indicate retention of information happens when memories are created • Awkward or unique moments create long-lasting memories
	Getting the Wrong Answer	<ul style="list-style-type: none"> • Participants indicate they do not remember correct answers. • Wrong answers trigger a memory
	Receiving Feedback	<ul style="list-style-type: none"> • Participants indicate when the instructor provides feedback during gameplay, they retain the information longer
	Active Class Participation	<ul style="list-style-type: none"> • The act of playing and immersing in gameplay helped retain information
	Difficulties Retaining Information	<ul style="list-style-type: none"> • Participants who did not retain information from gameplay shared little to no memory triggers • Participants who did retained information shared multiple memory triggers
Game Mechanics	The Game Itself	<ul style="list-style-type: none"> • Flaws in the game can hinder learning from the game • Participants considered games flawed when questions were too hard or when questions and answers were poorly written • Quality of graphics and design of game indicated to participants that instructor took their learning seriously
	Gameplay	<ul style="list-style-type: none"> • Disruptions during gameplay can hinder learning • Participants considered gameplay disrupted when directions were confusing, when gameplay disrupted

		<p>other people, or when there was not enough time to complete game tasks</p> <ul style="list-style-type: none"> • When instructors took gameplay seriously, so did the participants
Transferable Skills Learned from Games	Terminology	<ul style="list-style-type: none"> • What most participants say they took away from the game-based learning experience
	Team Work	<ul style="list-style-type: none"> • How to create design solutions despite varying opinions and personalities in the team
	Speed	<ul style="list-style-type: none"> • Unexpected understanding of how long it can take to finish a project
	Ability to Communicate Lighting Designs	<ul style="list-style-type: none"> • Ability to speak intelligently and confidently about lighting to clients and other professionals