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## Perceptions of Failure in Education: Changing the Fear of Failure Through Gamification

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Perceptions of Failure in Education:  
Changing the Fear of Failure Through Gamification

By

Kathie Anne Kallevig

A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of

Master's of Science

In

Educational Technology

Minnesota State University, Mankato

Mankato, Minnesota

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This thesis is submitted as part of the required work in the Department of Educational Studies, K-12 and Secondary Programs, KSP 610, Scholarly Writing, at Minnesota State University, Mankato, and has been supervised, examined, and accepted by the members of the student's committee.

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## **ABSTRACT**

The purpose of this study is to examine the perceptions in higher education of failure and the use of gamification to address the fear of failure. The perceptions of students about failures and successes in learning through gamification were explored. The research design for the proposed study was a survey comprised of qualitative and quantitative questions. The survey explored how students in formal education view failure in games and in learning, how failure strategies are viewed in higher education lesson plans and if failure strategies can be used to promote learning in games. During the summer of 2014 and during the fall of 2014 both undergraduate and graduate students participated in the survey. Results of this research demonstrate that students in a higher education classroom feel that failure can be a positive learning strategy when followed by thoughtful feedback following the failure experience and when it is applied as part of a trial and error process.

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## CHAPTER ONE

### Introduction

It is widely understood and agreed that students today learn differently than students did a generation ago (Willingham, 2010). Current student populations have grown up with access to technology; these students are identified as digital natives. Digital natives, a term coined by Prensky (2001), are individuals who were born during or after the general introduction of digital technologies and through interacting with digital technology from an earlier age, have a greater understanding of its concepts and processes. This category includes today's students, K-16, as they are the first generations to grow up with digital technologies. Our students have changed radically; they are no longer the people our educational system was designed to teach (Prensky, 2001).

These students require different approaches to education. Inclusion of games in the classroom, provide opportunities to include familiar applications in learning environments. These new technologies afford us the ability to convey concepts in new ways that would otherwise not be possible, efficient, or effective, with other instructional methods (Klopfer, Osterweil, Groff & Haas, 2009). In addition to new technologies in the classroom, new approaches to learning must be addressed or considered. New approaches, such as failure as a learning strategy need to be considered.

The availability of technology has changed this generation of learners in ways that are notable and challenging to educators. Prensky (2001) explained that these digital

natives have spent their entire lives surrounded by and using computers, videogames, digital music players, video cameras, cell phones, and all other toys and tools of the digital age. In addition to the familiarity with technology, these students are able to multi-task effectively. Fudin (2012) referred to a TIME magazine article that recognized that these students are able to simultaneously talk, listen to music, text, and browse the internet and sometimes do homework. This ability to multitask may cause some discord with educators, as current educators may expect their students to focus on a singular task. Other research (Rosen, 2008; Ophir, Nass & Wagner, 2009) insists that students are not truly multi-tasking but are able to process cognitive changes more swiftly by shifting between tasks more rapidly than previous generations. They are not actually doing two tasks at the same time, just shifting back and forth between tasks more rapidly (Rosen 2008; Prenksy, 2001).

It is clear that technology has changed our lives and how we advance through our lives. The next generation of jobs will be characterized by increased technology use, extensive problem solving, and complex communication (Levy & Murnane, 2004; Klopfer, Osterweil, Groff & Haas, 2009; Protopsaltis, Hainey, Borosis, Connolly, Copado & Hezner, 2013). With this group of students, it is not only what students need to learn that is changing, but also how and when they learn. One way that educators have risen to meet the needs of today's learners is by including gamification in the classroom. Gamification is the use of game design in non-game contexts (Deterding, Khaled, Nacke & Dixon, 2011).

Gamification provides players [learners] with opportunities to take on challenges and tasks without the fear of failure. Within the traditional confines of the classroom, students fear failure and look for less challenging routes (Cox, 2009). Blending these two perspectives may allow for students to view failure in a positive light. By teaching practices that support peer failure and empathy in the classroom, gamification can establish an environment that provides a secure environment for learning and exploration. According to Alfi, Katz & Assor;

Pupils are likely to invest in considerable effort in coping with temporary failure (thereby turning it into success) if they think that there is a series of actions that can lead to mastery of the task and they are sufficiently competent to perform those actions (2004, p.33).

Unlike traditional learning systems, “games associate learning with fun and allow for trial and error (freedom to make mistakes)” (Cohen, 2011, p.17). Traditional learning systems focus on teacher centered learning with a “one size fits all”, face-to-face instructional approach, where the instructors/teachers set the goals and expectations for the learners. In a gamified classroom, mastery and competency is based on achievement with movement and graduation (Peppler, Danish and Phelps, 2013). Students who are enrolled in a gamified classroom are not constrained by traditional grade levels, or time lines. Learners are able to actively participate in the design of their learning, selecting the appropriate resources to supplement their education. Teachers are able to encourage learners to be independent, goal oriented and reflective learners (Whitton, 2007).

The gamified classroom provides opportunity for students to embrace failure and challenges (Nicholson, 2013). A gamified classroom works when players do not fear the failure because failure represents an opportunity for improvement and the chance to try again (Fried, 2010). Gamification makes the classroom more fun and engaging for the purpose of motivating and changing learner behaviors. Jones (2013) explains that gamification encourages fun, focus, competitiveness, collaboration, camaraderie, retention, mastery (fail often until the problem is solved), meaningful choice and productivity. The gamified classroom includes: levels, challenges, rewards, leaderboards, feedback loops, progress (such as a status bar), conditions and complexity. Students are more engaged in the learning and more open to failure in situations. Failure is a necessary component in games (Harteveld, Guimaraes, Mayer & Bidarra, 2007; Apostol, Zaharescu & Alexe, 2013). This approach to failure provides new opportunities and discussion for educators and students alike.

In contrast to the gamified classroom, game-based learning is a type of game play that has defined learning outcomes (Jones, 2013). Game based learning is crafted to balance subject matter with gameplay and the ability of the player to retain and apply the material to the real world. Some of the benefits of game based learning include: students become problem solvers and self-directed learners, students learn to analyze multimodalities, and it allows students to participate in friendly competition with peers (Jones, 2013).

While including gaming within the classroom has its own set of challenges, educators must reassess their thoughts on learning with gamification; learning through failure and how students can repurpose their learning through failure and view the role failure plays in games. This new attitude to learning may open up new opportunities for students to learn and instructors to integrate a new learning taxonomy within the classroom. (Groff, Howells, & Cranmer, 2010).

Those who promote and support gamification in the classroom see significant promise in the use of video games as learning tools in the classroom. Supporters of game-based learning in higher education cite the ability of digital games to teach and reinforce skills important for future jobs such as collaboration (Johnson, Smith, Willis, Levine & Haywood, 2011), problem-solving, and communication (Ketelhut, Dede, Clarke, & Nelson, 2006). Though gamification may add an element of fun, students and instructors alike are able to see the benefit.

Challenges that instructors may face include an active pedagogy which relies on the insistence that learning is inevitably “fun”, and instructors may question whether or not learning should always be fun or not (Okan, 2003). In addition to the “fun” challenge, another challenge that instructors may have is that games may replace class lecture and or discussion based learning. Kebritchi (2010) poses the concern that games are becoming such innovative learning tools that teachers may assume that there is no need for lecture, and in place “rely on the game and use it as a teaching replacement and not as a

supplement” (p.263). These challenges may allow for more creativity from both the students and the instructors.

### **Statement of Problem**

Educators today must modify their pedagogy to better meet the needs of the learners in the classroom, the digital natives. The problem is that most educators use yesterday’s education for tomorrow’s students. Education is traditionally viewed as educators conveying information to students. Wolf (1988) explains that in colonial days, schools were based on ‘recitation literacy’ and from the World War I era forward; schools were based upon ‘extraction literacy’. Educators today must embrace the idea of generative literacy. There has been a shift in the abilities of today’s students. Digital natives are accustomed to doing things differently than previous generations. Digital natives, according to Jones and Shao (2011), have new attitudes, aptitudes, and approaches to learning. Prensky (2001), who coined the term ‘digital native’, believes that the brains of digital natives are physically different from those of previous generations because of the direct effects of digital technologies.

Educators are risking the loss of interest by their students when the choice and application of the curriculum falls short of what the students need (Cohen, 2011; Frymier & Shulman, 1994). Educators must be cognizant of how students learn and why the learning occurs. Today’s student population is familiar with technology and including technology into their learning environments is a natural approach.

Today's educators may not view gamification as a valuable learning tool, dismissing the learning from both the successes and the failures that may occur through game play. Teachers who are not gamers may be frustrated by learning or teaching with strategies and pedagogies with which they are unfamiliar (Gee, 2007). Approaching this dynamic shift in education, including technology, embracing gamification requires a new teacher. This new teacher should be able to 'let go', give learners the space to take greater responsibility in their learning, engage their learners' identities, harness lateral knowledge-making energies amongst learners, and differentiate instruction in order to cater effectively to learner diversity (Kalantzis & Cope, 2010). If we, as educators, are to determine if instructors should embrace what gamification offers, we must also understand what gamification can offer a higher education classroom.

The purpose of this study is to examine the perceptions in higher education of failure and the use of gamification to address the fear of failure. The perceptions of students about failures and successes in learning through gamification will be explored. The research questions that will guide this study include:

1. How do students in a higher education classroom view failure? How do they view failure in digital games?
2. How are failure strategies used to promote learning in games?
3. In what ways can we integrate failure strategies in games into our lesson plans in higher education?

The next section will address the importance of the study and what benefits may come from this study.

### **Importance of the Study**

A clearer understanding of how students and instructors view failure, may permit instructors to understand how failure can be used in learning and therefore be more willing to include gamification-learning methodologies in their practice.

Research is available on possible causes of failure in the classroom. Failure has been attributed to the industrial or post-industrial educational model, that is characterized by a dominant ideology, deficit in cultural capital, social class awareness, sensory deprivation, lack of play during infancy, poor communication, and deficient in class dynamics, teachers' attitudes, curricula or student self-esteem and confidence (Bourdieu & Passeron, 1996; Fragoudaki, 1985; Marsh, Parker & Smith, 1983; Matsagouras, 2000; Milonas, 1998, 1999; Scheerens, 1992; Tremblay et al., 1992).

The possible causes of student failure are well documented. Researchers have sought to isolate possible causes of student failure, reviewing psychological and social variables including motivation, self-concept, socioeconomic backgrounds, educational structures, and teacher and student personalities (Lloyd, 1978; Markovitis & Tzouriadou, 1991; Mortimore et al., 1988; Tremblay et al., 1992). In addition to research on failure, understanding what roles digital games play as effective learning or instructional resources is an important element to consider.

Digital games are seen as effective learning and instructional resources that foster learning (DeMaria, 2007; Galloway, 2006; Gee, 2007, 2003; Newman, 2004; Shaffer, 2006). This idea is related back to gamification. Gamification is the use of game design elements and game mechanics in non-game contexts. In gamification, the student does not play an entire game from start to finish; instead they join in activities that include fundamentals from games such as earning points, overcoming a challenge or receiving badges for concluding tasks.

Regardless of the platform, digital games are not easy to play. Digital games are complex and demanding learning activities (Clarke & Duimering, 2006; Stapleton, 2004). Research relating digital gaming and learning has multiplied in recent years. Most of the studies have focused on adults and computer games, but have increased in numbers to include children and digital computer games (Agosto, 2004; Carr, Buckingham, Burn, & Schott, 2006; de Castell & Jenson, 2003; diSessa, 2000; Kafai & Resnick, 1996). With the idea of using digital games in education, understanding how learning occurs and how the learning is perceived needs to be reviewed to measure the level of effectiveness of learning with a game design.

Learning progressions are frequently used in education (Moline, 2008). These progressions are focused on sequencing of teaching and learning expectations across developmental stages, ages, or grade levels. In traditional classroom settings, a student who does not master a concept or skill could fall behind in their skill base and that may interfere with later attempts to build more complex concepts. In comparison, digital

games inherently force the player [learner] to master a concept or skill in order to advance. This study will help educators understand the role perception of failure plays in games and how that may be similar or different from perception of failure in learning.

### **Methods**

The primary databases used to locate resources were Education Resources Information Center (ERIC) and Journal Storage (JSTOR). All resources were peer reviewed and published no earlier than 2000. Texts by individuals who are considered to be professionals or experts in the field of study were also included.

The research design for the proposed study was a survey comprised of qualitative and quantitative questions. The survey explored how students in formal education view failure in games and in learning, how failure strategies are viewed in higher education lesson plans and if failure strategies can be used to promote learning in games.

The survey was distributed to students at a Midwestern university, and both graduate and undergraduate students were encouraged to participate. A pilot study was conducted during the summer 2014 session to improve the survey's validity and reliability. The survey was revised and re-administered with a new population during the fall 2014 semester after reviewing the impact of questions from the pilot study. Students completed a survey that explored their views of failure and the attitudes that they associate with failure. The online survey consisted of a mix of multiple choice and short answer questions. Institutional Review Board (IRB) permission was gained on May 1<sup>st</sup>, 2014. The IRB reference number for this study is: 602405.

Students had the choice to participate in the survey that was distributed through email. Participation was solicited through email correspondence with department chairs asking for permission to request instructors to distribute the survey link through their online course management system class lists.

### **Limitations of the Study**

There were some limitations with this study. The survey was distributed to a convenience sample of students who were currently enrolled at a Midwest university with a student population of about 15,000, although not all students choose to participate in the survey. This limited the amount of information available from students to one Midwest campus and therefore affects the generalizability to other settings.

In addition to the limitation of the population, it is possible that students who participate in any survey may falsify information in their responses. It will be difficult to identify whether respondents are being truthful. However, the study sought perceptions and perceptions are the truth in that person's eyes so it is believed that they will respond truthfully.

While these limitations may impact generalizability, this study can provide benefit to those who are curious about incorporating gamification in the classroom, the views of students about failure and how students in higher education may learn from failure.

### **Definition of Terms**

**Digital Natives.** The current generation of college students is the first to grow up immersed in technology. They have always had the Internet, laptops, cell phones with text messaging, AIM, Facebook™ or MySpace™, PlayStations™, digital cameras, DVD players, blogs, and any other number of digital technologies that allow them to instantly capture or communicate with their world. Natives use these technologies as extensions of their bodies and minds, gracefully integrating them into their daily routines (Prensky, 2005).

**Gamification.** The use of elements of game design in non-game contexts (Deterding, Khaled, Nacke & Dixon, 2011).

**Game Based Learning.** Is a type of game play that has defined learning outcomes. Generally, game based learning is designed to balance subject matter with gameplay and the ability of the player to retain and apply said subject matter to the real world (EdTechReview, 2014).

**Guided Mastery.** A therapeutic method of assisting others in raising their self-efficacy (i.e. perception that a task can be accomplished) so that they are motivated to attempt, and subsequently accomplish, progressively more difficult tasks that are involved in the implementation of behavioral therapies (Bandura, 1989).

**Self-Efficacy.** Our belief in our ability to succeed in certain situations (Bandura, 1989).

## **Overview**

This thesis includes a review of literature related to gamification and perceptions of failure, the methodology used to investigate the research questions using a series of surveys. The results of the investigation and findings of the research will be discussed, followed by limitations of the study, and possible future directions for research.

## CHAPTER TWO

This literature review will explore the research that informs us on the use of games in education and more particularly about their use in higher education. Games can improve student motivation, engagement, and learning in the classrooms. There are several studies that discuss the elements of gamification within the classroom; these studies evaluate how games can improve student motivation and engagement (Deterding, 2012; Johnson, Adams, Cummins, Estrada, Freeman & Ludgate, 2013; Kapp, 2012).

In addition to improving student motivation and engagement, gamification in the classroom can promote higher order thinking and more advanced learning and production abilities. Educational games require strategizing, hypothesis testing, or problem solving, with higher order thinking rather than rote memorization or simple comprehension (Paraskeva, Misirlaki & Papagianni, 2009). Gamification possesses obvious learning potential. Studies have been able to focus on additional advantages, including the potential rewards of videogames in education like immediate feedback, information on demand, productive learning, motivating cycles of expertise, self-regulated learning or team collaboration. However, some also address issues related to the educational content, learning transfer, learning assessment, teacher implications and technological transfer (Deterding, Dixon, Khaled & Nacke, 2011; Simões, Redondo & Vilas, 2013).

Review of the current literature helps answer the research questions posed in this study and will help guide conclusions from this literature review. The research questions that will guide the review of literature include:

1. How do students in a higher education classroom view failure? How do they view failure in digital games?
2. How are failure strategies used to promote learning in games?
3. In what ways can we integrate failure strategies in games into our lesson plans in higher education?

The literature review will create a summary of conclusions we might draw from the research and a discussion of the need for new research conducted in the present study. First, gamification of learning environments will be examined, followed by support for games in the classroom will be discussed, next a definition of games and game elements will be explored. Additionally, a definition of gamification will be provided and contrasted with a definition of game-based learning. Following the definitions of gamification and game-based learning, gamification in the classroom will be explored. With a good understanding of what gamification and game-based learning, the perceptions of failure in higher education will be address, including a definition of what failure in higher education means. Finally, using failure as an assessment tool will be discussed as both an assessment tool in games as well as within the classroom.

### **Gamification of Learning Environments**

In the following section the importance of feedback in games, elements within games, game adaptability to learning, and the importance of the debriefing process will be explained. Gamers are nothing if not reflective in action, and operate as researchers in the practice setting (Schön, 1983). No move is made without consideration of what the

move means – both to an ability to make future moves and to the current state of the game (Salen, 2007). This consideration is comparable to the idea of critical thinking and problem solving in education. In games, children submit to arbitrary rules and structures, but only if they continue to be playful (Klopfer, Osterweil and Salen, 2009). Most players undertake games with the consideration that failure is possible.

Games are often created with clear goals and immediate feedback available to the players (Dickey, 2005). Games allow players [learners] to rapidly evaluate their own progress through the game through responsive and rapid feedback (Facer, 2011). Valuable feedback provides information to players [learners] to improve. Without feedback, players [learners] are less likely to improve their performance. Feedback is an essential element of effective games. Effective games provide feedback that is “(1) clear and unobtrusive, and (2) immediately responsive to the player’s actions” (Rigby & Ryan, 2007, pg. 8).

There are several elements in addition to feedback that can enhance the learning experience. McGonigal (2011) explains that all games share four defining traits: a goal which offers a sense of purpose, rules that provide useful limitations, a feedback system that keeps players aware of their relationships with the goal(s), and voluntary participation. Together these elements provide opportunity for the player [learner] to make decisions based on their needs and wants within the game space and within their learning. A clear goal provides direction for the learning to occur, rules provide structure and necessary guidance and the voluntary participation allows learners to observe and make decisions based on observation.

Games can be adapted based on the need of students. Games also meet the unique teaching and learning needs of students when new concepts are introduced as a logical learning progression (Larsen-McClarty, Orr, Frey, Dolan, Vassileva & McVay, 2012). Learning progressions offer direction for the learner as to how to successfully complete the learning objective. Learning progressions are the path that students take to learn a set of knowledge or skills (Masters & Forster, 1996).

Learning does not end with the game; debriefing is critical to using games in education (Lederman & Fumitoshi, 1995; Larsen-McClarty, Orr, Frey, Dolan, Vassileva & McVay, 2012). Detailed discussions of the events, successes or failures of the task can help students understand their development and their progresses. Students can be encouraged to share different ways of approaching a problem (Larsen-McClarty, Orr, Frey, Dolan, Vassileva & McVay, 2012). Sharing common encounters allows or encourages students to discuss and reattempt the failure or incomplete attempt.

### **Support For Games In Learning Environments**

There are two reasons for support of games in learning environments. First, play during games contributes to child development and learning. Second, games scaffold the development and adaptation of learning and patience for students. In addition to the two reasons that support games in learning environments, games foster essential 21<sup>st</sup> century learning skills.

Play is an important element for both healthy child development and learning development (Ginsburg, 2007, Bodrova & Leong, 2003; Hirsh-Pasek, Golinkoff, & Eyer, 2003; Zigler, Singer, & Bishop-Josef, 2004). Games foster play, which produces a state

of flow, which increases motivation, which in turn supports the learning process (Paras & Bizzocchi, 2005).

Digital games offer an opportunity for play through simulated environments, and these games are not necessarily a distraction from learning, but rather an integral part of learning and intellectual development (Ferdig, 2009; Ke, 2009; Wimpenny, Savin-Baden, Mawer, Steils & Tombs, 2012). As researchers, we understand that play is iterative and that game design is a model rooted in reflection in action (Salen & Zimmerman, 2003 & 2005). In addition, we know that digital games and gaming practices have done much to shape our understanding and misunderstanding of the post-Nintendo generation and hold a key place in the minds of those looking to empower educators and learners (Salen, 2007).

In addition, video games can also scaffold the learner's development, help the learner to adapt to different levels of knowledge and motivation, and provide "infinite" patience for learners who need to attempt tasks multiple times before developing competence (Morris, Croker, Zimmerman, Gill & Romig, 2013). Buck (2013) reveals that the level of student engagement has the potential to increase if colleges and universities integrate games into the classroom because games create emotions of joy, pride, creativity, and curiosity. Much like leaderboards in games, education encourages students to be competitive to earn positions on honor rolls or the dean's list (Panitz, 1998; Kohn, 1993). School is designed to be competitive, much like the design of games (Squire, 2003; Prensky, 2005). Some educators may argue that competition is not an appropriate design of school instruction. Kohn (1993) states that there is no compelling

reasons to have students try to beat one another even for a small fraction of their total education experience. However, games can foster both competitive and cooperative learning experiences.

Scholars from various disciplines have shown increasing interest in using well-designed digital games to support learning (Gee, 2003; Prensky, 2006; Shaffer, Squire, Halverson, & Gee, 2005; Shute, Rieber, & Van Eck, 2011). Behind this interest is the belief that learning is at its best when it is active, goal-oriented, contextualized, and interesting (Bransford, Brown, & Cocking, 2000; Bruner, 1961; Quinn, 2005; Vygotsky, 1978).

Games foster collaboration, problem solving, and procedural thinking (Johnson et al., 2011) which are essential 21<sup>st</sup> century skills. Multi-player role playing games can also support problem-solving based learning, allowing partners to see the results of their actions (feedback) much faster than they could in real time (Khoo & Gentile, 2005) and allowing students to experience situations rather than being limited to reading their descriptions (Shaffer, 2004).

Games have been an area of interest in education long before the electronic age, with research documenting positive learning outcomes in the use of educational games (Betz, 1995; Klawe, 1998; Levin, 1981). Board games are brain games similar to puzzles and word games. Games engage students in healthy activities that can challenge the mind, teach social skills, and promote active learning while having fun (Sharp, 2012). Some examples of traditional learning games used before electronic versions in the classroom include: Connect 4, which encouraged counting, pattern recognition, and

competition; Dice, which encouraged counting and basic mathematical skills; and Jacks which helped develop fine motor skills and counting.

### **Definition Of Games And Game Elements**

To gain a full understanding of what games can do for a classroom, it is important to understand what a game is and what are some important elements in games. These elements will be explained in this section.

There have been many different definitions and attempts at defining a game. However, for this project, the definition given by Ralph Koster will be utilized. Koster (2005) explains, “A game is a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional response.” This definition can be dissected to gather a more dynamic understanding of how games may benefit both students and instructors.

Kapp (2012) explains each element of the definition: system, players, abstract, challenge, rules, interactivity, feedback, quantifiable outcome and emotional reaction. These elements are essential to games and higher education. Kapp (2012) explains that the system aspect is the idea that each part of a game impacts and is integrated with other parts of the game.

Games and gaming have played influential cultural and social roles throughout the development of civilization. For instance, games have played a role in the establishment of social structures and the transmission of socio-cultural knowledge and beliefs (Mead, 1934). Ancient civilizations used war games to develop strategies for engagement (Gredler, 1996).

Games involve a person interacting with game content or with other players; those who play the games are referred to as players (Kapp, 2012). Throughout this project, the players are also identified as learners. In addition to the system and the players, games are abstract. By abstract (Kapp, 2012) means that the game contains elements of a realistic situation or the essence of the situation but is not an exact replica. Games also provide challenge to the players [learners], challenges keeps the players engaged in the activity. Kapp (2012) states that a game becomes boring when a challenge no longer exists. Rules are also a common expectation of a game. Rules provide structure, provide a sequence of playing, the winning state, and what is “fair” and what is “not fair” within the game construct (Kapp, 2012).

Games are expected to possess an element of interactivity. Kapp (2012) explains that players interact with one another, the game system, and with the content presented during the game. In connection with interaction, feedback plays an essential role of playing games. Feedback within a game is usually instant, direct and clear (Kapp, 2012). Feedback provides opportunity for players [learners] to adjust behaviors to progress in the game.

Next, games possess quantifiable outcomes. Games are designed so that winning is clear. The result of a well-designed game is that the player clearly knows when he or she has won or lost (Kapp, 2012). Games become a competition to win and demonstrate a level of mastery. When the player wins or loses, typically, there is an emotional reaction. Kapp (2012) explains that games more than most human-interactions, evoke strong emotions on many levels.

With a clear understanding of what a game is, and what a game typically embodies, the research can address gamification and game-based learning as parts of learning environments. These elements are important to the foundation of the study.

### **Definition Of Gamification**

Arnold (2012) explains that there has been increased attention surrounding gamification – the integration of game elements, mechanics, and frameworks into non-game situations and scenarios. When applied to education, the opportunities for experiential, self-paced and lifelong learning expand exponentially (Arnold, 2012). Learners become engaged by the fun and are rewarded with knowledge and skills. Gamification transfers the mode, value, and incentive of game play to a separate experience like buying groceries, visiting web sites, or even learning. Gamification borrows rewarding elements of game play, such as: rules, victory conditions, rewards, punishments, status and stakes. Gamification can draw a parallel between learning and fun. Gamification is a powerful tool for catalyzing attention, focus, and investment (Arnold, 2012).

Gamification is a valuable tool to enhance motivation. Utendorf (2012) states that it's not about developing full-on games, but rather it's about using gaming attributes to drive engagement, strengthen skills, or foster behavior changes. The learning does not turn into a game, however the features (i.e. curiosity, collecting, exploration, and domination), which entice players to engage, are used to draw in learners.

Engagement is a significant element in gamification. Gamification draws in the attention of the player [learner] and gets their participation. “Strategies of design that lead

to engagement may include role-playing, narrative arcs, challenges, and interactive choices within the game as well as interaction with other players (Dickey, 2006).

Motivation is the process that energizes and gives direction, purpose or meaning to behavior and actions (Kapp, 2012). In order to be motivated, the challenge must not be too hard or too simple. Dynamic participation in an action or activity is a fundamental element in gamification.

With a firm understanding of gamification, game-based learning can be explained in contrast. Gamification is not game-based learning, nor does it require students to play games. Gamification is used to engage students, promote competition, and to increase the visibility and perceived importance of otherwise minor and less visible actions. Some researchers state that gamification is encouragement mechanics (Raymer, 2011; DeMonte, 2014).

### **Definition Of Game-Based Learning**

Game-based learning is not limited to using games to teach students. All games, regardless of whether they are digital or not, embody a variety of tools that help create and generate effective learning experiences. These learning experiences are free from consequences in the real world. According to Teed (2013) game-based learning uses competitive exercises, either pitting the students against each other or getting them to challenge themselves in order to motivate them to learn better. Game-based learning provides a contextualized experience that allows a variety of learning through practice, failure, reflection, and repetition (Whitton, 2012). In addition to these learning tools, games promote collaboration, as players [learners] need to work together on shared goals.

Game-based learning is an excellent way to support constructivist pedagogies through active learning and participative teaching approaches (Whitton, 2012). Many games provide situations that allow players [learners] to employ techniques such as learning through problem solving or inquiry. Integrating game-based learning into an education environment provides motivation for students to learn, immerses them in material so they learn more effectively and it encourages students to learn from their mistakes. It is assumed that learners construct understandings by interacting with information, tools, and materials and through collaborating with other learners in interactive learning environments. The learning environment must scaffold the learning process (Dickey, 2006).

Game-based learning is learning through games. Using game-based learning is appropriate when educators wish to repackage educational content, promote critical and strategic thinking, and engage students who are otherwise not engaged and to support both students who struggle and those who are talented. Game-based learning is about the game and the cognitive residue.

### **Gamification In The Classroom**

In the context of higher education, when students are expected to think critically in order to solve problems, game-like simulations can be leveraged in any discipline to reinforce the real world applications of concepts. Both hybrid classrooms and traditional brick and mortar educational delivery models can leverage the concept of gamification to enhance engagement and improve content comprehension (Arnold, 2012).

Game-based techniques, when used properly, have the influence to engage, inform, and educate. Examples of game-based techniques include: providing a leaderboard to track student participation and attendance, graphing your daily runs to challenge yourself and others to reach the next level, and providing a safe space for students to gain experience through trial and error which allows the element of failure into the process of gamification.

Game mechanics are the constructs, the rules of playing a game. These may include levels, earning badges, point systems, scores and time restriction; these elements are critical building blocks during gamification (Kapp, 2012). Game-based learning uses everyday events like jogging or running and turns it into an activity that has elements of competition, cooperation, exploration and storytelling. With a clear understanding of what game mechanics and game-based learning are, the next section explores perceptions of failure to learn in higher education.

### **Perception of Failure in Higher Education**

It is important to understand the perception of failure in higher education as it does influence how students learn about their learning abilities. In the following section, the definition of failure in higher education will be addressed; the perceptions of failure held by instructors; and finally the perceptions of failure by students in higher education.

### **Definition Of Failure In Higher Education**

Failure defined in a broad sense refers to a grade below a passing level, or simply to a performance below expectations (Lambert, 1969). It is estimated that 85% of first-time college students note their intentions to earn a bachelor's degrees, yet most leave

college before doing so (Wirt, Choy, Gerald, Provasnik, Rooney, Watanabe & Tobin, 2002). Students, who may leave school before achieving this goal, may do so because of barriers. These barriers may include the fear of failure. Failure is often perceived as a negative event (Orlando, 2011). Often those who experience failure view it as a “set-back” or “hold-up” to progress. Educators and students may view failure differently, however, the stigma of failure is visible to both.

In educational settings, when students participate in effort-filled activities (such as completing tasks), achievement and productivity are believed to relate to motivation. When students fail at effort-filled activities, motivation to complete such tasks may falter. Motivation is a very important determinant of our behavior (Heimerdinger and Hinsz, 2008). Failure may pose a threat to the self and instill a state of insecurity that motivates behavior aimed at correcting the situation and thus improve subsequent performance (Bélanger, Lafrenière, Vallerand & Kruglanski, 2013). Failure becomes a motivation to avoid such insecurity. There is a need to reconsider the ontology of failure – how people perceive and interpret failure – if we are to ever understand failure and learn from it.

### **Instructor Perceptions Of Failure**

Failure is a natural part of life, learning, and assessment – an expected outcome (Guskey, 2003). Though it may be a natural course in life, it is not received as a natural event. Failure in the classroom has a negative stigma attached. Educators do not approach failure (in the terms of failing a student) as an opportunity to humiliate or intimidate a student (Brooks, 2007). Some educators may find the act of failing a student to be stressful itself. Dawley (1999) explains that at times instructors may have a feeling of

personal failure when their teaching doesn't work, when they teach, but some students don't learn. This view of failure creates a perception that failure, though natural, certainly isn't a joyful part of the teaching experience.

Most individuals would agree that you can learn from failure. There is no shortage of inspirational quotes on failure, rarely from an anonymous figure. Sorbel states, "Americans love a nice, meaty failure – as long as it ends with success," (Chronicle of Higher Education; May, 2014). This bi-polar approach is what damages the perception of failure in education. Educators understand from our own experiences that learning from failure will provide more opportunity than a strong grade point average. Educators also understand that individuals [students] who make great strides encounter failure time and again before accomplishing their goal.

### **Student Perceptions Of Failure**

When a student fails a grade level, we identify them as being "held back", "left behind" – rhetorically powerful phrases in themselves, the student becomes emotionally, socially, academically, and physically separated from their peers (Carr, 2013). Failure is an experience of isolation. Failure is an understood outcome of assessment, the product of not satisfying an objective standard of achievement. Students who experience failure acknowledge deficiencies in themselves as reasons for their failure, however, the majority will place responsibility on factors related to the instructor (Lambert, 1969) often citing motivation and that the instructor did not incite motivation in the student.

The fear of failure is a motive to avoid failure in an achievement context, and involves cognitive, behavioral, and emotional experiences (Sagar, Boardley, Kavussanu,

2011). Education is a setting in which students want to achieve their goals. Students who fail to achieve goals often face a variety of setbacks. In individuals who fear failure, this can elicit shame and devaluation of the self, leading to undesirable social behaviors (Stuewig, Tangney, Heigel, Harty, & McCloskey, 2010). Such undesirable behaviors may include: withdrawing from the class or college and cheating to achieve.

Shifting the focus from failure as a negative instructional element to a positive element, we might begin to focus on the positive impact that failure may provide to the higher education classroom through the use of digital games.

### **Using Failure As An Effective Assessment Tool in Digital Games**

Failure can be used as an effective assessment in digital games. In the following sections, failure as an effective assessment tool will be addressed by examining: using assessment tools in the classroom, using assessment tools in digital games, failure in games and failure as an effective assessment tool..

### **Using Assessment Tools In The Classroom**

Assessment is the single most effective instructional strategy to increase learning (Vega, 2014). Yet no single assessment can evaluate all the kinds of learning we value for students, nor can a single instrument meet all the goals held by parents, practitioners, and policymakers (Darling-Hammond, Herman, Pellegrino, Adedi, Aber, Baker, Bennett, Gordon, Haertel, Hakuta, Ho, Linn, Pearson, Popham, Resnick, Schoenfeld, Shavelson, Shepard, Shulman, & Steele, 2013). Early theories of education believed that complex higher-order thinking skills were acquired in small pieces, breaking down learning into a series of prerequisite skills. It was believed that valid assessment of higher order thinking

skills required that students be unfamiliar with the questions or tasks they are asked to answer or perform and that they have sufficient prior knowledge to enable them to use their higher order thinking skills in answering questions or performing tasks (King, Goodson, & Rohani, 1998). The learner would memorize these pieces, and assemble them into complex understanding and insight, so that the puzzle could be arranged to form a coherent picture.

Educators recognize the importance of having students develop higher order thinking skills yet often do not assess their students' progress. Given the goal of using educational games to support learning in school settings and elsewhere, we need to ensure that the assessments are valid, reliable, and also pretty much invisible (to keep the engagement intact) according to Shute and Ke (2012). This is where stealth assessment becomes effective. Secretary of Education, Arne Duncan, in 2010 called for research as to how assessment technologies, such as simulations, collaborative environments, virtual worlds, games, and cognitive tutors, can be used to engage and motivate learners and motivate learners while assessing complex skills. Educators today understand that learning requires that the learner engage in problem solving to actively build mental models. This changed perception of learning through a more immersive experience in the assessment as the actual learning has implications for how failure is perceived.

### **Using Assessment Tools In Digital Games**

Games can engage students in profound tasks that, if constructed properly, will produce valuable information for teachers and students. Computer games were hypothesized to aid instructional purposes because they theoretically provide diverse

approaches that can address cognitive and affective learning, interactivity, and, perhaps most critically, motivation for learning (O'Neil, Waines, & Baker, 2005). Digital games have potential for improving how formative assessment is conducted (Zapata-Rivera & Bauer, 2012).

There are various reasons why digital games can be an effective source for assessment. Assessment occurs naturally in games. Well-designed digital games can provide meaningful assessment environments by providing students with scenarios that require the application of various skill competencies that are critical in learning environments. The prospect for games to be used as assessments is heightened because of their aptitude to gather deep, rich data about students and then to analyze—through advanced methods (Baker & Yacef, 2009).

Role playing games, such as World of Warcraft (WoW), require learners [players] to read lengthy and complex quest logs that tell them the goals of the game. Without comprehending the quest instructions, players [learners] may not know how to proceed or complete said task (Shute, Ventura, & Zapata-Rivera, 2014). Without these established and evocative assessments, educators could not determine what students can do with the skills and knowledge obtained. Failure to play, in this way is a strong indicator of lack of skills and knowledge with which to play. What the student and teacher does with these indicators has implications for perceptions of failure.

### **Failure In Games**

An attractive element of the gaming experience as a learning tool is that it provides opportunity for continued practice because negative consequences are not

typically associated with failure. Failure serves as an integral part of the learning experience (Gee, 2009; Groff, Howells & Cranmer, 2010; Ke, 2009; Klopfer, Osterweil & Salen, 2009). Players are encouraged to improve by repeated practice by either advancing within the game or replaying portions of the game. There is some evidence that error and failure may be viewed differently within gaming contexts (McGonigal, 2011). Specifically, errors in gaming environments may not aggravate anxiety and threaten attention in the same way that it does in academic contexts. The simplest theory of failure states that failing serves as a contrast to winning, that failure thereby makes winning all the more enjoyable (Wolf & Perron, 2009). Failure within the game provides learning opportunities about what does and does not work.

Failure, as part of the learning experience (Gee, 2009; Groff, Howells & Cranmer, 2010; Ke, 2009; Klopfer, Osterweil & Salen, 2009), provides opportunity for players [learners] to take risks and quickly learn from their mistakes (Larsen-McClarty, Orr, Frey, Dolan, Vassileva & McVay, 2012). Much like in playing games, when we fail a level, we do not quit the game, we often continue to play the game for the heightened sense of completion. This opportunity often provides knowledge and insight on how to continue. These opportunities suggests that one potentially useful feature of gaming in education is changing how students interpret error, specifically, changing children's attributions of error and failure from negative external evaluation to constructive feedback (Morris et al., 2013).

We learn how to handle or cope with failure through the process of play. One doesn't actually fail at play per se, but one is free to do things at play that would look like

failure in other contexts (Klopfer, Osterweil and Salen, 2009). Consider playing with building blocks, the tower you construct will tumble; this is not viewed or considered to be failure. Any child has unlimited freedom to undertake such doomed experiences, and learns as much about the nature of things from failure as from success. We are free to learn from failure and move closer to mastery. The perception of failure is transformed in games to part of the process of play.

### **Failure As An Effective Assessment Tool**

Failure can be an effective learning tool. As the old adage goes, if at first you don't succeed, try, try, again. Despite the societal taboo against failure, there is one place where it is expected and embraced – games. In particular, video games are built on the premise that progress happens through a process of experimentation, failure, and adaptation (Marquis, 2013). Educators have a variety of tools at their disposal to help students learn. However, educators often dismiss failure as a learning tool because it is often seen as something that is “bad” or “wrong”. This is not the case. As educators, we must incorporate and accept failure as part of our pedagogy.

Turning game play into a lesson about the value of failure is easy since students already implicitly understand that games function by this process and success depends on the ability to learn from their mistakes (Marquis, 2013). Researchers Autin and Croizet (2012) conclude that children might perform better in school if teachers and parents sent the message that failing is a normal part of learning. Recognizing that failure is a fundamental part of learning could stop a malicious cycle in which difficulty creates feelings of incompetence that in turn disrupts learning (Autin & Croizet, 2012).

Learning from the failure inherent in game play requires an active strategy of verbalizing what has gone wrong, discussing strategies with others, trying new approaches, and discussing how the strategy and the process can be generalized to other contexts (Marquis, 2013). Stressing the importance of dialogue or feedback post play is an essential element to include failure as a learning strategy within the classroom. Discussing the lessons learned from mistakes or challenges provides opportunity for students to discuss with their peers about strategy and adaptation.

Students are likely to resist the linking of schoolwork and failure at first, however, this provides opportunity to discuss the ways in which failure, even in school, provides the same sort of opportunity to reassess and learn from mistakes (Marquis, 2013). The idea of looking at failures and learning from them is worth pursuing. Conferences such as TED and TheFailCon enthruse people to be honest and open about their ideas, struggles and successes. Acknowledging failure actually changes it into a feedback process.

McGonigal (2011) explains that positive failure feedback enforces our sense of control over the outcome of the game. In turn, when we have control over the outcome of the game, we gain a level of control over our learning. As long as our failure is interesting, we keep trying – and remain hopeful that we will succeed eventually (McGonigal, 2011). The perception of failure becomes a perception of control over success over outcomes in games.

### **Applying Stealth Assessment In Digital Games**

Digital games have potential for improving how formative assessment is performed (Zapata-Rivera & Bauer, 2012). Games can engage students in profound tasks

that, if constructed properly, will produce valuable information for teachers and students. Computer games were hypothesized to aid instructional purposes because they theoretically provide diverse approaches that can address cognitive and affective learning, interactivity, and, perhaps most critically, motivation for learning (O'Neil, Waines, & Baker, 2005).

There are various reasons why digital games can be an effective source for assessment. Well-designed digital games can provide meaningful assessment environments by providing students with scenarios that require the application of various skill competencies that are critical in learning environments. Role playing games, such as World of Warcraft (WoW), require learners [players] to read lengthy and complex quest logs that tell them the goals of the game. Without comprehending the quest instructions, players [learners] may not know how to proceed or complete said task (Shute, Ventura, & Zapata-Rivera, 2014).

The intent of using educational games to support learning within the classroom and beyond, means that educators need to ensure that the assessments are valid, reliable, and also invisible to maintain engagement. Stealth Assessments (Shute, 2011; Shute, Ventura, Bauer, & Zapata-Rivera, 2009) are evidence-centered, design-based assessments that are woven directly and invisibly into the fabric of the learning environment. Shute (2011) states that during game play, students naturally produce rich sequences of actions while performing complex tasks, drawing on the very skills or competencies that we want to assess in education (i.e. scientific inquiry skills and creative problem solving.). Evidence needed to assess the skills is provided by the

players' interactions with the game itself (the process of play), these interactions can be contrasted with the results of the activity – the norm in educational environments.

Shute, et. al. (2009) argue that using well-designed games as vehicles to assess and support learning will help disrupt students' growing detachment from school, provide dynamic and ongoing measures of learning processes and outcomes, and offer students chances to apply such complex talents as creativity, problem solving, persistence, and collaboration. Making use of this stream of gameplay evidence to assess students' knowledge, skills and understanding (as well as beliefs, feelings, and other learner states and traits) present problems for traditional measurement models presently used in assessment (Shute, 2011). Imbedding assessments within games provides a way to observe players' advancement toward targeted competencies and to use that information to support learning. Stealth assessment within the game environment can infer what learners know and do not know at any point in time.

Stealth assessment is also intended to remove or seriously reduce test anxiety, while not sacrificing validity and reliability (Shute, Hansen, & Almond, 2008). The intended goal of stealth assessment is to eventually blur the distinction between assessment and learning (Shute, et. al., 2011). It is essential to understand the elements of the stealth assessment. Shute, et. al. (2011) describes these elements as: evidence-centered assessment design, and formative assessment and feedback to support learning.

Evidence-centered assessment design (ECD), according to Messick (1994) begins by identifying what should be assessed in terms of knowledge, skills, or other attributes. These variables cannot be observed directly, so behaviors and performances that

demonstrate these variables should be identified instead (Shute, et. al., 2011). Evidence-centered assessment design is versatile to use in a variety of situations. Shute and Kim (2013) state that ECD supports a broad range of assessment types, from classroom quizzes to simulation-based assessments.

Formative assessment, according to Sadler (1998), is an assessment that is explicitly intended to provide feedback on performance to improve and accelerate learning. These assessments include both formal and informal processes teachers and students use to collect evidence for the purpose of improving learning. Within the classroom, we assess formally through assignments, tests, quizzes, performance, projects, and surveys; or informally through questioning and dialogue, observing, and anecdotal note taking. We may or may not be engrossed in formative assessment: the decisive factor is not the type of assessment we use, but rather how we (instructors and students) use the information obtained.

With an understanding of what stealth assessment is, what assessment is and what benefit it provides to a classroom, we can begin to explore: what the potential benefits of integrating failure strategies as an assessment tool provides for a higher education classroom.

### **Integrating Failure Strategies in Games into the Higher Education Classroom**

In the following section, potential benefits and drawbacks of using failure as an assessment tool will be outlined. These areas are essential to understand prior to using failure as a learning strategy in higher education.

### **Potential Benefits Of Using Failure As An Assessment Tool**

There are potential benefits for using failure as a learning strategy. Failure is a learning mechanism. Our little mistakes serve to build up a framework of experience that allows us to more proficiently navigate our lives (Choina & McInroy, 2013). Using failure as a learning strategy opens the channels of communication to discuss and explore how the failure occurred and what was learned as a result of said failure.

Dialogue is a product of failure. Often we question, “what did we do wrong”, “what would I do differently given the chance to re-do the task” and “what did I learn from this?” These open channels provide opportunity for students and instructors to discuss the failure event. This dialogue provides support for others to explore, discuss and experiment. Potentially, the dialogue and feedback may help reduce the stigma typically associated with failure.

### **Potential Drawbacks Of Using Failure As An Assessment Tool**

Potential drawbacks of using failure as a learning strategy exist as well. Education typically discourages failure. Orlando (2011) states that a student is measured at various points along a course on how well they have mastered material, failure is preserved and carried with the student throughout the course, resulting in students becoming failure-adverse, demoralized by failure, and focusing more on the grade, than the education. It may be difficult to reposition failure in education as an effective learning strategy.

Students may be hesitant to accept failure as a positive when it has always been viewed with negative connotations. Though educators may demonstrate that failure is acceptable and allowable, students still may resist. Success and achievement is celebrated in the classroom, where failure develops doubt.

### **Stealth Assessment In The Higher Education Classroom**

Stealth assessment is intended to support learning and maintain flow, defined as a state of optimal experience, where a person is so engaged in the activity at hand that self-consciousness disappears, sense of time is lost, and the person engages in complex, goal-directed activity not for external rewards, but simply for the exhilaration of doing (Csikszentmihalyi, 1990). With flow, the fear of failure blurs into the background. The focus becomes the activity and learning from said activity. Stealth assessment provides opportunity to remove (or reduce) test anxiety, while not sacrificing validity and reliability (Shute, Hansen, & Almond, 2008). The goal is to eventually blur the distinction between assessment and learning (Shute, 2011).

The main assumptions with stealth assessment research include (1) that learning by doing (required in game play) improves the learning processes and outcomes; (2) different types of learning and learner attributes may be verified and measured during game play; (3) strengths and weaknesses of the learner may be capitalized on and bolstered, respectively, to improve learning; (4) finally, formative feedback can be used to further support student learning (Gee, 2003; Shute, 2007, 2008; Shute, Hansen, & Almond, 2008; Squire, 2006).

The use of stealth assessment in higher education classrooms provides opportunity to face complex problems, enhances the ability to think creatively, critically, collaboratively, and systematically and then communicate effectively (Shute, 2011). These skills are not easily measured by multiple-choice responses on a simple knowledge

test. These skills are relevant for 21<sup>st</sup> century learners. Assessment should be continual and invisible to students, supporting real-time, just-in-time instruction (Shute, 2009).

Assessment methods, such as stealth assessment, need to be explored to identify new skills and standards relevant for today's students. Shute (2009) states that traditional assessments of content are often too simplified, abstract, and decontextualized to suit current education needs, and they also fail to assess what students actually can do with the knowledge and skills obtained in and out of school. Stealth assessment can infer what learners know and do not know at any point in time (Shute, Ventura, Small & Goldberg, 2014).

### **Summary and Conclusions**

Gamifying the higher educational learning environment can provide new routes of learning information and processing the information. Today's classroom is different from the classrooms of the past. Students are interested in alternative learning tools and learning assessments.

Failure is an option. Failure is a good thing. When we fail, we pay attention to what went wrong, and why. The experience of failure only and invariably prepares us to succeed in the future. The act of learning from and building on each mistake is vital to success and learning. Failure is and must be an accepted part of the learning process. Failure is a natural occurrence in both play and in education. Using and integrating failure can be an effective assessment tool in higher education.

Stealth assessment is the process of embedding assessments directly and invisibly into the learning or gaming environment. This stealth application reduces the anxiety that

may be associated with failure. The focus becomes the activity – rather than the outcome. Reducing tension and building a sense of accomplishment when tasks are completed, even after multiple attempts.

The research supports continued investigation of using gamification in the classroom and gamification techniques in higher education. To complement and build on the use of gamification in the classroom, employing stealth assessment strategies provides new insight on reducing the stigma associated with failure. The re-purposed stigma associated with failure can in turn demonstrate what students are able to comprehend and naturally produce, such as performing complex tasks, drawing on the very skills or competencies that educators want to assess including: scientific inquiry skills, creativity, and critical thinking.

Failure has a negative connotation. Educators and students may approach failure differently, however, the stigma of failure remains the same. Fear of failure may stimulate motivation on behalf of students to become better. There is a significant need to change the ontology of failure if we are ever to understand failure and be able to effectively learn from it.

To change the perception that failure has in a higher education classroom, incorporation of gamification in higher education lesson plans may provide opportunity to change that negative connotation. The following research study attempts to explore these areas.

## **CHAPTER THREE**

Chapter Three describes the research methodology. First the methodology will be identified, then the research design will be addressed, followed by a description of the instrumentation used. The chapter will also include; a description of the pilot survey distribution, a discussion of the validation and revision of the survey, the fall 2014 distribution; data collection and methods of analysis.

### **Methodology**

This research was undertaken to learn about the perceptions of students on whether failure can be an effective learning strategy through integrating gamification elements within a higher education classroom. This chapter outlines this research, including the sample, the validity of the study, and research design. Reliability of the study will be discussed in Chapter Five.

### **Research Design**

A blend of quantitative and qualitative research methodology was used for this study. A survey was distributed to a pilot population of students at a Midwest college during the summer session of 2014. The intent of the pilot survey was to gauge the validity of the survey questions and if needed to make any corrections to the language used in the survey to be distributed during the fall of 2014. Convenience sampling was used in both the summer and fall surveys. Following the pilot distribution, the language of the survey was readdressed and some of the language was strengthened for the fall

2014 distribution. The survey questions permitted quantitative analysis of perceptions as well as qualitative information regarding the thinking behind perceptions on some questions. The term 'survey' is ordinarily applied to a research methodology designed to collect data from a specific population, or a sample from that population, and typically utilizes a questionnaire or an interview as the survey instrument (Robson, 1993).

Surveys are used to obtain data from individuals about themselves, their households, or about larger social institutions (such as universities). Sample surveys are an important tool for collecting and analyzing information from selected individuals. They are widely accepted as a key tool for conducting and applying basic social science research methodology (Rossi, Wright, and Anderson, 1983).

The American population is familiar with the use of surveys to assess issues or project trends: marketing researchers use surveys to study consumer preferences and shopping patterns (Leary, 1995). The Gallup poll on education in America is an ongoing project of Phi Delta Kappa. Results of the annual survey are published each year in the Kappan magazine. Selected American television viewers participate in the Nielson surveys, designed to estimate the size of various television program audiences for the purpose of establishing advertising rates. Such sample surveys are comprised of standardized methodologies designed to gather information by examining systematically identified population samples. Social scientists rarely draw conclusions without disaggregating the same population into various sub-groups. For example, the Gallup polls typically examine issues disaggregated by gender, ethnicity, education and region of the country (Rossi, Wright and Anderson, 1983).

Leary (1995) indicates there are distinct advantages in using a questionnaire vs. an interview methodology; questionnaires are less expensive and easier to administer than personal interviews; they lend themselves to group administration; and, they allow confidentiality to be assured. Robson (1993) indicates that mailed surveys are extremely efficient at providing information in a relatively brief time period at low cost to the researcher.

For these reasons, the researcher chose a descriptive research methodology and designed a questionnaire survey instrument with both quantitative and qualitative questions to assess perceptions on whether failure can be an effective learning strategy through integrating gamification elements within a higher education classroom.

Validity is an indication of how sound the research is, according to Seliger & Shohamy (1989), “any research can be affected by different kinds of factors which, while extraneous to the concerns of the research, can invalidate the findings”. Test validity can indicate how much meaning can be placed upon the test results. With the results of the survey, test validity can offer a perspective about how much and which information can be used to draw conclusions from the survey. Face validity is a measure of how representative a research questions is ‘at face value,’ and whether it appears to be a good question. If experts generally agree that a question will yield valid information, this is a sign of validity. This information supports the need in the current research to pilot the survey first and then determine how to revise and continue.

An application was submitted to the Institutional Review Board (IRB) for permission to distribute the survey to the student population. On May 1<sup>st</sup>, 2014, the IRB approved the request to involve human participants in this study.

### **Instrumentation**

The survey in this study addressed two purposes. The first purpose was to examine the perceptions of the use of failure as an effective learning strategy in higher education. The second purpose of this study was to examine the perceptions of the use of failure in game play as an effective assessment tool.

Before distributing the survey, the participants received a letter inviting them to voluntarily participate in the survey. The participants did not need to disclose any identifying personal data such as name, student identification number or phone number to complete the survey. This provided a level of anonymity to the survey respondents. Participants were provided with the IRB approval number and researcher contact information for any additional questions or concerns regarding involvement in the study.

The survey distributed to participants addressed various questions. The preliminary questions in the survey gathered essential demographic information from the respondents. These questions provided background information about the respondents. Participants were asked if they played digital games. In the pilot study digital games were not defined as clearly as during the fall 2014 distribution. For the fall 2014 distribution, digital games were identified as gaming consoles, computers and mobile devices. Participants were also able to identify the amount of time that they played digital games. This helped identify the casual gamers from the more serious gamers.

In addition to identifying the amount of time participants played digital games, it was important to find out what style of games participants played. Participants were given different gaming styles to choose from, these include: first person shooters, MMORPGs, adventure and puzzle games. Each game style included an example of a popular game for clarification. This is important to know because each game style requires different skillsets. In addition to the style of gaming, participants were able to select the number of hours per week that they devoted to playing games. For ease, the survey used increments of time: 1-3, 4-8, and 9 or more hours per week.

Additional questions asked participants to what extent they agreed with a statement regarding the use of failure as a learning tool / strategy. Participants were asked about their perception of failure and if failure can be used in a learning environment. Participants were able to base their responses on strongly disagree, disagree, neither agree-nor-disagree, agree and strongly agree. These questions allowed participants to identify their degree of agreement. Also, included in the survey was an opportunity for students to provide a text response to explain their response.

### **Summer 2014 Survey Pilot**

The survey questions distributed during the summer of 2014 were prepared in hopes of addressing the research questions posed at the start of Chapter One. The first research question is how do participants in a higher education classroom view failure? How do they view failure in games? The summer 2014 survey questions that answered this research question included: When you fail at a level of a game (i.e. did not successfully complete the level, died, ran out of time, etc.), do you quit the game or

continue? If you quit, why do you quit? If you continue, why do you continue? The final question asked participants to select their degree of agreement on a scale of strongly disagrees to strongly agree on the following statement: Failure (when you unsuccessfully complete a task) is viewed as a positive element / outcome.

The second research question in this study is how are failure strategies used to promote learning in games? To address this question, two questions from the summer 2014 distribution were used. Participants were asked to rate their agreement, from strongly disagree to strongly agree for each survey question. The summer 2014 distribution questions include: 1) Digital games can be used to enhance a participants learning experience in the classroom; 2) You learn better when you successfully complete a task (in game play) than when you fail at a task (in game play).

The third and final research question in this study is: In what ways can we integrate failure strategies in games into our lesson plans in higher education? For the summer 2014 distribution, three questions were used to address this question. Participants were asked to rate their agreement, from strongly disagree to strongly agree for each survey question. These survey questions included the following three questions: 1) Failure (when you unsuccessfully complete a task) can be used as an assessment tool (a standardized means of obtaining information); 2) Failure can be used as a lesson plan (as part of course instruction); 3) Failure can be used as a learning strategy (an approach used by participants to help them understand information and solve problems).

### **Validation And Revision Of The Survey**

Reliability and validity are valuable aspects of questionnaire design. According to Suskie (1996), a perfectly reliable questionnaire elicits consistent responses. Although it is difficult to develop, it is practical to design a questionnaire that approaches a consistent level of response.

Leary (1995) offers seven guidelines for designing a useful questionnaire:

1. Use precise terminology in phrasing the questions.
2. Write the questions as simply as possible, avoiding difficult words, unnecessary jargon, and cumbersome phrases.
3. Avoid making unwarranted assumptions about the respondents.
4. Conditional information should precede the key idea of the question.
5. Do not use double-barreled questions (Questions that ask more than one question but provide the respondent with the opportunity for only one response).
6. Choose an appropriate response format.
7. Pretest the questionnaire.

Robson (1993) indicates that a high reliability of response is obtained by providing all respondents with the exact same set of questions. Validity is inherently more difficult to establish within a single statistical measure. If a questionnaire is perfectly valid, it must measure in such a way that inferences taken from the questionnaire are perfectly valid; it must measure in such a way that inferences drawn from the questionnaire are entirely accurate. Suskie (1996) suggests that reliability and validity are enhanced when the researcher takes certain anticipatory steps.

Have people with diverse backgrounds and viewpoints review the survey before it is administered. Find out if:

1. Each item is clear and easily understood.
2. They interpret each item in the intended way.
3. The items have an intuitive relationship to the study's topic and goals, and
4. Your intent behind each item is clear to colleagues knowledgeable about the subject (p.59).

With these items in mind, the survey was reviewed, validated and revised through examination of the summer 2014 pilot survey results, and distributed to the population of participants at a midwestern university during the fall of 2014. Dr. Carrie Chapman, the Department Chair of Educational Studies: K-12 & Secondary Programs, Dr. David Georgina, Coordinator of the Master of Science of Educational Technology program and Jeffery Dahlke, Research Consultant with the Center for Excellence in Scholarship and Research at Minnesota State University - Mankato reviewed this survey as part of the process of validation, suggesting improvements as needed to increase the validity of the questions and consistency of respondents.

#### **Fall 2014 Distribution**

The second distribution of the survey included survey questions that had been rephrased for clarity. After review of the responses for the pilot, additional questions were deemed necessary to encourage more thoughtful responses. The intent of rephrasing the questions was to encourage more accurate responses from participants.

The first research question in this study is how do participants in a higher education classroom view failure? How do they view failure in games? For the fall 2014 distribution, there were five survey questions used to address this question. Participants were asked to rate their agreement, from strongly disagree to strongly agree for each survey question. These questions included: 1) I learn better from failure in game play; 2) I learn better from success in game play; 3) When I fail during game play (i.e. did not complete the level, died, ran out of time, etc.), 4) I quit the game; 5) I quit the game because and If I fail a level of a game, I will re-attempt that level.

The second research question in this study, how are failure strategies used to promote learning in games, was addressed by the use of two survey questions from the fall 2014 distribution. Participants were asked to rate their agreement, from strongly disagree to strongly agree for each survey question. These questions included: 1) Failure in game play can be a positive learning experience and: 2) Failure in game play can be a negative learning experience.

The third and final research question in this study, in what ways can we integrate failure strategies in games into our lesson plans in higher education, was addressed through two survey questions from the fall 2014 distribution. Participants were asked to rate their agreement, from strongly disagree to strongly agree for each survey question. The first survey questions was: Failure can be an effective part of a lesson plan (course instruction): (a) when there are no consequences to the learner, (b) when it is applied as a trial and error process, and (c) when constructive feedback is provided following the failure. The second question used was: Digital games can provide meaningful learning

environments by providing participants with scenarios that require the application of various competencies, such as reading comprehension and problem solving. Copies of the surveys are provided in Appendix A (summer pilot) and Appendix B (fall survey).

### **Data Collection**

During the study, the questionnaire was distributed to enrolled participants at a Midwest university during the 2014 summer session. Faculty members received an invitation to distribute a digital link for the pilot questionnaire to their enrolled participants via email. Participants were also given an invitation to complete the questionnaire through a digital link in an email and a Desire2Learn announcement. Participants decided to participate or to abstain from participating in the study. During the pilot period, participants responded over a two-week period. During the fall 2014 session, participants had a 10-day period in which to reply.

### **Method Of Analysis**

The data analysis consisted of examining the surveys for correctness and completeness, coding and keying data into a database, and performing an analysis of descriptive responses according to frequency distributions and descriptive statistics. All incomplete surveys were discarded from the analysis. Frequency tables and descriptive statistics were constructed to display results with respect to each of the research questions.

To better understand the qualitative responses given by the participants, the responses were reviewed and analyzed using thematic analysis, searching for common themes and ideas that were presented by the respondents. A thematic analysis provides a

method for identifying, analyzing, and reporting reoccurring themes within the data (Boyatzis, 1998). In addition, a thematic analysis moves beyond counting words and phrases and focuses on identifying and describing both implicit and explicit ideas within the data (Harden & Thomas, 2005).

### **Summary**

The purpose of this chapter was to describe the research methodology of this study, explain the sample selection, describe the procedure used in designing the instrument and collecting the data, and provide an explanation of the statistical procedures used to analyze the data. The results of this research are reported in Chapter Four.

## **CHAPTER FOUR**

Chapter four will address the results of the research project conducted over the summer 2014 and fall 2014 semesters. This chapter will include the survey results for both the summer and fall 2014 survey distributions, a summary of the responses and address each of the research questions posed.

In the previous chapter, a survey was identified as the most appropriate method for gathering data for this study. The results of this analysis will be presented in this chapter. Once the results are presented, discussion will conclude with how the results address the research questions that were posed in Chapter One.

### **Survey Results**

To create a clear image of who the respondents were, several demographic questions were asked at the start of the survey. These questions provided insight into any differences between populations and their perceptions as well. During the course of the research project, the survey was distributed twice. The first distribution of the survey occurred during the summer 2014 session. The second distribution was during the fall 2014 semester.

### **Summer Session Survey Results**

During the summer session there were 39 participants who volunteered to complete the survey. The survey was distributed to two sections of an undergraduate public speaking class and two graduate level educational technology courses. There was a potential for 86 participants to complete the survey, 39 chose to participate indicating a

participation rate of 45%. For the summer distribution of the survey, the number of participants was not anticipated to be high as summer enrollment at most universities is not as substantial as during the fall and spring semesters. Of the 39 participants who completed the survey, 13 were male and 26 were female. There were three participants who had completed 0-29 credits, five had completed 30-59 credits, eight had completed 60-89 credits and there were 23 participants who had completed 90 credits or more. The ages of participants who participated represented ages from 18 to 42 years of age and older. There were 19 participants who identified themselves as 18-25 years of age, 12 who were 26 to 33 years of age, three who were 34-41 years of age and five who identified that they were 42 years of age and older.

Respondents were asked if they played digital games and of the 39 participating participants, 25 (64%) responded that they played digital games and 14 (36%) participants stated that they did not. There were 16 females who responded that they played digital games, while only nine males responded that they played digital games. Respondents were asked how frequently they played digital games. There were 12 participants who stated that they never played digital games and six participants who responded that they played digital games daily.

Table 1 illustrates the various digital games that the respondents acknowledged that they played. Participants were allowed the opportunity to select multiple game play styles. Significantly more participants (26) played puzzle games such as Tetris, CandyCrush Saga and Professor Layton. The least played game style was MMORPG's with a total of four participants acknowledging that they played.

Table 1

*Digital game play styles*

Game Styles	Respondents
First Person Shooters (FPS) (Call of Duty, Halo)	7
MMORPG's (World of Warcraft, Final Fantasy, Guild Wars)	4
Adventure Games (Myst, Dark Fall: Lost Souls)	5
Puzzle Games (Tetris, CandyCrush Saga, and Professor Layton)	26

The summer 2014 participants multiple digital game play styles are illustrated in Table 2. For each type of digital game play style, the number of participants who also played an additional style of digital game is indicated. It is interesting to note that for participants who frequently played first person shooters (FPS), MMORPGs and Adventure games, their next game selection was puzzle games. The left column represents the primary game choice, as you read right across the columns you see the popularity of other game choices selected. For example, seven participants selected FPS games as their most played game, of those seven, three played MMORPGs, four played Adventure games and five played Puzzle games.

Table 2

*Multiple game play styles*

	FPS	MMORPGs	Adventure	Puzzle
FPS	7	3	4	5
MMORPGs	3	4	3	4
Adventure	4	3	5	5
Puzzle	5	4	5	26

Participants were asked if they felt that digital games can enhance their learning experience in the classroom, and Table 3 illustrates the results. Participants were allowed to respond to the question with answers ranging from strongly disagree to strongly agree.

Table 3

*Digital games can be used to enhance a students learning experience in the classroom.*

Answer	Male	Female
Disagree	1	4
Neither Agree nor Disagree	3	7
Agree	9	15

There were five participants who disagreed that digital games can be used to enhance a student's learning experience in the classroom. In contrast, there were 24 participants who agreed that digital games can be used to enhance a student's learning experience in the classroom. There were significantly more participants who agreed that

digital games can enhance a student's learning experience in the classroom, with a total of 24 participants agreeing. It is also significant to note that there were 10 participants who neither agreed nor disagreed with the statement.

When asked if participants learn better when they successfully complete a task (in game play) than when they fail at a task (in game play), responses were similar in number. Participants were allowed to respond to the question with answers ranging from strongly disagree to strongly agree. There were more participants who disagreed (12 participants) than agreed (9). There was a large population that neither agreed-nor-disagreed, 15 participants. With a majority of the respondents disagreeing with the statement, the assumption can be made that participants value failure in game play and that they learn from their mistakes.

The next question asked participants whether or not they quit the game or continued the game if they were not successful in completing the task. Of the respondents who replied, 18 stated that they would continue, one stated that they would quit and 19 participants stated that it would depend on their mood. It is significant to note that there was only one student who stated that they would quit, however, that when participants were provided opportunity to explain if they quit, why they quit, there were 19 total replies posted.

Participants were provided opportunity to explain their choice. Text replies that occurred two or more times were used. Participants who quit stated: "Maybe frustrated, or have something else to do", "Sometimes I feel like I need to take a break and come back later with fresh eyes", and "don't want to play anymore". Participants who

continued stated: “Hate to lose”, “To beat the level and move on”, “Makes me upset to fail” and “want to learn to correct the mistake”. The text responses illustrate that participants, though frustrated with failure, value opportunity to learn from mistakes and continue.

Participants were then asked to respond to the following statement, failure (when you unsuccessfully complete a task) is viewed as a positive element/outcome, using the strongly disagree to strongly agree scale. There were 14 participants who neither agreed-nor-disagreed with the statement, 11 who disagreed and 10 who agreed. The similar responses to this question represent some indifference to failure being considered a positive element / outcome.

Participants were asked if they agreed if failure (when you unsuccessfully complete a task) can be used as an effective assessment tool (a standardized means of obtaining information). Participants were allowed to respond to the question with answers ranging from strongly disagree to strongly agree. There were three participants who disagreed, 10 who neither agreed-nor-disagreed with the statement and 20 who agreed with the statement. There was a significant population (20 participants) who agreed that failure can be used as an effective assessment tool. This question relates directly back to the third research question which asks in what ways can we integrate failure strategies in games into our lesson plans in higher education.

The next survey question to which they responded had the same answer scale (strongly disagree to strongly agree). Participants responded to the question of whether failure can be used as a lesson plan (as part of course instruction). There were 23

participants who agreed that failure can be used as a part of a lesson plan and only four participants disagreed. There were eight participants who neither agreed-nor-disagreed with the statement. Again, this survey question relates back to the third research question, in what ways can we integrate failure strategies in games into our lesson plans in higher education. The results of this question support that participants feel that failure can be a part of course instruction.

Failure can be used as a learning strategy (an approach used by participants to help them understand information and solve problems), was the final survey question posed to participants. Participants were allowed to respond to the question with answers ranging from strongly disagree to strongly agree. There were two participants who disagreed with the statement, 24 who agreed and eight who neither agreed-nor-disagreed. It is significant to note that 24 participants (61%) believe that failure can be used as a learning strategy.

For the fall 2014 distribution of the survey, some questions were rephrased. The survey questions were rephrased to assist with clarity and provide deeper insight to the research questions. Additional questions were added to the survey to provide feedback and provide further analysis.

### **Fall Semester Survey Results**

During the fall 2014 semester there were 124 participants who volunteered to complete the survey. The survey was distributed to the mass lecture for the fundamentals of communication (CMST 100), with a potential of 625 enrolled participants and to graduate participants enrolled in educational technology courses, with a potential of 39

participants. The total possible population was 664 participants and 124 participants participated for a participation rate of 18%.

All participants had an opportunity to stop participating in the survey at any time. Of the 124 participants who participated in the survey there were 45 who identified themselves as male, 78 female, and one chose to not disclose their biological sex. The student who chose not to identify themselves as male or female will have a \* to identify their answer.

Demographic information was collected from participants to begin the study. Participants were asked to identify their age with a text-based response. There were 88\* participants who were 18-20 years of age, 30 participants who were 21-29 years of age and 5 who were 30 and older. The 18-20\* year olds were strongly represented.

Participants were then asked to identify their year in school. Participants were able to self-identify if they were freshmen, sophomores, juniors, seniors, or graduate participants. There were 13 freshmen, 70\* sophomores, 17 juniors, 9 seniors, and 15 graduate participants. There were significantly more sophomores who participated.

The survey respondents were asked if they played digital games. To help clarify what was meant by digital games, this was defined for the respondents as gaming consoles, computers, and mobile devices. Of the participants who participated in the research, there were 83\* participants who responded that they played digital games and 40 participants who did not.

Participants were provided the opportunity to identify the frequency at which they play digital games during the week. There were 58\* participants who played on average

1-3 hours per week, 18 participants who played on average 4-8 hours a week, and 5 participants who played digital games 9 or more hours a week.

The next area participants reviewed were the different categories of games played. Participants were provided with four different gaming categories: first person shooters (FPS), MMORPGs, adventure and puzzle. Participants were allowed to select multiple categories to reflect their gaming style. Illustrated in Table 4, puzzle games were the most popular.

Table 4

*Digital game play styles*

Game Styles	Respondents
First Person Shooters (FPS) (Call of Duty, Halo)	36
MMORPG's (World of Warcraft, Final Fantasy, Guild Wars)	23
Adventure Games (Myst, Dark Fall: Lost Souls)	22
Puzzle Games (Tetris, CandyCrush Saga, and Professor Layton)*	58

It is clear that there were participants who selected multiple digital game play styles. Running a cross-tabulation on the results, the results are demonstrated in Table 5. These results are significant as they illustrate that participants may enjoy and learn from various game environments that require different learning competencies. The left column represents the primary game choice, as you read right across the columns you see the popularity of other game choices selected. For example, 37 participants selected FPS

games as their most played game, of those 37, 16 played MMORPGs, 15 played Adventure games and 24 played Puzzle games.

Table 5

*Multiple digital game play styles*

	FPS	MMORPGs	Adventure	Puzzle
FPS	36	16	15	24
MMORPGs	16	23	10	15
Adventure	15	10	22	19
Puzzle	24	15	19	58

The next series of questions used the same scale (strongly disagree to strongly agree). These questions asked participants if they agree that digital games can be used to enhance a student's learning experience in the classroom. There were 15 participants who disagreed with this statement, 28 who neither agreed-nor-disagreed and 59 who agreed with this statement. Significantly more participants agreed that digital games can be used to enhance a student's learning experience in the classroom.

Evaluating the 59 participants who agreed that digital games can enhance a student's learning experience in the classroom, 36 agree that failure in game play can be a positive learning experience. In contrast, of those same 59 participants, 19 agreed that failure in game play can be a negative learning experience. More participants felt that failure in digital games can both be a positive learning experience and enhance learning in the classroom. These results are illustrated in Table 6.

Table 6

*Digital games: failure creating a positive or negative learning experience.*

	Positive Learning Experience	Negative Learning Experience
Disagree	1	17
Neither Agree-nor-Disagree	14	20
Agree	42	20

Participants were then asked if they learn better from failure in game play. Using the same scale (strongly disagree to strongly agree), there were more participants who agree than disagree that failure improves learning, but a significant number of students neither agree or disagree leaving this issue somewhat unresolved. There were 16 that disagreed that they learn better from failure. There were 59 participants who agreed that they learn better from failure in game play. There were 47 who were indifferent. Running a cross tabulation of these results with failure in game play can be a positive or a negative learning experience supported the use of failure. The results are illustrated in Table 7.

Table 7

*Learning better from failure: A positive or a negative learning experience*

	Positive Learning Experience	Negative Learning Experience
Disagree	1	13
Neither Agree-nor-Disagree	4	14
Agree	40	18

\*Using the 45 participants who agree that they learn better from failure in game play.

In the next statement participants were put in the position of failure and asked if they quit because of the assumed failure. Participants used the scale of strongly disagree to agree to respond. There were 51\* participants who disagreed, 29 who neither agreed-nor-disagreed with the statement and 16 who agreed. The majority of respondents disagreed, and would not quit the game if faced with failure. For participants who quit the game, they had an opportunity to enter a text response. Responses that occurred more than twice were noted. Participants stated: “I got bored with it”, “I have something else to do”, “I got frustrated”.

Participants were then asked if they would re-attempt the level if they failed. There were 65\* participants who agreed that they would re-attempt the level, seven participants disagreed and 13 neither agreed-nor-disagreed. Participants are more likely to re-attempt after failure than not. Participants were provided opportunity to enter a text response to explain why they re-attempt following the failure. Responses that appear more than twice were: “It’s the sense of achievement after beating that level or the game

itself”, “Failure should never mean quit. You would never get anywhere in life like that”, and “Because if you try again, you could succeed. You are always learning something new”.

Participants were then asked if failure can be a positive learning experience. Utilizing the same response scale (strongly disagree to strongly agree) participants responded to whether they agree that failure can be a positive learning experience. There were six participants who disagreed, 31 participants who neither agreed-nor-disagreed and 57\* participants agreed that failure can be a positive learning experience.

In contrast, participants were asked if failure can be a negative learning experience. There were 31 participants who disagreed that failure can be a negative learning experience, 44 participants who neither agreed-nor-disagreed and 33 participants who agreed that failure can be a negative learning experience. These results did not appear to be as significant as if failure can be a positive learning experience, as there was a more notable skewing of numbers toward agreeing that failure can be a negative experience.

The next question provided options to respondents. The base portion of the question stated: Failure can be an effective part of a lesson plan (course instruction): with three supplemental responses. These results will be illustrated in Table 8.

Table 8

*Failure can be an effective part of a lesson plan (course instruction):*

	Strongly Disagree	Disagree	Neither Agree-nor- Disagree	Agree	Strongly Agree
When there are no consequences to the learner.	4	20	29	45	11
When it is applied as a trial and error process.	1	5	28	62	13
When constructive feedback is provided following the failure.	0	7	24	56	22

Participants were in support that failure can be a part of the lesson plan in each of the three responses. They were more supportive of failure when used as a trial and error process (75 participants agreeing) and when constructive feedback is provided (78 participants agreeing). The lowest of the three was when there are no consequences to the learners with 56 who agreed. These results show that participants want some benefit to the failure, when there are no consequences; there are no benefits to trying. More students

agree that feedback following the failure is more desirable than when there are no consequences.

Participants were asked what their attitude was towards educational games. Different educational games were provided as examples for participants, these included: Oregon Trail, Number Munchers and Connect 4. Participants were able to rate their attitude on a scale using Very Bad, Bad, Poor, Neither Good nor Bad, Fair, Good and Very Good. Respondents' attitudes towards educational games were fairly positive. There were 44 participants who rated their attitude as good. There were only eight participants who rated their attitude on the negative half of the scale, with two rating their attitude as very bad, four rating their attitude as bad and two rating their attitude as poor.

Participants were then asked to rate their attitude towards recreational games. Recreational game examples were provided, these include: Halo, Angry Birds, and CandyCrush Saga. These responses were similar in distribution. There were 31 participants who rated their attitude towards recreational games as good. There were 16 participants who rated their attitude as poor.

Participants were then asked if they agreed if recreational games can be valuable in an educational setting. Participants were provided a rating scale of strongly disagree to strongly agree. There were 14 participants who disagreed that recreational games can be valuable in an education setting, and there were 59 participants who agreed that recreational games can be valuable in an educational setting. Though there was a majority of participants who supported recreational games as a valuable part of an educational setting there were 41 participants who neither agreed-nor-disagreed.

The final question in the fall 2014 distribution asked participants to what extent they agreed (strongly disagree to strongly agree) with the following statement: digital games can provide meaningful learning environments by providing participants with scenarios that require the application of various competencies, such as reading comprehension and problem solving skills. There was a strong population of participants who agreed with the statement (80 participants), only six participants disagreed. The strong positive response illustrates that participants feel that digital games provide learning environments for development of various competencies such as reading comprehension and problem solving skills.

### **Summary of Responses**

The responses to the survey questions provided useful insight as to how participants viewed failure, the use of failure as part of the learning experience and whether or not digital games can provide useful or meaningful learning experiences in the classroom.

Participants were more agreeable to the use of digital games in learning environments when opportunity for discussion and reflection were included. Participants also identified that learning from failure is acceptable and that they learn better from failure during game play. The student population also identified that they agree that failure can be a positive learning experience.

The final section of this chapter applies the results of the survey questions to the research questions identified in Chapter One. There were three research questions posed

at the start of the research. Results of the fall 2014 survey distribution were used to answer these research questions.

### **Research Question One**

How do students in a higher education classroom view failure? How do students view failure in games? To address this question, the results of the fall 2014 survey were used.

The first survey question from the fall 2014 distribution to be discussed is: I learn better from failure in game play. There were 16 participants who disagreed (combining both disagree and strongly disagree) with this statement. There were 48 participants who neither agreed-nor-disagreed with this statement. There were 59 participants who agreed (combining both agree and strongly agree) with this statement. There were significantly more participants who agreed that they learn better from failure in game play than those who disagreed with the statement. It is important to note that there was a significant population that who neither agreed-nor-disagreed with the statement.

The second question, I learn better from success in game play had the following responses: 22 participants disagreed (combining disagree and strongly disagree), 48 participants who neither agreed-nor-disagreed with the statement and there were 53 participants who agreed (combining agree and strongly agree) that they learn better from success in game play. The results are similar in numbers to learning better from failure. It is important to note that there were more participants who disagreed that they learn better from success (22 participants) than there were participants who disagreed that they learned

better from failure (16). The number of indifferent participants showed to be the same for both learning from failure and learning from success.

The third survey question, when I fail during game play (i.e. did not complete the level, died, ran out of time, etc.), I quit the game yielded the following results: 73 participants disagreed (combining disagree and strongly disagree), 29 participants neither agreed-nor-disagreed and there were 20 participants who agreed (combining agree with strongly agree) with the statement. These results illustrate that of the fall 2014 responses, significantly more participants acknowledged that they do not quit a game because of failure than participants who agreed that they quit and participants who neither agreed-nor-disagreed with the statement.

The fourth survey question allowed participants who responded to the previous question to explain their responses. Responses that occur more than twice will be listed. These include: I get frustrated and don't like to start over again, I am out of ideas and I have nothing in mind to help me proceed to the next level, I never like to feel like I failed and if a game is making me feel like that then I'm not going to keep playing it and I got bored.

The final survey question, "if I fail a level of a game, I will re-attempt that level" yielded the following results. There were seven participants who disagreed (combining disagree and strongly disagree), 13 participants who neither agreed-nor-disagreed with the statement and there were 103 participants who agreed (combining agree with strongly agree) that if they fail a level of a game, that they will re-attempt that level. This result shows a significant number of participants who refuse to allow failure to end game play. Again, participants had the opportunity to explain their responses. Responses that occur

more than twice indicated: I learn from the mistakes I made; I learn new things while practicing, to achieve success, failure should never mean quit; you would never get anywhere in life like that, you want to succeed – nobody wants to fail or be called a failure, because if you try again – you could succeed, you are always learning something new and because I want to succeed at that level. These responses support the survey responses to the previous questions.

### **Research Question One Summary**

To address the first research question, how do participants in a higher education classroom view failure, results fall 2014 survey will be considered. Though the results in the addressed surveys were too close to show any significant difference, participants did not consider failure (either in game play or outside of game play) to be an obstacle to their learning. Participants who encountered failure saw opportunity to challenge themselves to learn from the failure to continue or be successful.

The second part of the research question asked how they view failure in digital games. Based on the results of the survey, there is a similarity between participants' view of failure within the higher education classroom and in digital games. Participants acknowledged that failure is natural part of playing digital games, and though not typically welcomed in a higher education classroom it is something that they acknowledge they must face in order to become successful.

### **Research Question Two**

How are failure strategies used to promote learning in games? To address this question, the results of the fall 2014 survey were addressed and analyzed.

Using the results from the fall 2014 distribution, the following two survey questions were used: Failure in game play can be a positive learning experience; and Failure in game play can be a negative learning experience. First, failure in game play can be a positive learning experience. There were eight participants who disagreed (combining disagree with strongly disagree) with this statement, 31 participants who neither agreed-nor-disagreed with this statement and 80 participants who agreed (combining agree with strongly agree) with the statement. These results show a significant number of participants agreed that failure in game play can be a positive learning experience with 80 responding favorably.

In contrast, the second survey question was; Failure in game play can be a negative learning experience. The following are the results: 39 participants disagreed (combining disagree and strongly disagree), 44 participants who neither agreed-nor-disagreed with the statement and 36 participants who agreed (combining agree with strongly agree). These results show no significant difference between participants who disagree and participants who agree, there was a stronger representation of the participants who neither agreed-nor-disagreed with the statement.

It is interesting to note that more participants responded favorably that failure in game play can be a positive learning experience than a negative experience. These results show that participants can learn from failure and participants are able to progress successfully.

### **Research Question Two Summary**

In response to the second research question, how are failure strategies used to promote learning in games, results from the fall 2014 survey distributions were considered. From an early age, we are programmed to believe that failure is bad. To a certain degree, failure is a normal expectation within the classroom. Participants who participated in the 2014 survey distribution acknowledge that they learn better when they fail than when they succeed at a task. There was a significant student population from the fall 2014 distribution, 80 of 124 (64%), that noted that failure can foster a positive learning experience. In contrast, 36 of 124 (29%) noted that failure can foster a negative learning experience.

As noted above, failure can foster a positive learning experience during game play. Most participants expect a certain level of failure when participating in game play. There is a positive student population that acknowledges that digital games can be used to enhance a student's learning experience. When failure is expected, participants experience opportunity to discuss failures with others or to develop new strategies in order to successfully complete tasks. Failure teaches participants to better prepare, to have better analysis and to consider alternative options.

### **Research Question Three**

In what ways can we integrate failure strategies in games into our lesson plans in higher education? To address this question, the results of the fall 2014 survey distribution were analyzed.

To address the third and final research question, there were two survey questions used from the fall 2014 distribution. The first survey question had three components to the question. First, Failure can be an effective part of a lesson plan (course instruction) when there are no consequences to the learner. Participants from the fall 2014 distribution responded as follows: 24 participants disagreed (combining disagree and strongly disagree), 29 who neither agreed-nor-disagreed with the statement and 56 participants who agree (combining agree and strongly agree) that failure can be part of a lesson plan when there are no consequences to the learner. There were twice as many participants who agreed that failure can be an effective part of a lesson plan when there are no consequences to the learner than those who disagreed or who neither agreed-nor-disagreed with the statement.

The second component read as follows: Failure can be an effective part of a lesson plan (course instruction) when it is applied as a trial and error process. This question component received the following results: six participants disagreed (combining disagree and strongly disagree), 28 participants who neither agree-nor-disagree and 75 who agree (combining agree and strongly agree) that failure can be an effective part of a lesson plan when it is applied as part of a trial and error process. This result shows a significant number of participants (75 participants) who agree that failure can be an effective part of a lesson plan when it is applied as part of a trial and error process over participants who disagree (six participants).

The third and final component of the question reads as follows: failure can be an effective part of a lesson plan when constructive feedback is provided following the

failure. The results are as follows: seven participants disagreed (combining disagree and strongly disagree), 24 participants neither agreed-nor-disagreed and 78 participants who agreed that failure can be an effective part of a lesson plan when constructive feedback is provided following the failure. There were significantly more participants who agreed (78 participants) that failure can be an effective part of a lesson plan when constructive feedback is provided following the failure than participants who disagreed (7 participants) that failure can be effective even when constructive feedback is provided.

The second survey question used was, 'Digital games can provide meaningful learning environments by providing participants with scenarios that require the application of various competencies such as reading comprehension and problem solving skills'. This survey question provided the following results: six participants disagree (combining disagree and strongly disagree), 32 participants who neither agree-nor-disagree and 80 participants who agree (combining agree and strongly agree). These results show a significant number of participants who agree that digital games can provide meaningful learning environments by providing participants with scenarios that require application of various competencies, such as reading comprehension and problem solving skills.

### **Research Question Three Summary**

The third and final research question asks in what ways can we integrate failure strategies in games into our lesson plans in higher education. Using the results from the summer 2014 and fall 2014 survey distribution, there was a significant student population that agreed that failure can be used as a learning strategy. As educators, we can integrate

failure strategies in games into higher education classrooms by including failure as an assessment tool. Using failure as an assessment tool may include: having a debriefing following an activity to discuss what participants encountered and how they overcame obstacles and participating in a discussion board in online classes.

Participants who participated in the survey agreed that failure can be an effective part of a lesson plan when there are no consequences to the learner, when it is applied as a trial and error process and when there is constructive feedback provided following the failure. When participants are not afraid of failure (no consequences), they may be more likely to take risks that they may normally avoid when faced with penalties or consequences. Participants acknowledged that failure could be an effective part of a lesson plan when applied as a trial and error process. For participants this may mean having multiple opportunities to complete a task, each time learning something from the experience and applying it to future situations. Finally, participants strongly agreed that failure could be an effective part of a lesson plan when constructive feedback is provided following the failure. Feedback, as noted in Chapter two, is an important element of using failure successfully. Feedback is an essential element of game play and within the classroom. Feedback provides information back to the participants on what and how to improve, feedback keeps players (and participants) aware of their relationships with the goal(s).

## **CHAPTER FIVE**

The following pages will present a summary and conclusions drawn from the study, and a summary of the responses to the research questions. In addition to these areas, limitations to the research and suggestions for future research will be addressed and followed by a final summary.

### **Summary and Conclusions**

The perceptions of students' uses of failure as a learning strategy in a higher education classroom are varied. During the course of this research study, perceptions of the use of failure as a learning strategy, and the potential benefit of including gamification practices in a higher education classroom were explored. Opinions of both undergraduate and graduate students were considered during this project.

It is evident from the research that failure is an important part of the learning process. Researchers explain that video games can scaffold the learner's development, help learners to adapt to different levels of knowledge and motivation, and provide "infinite" patience for learners who need to attempt tasks multiple times before developing competence (Morris et al, 2013).

### **Research Question Summaries**

The first research question posed in Chapter One asks, "How do students in a higher educational classroom view failure? How do they view failure in games?" The literature review revealed that failure, as perceived by students, has a negative stigma naturally associated with it. Carr (2013) states that when a student fails a grade level, we

identify them as being “held back”, “left behind” and may lead the student to become emotionally, socially, academically, and physically separated from their peers.

The survey that was administered revealed that students in a higher education classroom view failure as a necessary element in a learning environment. Students who experience failure acknowledge deficiencies in themselves as reasons for their failure. When asked if students will re-attempt a level of a game following failure, 102 out of 123\* (82%) participants stated that they would re-attempt. Students cited that when they re-attempt following a failure experience in a digital game, they feel accomplished; they want to improve and do not want to give up. Some students explained that that they want to succeed, that it is better to try again than to give up. Participants also stated that they don't like the feeling of failure and want to prove to themselves that they can do better.

The responses from participants in this study do not overtly agree with the literature review. However, the responses show that failure is not a setback to their learning. Participants are willing to accept a certain amount of failure if they are learning from mistakes and moving forward. This is an interesting addition to the research field. Existing research focused on motivation and instructors that did not incite motivation from the student. This research suggests that the motivation may be student centered (the student taking the initiative to beat or overcome the obstacle).

The second research question posed in Chapter One asks, “How are failure strategies used to promote learning in games?” Research suggests that failure is an attractive element of the gaming experience as it promotes continued practice (Gee, 2009; Groff, et al., 2010; Ke, 2009). Players are encouraged to improve by repeated practice

either by advancing within the game or replaying portions of the game. Some research even states that failure makes all winning more enjoyable (Wolf & Perron, 2009), failure within the game provides learning opportunities about what does and does not work. These thoughts were echoed by participants in the survey distribution. Participants cited that it is a good feeling of accomplishment when you finally finish the level, they want to improve, and they like the challenge. These results of this study match what is suggested in the literature review.

The third and final research question posed in Chapter One asks, “In what ways can we integrate failure strategies in games into our lesson plans in higher education?” The reviewed literature supports the use of failure strategies as learning tools. Marquis (2013) suggests that video games are built on the premise that progress happens through a process of experimentation, failure, and adaptation. This process is what is commonly understood as trial and error. Classrooms, educators and students value the concept of if at first we don’t succeed, we try, try again. As educators we can attempt to remove the negative stigma associated with the term failure. As educators we can also debrief our students following failure experiences and ask them for feedback or insight on the failure experience. This provides opportunity for students to reflect on the experience and what they can do to improve and move on from the failure.

The survey results from the fall 2014 distribution show that participants felt that failure can be an effective part of a lesson plan when constructive feedback is provided following the failure experience (29 students agreed), as part of a trial and error process (27 students agreed) and when there are no consequences to the learner (21 students

agreed). The results compliment what is found in the literature review. The trial and error process (Marquis, 2013) was the most utilized method found in the research, however, the second most utilized suggested that a dialogue following the failure experience would be beneficial (Marquis, 2013; McGonigal, 2011; Shute, 2011). All research suggested that there must be some element of either discussion or debriefing following the failure experience.

### **Conclusions**

Several conclusions can be drawn based on the results of the literature review and the research study. The first conclusion is that failure in games can be an effective learning element. Literature suggests that failure in games promotes critical thinking and problem solving skills in students (Gee, 2009; Groff et al., 2010; Ke, 2009; Klopfer, et. al., 2009). These are essential elements in learning, especially in a higher education classroom. The conducted survey results show that 80 out of 123 (65%) participants agree that digital games can provide meaningful learning environments by providing students with scenarios that require the application of various competencies, such as reading comprehension and problem solving skills.

The next conclusion that can be drawn is that failure can be an effective part of the course instruction. The literature review suggests that the trial and error process and a debriefing following the failure experience would be beneficial to students who experience failure (Marquis, 2013; McGonigal, 2011; Shute, 2011). The survey results from the fall 2014 distribution illustrates failure can be an effective part of a lesson plan when constructive feedback is provided following the failure experience, as part of a trial

and error process and when there are no consequences to the learner. More students agreed to both the options of feedback following the failure and the trial and error process.

Third, failure is an acceptable risk in games and remains uncertain in education. Research suggests that failure in gaming is expected or anticipated. McGonigal (2011) suggests that error and failure in gaming environments may not aggravate anxiety and threaten attention in the same way it does in academic contexts. This research study focused on failure in the gaming context and did not further explore the connotation of failure in an educational setting. Additional insight of how students perceive failure in educational contexts is needed and suggested for future studies.

### **Limitations of the Research**

During the course of the research there were different limitations identified. In terms of the literature review, the material accessed on perceptions of failure in the academic classroom was limited in scope; most of it was focused on K-12 environments rather than higher education. There was little research on perceptions of failure in the positive nature (i.e. that failure can be positive). The literature about students' perceptions of failure was limited in size of available resources and relevancy towards academics; some of the research was more centered on athletics.

Beyond the literature limitations, survey participants were limited. Though the population surveyed was convenient to the researcher, the participation rate was low (18% for the fall distribution). The survey was distributed as optional and had no benefit

to participate and no penalty for declining participation. Repeating this research to acquire a higher participation rate may yield different results in the future.

### **Suggestions for Future Research**

Future researchers may wish to use and analyze more text based questions that may reveal students perception of failure; academically and, within game play. Text based replies may provide additional insight as to how students actually view failure since the available literature is limited in scope.

In addition to text-based replies, future researchers may evaluate the game play styles (such as First Person Shooters, Puzzle or Adventure) and participants' perception of failure in different styles of game play. Different gaming styles require different abilities; these abilities may be strengthened (or weakened) through failure.

Finally, research based on actual applications of failure in the gamified classroom such as failure without consequences, failure with feedback, and failure with trial and error should be conducted to move beyond the exploration of general perceptions in this study toward specific perceptions when experiencing each of these types of failure. This extension of the research should also investigate the impact on the types of essential skills developed in the gamified classroom.

### **Summary**

The use of failure as a learning strategy in higher education can be a beneficial addition. Failure promotes the development of essential skills such as problem solving, critical thinking and reading comprehension. Taking the lead from digital games, failure can be used as a positive experience. The use of failure in an educational environment

provides opportunity for students and instructors to participate in a discussion about the results of the failure and what assumptions can be drawn from the failure itself. The negative connotation associated with failure needs to be challenged to encompass the learning that naturally occurs following failure experiences.

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**APPENDIX A****Survey Questions Administered -- Summer 2014**

1. If you consent to being a participant in this research study, select agree. If you do not consent to being a part of the research study, select disagree.
  - a. Agree
  - b. Disagree
2. Are you male or female?
  - a. Male
  - b. Female
3. How old are you?
  - a. 18-25
  - b. 26-33
  - c. 34-41
  - d. 42 or older
4. What is your highest level of education completed?
  - a. 0-29 credits completed
  - b. 30-59 credits completed
  - c. 60-89 credits completed
  - d. 90 credits or more completed
5. Which college do you affiliate with?
  - a. College of Allied Health and Nursing

- b. College of Arts and Humanities
  - c. College of Business
  - d. College of Education
  - e. College of Extended Learning
  - f. College of Graduate Studies and Research
  - g. College of Science, Engineering and Technology
  - h. College of Social and Behavioral Sciences
6. What type of degree are you pursuing?
- a. Associate of Arts (AA)
  - b. Bachelor of Arts (BA)
  - c. Bachelor of Athletic Training (BATR)
  - d. Bachelor of Fine Arts (BFA)
  - e. Bachelor of Music (BM)
  - f. Bachelor of Science (BS)
  - g. Bachelor of Science in Engineering (including Civil, Computer, Electrical, and Mechanical)
  - h. Bachelor of Science in Social Work (BSSW)
  - i. Master of Arts (MA)
  - j. Master of Business Administration (MBA)
  - k. Master of Accounting (MAcc)
  - l. Master of Science (MS)
  - m. Master of Social Work (MSW)

- n. Master of Education (MEd)
- o. Master of Music (MM)
- p. Master of Public Administration (MPA)
- q. Doctor of Education (EdD) – Counselor Education and Supervision
- r. Doctor of Psychology (PsyD)
- s. Doctor of Education (EdD) Educational Leadership
- t. Other

7. Do you play digital games?

- a. Yes
- b. No

8. How frequent do you play digital games?

- a. Never
- b. Less than once a month
- c. Once a month
- d. 2-3 times a month
- e. Once a week
- f. 2-3 times a week
- g. Daily

9. Do you play first person shooters (i.e. Call of Duty, Halo, etc.)?

- a. Yes
- b. No

10. Do you play MMORPG's such as World of Warcraft, Final Fantasy or

GuildWars?

a. Yes

b. No

11. Do you play adventure games like Myst or Dark Fall: Lost Souls

a. Yes

b. No

12. Do you play puzzle games such as Tetris, CandyCrush Saga or Professor Layton?

a. Yes

b. No

13. How often do you play the following?

	First Person Shooters	MMORPGs	Adventure Games	Puzzle Games
Never				
Less than Once a Month				
Once a Month				
2-3 Times a Month				
Once a Week				
2-3 Times a Week				
Daily				

14. Digital games can be used to enhance a students learning experience in the classroom?
- a. Strongly Disagree
  - b. Disagree
  - c. Neither Agree nor Disagree
  - d. Agree
  - e. Strongly Agree
15. You learn better when you successfully complete a task (in game play) than when you fail at a task (in game play)?
- a. Strongly Disagree
  - b. Disagree
  - c. Neither Agree nor Disagree
  - d. Agree
  - e. Strongly Agree
16. When you fail a level of a game (i.e. did not successfully complete the level, died, ran out of time, etc.), do you quit the game or continue?
- a. Quit
  - b. Continue
  - c. Depends on my mood
17. If you quit, why do you quit?  
(dialogue box)

18. If you continue, why do you continue?

(dialogue box)

19. Failure (when you unsuccessfully complete a task) is viewed as a positive element.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

20. Failure (When you unsuccessfully complete a task) can be used as an effective assessment tool (standardized means of obtaining information)?

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

21. Failure can be used as a lesson plan (as part of course instruction).

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

22. Failure can be used as a learning strategy (an approach used by students to help them understand information and solve problems).

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

**APPENDIX B****Survey Questions Administered -- Fall 2014**

1. Which biological sex do you identify with?
  - a. Male
  - b. Female
  - c. Prefer not to disclose
  
2. How old are you?  
(dialogue box)
  
3. Which year in college are you?
  - a. Freshman
  - b. Sophomore
  - c. Junior
  - d. Senior
  - e. Graduate Student
  - f. Choose not to disclose
  
4. Which college do you affiliate with?
  - a. College of Allied Health and Nursing
  - b. College of Arts & Humanities
  - c. College of Business
  - d. College of Education
  - e. College of Extended Learning

- f. College of Graduate Studies and Research
  - g. College of Science, Engineering and Technology
  - h. College of Social and Behavioral Sciences
5. Which type of degree are you pursuing?
- a. Associate of Arts (A.A.)
  - b. Bachelor of Arts (B.A.)
  - c. Bachelor of Athletic Training (BATR)
  - d. Bachelor of Fine Arts (B.F.A.)
  - e. Bachelor of Music (B.M.)
  - f. Bachelor of Science (B.S.)
  - g. Bachelor of Science in Engineering (Including: Civil, Computer, Electrical and Mechanical) (B.S.E.)
  - h. Bachelor of Science in Social Work (B.S.S.W.)
  - i. Master of Arts (M.A.)
  - j. Master of Business Administration (MBA)
  - k. Master of Accounting (M.Acc.)
  - l. Master of Science (M.S.)
  - m. Master of Fine Arts (M.F.A.)
  - n. Master of Social Work (M.S.W.)
  - o. Master of Education (M.Ed.)
  - p. Master of Public Administration (M.P.A.)
  - q. Doctor of Education – Counselor Education and Supervision (Ed.D.)

- r. Doctor of Nursing Practice (D.N.P.)
  - s. Doctor of Psychology (Psy. D.)
  - t. Doctor of Education – Educational Leadership (Ed.D.)
  - u. Other
6. Do you play digital games? (Including: Gaming consoles, computers, and mobile devices)
- a. Yes
  - b. No
7. On average, how many hours per week do you play digital games?
- a. 1-3 hours
  - b. 4-8 hours
  - c. 9+ hours
8. Do you play First Person Shooters? (These games include: Battlefield, Call of Duty, and Halo)
- a. Yes
  - b. No
9. On average, how many hours per week do you play first person shooters?  
(Example: 5 hours)
- a. 1-3 hours
  - b. 4-8 hours
  - c. 9+ hours

10. Do you play Massive Multiplayer Online Role Playing Games (MMORPGs)?

(These games include Elder Scrolls Oblivion, Guild Wars, Star Wars: The Old Republic, and World of Warcraft)

- a. Yes
- b. No

11. On average, how many hours per week do you play MMORPGs? (Example: 5 hours)

- a. 1-3 hours
- b. 4-8 hours
- c. 9+ hours

12. Do you play adventure games? (These include Dark Fall: Lost Souls, The Walking Dead, Resonance)

- a. Yes
- b. No

13. On average, how many hours a week do you play adventure games? (Example: 5 hours)

- a. 1-3 hours
- b. 4-8 hours
- c. 9+ hours

14. Do you play puzzle games? (These games include: Tetris, CandyCrush, Professor Layton, Portal, and BrainAge)
- Yes
  - No
15. On average, how many hours a week do you play puzzle games? (Example: 5 hours)
- 1-3 hours
  - 4-8 hours
  - 9+ hours
16. Digital games can be used to enhance a students learning experience in the classroom.
- Strongly Disagree
  - Disagree
  - Neither Agree nor Disagree
  - Agree
  - Strongly Agree
17. I learn better from failure in game play.
- Strongly Disagree
  - Disagree
  - Neither Agree nor Disagree
  - Agree
  - Strongly Agree

18. I learn better from success in game play.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

19. When I fail during game play (example: did not complete the level, died, ran out of time, etc.), I quit the game.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

20. I quit the game because:

(dialogue box)

21. If I fail a level of a game, I will re-attempt that level.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

22. Why do you reattempt the level after failure?

(dialogue box)

23. Failure in game play can be a positive learning experience.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

24. Failure in game play can be a negative learning experience

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

25. Failure can be an effective part of a lesson plan (course instruction:

	Not at all likely		Extremely likely		
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
When there are no consequences to the learner.					
When it is applied as a trial and error process.					
When constructive feedback is provided following the failure.					

26. My attitude towards educational games (such as Oregon Trail, Number Munchers, Connect 4, etc.) is:

- a. Very Bad
- b. Bad
- c. Poor
- d. Neither Good nor Bad

- e. Fair
- f. Good
- g. Very Good

27. My attitude towards recreational games (such as Halo, Angry Birds, CandyCrush, etc.) is:

- a. Very Bad
- b. Bad
- c. Poor
- d. Neither Good nor Bad
- e. Fair
- f. Good
- g. Very Good

28. Recreational games can be valuable in an educational setting.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

29. Digital games can provide meaningful learning environments by providing students with scenarios that require the application of various competencies, such as reading comprehension and problem solving skills.

- a. Strongly Disagree
- b. Disagree
- c. Neither Agree nor Disagree
- d. Agree
- e. Strongly Agree

