GAMIFICATION: A GUIDELINE FOR INTEGRATING AND ALIGNING DIGITAL GAME ELEMENTS INTO A CURRICULUM

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A Thesis
Submitted to the Graduate College of Bowling Green State University in partial fulfillment of the requirements for the degree of

MASTER OF EDUCATION

August 2012

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ABSTRACT

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Motivating students to learn is one primary goal of education. The same students that are unmotivated in school are highly motivated to play digital games. However, educational games have not enjoyed the same success as commercial games. An alternative approach to transforming education is to apply the aspect of popular game design into the more traditional existing best practice within the schools. Gamification is the process of integrating digital game attributes into an academic curriculum utilizing things such as levels, challenges and rewards with the goal of increasing student engagement. Thus, designing educational curriculum in the same way that successful games are designed may lead to more effective teaching and learning. This study used a review of literature and experts to create a set of guidelines of digital game attributes and design that can be applied to a more traditional curriculum. One purpose of this guideline was to provide educators with an alternative method of curriculum design and content delivery. The second purpose of this guideline was to provide suggestions for how teachers as to how they might implement digital game elements into an academic setting.
ACKNOWLEDGEMENTS

I would like to thank all of the faculty and staff at Bowling Green State University for their guidance and support. I want to thank Dr. Terry Herman for her instrumental role in my success. I would also like to thank the members of my committee and my expert panel for providing me with a wealth of expertise during my research. Finally, I would like to thank my entire family including my parents Don and Judy Mieure who encouraged me to go back to school, my wife Teresa Mieure, and children Andrew Mieure, Samantha Mieure, and Gabriel Mieure who encouraged and supported me every step of the way. Thank you.
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CHAPTER I: INTRODUCTION

Context of the Problem

Today’s educational system is largely based in Industrial Age theories. The factory and model school and college replaced the one room schoolhouse of the Agrarian age during the Industrial Age (Draves & Coates, 2011). These theories stress the ideas that education should have a hierarchy in which the instructor dictates the teaching of the learners. Also prevalent in these theories are the idea that one should learn from written text by means of absorbing information and then regurgitating the learned information. Currently the factory school is being transformed into a new pedagogical model for the 21st century (Draves & Coates, 2011). Even with enormous technological advances in recent decades that have changed the way humans live, the educational system still remains primarily the same. There is no question that there have been changes, e-learning being an example; however, it still relies on content delivery systems that match or highly resemble those of the past.

So what is the problem? The problem is that newer generations have grown up differently. Newer generations have grown up with technologies that have altered human socialization. They have had access to laptop computers, mobile phones, video game consoles, and handheld communication devices. This has changed the way they live their lives, and hence has changed the ways in which they learn new information, gain new knowledge, and socialize with each other (Prensky, 2002, 2005). Educational systems have been slow to adapt to this new kind of learner. Of all these technologies that have transformed and changed recent generations, digital games is perhaps one of the most influential. In fact, today three billion hours per week are spent playing digital games around the world and five hundred million people play digital games at least 1 hour per day (McGonigal, 2010). Furthermore, in the “gamer culture” a gamer
will have played digital games for 10,000 hours by the age of 21. A student will have spent
10,080 hours in a classroom from the fifth grade to high school graduation (McGonigal, 2010).
This should be a clear signal that the core elements of video games correlate with the tendencies
of newer, and in some cases, older generations.

There has been overwhelming research showing that students have become less engaged
within current educational settings (Prensky, 2005). There have also been a number of proposals
that have been introduced with the hope of making education more dynamic and engaging. Some
of these ideas have worked and many of them have not. The fact remains that there is still a lot of
work to do when it comes to transforming the educational system to meet the needs of newer
generation students. Meeting these expectations will require an evaluation of what factors are
most engaging to learners with the goal of enriching the experience and meeting the learning
outcomes. Learner centered, not instructor centered, and content delivery, not content absorbing
attributes must be pursued and implemented. Digital games, which have become so ubiquitous to
newer generations, may hold some answers to this transition.

**Statement of the Problem**

The problem of this study was to identify and analyze how specific digital game
attributes can be crafted into a best practices guideline, which could be used in the gamification
of a higher education curriculum for the purpose of increasing collaboration, engagement, and
effective learning.

**Objectives**

The objectives of this study were to:

1.) Identify video game attributes that can be effective strategies in the delivery of
content to students.
2.) Create a guideline of best practices utilizing the cognitive factors of video game design which can be effectively integrated into a curriculum.

3.) Convene an expert panel of six to eight individuals with expertise in instructional design, engagement, and game-based learning to review the model in an alpha/beta iterative testing methodology.

**Significance of the Study**

Extensive research has been done in the area of video games and education. Many experts have proposed the implementation of video game attributes and elements into educational settings for the purpose of increasing engagement. To this time, there has been very little tangible evidence of a clear, systematic way to accomplish this. Educational games have rendered some success; however, they have been slow to progress and usually lack quality design. Much of this comes from the lack of profit that is affiliated with serious games and the failure to implement a universal design that can be crafted into a large number of curricula. Pure games have also produced a number of studies that have delivered mixed results. The entertainment focus of pure games has proven difficult to translate into educational uses. Thus, it is time to begin using the wealth of research conducted in the area of video games and learning to implement a more structured framework that can effectively be applied to actual classroom situations. The researcher attempted to present and confirm a model that blends video game attributes, digital technologies, and traditional measuring of learning outcomes to enhance the educational environment and engage learners. There is more than enough research conducted on the subject and not enough implementation. Therefore, the researcher will attempt to “bridge” the cognitive elements of video games and the “actual” learning environment and by aligning the
content, the game and the classroom to show that it can in fact be successful. As in the words of Richard Van Eck (2006),

> What is needed now is (1) research explaining why DGBL [digital game-based learning] is engaging and effective, and (2) practical guidance for how (when, with whom, and under what conditions) games can be integrated into the learning process to maximize their learning potential. We are ill-prepared to provide the needed guidance because so much of the past DGBL research, though good, has focused on efficacy (the message that games can be effective) rather than on explanation (why and how they are effective) and prescription (how to actually implement DGBL). (p. 1)

**Definition of Terms**

Digital Game-Based Learning or DGBL: "Game-based learning" refers to teaching-learning actions carried out in formal and/or informal educational settings by adopting games (Kirriemuir & McFarlane, 2004, p. 19).

Serious Game: A game designed for a primary purpose other than pure entertainment (Serious Game, n.d.).

Experience Point: An experience point (often abbreviated to EXP or XP) is a unit of measurement used in many role playing games (RPGs) and role playing video games to quantify a player character's progression through the game (Experience Point, n.d.).
CHAPTER II: REVIEW OF THE LITERATURE

Video games have become increasingly embedded into our society. Many people play some type of video game on a daily basis. Whether it is a computer game, a social network game, or a console game this phenomenon reaches across people of all ages. Since the “golden age” of video games that attracted customers to arcades in order to play such classics as Pac Man and Space Invaders, society has witnessed an amazing progression of the games themselves and the people that play them. Video games are no longer just for bored teenagers at a local arcade. They have now become a huge commercial business that attracts people of all ages and from all walks of life. Not only has the consumer base grown but also the platforms in which games are played. There are now console games using wireless and motion censored controllers, games built into social network sites, off-the-shelf personal computer games, downloadable computer games, handheld game devices, and mobile phone games. It is clear that humans like to play games in a number of different realms. The video game industry has continued to grow and currently yields more profit than the music and movie industry, making the video game industry the leader of the entertainment world. Perhaps just as intriguing is the mass number of people that play games. Doug Lowenstein, president of the Entertainment Software Association, said “there will soon be 75 million Americans who are 10 to 30 years old—an age bracket that grew up on video games” (Seattle Times, 2006). This statement holds a lot of reflection. It would indicate that we are reaching a time when every future generation will grow up with digital games.

So what is the secret behind the success of video games and gaming? Actually, there are a number of ways to answer this question. There are endless reasons for this phenomenon including motivation, fun, entertainment, competition, socialization, and immersive engagement
just to name some. There seems to be a natural attraction to video games and people willing to spend money to play them.

Video game designers know this supporting why video game design is critical to the industry. Looking further than the graphics and visuals of video games, there is clearly a cognitive factor that goes into their design. Perhaps these video game designers have uncovered a new tendency in human nature over the past three decades. Many will watch in amazement at the profits that this industry collects. However, some of us will take a closer look into the phenomenon. A view that sees video games and their players as a new discovery of human nature. A view that expands upon the idea that video games are so captivating to the human mind. With this view, some will take this new found information and apply it to the betterment of human society. In the words of Doug Lowenstein, "Common sense tells us that a medium so basic to the lives of these 'Millennials' has potential beyond the living room. We would be crazy not to seek ways to exploit interactive games to teach our children" (Seattle Times, 2006).

Today's Learners

There is something different about the learners of today as opposed to the learners of the past. This can be seen in many different facets, most importantly their surroundings and their expectations. The current educational system is based primarily on 19th century ideals from the industrial age. It focuses on a hierarchy of teacher and learner. The instructor is to present the content and the learner is to absorb the content and then be tested to determine the learning outcomes. However, something new is happening in society: the digital age. Recent generations of learners have had the blessing of emerging technologies. As a result of this, learners today are engaged with technology all the time. They no longer look to a professor or instructor as the only means of learning information. They no longer depend on face-to-face interactions to socialize.
As a result of these things, they are different. However, the educational system has failed to transform accordingly. As indicated by Marc Prensky (2005):

Every single student we teach has something in his or her life that’s really engaging—something that they do, that they are good at, something that has an engaging, creative component to it. And if we educators don’t start coming up with some damned good curricular gameplay for our students and soon they’ll all come to school wearing (at least virtually in their minds) the t-shirt I recently saw a kid wearing in New York City: “It’s Not ADD—I’m Just Not Listening!” So hi there—I’m the tuned-out kid in the back row with the headphones. Are you going to engage me today, or enrage me? The choice is yours. (p. 64)

In this instance, Prensky makes a reasonable reflection of the new learner.

Many have indicated that the educational system has not yet transformed enough to meet the needs of new learners. New learners of this generation demand more engagement, collaboration, and an environment that is learner centered. It seems that this is part of the problem. The distance between traditional teaching tactics and the learner is the result of the change in the learner. Prensky makes note of this issue when he states (2002):

The goal of keeping users (i.e., learners) engaged is, of course, not the primary concern of educators. The primary goal of educators is to instruct, i.e., to get the material across. Learners are typically trapped, either physically in a classroom, or by their goals. Although some small effort may be put toward engagement, if the learning process is a painful one, well, tough. (p. 3)

Therefore it can be argued that transformations in the educational system need to come from recognition of the traits of new learners and an attempt to reform the presentation and
delivery of the content. This has been slow to come. There has been plenty of research to show different ways in which changes can be made, however not many of these changes have truly taken hold. One could have easily guessed that with the advancement of technology and its tools that the educational system would be more inclined to capitalize. Perhaps the new learner should be looked at in another light, not just that they expect different things than what was expected by learners in the past, but that they live in a changed world. It is frequently mentioned how technology has changed the world and recent generations; there is not much argument there. However, it can be argued that other societal domains have also influenced this. Perhaps students are recognizing that education is no longer just a generalization. Maybe they recognize that in a new global world, knowing a little bit about a lot is not as good as knowing a lot about a little. Or perhaps they realize that the ability to find and locate information quickly and effectively is more important than already knowing it. There is no doubt that people have to learn the basic functions in society such as reading, writing, and communication. However, many students may feel that most of what they learn will never apply to real life. It is imaginable that a college student does not see an education as a “guarantee” of employment. So it is only natural that they would ask “what else is in it for me?” This is where the educational system needs to be more dynamic to meet the changing attitudes of new learners. Not just from the standpoint of how classes are taught and what technology can be used to help teach them, but just as importantly from the standpoint of what the students are demanding.

**Engagement and Collaboration**

Engagement and collaboration are extremely important aspects within the realm of video games and education. Much of this research has determined that key aspects of video games include engagement and collaboration of the players. In most every case of credible research, the
two are listed as aspects that lead to a successful game. In fact, one could easily argue that collaboration is the axle of most online games and social network games. These cognitive factors are successfully woven into the game leading players to become engaged in the game and engaged in socialization while playing the game. Many of the most successful online games are based on the premise that in order to successfully complete the game, some kind of collaboration is required. Upon research of the subject there is little doubt that good game designers know and use this to keep players playing the game.

In regards to education, one of the most prominent positions on student engagement is the Engagement Theory by Greg Kearsley and Ben Shneiderman (1998). They describe the following:

The fundamental idea underlying engagement theory is that students must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks. While in principle, such engagement could occur without the use of technology, we believe that technology can facilitate engagement in ways which are difficult to achieve otherwise. So engagement theory is intended to be a conceptual framework for technology-based learning and teaching. (p. 1)

With this definition in mind it is clear that collaboration that utilizes technology is a key element. Engagement theory encompasses the idea that an educational setting will be enhanced with collaboration and group projects. Furthermore, it can be noted that collaboration itself can be administered to almost any environment. As stated by Kearsley and Shneiderman, “collaborative learning is a technique that applies to any domain. Math students can work on problems, English students can review each other's work, Computer Science students can develop or debug programs together, and so on” (Kearsley & Shneiderman, 1998, p. 1).
primary goal of collaboration in an educational environment is to foster engagement of the students. Examining the elements of video games, one can make a clear connection between the success of video games and their inherent collaboration and engagement of the players. Thus it should be easily argued that those inherent qualities of a good video game could be rather seamlessly transferred into a curriculum.

Research is showing that a shift to a more collaborative environment in educational settings is needed. It has been argued by many that this need for collaboration derives from a change in the learners. Amory states that educators should push for collaboration among students because learning is social and dialogue is the foundation of social constructivism (Amory, 2006). This again shows a clear change in the attitudes of today's students and learners. Marc Prensky states “The Games Generation has been raised with, and become accustomed to, the worldwide connectedness of email, broadcast messages, bulletin boards, usergroups, chat, multiplayer games, and instant messaging” (Prensky, 2001, p. 57). With this in mind, it seems clear that we are now dealing with a different sort of learner. We are dealing with a learner that is used to collaborating on many levels, from day-to-day communication to leisure activities such as playing video games. They collaborate to be engaged in life. It is no surprise that they expect the same from an educational setting. The unsurpassed success of massive multiplayer online games such as World of Warcraft, social network games like Farmville, and the Xbox live community demonstrates this. People like to work with other people under the umbrella of technology to achieve a goal. This is what makes collaboration and engagement no longer just an educational option, but a necessity.
Motivation

Motivation is the driving force by which humans achieve their goals, and motivation can be described as intrinsic or extrinsic (Cherry, 2012). Motivation is certainly a basic human trait, and it is a trait that is key to the success of video games. Intrinsic motivation refers to motivation that is driven by an interest or enjoyment in the task itself, and exists within the individual rather than relying on any external pressure (Cherry, 2012). There is research that connects human motivation to video games and education. In fact, motivation is a key element that drives people to play video games and also learn. Hence it is important that we recognize where all of this ties together.

From the standpoint of video games, one can revert back to the basic trait of motivation. One has to be motivated to go out and spend money to buy a video game, then to play the video game, and ultimately be successful at that game. Even before an individual purchases a video game, motivational factors are already at play. Examining the basic premise that motivation is why people do what they do, this should also apply equally to learning. If someone is motivated to learn a subject or content, they will most likely do so. The engagement theory argues that in order to foster this motivation, an effective environment must first be created. The theory explains that “students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities” (Kearsley & Shneiderman, 1998, p. 1). So it is clear that video games create an environment for which the player is motivated to play the game. Research clearly supports this idea. Research shows that one might expect to see is increased motivation, as many would agree that playing games is at least motivating, and probably educational. Early research on arcade style games supports this hypothesis, showing that games create intrinsic motivation through fantasy, control, challenge, curiosity, and competition. (Cordova & Lepper,
1996; Malone, 1981). One might also hypothesize that games leverage players' natural desires to
develop new skills, participate in new roles, or better understand the world from a new or
"professional" perspective (Gee, 2003, p 1; Squire, 2005).

Motivation for these gamers was not simply a "property" or variable that they either had or did not; it emerged through the intersection of students' goals, the game's affordances, their life histories, and institutional context (Squire, 2005). This seems to be a very formidable approach to the harnessing power of video games. In fact, much research suggests that the use of games for learning leads to improved general learning, increased motivation, and improved performance in situations where the proper applications of digital games are used. It is realized that digital games can be an effective part of learning outcomes. (Prensky, 2001). By recognizing the motivational factors behind the success of video games, educators should be able to use these same factors to motivate and engage students. Though there has been some progress with this issue, it seems that it has not been taken seriously enough to date in order to produce the results that it is capable of producing. People in general are enticed by games. Whether we are talking about computer games, console games, board games, games on a mobile phone, or even credit card points and miles, games motivate people to achieve goals. As indicated by Prensky, “Why is motivation such a big problem? Because all learning requires effort, and, like crime, people rarely do it without a motive” (Prensky, 2002, p. 19). These same strategies need to be introduced into educational settings to lay the groundwork for motivation, collaboration, and engagement of the learner. In short, there is a lot to be learned from the motivational success of video game design.
Cognitive Elements

The research has demonstrated that there are a number of cognitive factors that go into successful video game design and implementation. In fact, Gee writes that video games are not just a waste of time, but by playing video games a person is learning to experience, collaborating, developing resources, and thinking in ways that engage and manipulate (Gee, 2003). Gee goes on further to say that while e-learning has a reputation for being boring and ineffective, on the contrary games have developed a reputation for being engaging and immersive, recruiting deep thinking and complex problem solving (Gee, 2003). Additional studies have indicated that cognitive factors play an important role in the understanding of video games in relation to education. Richard Van Eck indicates that “A cursory review of the experimental research in the last 5 years shows well-documented positive effects of DGBL across multiple disciplines and learners” and that “Games are effective not because of what they are, but because of what they embody and what learners are doing as they play a game” (Van Eck, 2006, p. 16). Van Eck goes on to discuss how important it is to understand the cognitive elements of human behavior and how they can be assessed in order to maximize the benefits of digital game-based learning. Van Eck (2006) concludes:

Games embody this process of cognitive disequilibrium and resolution. The extent to which these games foil expectations (create cognitive disequilibrium) without exceeding the capacity of the player to succeed largely determines whether they are engaging. Interacting with a game requires a constant cycle of hypothesis formulation, testing, and revision. This process happens rapidly and frequently while the game is played, with immediate feedback. Games that are too easily solved will not be engaging, so good games constantly require input from the learner and provide feedback. Games thrive as
teaching tools when they create a continuous cycle of cognitive disequilibrium and accommodation while also allowing the player to be successful. There are numerous other areas of research that account for how and why games are effective learning tools, including anchored instruction, feedback, behaviorism, constructivism, narrative psychology, and a host of other cognitive psychology and educational theories and principles. Each of these areas can help us, in turn, make the best use of DGBL. (p. 1)

The cognitive factors of motivation and collaboration have been discussed in this research. One other cognitive factor that is important to the framework of a successful video game is competition. Just as much as players like to collaborate while engaged in games, they also like to compete. Thus competition becomes a motivational factor for playing video games. This competition is two pronged: there is competition with other players and competition with artificial intelligence. Both of these elements are very prominent in video games. One good example of this phenomenon is with first person shooter games such as Call of Duty and Gears of War. Both games offer a campaign mode, online multiplayer mode, and private matches. This means that there are two primary ways in which a player can compete: against others or against the computer. In any case, it is this competition that fosters motivation and engagement. If a player is motivated to meet a specific goal, they are then engaged in meeting that goal. This is part of the success of online play modes. Players want to see what their abilities are when matched up against other players which leads to the motivation to get better at the game. In saying this, one interesting aspect should be noted: most of this motivation is achieved without the lure of monetary gain. Close to all players that compete in multiplayer games online will not receive a tangible reward from it. The rewards are masterfully crafted into the game. This is why it is important to align video games with intrinsic motivations. The motivation is the task itself
and not a tangible reward, as mentioned before. In education, there are rarely tangible rewards, but more often the reward of personal success and gratification. “The ‘mind alterations’ or ‘cognitive changes’ caused by the new digital technologies and media have led to a variety of new needs and preferences on the part of the younger generation, particularly—although by no means exclusively—in the area of learning” (Prensky, 2001, p. 4). Thus in correlation with the research, it is clear that the cognitive factors that result in the success and mass participation of video games should also be administered in educational settings. More research and study should be done in this area to ensure that society is not failing to implement a proven phenomenon.

**Pure Games**

The term “pure games” is used to describe games that have been developed and sold for entertainment purposes. There has been some use of pure games in educational settings, however the use of these games has not been very frequent and has lead to mixed results. There must be a distinction between which pure games are computer based and which ones are console based. In general, most pure games that might have educational value are computer based. Examples of such games include Age of Empires, Civilization, Rome, Civil War General, Sim City, Railroad Tycoon, Roller Coaster Tycoon, and Zoo Tycoon. All of the games mentioned are based on factual information and when playing them one can learn about factual content. For instance, in the game Civil War General, the player can take the role of an actual civil war general and play the actual battles which include historically correct information. Or in the case of Railroad Tycoon, the player can build a railroad system from the ground up, expand the rail system, and buy the equipment to make their business prosper. There is no doubt that the design of games like these is based on factual information. Actually, the authenticity of the information in these games is very impressive. These “pure games” have been noticed by the educational community
as a source for learning. However, it is also evident that these games were designed and developed for entertainment purposes and profits. The games do in fact include a lot of authentic base information; however, they are designed to be an entertainment tool. Therefore, it has been difficult to seamlessly transfer these computer games into the classroom. Even though they may include factual information they do not necessarily progress in a logical or chronological order. Many times they are designed to give the player the option to do many different things, and by playing the game the player will learn some facts but most likely will not grasp the overall context of the content. The player wants to beat the game. For instance, in the game Age of Empires, there is a lot of good historical representation of societies and nation building. However, upon playing the game it becomes clear that you cannot be successful in the game unless you do things that would have never realistically been done by the peoples of the colony that you are controlling. This is an example of where the “fantasy” element of the game play becomes present. So in general, Age of Empires offers the player an astounding amount of factual history; however, if one were to replicate the succession of a colony, they would most likely not win the game. This is why there has been somewhat disappointing results in using pure games as a replacement for textbooks and lectures.

Another side to “pure games” are games that are designed to be played on a console, such as Wii or Xbox 360. Unlike the computer-based games, console games have a different feel and different approach. Many of the computer games take advantage of better quality graphics and better running systems; however, they are more inclined to be played within the system. On the other hand, many console games are designed with the purpose of online multiplayer settings. There is no doubt that the best selling games for consoles are usually designed to be online games. Some examples of these games are Gears of War, God of War, Call of Duty, and Madden
NFL Football. It can be noticed that all of these games are level and achievement based. They tap into a system of progression for the player, creating an environment where the player seeks to move up in levels by accomplishing more short-term goals. By doing this, the player will find that they can unlock different parts of the game to enhance their character attributes. Or in the instance of Madden Football, the player can create a team, or build a dynasty with an existing team, using either created players or actual NFL players. As noted, these games are designed to give the player a lot of options and the goal of being rewarded with successful online play. Like the computer games mentioned, the console games could also afford the player with a lot of factual information; however, the console games are much more about achievements and being able to test the players' skills within an online community. Most console game players are also community-based players, and the game designs reflect this. For many reasons, console games have made virtually no headway in educational settings. Many of the problems involve their graphic nature and the fact that they can only be used on the console itself. These along with other factors have become barriers for their integration into education.

**Serious Games**

“Serious games” are described as games that are developed for the exclusive use in an educational environment. Many serious games have been developed in recent years. The success of these games again has yielded mixed results. Some of the factors that have lead to these mixed results include the reluctance of schools systems to adapt games into the curriculum, the cost involved, and the lack of quality design. The gaming industry has become very profitable in recent decades and it seems that the best game designers are working in the private sector. Also, educational games provide only a narrow customer base. Thus, due to financial reasons it is
difficult to get a quality serious game designed at an affordable price. Also, the lack of concrete research on the success of games in education does not entice schools to make the investment.

The Certification Map website listed the top seven educational video games of all time. These titles included Mavis Beacon, Number Munchers, Jeopardy, Where in the world is Carmen San Diego?, Math Blaster, Sim City, and the Oregon Trail (Top Seven Educational Video Games of All Time, 2009). A closer look at these games would reveal that they are in fact very educational in nature. Most of the titles are older and have outdated graphics and game play. For instance, Sim City and Math Blasters have been used in real classroom scenarios in the past. As mentioned before, they received mixed results from instructors and administrators. One instance of an educational game that produced fairly positive results was Conspiracy Code, a game developed by 360ed. This game was developed from the ground for a Florida school district in order to address struggling students. The game was used to teach history. In the end, the game did produce somewhat positive results and was generally accepted as a success. Conspiracy Code was developed for the sole purpose of education and was not popular on the entertainment market. This gets back to the point that even with a moderately successful serious game, they practically have no use in the more profitable entertainment market. This again demonstrates the barriers of serious educational games and their development.

**Video Games and Learning**

Digital games and their relation to learning have become much more prominent in recent decades. Upon the examination of research into pure games and serious games, it is clear that there is potential for the gamer generation to experience a more dynamic educational setting in the future. Many experts contend that even with the reluctance to inject video game aspects into
curricula there is not only a need to expand research on the subject but also a need to aggressively act on it. In the Article, Wilson et al. states (2009):

Games are increasingly used for educational, training, and research purposes. Overall, a review of the literature indicates that games can lead to better cognitive, skill-based, and affective outcomes. However, more robust, scientific research is needed that provides a clearer picture of their true impact. For example, in all of these studies reviewed, multiple game attributes were embedded in the games. It is not clear whether one attribute had a greater impact on learning than another, or whether it was the combination of attributes that led to success. Therefore, future research must seek to understand which specific game attribute(s) have the greatest impact on learning. (p. 259)

This is key to the progression of how video games can impact learning in a positive way.

Marc Prensky discusses many aspects of video games and learning in his 2002 article “The Motivation of Gameplay.” In this article he makes a compelling argument of ways in which the educational environment can be enhanced by the use of video game elements. Prensky writes (2002):

I hear regularly from many sources that college students devote a huge proportion of their time to playing computer and video games, often rivaling—and in extreme cases exceeding—the time they put into their studies. Computer and video games are so engaging—and education is often so unengaging—NOT because that is the “natural state of things,” or “the nature of the beast.” The reason computer games are so engaging is because the primary objective of the game designer is to keep the user engaged. (p. 2)

Prensky makes the point that successful engagement of video games is the same reason that education is non-engaging to students.
He goes on to say “Students who spend so much of their time playing rich, fun, and engaging interactive games will no longer accept or do learning that is painful and boring. And as the military and many businesses have already found, to get these students involved in learning we have to inject fun into the process” (Prensky, 2002, p. 4).

Many researchers and experts recognize that video games have created a new dynamic for instructors to connect with learners. “Games can bring a number of opportunities into the classroom, including: the opportunity to explore content from a new point of view, the challenge to learn through teaching and simulating by building a game, and the reinforcement of teamwork and collaboration” (Salter, 2011, p. 1). In his book 21st Century Skills and Serious Games: Preparing the N Generation, Spires indicates that “Although in its infancy, game-based technologies hold promise in forging new models of learning and teaching for the formal schooling process. We need a systematic way to analyze the learning features of games and conduct educational research that will help articulate the cognitive, affective, and social benefits for education” (Spires, 2008, p. 1). Many experts now recognize that there is a bold connection between digital games and human learning. They also recognize that gaming itself has become so powerful and profitable that there is a dire need to somehow harness the ideas behind video game design into education. It is no longer just a hunch that there is a connection between video games and learning, but it is a fact. Educators should now take this outstanding opportunity to improve and modernize educational environments. It has become more than just a study; it has become a requirement.

Video Game Design

Perhaps the most important element of video games and learning is video game design. The very design of the game has everything to do with how it will captivate a player. This is why
an examination of the design of a game is extremely important to whether or not it will have uses in an educational environment. Experts in the field contend that digital games are an integral feature of life with newer generations (Tapscott, 1998) and commercial video games are motivating as can be seen by the willingness of people to make an extended commitment to play them (Prensky, 2003). As mentioned prior, it is very important to understand the aspects of video game design to understand it's overall benefit to other applications. Learning is no exception to this rule. There has been a lot of research done in the area of game design and it is well known that video games have become very successful by engaging the player. Collaboration, motivation, and competition are all factors that contribute to this success. However, to clearly understand exactly how video game design leads to the success of video games, one must take a closer look at the characteristics that entice people to play them.

One aspect that should be examined is the idea of progressive levels and achievements in video games. Most all of the best selling and most successful games include these elements. This has been the case for some time in video games and has almost become an expectation for the player. When a person purchases a video game they have come to expect that there will be levels to play through, each one getting more difficult and unlocking hidden features and rewards. This has been a very powerful tool used by game designers. Salter indicates this by stating that “Achievements and leveling in games are inherently social” and “Games work best when they provide immediate rewards, but most of the traditional feedback in a class has to be delayed—grading, particularly in classes that demand writing and projects instead of multiple choice, takes time and reflection” (Salter, 2011, p. 1). It can be noted that there is a direct correlation between immediate rewards and motivation. Therefore a change in approach is needed to capture the benefits of this in education. Video games are an integral feature of life in this net generation
(Tapscott, 1998), and commercial video games are motivating as evidenced by the willingness of students to make an extended commitment to play them (Prensky, 2003).

Another component of game design is something that Prensky alludes to as “Gameplay.” He states that Gameplay is all the doing, thinking, and decision making that makes a game either fun, or not. In a puzzle game, the Gameplay is the physical and mental activities in the puzzles. In a shooter, it’s the player’s and the opponents’ speed and abilities. In a strategy game it’s the available options and tactics. Gameplay includes the game’s rules, the various player choices, and how easy, gradual, or hard or the road to success is (p. 9).

He goes on to describe that, Game designers focus primarily on motivation; educators don’t. The most important thing that educators can learn from game designers is how they keep the player engaged. Gameplay is all the activities and strategies game designers employ to get and keep the player engaged and motivated to complete each level and an entire game (p. 8). This is important in that it reaffirms the connection between video games, engagement, and motivation. It also clearly suggests that game designers understand this and design products to illuminate these factors. As Prensky also says in his article, As a game designer, you’re focused totally on engaging your audience. ‘How can I keep a maximum number of players on the edge of their seats for hours and hours?’ is the problem you’re working to solve. You give continuous thought to the kinds of interaction the player will have with your game—its Gameplay. You work hard to introduce everything about the subject and content of your game via the action, with an absolute minimum of telling (gamers hate telling) and in fact, once one begins thinking about
learning from the Gameplay point of view, there is no end to the ways one can inject more Gameplay—active engagement at every second—into traditional education (p. 11).

There has been much written about the characteristics of game design. Many opinions have surfaced regarding which factors within game design are the most effective. Most all of the opinions have relatively similar conclusions: engagement, collaboration, motivation, and competition. In order to take this issue a step further, Malone and Lepper (1987) give a list of key characteristics of a learning game. Their evaluation provides four components: challenge, curiosity, control, and fantasy. These are certainly not the only characteristics that make effective game design, however they do provide a good guide for learning games. They describe the characteristics as follows:

a) Challenge is created by having clear, fixed goals that are relevant for the learner. Uncertain outcomes provide challenge by offering variable difficulty levels, hidden information, and randomness. Feedback on performance should be frequent, unambiguous, and supportive. Lastly, the activity should promote feelings of competence for the person involved.

b) Curiosity exists in two different forms: sensory curiosity and cognitive curiosity. Audio and visual effects, particularly, in computer games may enhance sensory curiosity. When learners are surprised or intrigued by paradoxes, or incompleteness, it arouses cognitive curiosity.

c) Control is experienced as feelings of self-determination and control on the part of the learner. The ingredients of contingency, choice, and power contribute to the control feature of the learning experience. When the individuals face choices that
produce powerful effect, it increases their sense of personal control.

d) Fantasy encompasses both the emotions and thinking process of the learner.

Fantasies should appeal not only to the emotional needs of learners, but should provide relevant metaphors or analogies. Lastly, fantasies should have an integral relationship to the material covered. (Dodge, 2000)

Interestingly, there have been additional criteria that were added to this model. These additions are from Turkle in 1997. He contends that the model should also include iteration and reflection (Turkle, 1997). He describes iteration as vital to learning. Turkle (1997) states that:

Whether it consists of small iterations within the activity sequence, or replaying the entire game to attempt alternate strategies, iteration supports the learning process by encouraging experimentation, hypothesis testing, and synthesis.

Reflection should happen during these iterations, as players test new hypotheses and synthesize the outcomes with their existing understanding. But this process can be sidetracked by transparency issues, or simply not occur at the level that the game designers wish. (p. 5)

James Paul Gee also provides a comprehensive list of methods that make a good learning game in his article “Learning by Design: Games as Learning Machines.” In this article he identifies 14 specific characteristics of good games. He contends that “my argument is that good game designers are already doing a very good job at making learning happen” (Gee, 2004, p. 17).

He summarizes these characteristics as follows:

1) Co-Design: In good games, players feel that their actions and decisions—and not just or primarily the designers’ actions and decisions—are co-creating the world they are in and the experiences they are having.
2) Customize: Good games achieve this goal in one (or both) of two ways. In some games, players are able to customize the game play to fit their learning and playing styles. In others, the game is designed to allow different styles of learning and playing to work.

3) Identity: Good games offer players identities that trigger a deep investment on the part of the player. They achieve this goal in one of two ways. Some games offer a character so intriguing that players want to inhabit the character and can readily project their own fantasies, desires, and pleasures onto the character. Other games offer a relatively empty character whose traits the player must determine, but in such a way that the player can create a deep and consequential life history in the game world for the character.

4) Manipulation: Computer and video games inherently involve action at a (albeit virtual) distance. The more and better a player can manipulate a character, the more the player invests in the game world.

5) Good games offer characters that the player can move intricately, effectively, and easily through the world. Beyond characters, good games offer the player intricate, effective, and easy manipulation of the world’s objects, objects which become tools for carrying out the player’s goals.

6) Well-Ordered Problems: Problems in good games are well ordered. In particular, early problems are designed to lead players to form good guesses about how to proceed when they face harder problems later on in the game. In this sense, earlier parts of a good game are always looking forward to later parts.

7) Pleasantly Frustrating: Good games adjust challenges and give feedback in such a
way that different players feel the game is challenging but doable and that their effort is paying off. Players get feedback that indicates whether they are on the right road for success later on and at the end of the game. When players lose to a boss, perhaps multiple times, they get feedback about the sort of progress they are making so that at least they know if and how they are moving in the right direction towards success.

8) Cycles of Expertise: Good games create and support the cycle of expertise, with cycles of extended practice, tests of mastery of that practice, then a new challenge, and then new extended practice. This is, in fact, part of what constitutes good pacing in a game.

9) Information “On Demand” and “Just In Time”: Good games give verbal information—for example, the sorts of information that is often in a manual—“just in time” and “on demand” in a game. Players don’t need to read a manual to start, but can use the manual as a reference after they have played a while and the game has already made much of the verbal information in the manual concrete through the player’s experiences in the game.

10) Fish Tanks: Fish tanks are stripped down versions of the game. Good games offer players fish tanks, either as tutorials or as their first level or two. Otherwise it can be difficult for newcomers to understand the game as a whole system since they often “can’t see the forest because of the trees.”

11) Sandboxes: Sandboxes are game play much like the real game, but where things cannot go too wrong too quickly or, perhaps, even at all. Good games offer players sandboxes, either as to tutorials or as their first level or two. You can’t
expect newcomers to learn if they feel too much pressure, understand too little, and feel like failures.

12) Skills as Strategies: In good games, players learn and practice skill packages as part and parcel of accomplishing things they need and want to accomplish. They see the skills first and foremost as a strategy for accomplishing a goal and only secondarily as a set of discrete skills.

13) System Thinking: Good games help players see and understand how each of the elements in the game fit into the overall system of the game and its genre (type). Players get a feel for the “rules of the game”—that is, what works and what doesn’t, how things go or don’t go in this type of world. Thus, after examining the characteristics of game design, it can be seen that it is critical for the designer to consider a number of factors before finalizing a design. It is the design of the game.

14) Meaning as Action Image: This is, of course, the heart and soul of computer and video games (though it is amazing how many educational games violate this principle). Even barely adequate games make the meanings of words and concepts clear through experiences the player has and activities the player carries out, not through lectures, talking heads, or generalities. Good games can achieve marvelous effects here, making even philosophical points concretely realized in image and action (Gee, 2004, p. 17-22).

From the research it can be seen it is game design that will ultimately determine how effective the game is, inside or outside a classroom. A designer must understand the content, genre, audience, and which combination of characteristics will be most effective. Good game
designing will lead to engagement of the player, which will lead to positive gameplay and result in successful learning.

**Case Studies**

There have been a number of studies done on the effects of video games on learning. For the purpose of this literature review the researcher has concentrated on studies that centered around the success of video game elements that were used within an educational setting. Upon review of these case studies, it is clear that video games in education have yielded mixed results. It is almost impossible to make a clear conclusion on the subject at this time. Furthermore, the various amount of factors that affect these studies make it difficult to come to one general conclusion.

Some of the issues begin with teachers and administrators. Many of them see too many barriers to integrating video games into education. Video game implementation in classrooms is dependent on teachers’ willingness to adopt the technology. John Rice, in a review of 12 scholarly papers, identified teacher barriers to video game implementation (Rice 2006). The lack of pedagogically appropriate games and the lack of understanding of cognitive learning supported by more complex role-playing modern games were stated as reasons that teachers did not implement games in instruction. Additional factors identified were: teacher resistance to relinquishing control of the classroom, inability to find teaching role during game-playing instruction, and the notion that video games, though fun, are not serious learning experiences (Dede & Ketelhut, 2003; Rice, 2006). Another issue that has come to bear is that of “pure” games in the classroom. It has proven difficult to transfer a game in its off-the-shelf version and inject it directly into an educational setting. There is no doubt that it is the most economical way to utilize video games in class; however, it does have drawbacks. “Integrating commercially
available off-the-shelf (COTS) games is not without its drawbacks. Commercial games are not designed to teach, so topics will be limited and content may be inaccurate or incomplete. This is the biggest obstacle to implementing COTS DGBL” (Van Eck, 2006, p. 1). This correlates with prior research suggesting that not all games are in total suitable for learning.

A 2003 survey study did reveal some interesting information regarding the integration of video games into the classroom. This survey was documented by McFarlane and Kirriemuir and the results were summarized. Some of the key overviews to note included:

- Video console games were still considered to be of limited immediate use in the classroom; software was perceived as unsuitable and consoles of little use other than “pure” gaming. In addition, two teachers indicated that strategic and simulation games were found more on PCs than gaming consoles.
- The most used games were still simulation games such as RollerCoaster Tycoon and Sim City. Several teachers expressed concern over the accuracy of content, and whether compromises between complexity and playability resulted in the players/school children receiving inaccurate and simplistic ideas of how particular scenarios realistically operate.
- Teachers were frustrated with the quantity of non-relevant content in games, such as full motion video, but understood the rationale for their inclusion.
- Several teachers would have liked to use specific games they had encountered, but an abundance of irrelevant and distracting content and functionality was off-putting.
- Games were usually introduced by the actions of an enthusiastic teacher who is familiar with a particular game, and can see the potential that the game has to a
particular class or subject. It is less common for games to be introduced as a defined school policy, and virtually unheard of for “pure” computer and video games to be introduced.

- Several teachers mentioned the emergence of online games and expressed a great interest. However, using online methods gave rise to concerns about security, inappropriate people joining in, and access to unwanted or inappropriate Internet-based content. (Kirriemuir & McFarlane, 2004, p. 8-10)

It is evident from some of the studies that teachers and administrators have been reluctant to assimilate video games into the classroom. It can be noted that teachers have numerous concerns about how practical it would actually be, and furthermore how successful the learning outcomes would prove. However, the research did bring light to some positive studies on the topic. So do games work? Preliminary research says yes. For example, in one recent study, Barab and colleagues divided students into three groups. The study showed that “The students who learned by playing educational video games performed better than the students who learned from the electronic textbook. And the students who had played the 3-D, ‘full immersion’ game outperformed all others in the critical thinking task” (Barab et al., 2009). This study and its conclusions were cited in an article by Gwen Dewar (Dewar, 2010). So what do students feel about integrating video games into the classroom? A study cited by Squire in his book Changing the Game: What Happens When Video Games Enter the Classroom? showed that students had a very positive response to the study. Many students in the study said that playing the video game was fun, motivating, and engaging. Specifically, the students in the study responded by stating:

“It was definitely better than sitting in a chair all day and listening to a teacher talk because that is really boring. So, I liked it because you get to interact and actually be a
part of the lesson. You got to learn and have fun at the same time.”

“I loved using the video game. Most of the kids in my class don’t like reading out of textbooks, so the video game made it a lot more interesting and easier to learn.”

“I liked the interaction; that you could interact with what was in the cell. It’s not the real thing, but it’s close to it.”

“I would definitely recommend this game because it’s lots of fun and I know that kids these days don’t like sitting reading a board or reading a textbook. And lots of kids play video games and everyone was really happy about that.”

“It’s a good teaching method I think. You learn a lot.” [student with autism]

“It’s a great way to learn and have fun at the same time. Lots of people don’t like learning in class, especially boys. But even for a girl, I think they enjoy it a lot too, sitting in the computer lab playing a game rather than writing.” (Squire, 2005, p. 123-129).

In summary, there is still more research and study to complete on the issue of video games and learning. However, it seems clear that there is enough evidence to conclude that the venture is worthwhile. Video games and their cognitive factors, if injected carefully into educational environments, can prove to be a very powerful and successful phenomenon.

Gamification of the Curriculum

There has been much research done in the area of gamifying the curriculum. On one hand there is the design of the curriculum which reflects the integration of digital game elements and on the other hand there are the cognitive and learning factors that lead to the phenomenon. Leading researchers on the subject clearly define that the motivational elements which lead to the success of digital games are also the same elements that lead to engaging learning environments.
This idea is approached from a variety of angles; however, it provides a clear indication that the elements which are fundamental to game design are lacking a presence in academia.

Gabe Zicherman in “How Games Make Kids Smarter” shows evidence that playing games can actually increase IQ. He also states that the most successful learning environments include students who state that “learning is fun” and “learning is multiplayer.” Zicherman eludes to the idea that in the early days of digital games, the player was confined to mechanics that involved a control stick and a firing button. However, with the evolution of digital games, players now are forced to multitask in order to have success. They must not only be able to navigate the game, but they must be able to communicate, socialize, and collaborate during gameplay. This leads to an increase in brain reaction and continuous learning (Zicherman, 2011).

Tom Chatfield also eludes to the cognitive factors of game design. In his presentation “Seven Ways Games Reward the Brain,” he indicates that games motivate and compel the individual by making rewards emotional. He states that “wanting and liking lead to engagement” and that the “reward schedule of games is successful at keeping players engaged.” Chatfield also touches on the idea of probability in games. He uses the example that probability leads to heightened engagement through the process of making a game challenging but not too difficult (Chatfield, 2010). This attribute can be directly cited in digital games. For instance this can be found in the extremely successful video game Call of Duty: Black Ops. In this game, a player can choose between a variety of killstreak rewards. The more kills a player gets without dying will result in a more effective killstreak reward. For example, if a player gets three kills without dying the player can get a spy plane to put enemy players on the radar screen. If a player gets 11 kills without dying the player can release a pack of attack dogs which will most certainly lead to a higher score. Interestingly, in the this game a player can also choose a killstreak reward called
a “care package” by getting five kills without dying. The “care package” is called in and a helicopter drops a box in the area of the player. The box has an unknown killstreak reward. Thus, the player is really playing on “probability.” Sometimes the box contains a highly effective reward and sometimes it contains a meaningless reward. In the end, a player can get five kills without dying, get a care package, and get a killstreak reward that would have taken eleven kills without dying. On the contrary, the player could get a killstreak reward that would have only taken three kills without dying. The dynamics of this is that it is enforcing the idea of probabilities which lead to overall engagement. From the player standpoint, they are gambling on getting a higher reward, which will ultimately help their own statistics and help their team win. This is exactly what Chatfield refers to.

Another important factor that leads to the importance of gamification is the idea of fantasy and reality in digital games. Digital games have evolved to successfully blend the fantasy and reality of the player. In the early days of digital games, fantasy was the focus. However, in current game design, designers are finding ways to connect the fantasy of the game and the reality of life. Jesse Schell supports this notion in his presentation “When Games Invade Real Life” by saying that “games are breaking into reality.” He includes the example of the popular game Guitar Hero in which the player actually plays the game with a real guitar instead of a controller. He contends that this overlapping is leading to motivation and engagement (Schell, 2010). This is also evident in other popular games such as Mario Kart in which actual steering wheels are used to operate the vehicles and the game Tony Hawk Pro Skater in which the player stands on a skateboard device to navigate the game. It can also be added that consoles such as the Wii and Kinect are harnessing this connection with the player by utilizing voice command and motion sensor controls. This notion of games crossing into reality has also been addressed by
other research which focuses on the situated knowledge of the player. The research examines how digital games provide investments in learning and also epistemic frames for creating new ways of knowing (Gee, 2005). Even further, John Seeley Brown and Douglas Thomas investigate not only how information gets from the game to the learner but how games “teach” and what the implications of vivid and imaginative thinking may be (2007). In their article, they make the important point that games make the experience different from the typical learning environment and that there is something additional happening that makes the learning experience in games very powerful (Brown & Thomas, 2007). They refer to “timed quest” in which players are given a limited amount of time to complete a quest. They cite the example of the massive multiplayer online game World of Warcraft which uses these exact elements. It is shown that such interaction with a game can lead to a “direct transfer perspective” that would focus on skills such as improved hand-eye coordination and developing analytical reasoning. A situated learning perspective should examine how the pressure of time constraints can help improve skills such as time management or broaden a player's understanding of how various interconnections work within those time constraints (Brown & Thomas, 2007). This is also referred to by James Gee as “embodied empathy for complex systems” (Gee, 2005, p. 84). Therefore, the idea of timed elements and constraints within digital games can be both effective for learning and engagement.

**Blending the Research**

It is clear from the literature that there are some elements of video games that are successful in an academic setting and some that are not. It is also clear that there is more than enough evidence that cognitive elements of video games need to be injected into education at a higher rate. With the correct combination of factors such as motivation and engagement which are at the core of video game design and proven teaching tactics, education can be greatly
enhanced and improved. This dynamic is the answer to many of the issues that hinder today's educational experience for the learner.

In the words of Henry Jenkins, “Nobody would propose electronic games as a panacea for the problems plaguing contemporary education, but educators could learn something from the holding power of such games” (Jenkins, 2005, p. 48). He goes on to state “The worst thing a kid can say about a homework assignment is that it is too hard, and the worst thing a kid can say about a game is that it is too easy” (Jenkins, 2005, p. 48). This reaffirms the fact that video games are not the answer to each and every problem in education. However the significance of their effects on players is undeniable. With this in mind, there is no logical reason why a comprehensive plan to integrate video game elements into curricula would not be effective for the learner. There have been some moderate attempts to do this, however what is required is a robust plan that can begin to identify which elements of video games can be used as successful tools within certain curricula. Jenkins indicates that simulation games should never be a replacement for good teaching and tried and time methods, but as a tool that good teachers and educators can use to spark learning, collaboration and to provide a context for a range of other related experiences for the learner (Jenkins, 2005). It is recognized that video games are not the answer, but a tool to enhance engagement in education. What lacks is evaluation. “We must also understand whether a single game attribute leads to learning or if a combination of multiple attributes within a game has a stronger effect. Many areas of research remain unexplored” (Wilson et al., 2009, p. 220).

It is apparent that it is now time to align curricula with the attributes. As stated before, it is time to move forward from the research and develop a comprehensive plan to harness and utilize the power of video games in education. “We need a systematic way to analyze the
learning features of games and conduct educational research that will help articulate the cognitive, affective, and social benefits for education” (Spires, 2008, p. 9). Spires is absolutely correct. The sooner that a system is in place the sooner the educational system can benefit from video game attributes. The research is overwhelming. The indicators are positive. If visionaries can develop an effective framework of exactly how to incorporate video games into the curriculum, educators should be more willing to make these imperative changes. This will result in the dynamic, engaging, learner-centered approach to education that learners are now demanding in the digital age.

Section Summary

The purpose of the reviewed literature in this section serves three purposes: to provide the reader with a background of literature on the subject of video games and learning and the associated theories, to provide the reader with an understanding of the relevant case studies involving digital games and education, and to demonstrate the need for the researcher’s proposal for a study. The literature that was examined in this review reveal that there are a number of cognitive factors that go into video game design. Of these factors, many of them have been proposed as an effective tool having the goal of creating a more dynamic, engaging, and learner-centered educational setting. There is little doubt that there is enormous potential for the use of video game attributes in education. Also demonstrated is that there is a divide between educators and learners on not only how effective video game attributes can be but also in what ways can they be incorporated into education and curricula. In effect, this is where the researcher views the problem: exactly how to effectively use the tactics of video game designers in order to create a model that will succeed in education. Upon review of the subject, the researcher believes that there is a dire need to “bridge” video game design elements and effective educational models.
Upon review of the literature there is no doubt that building this bridge could be a daunting task. However, it is a task that needs to be taken on by educators and learning designers. It would be a monumental shortfall to learners if they do not. Thus, this becomes the engine of the researcher's study. A study that intends to demonstrate that video game design attributes in fact can be creatively crafted into a curriculum or syllabus. Not only this, but this redesign of a model and alternative delivery of the content will in fact produce just as many or more successful learning outcomes. The researcher hopes that this study will become a small part of a larger initiative to make this transition. An initiative that will provide educators with a comprehensive, step-by-step model that proves its intentions are effective. This initiative is owed to learners crying out for a more dynamic, learner-centered, exciting, and engaging educational experience that meets the needs and demands of the digital learner.

“It's not just the digital natives who are getting restless. We all want to see DGBL both accepted and implemented intelligently” (Van Eck, 2006, p. 1). Richard Van Eck makes it clear that this change is needed. Educators need it, learning designers need it, and more importantly, learners need it. Van Eck (2006) contends:

If we continue to preach only that games can be effective, we run the risk of creating the impression that all games are good for all learners and for all learning outcomes, which is categorically not the case. What is needed now is (1) research explaining why DGBL is engaging and effective, and (2) practical guidance for how (when, with whom, and under what conditions) games can be integrated into the learning process to maximize their learning potential. We are ill-prepared to provide the needed guidance because so much of the past DGBL research, though good, has focused on efficacy (the message that
games can be effective) rather than on explanation (why and how they are effective) and prescription (how to actually implement DGBL). (p. 1)

Actually, the researcher could not agree more.
CHAPTER III: METHODOLOGY

In recent decades there have been numerous advances in digital technology. In many facets of society, technology has enhanced and revolutionized the way in which humans interact and industries provide products. However, many schools and educational environments still rely on traditional means of teaching. There is a lot of research suggesting that learner-centered and technology-based educational designs are more effective than traditional styles. With this in mind, it can be concluded that even though there has been some advancement in the educational system to adopt technology in the past decade, there is still an enormous gap between the technology that is available today and the utilization of this technology by educators. As a result of recent research, it has been concluded that the cognitive and motivational factors behind video game design could and should be used to enhance educational environments. Though there has been some integration of this phenomenon into real practice, there is still a reluctance to adapt these cognitive factors to the fullest potential.

Research has clearly indicated that today's learners are different than those learners who have benefited from traditional learning styles and content delivery. It concludes that current students have become more digitally inclined and less engaged in the classroom. Therefore it seems imperative that educators begin to reshape the current landscape of education. This means a more dynamic educational setting that capitalizes on new technologies, engagement of the learner, a more learner-centered approach, and a reevaluation of learning outcomes and content delivery.

Statement of the Problem

The problem of this study was to identify and analyze how specific digital game attributes can be crafted into a best practices guideline which could be used in the gamification of a higher
education curriculum for the purpose of increasing collaboration, engagement, and effective learning.

**Audience**

The intended audience of this study were facilitators and instructors who wish to be provided with a basic framework example of how to incorporate video game attributes into a curriculum and/or instructional module. This instructional design model should be altered in accordance with the specific learning goals of the audience.

**Objectives**

The objectives of this study were to:

1.) Identify video game attributes that can be effective strategies in the delivery of content to students.

2.) Create a guideline of best practices utilizing the cognitive factors of video game design which can be effectively integrated into a curriculum.

3.) Convene an expert panel of six to eight individuals with expertise in instructional design, engagement, and game-based learning to review the model in an alpha/beta iterative testing methodology.

**Research Design**

This study was conducted using the examination of prior research and analysis of video games and education to create a guidelines and best practices model. There has been prior research conducted on the subject; however, there is a lack of substantial evidence to show that the incorporation of video game design cognitive factors coupled with a digital role play can be just as effective as traditional delivery and learning styles. The researcher used a combination of cognitive factors of video games. The cognitive factors that were present in the model included
collaboration, motivation, time restrictions, self-learning, frequent feedback, rewards, and competition. The video game framework included levels, achievements, modifiers, and unlockable features. Upon completion of this model by the researcher, an expert panel provided feedback on the level of engagement and effectiveness they believe would be attained by using this model in a higher educational setting.

**Description of the Guidelines**

The researcher created a model of guidelines which will clearly suggest to an educator or facilitator ways to integrate digital game features into a curriculum. The model included three specific sections: attributes, characteristics, and structure. It will be noted that the combination of attributes and characteristics will lead to the definition and creation of a structure. All three components are extremely important to the guidelines as a whole; however, successful utilization of the guidelines is contingent upon realizing that the process of gamification is equally as important as the learning outcome. The journey to success has to be as engaging as the motivation to be successful in the end.

The attributes section of the model represented specific cognitive attributes that are present in the design of digital games and how these attributes can be applied to a curriculum. The characteristics section identified specific digital game characteristics and terms that can be directly integrated into an educational curriculum for engagement. Finally, the structure section outlined the basic structural elements of digital game design so that they can be effectively woven into a curriculum. Contrary to digital game design, gamification assumes that the learner is not very motivated to begin with, thus leaving educators with almost endless possibilities to inject digital game attributes and characteristics into an academic structure.
Expert Panel

An expert panel of six members was convened to review and analyze the researchers learning model. The expert panel members examined the likely effectiveness of this model by providing feedback on its instructional design features, learner engagement features, learner-centered focus, and digital game elements. The panel consisted of members with educational backgrounds including Master of Education and Ph D of Behavioral Science. Four of the six panel members had over 5 years of experience in instructional design and one panel member had experience with educational software development.

Educational Research and Development

The instructional model of best practice guidelines was developed based on the research of the study. In essence, there is no new research that is taking place but the model will be developed with the intent of using existing research to create a new product, that being the model itself, and expanding on the research via the expert analysis. This “formative” research will aim to modify the instructional model through evaluative information during the developmental process. It should be noted that the model will be unique in that the researcher did not identify a prior similar model; however, the model is based on existing research.

Model Content

The content that is contained in the best practices guidelines model for the integration of digital game attributes into a curriculum is focused on three major components: attributes, characteristics, and structure.

Attributes are the cognitive factors of digital game design that can be utilized in an educational or instructional setting. The model included a list of these factors that are common in
successful digital games and how they can be used to enhance an educational setting in the same way.

Characteristics are the specific components of digital games that are familiar to both players and learners. The model included a list of these characteristics, what they mean, how they are used within digital games, and how they can be transferred into an educational environment.

Structure is the method in which successful digital games are designed. The model included a list of these structural elements and corresponding ideas of how they can be utilized in the development of a lesson or curriculum.

The researcher utilized a number of criteria in determining the attributes and characteristics used in the model. The researcher used the literature of experts but was not limited to Marc Prensky, James Gee, Jane McGonigal, and Richard Van Eck. The researcher also relied heavily upon personal knowledge of digital games and gaming history. After a comprehensive review of the literature and a comprehensive study of popular video games, the researcher was able to compile a list of attributes and characteristics. The researcher realizes that there are a number of attributes and characteristics which are present in digital games; however, the researcher limited the list according to the objectives of the model.

First of all, the researcher wanted a model that could be used for educational purposes and selected attributes which had educational value. Certain digital game attributes, though present in digital games, did not have a strong enough correlation to learning outcomes to be included, such as fantasy and assuming the life of a character. Second, the researcher wanted to include attributes from digital games which were successful in the gaming community. The reasoning for this is that a game which is successful and popular in the gaming community will
be so due to successful design, therefore rendering the game worthy of effective motivation of the player. In short, a digital game which has a high number of players has been effectively designed, and the attributes and characteristics which lead to its success should be taken seriously. Finally, through extensive study of many games, the researcher wanted to include attributes from games which could most effectively be transferred to an educational setting. For instance, many of the best selling digital games include a system of levels and rewards. This idea can easily and effectively be transferred into an academic arena. The researcher wanted a model which was comprehensive enough to be informative but also simple enough to be effective. Therefore, the list of characteristics and attributes were carefully selected.

**Data Collection**

The research included an alpha and beta review process by an expert panel. Each member of the panel was provided with the researcher's guidelines of best practices model and a questionnaire. Each member of the expert panel assessed and then provided feedback to the researcher for the modifications and improvements.

**Timeline for Study**

November-December 2011 – Thesis Defense

February 2012 – Confirm expert panel alpha model development

February 2012 – Present alpha model to expert panel for review

March 2012 – Revise model and present to expert panel for beta review

March 2012 – Document panel feedback and make final revisions

March 2012 – Complete Chapters Four and Five of Thesis

**Budget**

$0 U.S. Dollars
CHAPTER IV: FINDINGS

This chapter contains an outline and findings of the alpha and beta review process. The panel consisted of six individuals with expertise in the area of digital game-based learning and instructional design. As indicated in the previous chapter, the panel members were instructed to review the gamification model (Appendix A) and provide feedback according to the effectiveness of its cognitive educational elements, digital game-based learning elements, and instructional design elements as directed by the questionnaire. The responses are outlined for the alpha and beta reviews respectively.

Alpha Review

Members of the expert panel received the alpha model and alpha review questions during the initial review process. The answers and consensus listed were used in the development of the beta model.

Instructional Design Aspects

• Are there any ways in which this model can be improved based on the principles of instructional design?

• How effective would this model be if utilized in the development of higher education courses and/or delivery of content to learners?

Cognitive Engagement Aspects

• Are there any ways in which this model can be improved based on the principles of learner engagement?

• How effective would this model be in regards to increasing student engagement and learning in a higher educational setting?
Digital game-based learning Aspects

- Are there any ways in which this model can be improved based on the principles of digital game-based learning?
- How effective would this model be if used by facilitators in higher educational settings to assist them in creating a gamelike atmosphere for their courses?

Upon evaluation of the alpha feedback from the expert panel, there were several issues that were addressed. The overall theme included four primary concerns. First was the structure of the model. Many members mentioned that the model was not well enough organized and that it lacked cohesiveness for the reader. Second, there were concerns that the model served as more of a list of terms and definitions rather than something that a facilitator could effectively employ in an educational setting. Third, the panel expressed that the model lacked specific examples to compliment the research. Finally, there was also feedback regarding the pedagogical correlations. The panel indicated that the model did not effectively tie pedagogy and digital game-based learning together and that the reader was left guessing on exactly how the two worked together.

After the initial review of the model by the expert panel, several suggestions were outlined. One panel member indicated that they were unable to respond to the questions due to the fact that they felt the model was simply a list of definitions and fell short of a workable model. Another panel member indicated that the model was done very well and that the main suggestion that they had was to test the model in an actual academic setting to more accurately determine its effectiveness. Another panel member indicated that the model was a good start; however, it did not go far enough in creativity and lacked real life examples that could be referred to by an instructor. Another panel member indicated that the model was somewhat
difficult to read and failed to effectively connect digital game elements and pedagogy. Finally, one member indicated that the model did not include some critical attributes of digital games and that the terminology was too first person shooter heavy.

The overall consensus of the alpha review was that the model was not descriptive enough, did not include enough applicable examples, and did not correlate with academia effectively enough. However, most of the panel members did indicate that the model was a very good initial work towards a more comprehensive and understandable guide.

**Alpha Review Revisions**

Upon review of the alpha responses, the researcher made changes to the model in order to accommodate the recommendations of the panel. In order to fulfill this the researcher added a section to the model. The section included a step-by-step process in which a facilitator should go through in order to prepare a lesson for gamification and also a list of specific examples of exactly how to employ these methods. The researcher felt that this would make a stronger correlation between digital game features and pedagogy and would also address the concerns of the model lacking specific examples and being more than just a list of attributes and definitions.

**Beta Review**

Recommendations from the alpha review were taken into consideration for the development of the beta model (Appendix B). The beta model included a number of applicable changes. The beta model pulled the digital game integration examples from the Application column, expanded on the correlation between the cognitive attributes and education, and also added a new section. The new section included a step-by-step guide of how to prepare a curriculum for digital game attribute integration and a list of very detailed examples on how to apply digital game attributes. The examples included a generic example of how to structure and
apply the digital game attributes and a correlating example which outlined specifics on how to effectively integrate. With the additions the researcher hoped to address the initial concerns of the expert panel.

Upon evaluation of the beta feedback from the expert panel there were additional concerns about the model. It seemed that most of the panel members were pleased to see the addition of a section providing specific gamification examples; however, there still remained concerns. The major concerns which stemmed from the beta feedback were the overall structure and presentation of the model and also the lack of deeper digital game correlations for the reader.

Expert panel members were provided with a copy of the beta model and were instructed to review the beta model using the same assessment criteria which were applied to the alpha model. After the completion of the beta review several other suggestions were made by the panel. In one case the panel member felt that the beta version of the model was even better and more thorough than the alpha model and did not require any alterations. One member of the panel suggested moving the definitions over to the first column of the model, putting the definitions just under the attributes and characteristics. Then the member suggested changing the second column to be titled “Digital Game Application.” Within the digital game application column there should be more focus on how the attributes are applied in digital games and then provide an example of a game that is prominent in the specific attribute and characteristic. The panel member felt that this would clear up some of the dead space in the first column and also provide a more effective connection to digital games. Another panel member addressed the possibility of somehow making the model address personality types and learning styles. The member referred to the Myers-Briggs Personality Type Indicator as an example. The member also stated that the model did not deal with potential cheating nor did it deal with failure. The
member questioned what would occur if there was a failure in the class the model was applied to and would the student be able to “start over” like in a real digital game.

**Beta Review Revisions**

Upon review of the beta responses, the researcher made additional changes to the model in order to accommodate the recommendations of the panel. In order to fulfill this, the researcher made two major changes to the table portion of the model. First, the researcher moved the “definitions” of the attributes and characteristics so that they would appear just under the attribute or characteristic it was defining. This accommodated for the dead space in the first column, cleared out the second column for revision while still providing effective definitions for all the terms. Second, the researcher created a new column titled “Digital Game Application.” As the panel suggested, this made the model more organized and addressed the lack of specific digital game examples. The researcher also considered the suggestions involving personality and learning types, cheating and failure. The researcher decided that the main goal of the model was to provide a framework and guideline of how to gamify a curriculum and that the intention of the model was not to effectively match gamification strategies with specific learning styles. Furthermore, the researcher felt that cheating would be a difficult attribute to address in the model and that how to deal with failure should be up to the instructor. However, these responses should be included in the Chapter V recommendations.

**Final Model**

The researcher used the expert panel beta review responses in development of the final model (Appendix C). The main focus of the changes in the final model were based on moving the definitions to the first column and also reforming and renaming the second column to more effectively explain digital game applications and examples. The final model includes the
definitions of each attribute and characteristic listed just under the attribute and characteristic and also renamed the second column “Digital Game Application” and describes in more detail how each attribute and characteristic is used in digital games. Additional research was completed to list an example of a digital game which was very effective in using the correlating attribute and characteristic.
CHAPTER V: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of the problem statement, objectives of the study, conclusions, and further recommendations for the use of the model in a higher educational setting. It will also outline further research and development in regards to this study and the proposed gamification model.

Summary

The problem of this study was to identify and analyze how specific digital game attributes can be crafted into a guideline of best practices which could be used in higher education for the purpose of increasing collaboration, engagement, and effective learning. The researcher constructed a model of guidelines and best practices on how to integrate digital game attributes into an academic setting. The model was developed by the researcher using information and knowledge gained through extensive research and also using personal knowledge of digital game design and attributes resulting from real experience playing digital games. The model was then modified and improved using the recommendations and suggestions from the expert panel regarding the cognitive elements, digital game elements, and instructional design elements of the model.

Review of the literature indicates that digital game-based learning can offer a more engaging and dynamic educational experience for learners. A number of researchers in the field have completed extensive studies and conclusions on the subject of digital game-based learning. Researchers have also concluded that today's learners are different. Today's learners aspire for a more learner-centered experience coupled with the use of recent technologies. Digital game-based learning offers students both of these attributes. It is evident that there is a need for a more engaging educational environment. Research concludes that more and more people are investing
time and energy into playing digital games as a result of their ability to engage and captivate players. As stated by Marc Prensky, the job of game designers is to keep the player engaged (Prensky, 2002). By their effective design, digital games create an environment where players are engaged and inspired, and in some cases engrained. This proves that digital game design is extremely successful at engagement and motivation. As indicated earlier, educational researchers have realized the positive potential of digital game design. However, after all of the research and studies, there is still a need for a comprehensive model on exactly how to integrate digital game elements into a curriculum. In order to successfully harness the elements of digital games in education there must be guidance and framework provided to facilitators. The researcher feels that it is critical to begin moving from research, studies, and speculation to a true form of integration. In the words of Van Eck (2006),

What is needed now is (1) research explaining why DGBL is engaging and effective, and (2) practical guidance for how (when, with whom, and under what conditions) games can be integrated into the learning process to maximize their learning potential. We are ill-prepared to provide the needed guidance because so much of the past DGBL research, though good, has focused on efficacy (the message that games can be effective) rather than on explanation (why and how they are effective) and prescription (how to actually implement DGBL). (p. 1)

Therefore, the model was created to be a guide for educators to assist them in the integration of digital game attributes into their learning experiences. The researcher realizes that there are a number of ways in which this can be done and the needs may vary depending on the content and delivery. However, the researcher hopes that this model will serve as part of an effort to framework and successfully integrate digital game attributes into higher educational settings.
The researcher believes that this model can serve as an effective example to facilitators and teachers, hopefully bridging the gap between research and reality.

**Objectives of the Study**

The objectives of this study were to:

1.) To identify video game attributes that can be effective strategies in the delivery of content to students.

The researcher achieved this objective through extensive research and personal knowledge of digital game design. The researcher was able to identify a number of attributes and characteristics that are common in digital game design and could be effectively applied to an academic setting.

2.) Create a guideline of best practices utilizing the cognitive factors of video game design which can be effectively integrated into a curriculum.

The researcher was able to achieve this objective by applying research, personal knowledge, and a list of attributes to a guideline model. The model was created by the researcher with the intent of being applied to academic curricula.

3.) Convene an expert panel of six to eight individuals with expertise in instructional design, engagement, and game-based learning to review your model in an alpha/beta iterative testing methodology.

The researcher was able to achieve this goal through the utilization of an expert panel. The expert panel was convened and completed an alpha and beta review process which led to the final model. The researcher was able to create a final model using research, personal knowledge, and the recommendations of the expert panel members. As a result, the final model improved through the review process.
The researcher created a model that included several digital game attributes that could be applied when considering integration. These attributes were identified as collaboration, socialization, competition, simulation, feedback, choices, challenge, motivation, goals, choices, bonuses, unknown elements, and problem solving. The researcher felt that these attributes were not only most prominent in current successful digital game design but also that they would serve the most practical purpose in the process of integration into an educational setting. The researcher also felt that it was important to identify common digital game characteristics and their purpose in digital game design. These characteristics included experience points, levels, loadouts, gameplay modes, multiple paths, rewards, achievements, unlockable features, and emblems.

In constructing a guideline of best practices, the model included a set of structural elements that could serve as some guidance on how digital game characteristics were applied. The structural elements included short-term goals, long-term goals, short-term goals within long-term goals, levels and phases, experience points, progression, learner centered, allotted time elements, and earning extras.

Upon completion of the alpha review, the researcher added a section to the model which included required steps in preparing an educational environment for gamification. These steps included the following:

1) Determine the content which is to be delivered to the learner.
2) Determine what the learning outcomes will be.
3) Determine the attributes and characteristics which needed.
4) Determine the content delivery structure which is needed.
5) Determine the structure of the learners (small groups, large groups, pairs, or individuals).

6) Apply the appropriate methods.

After indicating the preparatory steps, the model included several examples of implementation with the purpose of demonstrating exactly how the digital game attributes identified could be applied.

Upon completion of the beta review the final model was developed. The final model intended to capitalize on the suggestions of the expert panel and satisfy the objectives of the study. The final model included several digital game attributes and characteristics that are most common in a wide variety of digital games, especially those that are most successful in the entertainment market. The researcher realizes that there are an abundant amount of attributes that could be included; however, for the practical usability of the model, the researcher chose those which were most prominent and could be most effective. The final model also included detailed definitions of the attributes and characteristics, their digital game applications, examples of digital games that effectively used these attributes and characteristics, and also how they could apply to an academic setting.

Conclusions

There has been an abundance of research completed on the topic of digital games and education in the past. Perhaps in one way or another, digital game attributes have been used in educational settings. At this point in time a number of things have been established: there is evidence to support the success of digital games in our society; there has been an enormous amount of research connecting digital game attributes, motivation, and engagement; there have been years of research on ways in which video game design can be applied to education; and a
lack of real application. It is clear that much of today's education is still dictated by methods created in the agrarian and industrial ages. However, society is shifting towards a more technological approach. One aspect of technology, digital games, has been expanding in both success and impact. Digital game design holds a number of keys to unlocking human motivation, engagement, and potential. It should be realized that digital games are not successful merely because of graphics or marketing. Digital games are successful because of design. Furthermore, this design is not based on technology alone but is based on effective triggering human cognitive factors. Some have stated that education is like a game, and in the game of education success depends on design and delivery. Educational design should not ignore digital game attributes. Educational design should embrace digital game attributes. The researcher believes that this model can assist in the understanding and implementation of these attributes for the benefit of teaching and learning. Digital game designers have proven that their games can be innovative, creative, engaging, entertaining, enticing, challenging, emotional, social, and foundational. Learning can be too.

**Recommendations**

The researcher believes that as the world of digital games evolves and grows in the future education will be provided with additional resources to draw from. The following recommendations may be used to enhance and expand on the idea and design of this study.

1. The use of this gamification model in the design of curriculum.
2. The application of new and/or additional digital game attributes in curriculum design.
3. The creation of similar models to assist instructors with gamification.
4. A partnership between instructional designers and digital game designers in the
development of curriculum.

5. Continued research and development into the creation of a standardized set of gamification models for educational institutions.

6. Documented studies on the effectiveness of this and similar models which are applied to an actual academic setting.

7. Scientific research and testing which could help to solidify gamification and its effectiveness within a learning environment as research to date has been anecdotal.

8. Research which investigates specific learning types and personalities and how a gamification model can address different learning types.

9. Ways in which the issue of “failure” can be integrated into a gamification model to provide a digital game-based solution to learning difficulties.

10. Utilizing digital game-based learning and digital game attributes as a core element of instructional design techniques.

11. Providing continued education and research into future digital games to adjust and modify gamification accordingly.
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APPENDIX A: ALPHA MODEL

GAMIFICATION:

A GUIDELINE FOR ALIGNING AND INTEGRATING

DIGITAL GAME ELEMENTS INTO A CURRICULUM

**ATTRIBUTES**-Attributes are cognitive factors of digital game design that are used to engage the player.

<table>
<thead>
<tr>
<th>ATTRIBUTE:</th>
<th>DEFINITION:</th>
<th>APPLICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>Students learning together in order to achieve goals</td>
<td>Having students learn together via groups and partners to go through the learning process</td>
</tr>
<tr>
<td>Socialization</td>
<td>Students socializing during the learning process to enhance engagement</td>
<td>Having learners complete assignments and tasks in part outside the classroom using social network tools such as Twitter and Facebook</td>
</tr>
<tr>
<td>Competition</td>
<td>Students competing to achieve goals to enhance engagement and motivation</td>
<td>Digital game designers primarily use two forms of competition: one in which other players must lose and one in which a player competes against the computer. An educator can set up an environment where students can compete against an entity rather than each other. This will bring collaboration and motivation. The use of a digital game or a facilitator as the “person to beat” can accomplish this</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
<td>Simulating actual situations to see what would happen</td>
<td>Use simulation to replicate a learning experience. It is important to note that the more genuine the simulation the more genuine the experience for the learner. An educator can create an activity where learners can replay a historical event or run a virtual business that mirrors a real business</td>
</tr>
<tr>
<td><strong>Feedback</strong></td>
<td>Monitoring the learning process through frequent communication</td>
<td>Feedback can come in the form of hints, tips, guidance, praise and rewards. It is important that a lesson plan accounts for frequent feedback to the learner on how they are progressing</td>
</tr>
<tr>
<td><strong>Choices</strong></td>
<td>Giving the learner options on how to meet the learning goals</td>
<td>Players have options throughout a game, including how their character looks, what the character will be equipped with, how they want to complete the mission and which ways they can achieve success. Give the learner choices. Let the learner help design the syllabus, projects and lessons. Let the learner assist in determining the best path to a successful learning outcome to increase engagement</td>
</tr>
<tr>
<td><strong>Challenge</strong></td>
<td>Creating a patterned set of</td>
<td>Players want to be challenged at</td>
</tr>
</tbody>
</table>
challenges within a learning environment
the right time with the right
degree of difficulty. This can
also be done in an educational
setting with frequent challenges
to the learner that are not too
simple that they are boring but
also not so difficult that they are
frustrating

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Factors which keep a learner constantly engaged</th>
<th>Digital games are designed to make the player want to play the game and succeed. It should be noted that digital game design is based on intrinsic motivation. There is rarely a tangible reward in digital games, just the intrinsic reward of succeeding at the game in one form or another. By structuring a class like a digital game the intrinsic motivation of learners will most likely be triggered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>The learning outcomes that are trying to be achieved</td>
<td>Goals in a digital game are always clear at the start of the game and provide constant feedback to the player on the progress of meeting these goals. A lesson plan can be structured in the same way, identifying clear goals at the beginning and reinforcing the progress of the</td>
</tr>
<tr>
<td><strong>Bonuses</strong></td>
<td>Chances for the learner to earn additional perks</td>
<td>Bonuses can come in many forms, however they all have one thing in common: the bonus awarded to the player will assist the player in reaching the goals. An educator can do this by setting up occasional opportunities for the learner to earn bonuses. However these bonuses must factor into a larger goal. An example could be to give the learner a short answer question with a time limit to earn an extra credit question on an upcoming quiz or test.</td>
</tr>
<tr>
<td><strong>Unknown Elements</strong></td>
<td>Unknown or unexpected occurrences during learning which enhance engagement</td>
<td>A game can become more dynamic to a player if there are unknown or unexpected moments during the game. The same can hold true for learners in an educational setting. After the learning goals are clearly indicated, a facilitator can use some unexpected content to help learners deal with adversity and problem solving. One example could be during a mock trial to have a witness with new information unexpectedly testify.</td>
</tr>
</tbody>
</table>
This can force the learner to get a better sense of real situations and solve the problem accordingly.

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>DEFINITION:</th>
<th>APPLICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>The ability to solve complex problems and challenges</td>
<td>With clear goals a learner will be willing to solve problems to meet the goals. Educators should keep in mind that learners, like game players, are more than willing to do a lot of problem solving activities if it leads to the completion of a goal and is relevant to attaining that goal. Problems should be transferred to challenging steps within the process of final success</td>
</tr>
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</table>

**CHARACTERISTICS**—Characteristics are specific terms and attributes within digital games.

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>DEFINITION:</th>
<th>APPLICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience Points</td>
<td>Experience points are a common way in which digital games measure progress, success and achievement</td>
<td>Most of today's learners can relate well to the term “experience point.” To them, it indicates the measure of progress towards a goal. Educators who use experience points in academic settings can better connect with the gamer generation.</td>
</tr>
<tr>
<td>Levels</td>
<td>Levels are typically used in digital games to indicate</td>
<td>Today's learners relate to the idea that a person at level ten of a</td>
</tr>
</tbody>
</table>
progression through the game is further advanced than a person who is at level two. Not only this, today's learners are accustomed to measuring progress through “level” systems. This would result in a better relation with the learners understanding of progress and also allow the educator to alter lessons and incorporate digital game attributes. For instance, instead of learning a subject on the basis of reading chapters in succession, an educator could incorporate a level system into the classroom which would be very understandable to learners, allow for movement through the lesson in a logical order and also allow for a structure that is much like a digital game experience. Using levels can also enable an educator to break up content to naturally create short term goals within a complete learning outcome.

| Loadouts | Loadouts are a term used in video game design that has the intention of giving the player a choice | If someone is playing the role of a soldier in a game, the loadout would allow the player to pick which gun they want to use, |
which equipment they want to use, what the soldier will look like and perhaps what explosive devices they want to have available. If an agricultural lesson centered around students managing a farm, the loadout would give the students the option of what type of land they wanted, what type of equipment they wanted, what kind of livestock they wanted and what type of structures they wanted on the farm. The idea is that the learner would choose which loadout they would need in order to have a successful farm, depending on what kind of farm they wanted to create. Therefore, students that wanted to manage a farm that focused on crops, they would have a loadout that used better farming equipment and land as opposed to students who wanted to concentrate on beef, who would have better livestock. As they moved through the levels of learning, more advanced options of equipment and livestock would become available to them.
This is how game designers give the player a choice throughout the game, but leave more attractive options available as the player progresses leading to constant engagement and motivation.

| Gameplay Modes | Gameplay Modes are options given to the player on how they want to play the game. Some game options include online games, multiplayer games, team based games, solitary campaign games and modes with alternative rules and conditions. | The player is given a multitude of options on how to succeed in a digital game. The same principles could be applied to a curriculum. There should be a variety of different ways in which the learner can master the subject matter, and the learner should have the choice of which method they prefer. For instance, a history professor could plan a lesson around the Battle of Gettysburg and give the learners the option of either creating a board game simulation of the battle, a digital presentation about the battle, create a blog page about the battle or create their own instructional model of the battle. All of these options would be highly effective in teaching the subject matter, but more importantly the learner will... |
| **Multiple Paths, One Goal** | Creating multiple ways in which the player can succeed in the game | A game in which there is only one way to play and one way to win becomes redundant and boring. Game designers have realized that variety helps engagement. For example, in a digital golf game there are normally a number of different courses to play, a number of different game modes such as skins games, tournament games, best ball, careers and one single game. They all have different ways to achieve and in a sense they all lead to a different outcome. However, it should be noted that no matter which mode the player chooses, they have to do the same thing to succeed: play good golf. Thus educators should always look to make their class more dynamic by offering the learner a menu of how to learn the content while maintaining focus on the |
intended learning outcome. This becomes a more learner specific atmosphere. Also, it never hurts to ask the learner if they have a suggestion on an effective way to learn the content

| Rewards       | A recognition of accomplishment | Rewards come to the player very frequently during the game to give the player feedback on progress. The key point of rewards is that it gives the player continuous feedback and praises accomplishments. This characteristic should be borrowed from the digital game design and integrated into educational settings. Using rewards such as awarding extra experience points or enhancing a student’s chances to do well on a test will not only reinforce the learner but also relate to the learner as a game-type environment |

| Achievements  | Rewards a player and indicates how a player is progressing through the game | In many cases, achievements are “unlocked” in a digital game indicating that the player has earned an achievement. Also, the “unlocked” achievement will usually be required for the player |
Unlockable Features

Unlockables are items or perks that are available to the player but only after the player has succeeded in a task to unlock the perk.

Unlockable perks serve a number of important purposes including keeping the player engaged in the game, giving the player short-term goals to meet, giving the player a sense of achievement and in some cases surprising the player with a perk that they were unaware of. The overall existence of unlockable perks in digital games is to allow for multiple goals during gameplay. Just as important is that these unlockable perks are relative to the overall goal of the player. The perks need to enhance the chances of success in the game to be motivational. If used in education, these unlockable achievements can be very effective. They can give the player a sense of achievement and can help to motivate learners to continue playing and learning. It is important to design these achievements carefully to ensure that they are meaningful and relevant to the overall educational goals of the game.
learner a short term goal that will provide positive feedback and will be relevant to the overall learning outcome. Educators should incorporate unlockable features into a lesson to steer learners in the desired direction and give learners the satisfaction of “unlocking” a component of the lesson that will be critical to the overall success of learning the content. For instance in a statistics class, students could “unlock” access to important data sets, graphs or evaluation software after successfully demonstrating that they can master formulas in written form. This gives the learner a number of short term goals and gives the learner the motivation to unlock the perk knowing that they will be able to more easily compute data and obtain solutions. This will motivate the student to learn the formulas by hand and also learn to use statistical software applications. Furthermore, it can be indicated to students that some of the homework questions can be done more quickly with a
Emblems are tokens within a digital game that signify some kind of achievement in the game.

In the popular game Farmville there are many tokens that are obtained by the player while playing the game. These emblems identify how much the player has progressed in the game. Though they have no real tangible value, emblems are a very important part of digital game play. The gamer generation is very accustomed to the idea of completing a task and then receiving something that indicates they have completed that task. Something that makes them unique in a way. Other players tend to strive to obtain the same emblems as a more accomplished player, a sort of motivation through competition. Much like military badges, it lets other players know what you have accomplished. The goal is to be a decorated player, and you have the emblems to prove it. Therefore it is a good idea to include emblems for the
successes of students. They understand it, relate to it and it is a part of their culture. Much like a gold star on a school paper decades ago which doesn't indicate how well a student did, just that it was good, emblems can signify that a student has made an accomplishment. This shows frequent, identifiable and positive feedback which results in motivation and the feeling of success.

**STRUCTURE** - Structure is the general process in which gamification of a curriculum can take place.

**STRUCTURAL ELEMENT:** | **APPLICATION:**
--- | ---
Short-Term Goals | - used to keep learners engaged  
- used to provide frequent goals  
- used to provide frequent feedback  
- used to advise the learner of their progress  
- should always include a reward  
- helps to provide the learner with a clear understanding of the learning outcome

Long-Term Goals | - provides the learner with an overall goal which should be the same as the learning outcome  
- the learner should be periodically reminded of the long-term goals throughout the lesson  
- keeps the learner motivated during the accomplishment of short-term goals

Short-Term Goals Within Long-Term Goals | - long-term goals should include a built-in system of short-term goals along the way  
- short-term goals should directly impact the succession to the long-term goal  
- ”levels” should be used to chunk short-term learning goals while having relevance to the long-term goal
| Levels and Phases | -levels or phases serve to organize a learning strategy  
|                   | -levels or phases can be used to emphasize short-term goals  
|                   | -levels and phases are an understandable concept to today's learners  
|                   | -levels can be used to replace chapters or individual lessons  |
| Experience Points | -experience points can be used to measure the progression of learning  
|                   | -experience points are a common concept to today's learners  
|                   | -experience points serve as a reward or achievement to learners  
|                   | -experience points can motivate learners with short term goals  
|                   | -total experience points needed can establish a identifiable long-term goal  
|                   | -experience points can be collected to earn extra rewards such as extra credit questions on exams  |
| Progression       | -progression can include levels, experience points, phases, rewards, unlockables, achievements and perks  
|                   | -a system of progression can clearly identify short- and long-term learning goals  
|                   | -progression should include short-term goals leading to a long-term goal  
|                   | -progression should increase in difficulty  
|                   | -today's learners understand the system of progression and expect it to become more difficult as the progression progresses  
|                   | -progression provides facilitators a way to deliver content systematically from easy to difficult  |
| Learner Centered  | -focusing on the learner keeps the learner engaged  
|                   | -includes frequent rewards and feedback to the learner  
|                   | -allows the learner to have a choice in the learning process  
|                   | -learner-centered structure should include a set of rules while allowing the learner flexibility on  |
how they can best learn the content
-transfers the learning process and responsibility to the learner
-leads to more dynamic and engaging educational environments
-leads to problem solving by the learner
-entices the learner to succeed

| Timed Elements | -can include a limited amount of time for learners to complete a task
|-can include consistent maintenance of a task required by the learner
|-helps promote time management and organization
|-can keep learners engaged in the lesson
|-forces learners to invest time and effort into their own success
|-time restraints on tasks are inherently motivational
|-provide students two minutes to answer a question for a chance to earn extra bonuses
|-structure a lesson that requires frequent attention by students in order to succeed at a task |

| Earning Extras | -earning extra things is satisfying to learners
|-earning extra rewards and achievements is motivational to learners
|-provide occasional opportunities to earn extra things such as emblems, perks, advantages or extra credit
|-promotes a learner-centered environment
|-promotes additional learning
|-extra perks can stimulate short-term goals
|-extra perks can provide advantages to long-term goals |
APPENDIX B: BETA MODEL

GAMIFICATION:

A GUIDELINE FOR ALIGNING AND INTEGRATING DIGITAL GAME ELEMENTS INTO A CURRICULUM

**Attributes**—Attributes are cognitive factors of digital game design that are used to engage the player.

**Attribute:**

<table>
<thead>
<tr>
<th>Collaboration</th>
<th>Students learning together in order to achieve goals</th>
<th>Having students learn together via groups and partners to go through the learning process. This can help students with problem solving, working in groups and having to consider the ideas of others.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>Students socializing during the learning process to enhance engagement</td>
<td>Having learners complete assignments and tasks in part outside the classroom using social network tools such as Twitter and Facebook. This can utilize digital social skills and allow students to learn in a familiar environment and learn from each other through socialization.</td>
</tr>
<tr>
<td>Competition</td>
<td>Students completing to achieve goals to enhance engagement and motivation</td>
<td>Digital game designers often use forms of competition in games. An educator can set up an environment where students can...</td>
</tr>
</tbody>
</table>
compete against an entity rather than each other. This will bring collaboration and motivation. The use of a digital game or a facilitator as the “person to beat” can accomplish this. Students will be motivated to overachieve through competition.

<table>
<thead>
<tr>
<th>Simulation</th>
<th>Simulating actual situations to see what would happen</th>
<th>Use simulation to replicate a learning experience. It is important to note that the more genuine the simulation the more genuine the experience for the learner. An educator can create an activity where learners can replay a historical event or run a virtual business that mirrors a real business. Learners will be able to experience content in a way that is relevant to real life situations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>Monitoring the learning process through frequent communication</td>
<td>Feedback can come in the form of hints, tips, guidance, praise and rewards. It is important that a lesson plan accounts for frequent feedback to the learner on how they are progressing. Feedback is essential to reassuring the learner of their progress.</td>
</tr>
<tr>
<td>Choices</td>
<td>Giving the learner options on</td>
<td>Players have options throughout</td>
</tr>
<tr>
<td>how to meet the learning goals</td>
<td>a game, including how their character looks, what the character will be equipped with, how they want to complete the mission and which ways they can achieve success. Give the learner choices. Let the learner help design the syllabus, projects and lessons. Let the learner assist in determining the best path to a successful learning outcome to increase engagement and create a learner-centered environment.</td>
<td></td>
</tr>
<tr>
<td>Challenge</td>
<td>Creating a patterned set of challenges within a learning environment</td>
<td>Players want to be challenged at the right time with the right degree of difficulty. This can also be done in an educational setting with frequent challenges to the learner that are not too simple that they are boring but also not so difficult that they are frustrating. The correct balance of challenge will keep the learner engaged in the material.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Factors which keep a learner constantly engaged</td>
<td>Digital games are designed to make the player want to play the game and succeed. It should be noted that digital game design is based on intrinsic motivation. There is rarely a tangible reward</td>
</tr>
</tbody>
</table>
in digital games, just the intrinsic reward of succeeding at the game in one form or another. By structuring a class like a digital game the intrinsic motivation of learners will most likely be triggered. Learners will become motivated to learn more and work harder to achieve the academic goals of the curriculum.

<table>
<thead>
<tr>
<th><strong>Goals</strong></th>
<th>The learning outcomes that are trying to be achieved</th>
<th>Goals in a digital game are always clear at the start of the game and provide constant feedback to the player on the progress of meeting these goals. A lesson plan can be structured in the same way, identifying clear goals at the beginning and reinforcing the progress of the learner with constant feedback. These goals will assist the student in learning smaller amounts of information at a time which will produce a higher level of engagement.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bonuses</strong></td>
<td>Chances for the learner to earn additional perks and rewards</td>
<td>Bonuses can come in many forms; however, they all have one thing in common: the bonus awarded to the player will assist</td>
</tr>
</tbody>
</table>
An educator can do this by setting up occasional opportunities for the learner to earn bonuses. These bonuses must factor into a larger goal. A learner will be more engaged and motivated in a system that offers chances to improve success.

| Unknown Elements | Unknown or unexpected occurrences during learning which enhances engagement | A game can become more dynamic to a player if there are unknown or unexpected moments during the game. The same can hold true for learners in an educational setting. After the learning goals are clearly indicated, a facilitator can use some unexpected content to help learners deal with adversity and problem solving. This can force the learner to get a better sense of real situations and solve the problem accordingly. Unknown elements can also lead to a higher degree of attention by the learner if they do not always know what to expect. |

| Problem Solving | The ability to solve complex problems and challenges | With clear goals a learner will be willing to solve problems to meet the goals. Educators should keep... |
in mind that learners, like game players, are more than willing to do a lot of problem solving activities if it leads to the completion of a goal and is relevant to attaining that goal. Problems should be transferred to challenging steps within the process of final success.

**CHARACTERISTICS**—Characteristics are specific terms and attributes within digital games.

<table>
<thead>
<tr>
<th>CHARACTERISTIC:</th>
<th>DEFINITION:</th>
<th>TEACHING APPLICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience Points</td>
<td>Experience points are a common way in which digital games measure progress, success and achievement</td>
<td>Most of today's learners can relate well to the term “experience point.” To them, it indicates the measure of progress towards a goal. Educators who use experience points in academic settings can better connect with the gamer generation and introduce an additional way to organize their content and delivery.</td>
</tr>
<tr>
<td>Levels</td>
<td>Levels are typically used in digital games to indicate progression through the game</td>
<td>Today's learners relate to the idea that a person at level ten of a game is further advanced than a</td>
</tr>
</tbody>
</table>
person who is at level two. Not only this, today's learners are accustomed to measuring progress through “level” systems. This would result in a better relation with the learners understanding of progress and also allow the educator to alter lessons and incorporate digital game attributes. For instance, instead of learning a subject on the basis of reading chapters in succession, an educator could incorporate a level system into the classroom which would be very understandable to learners, allow for movement through the lesson in a logical order and also allow for a structure that is much like a digital game experience. Using levels can also enable an educator to break up content to naturally create short-term goals within a learning outcome.

| **Loadouts** | Loadouts are a term used in video game design that has the intention of giving the player a choice | If someone is playing the role of a soldier in a game, the loadout would allow the player to pick which gun they want to use, which equipment they want to use, what the soldier will look like, and potentially improve their gameplay experience. |
like and perhaps what explosive devices they want to have available. The idea is that the learner should choose which loadout they prefer in order to have a successful learning outcome. This is how game designers give the player a choice throughout the game, but leave more attractive options available as the player progresses leading to constant engagement and motivation. Allowing the learner to have choices in the learning process, such as whether to do a digital presentation, do a multiple choice test or do an essay test will lead to higher levels of engagement and cooperative learning.

| Gameplay Modes | Gameplay Modes are options given to the player on how they want to play the game. Some game options include online games, multiplayer games, team based games, solitary campaign games and modes with alternative rules and conditions | The player is given a multitude of options on how to succeed in a digital game. The same principles could be applied to a curriculum. There should be a variety of different ways in which the learner can master the subject matter, and the learner should have the choice of which method they prefer. For instance, |
A history professor could plan a lesson around the Battle of Gettysburg and give the learners the option of either creating a board game simulation of the battle, a digital presentation about the battle, create a blog page about the battle or create their own instructional model of the battle. All of these options would be highly effective in teaching the subject matter, but more importantly the learner will retain an option on how they want to learn the content. It becomes their decision and responsibility rather than a task administered.

| Multiple Paths, One Goal | Creating multiple ways in which the player can succeed in the game | A game in which there is only one way to play and one way to win becomes redundant and boring. Game designers have realized that variety helps engagement. For example, in a digital golf game there are normally a number of different courses to play, a number of different game modes such as skins games, tournament games, best ball, careers and one single |
They all have different ways to achieve and in a sense they all lead to a different outcome. However, it should be noted that no matter which mode the player chooses, they have to do the same thing to succeed: play good golf. Thus educators should always look to make their class more dynamic by offering the learner a menu of how to learn the content while maintaining focus on the intended learning outcome. This becomes a more learner specific atmosphere. Also, it never hurts to ask the learner if they have a suggestion on an effective way to learn the content.

| Rewards          | A recognition of accomplishment | Rewards come to the player very frequently during the game to give the player feedback on progress. The key point of rewards is that it gives the player continuous feedback and praises accomplishments. This characteristic should be borrowed from the digital game design and integrated into educational settings. Using |
rewards such as awarding extra experience points or enhancing a student’s chances to do well on a test will not only reinforce the learner but also relate to the learner as a game-type environment.

| Achievements | Rewards a player and indicates how a player is progressing through the game | In many cases, achievements are “unlocked” in a digital game indicating that the player has earned an achievement. Also, the “unlocked” achievement will usually be required for the player to move to the next level or the achievement will enable the player to gain an advantage in reaching later goals. It is important to factor a system of identifiable achievements to learners within an educational setting. Achievements are a critical part of motivation |

| Unlockable Features | Unlockables are items or perks that are available to the player but only after the player has succeeded in a task to unlock the perk | Unlockable perks serve a number of important purposes including keeping the player engaged in the game, giving the player short term goals to meet, giving the player a sense of achievement and in some cases surprising the player with a perk that they were |
unaware of. The overall existence of unlockable perks in digital games is to allow for multiple goals during gameplay. Just as important is that these unlockable perks are relative to the overall goal of the player. The perks need to enhance the chances of success in the game to be motivational. If used in education, these unlockable achievements can be very effective. They can give the learner a short-term goal that will provide positive feedback and will be relevant to the overall learning outcome. Educators should incorporate unlockable features into a lesson to steer learners in the desired direction and give learners the satisfaction of “unlocking” a component of the lesson that will be critical to the overall success of learning the content. This gives the learner a number of short-term goals and gives the learner the motivation to unlock the perk knowing that they will be able to gain some kind of advantage or choice in the learning process.
| Emblems | Emblems are tokens within a digital game that signify some kind of achievement in the game. In the popular game Farmville there are many tokens that are obtained by the player while playing the game. These emblems identify how much the player has progressed in the game. Though they have no real tangible value, emblems are a very important part of digital game play. The gamer generation is very accustomed to the idea of completing a task and then receiving something that indicates they have completed that task. Something that makes them unique in a way. Other players tend to strive to obtain the same emblems as a more accomplished player, a sort of motivation through competition. Much like military badges, it lets other players know what you have accomplished. The goal is to be a decorated player, and you have the emblems to prove it. Therefore it is a good idea to include emblems for the successes of students. They understand it, relate to it and it is a part of their culture. Emblems can signify that a student has |
made an accomplishment. This shows frequent, identifiable and positive feedback which results in motivation and the feeling of success. It also gives the learner the opportunity to show others their success. This is a core component of social learning.

**STRUCTURE**-Structure is the general process in which gamification of a curriculum can take place.

### STRUCTURAL ELEMENT:  
### TEACHING APPLICATION:

| Short-Term Goals | -used to keep learners engaged  
| -used to provide frequent goals  
| -used to provide frequent feedback  
| -used to advise the learner of their progress  
| -should always include a reward  
| -helps to provide the learner with a clear understanding of the learning outcome |
| Long-Term Goals | -provides the learner with an overall goal which should be the same as the learning outcome  
| -the learner should be periodically reminded of the long-term goals throughout the lesson  
| -keeps the learner motivated during the accomplishment of short-term goals |
| Short-Term Goals Within Long-Term Goals | -long-term goals should include a built-in system of short-term goals along the way  
| -short-term goals should directly impact the succession to the long-term goal  
| "levels" should be used to chunk short-term learning goals while having relevance to the long-term goal  
| -awards should be included with short-term goals  
| -short-term goal awards should be essential to success of the long-term goal |
| Levels and Phases | -levels or phases serve to organize a learning strategy  
| -levels or phases can be used to emphasize short-term goals |
- Levels and phases are an understandable concept to today's learners:
  - Levels can be used to replace chapters or individual lessons.

**Experience Points**

- Experience points can be used to measure the progression of learning:
  - Experience points are a common concept to today's learners.
  - Experience points serve as a reward or achievement to learners.
  - Experience points can motivate learners with short-term goals.
  - Total experience points needed can establish a identifiable long-term goal.
  - Experience points can be collected to earn extra rewards such as extra credit questions on exams.

**Progression**

- Progression can include levels, experience points, phases, rewards, unlockables, achievements, and perks:
  - A system of progression can clearly identify short- and long-term learning goals.
  - Progression should include short-term goals leading to a long-term goal.
  - Progression should increase in difficulty.
  - Today's learners understand the system of progression and expect it to become more difficult as the progression progresses.
  - Progression provides facilitators a way to deliver content systematically from easy to difficult.

**Learner Centered**

- Focusing on the learner keeps the learner engaged:
  - Includes frequent rewards and feedback to the learner.
  - Allows the learner to have a choice in the learning process.
  - Learner-centered structure should include a set of rules while allowing the learner flexibility on how they can best learn the content.
  - Transfers the learning process and responsibility to the learner.
  - Leads to more dynamic and engaging educational environments.
  - Leads to problem solving by the learner.
  - Entices the learner to succeed.
| **Time Allotted Elements** | -can include a limited amount of time for learners to complete a task  
-can include consistent maintenance of a task required by the learner  
-helps promote time management and organization  
-can keep learners engaged in the lesson  
-forces learners to invest time and effort into their own success  
-time restraints on tasks are inherently motivational  
-provide students two minutes to answer a question for a chance to earn extra bonuses  
-structure a lesson that requires frequent attention by students in order to succeed at a task |
|-----------------|-------------------------------------------------|
| **Earning Extras** | -earning extra things is satisfying to learners  
-earning extra rewards and achievements is motivational to learners  
-provide occasional opportunities to earn extra things such as emblems, perks, advantages, or extra credit  
-promotes a learner-centered environment  
-promotes additional learning  
-extra perks can stimulate short-term goals  
-extra perks can provide advantages to long-term goals |

**IMPLEMENTATION** - Implementation are specific ways in which digital game attributes can be implemented into an academic or educational setting.

This section will include the initial steps needed in which to prepare for gamification of a curriculum, generalized examples of an application, and a detailed example of exactly how the applications can be implemented.

**INITIAL PREPARATORY STEPS:**

1) Determine the content which is to be delivered to the learner.

2) Determine what the learning outcomes will be.

3) Determine the attributes and characteristics which needed.
4) Determine the content delivery structure which is needed.

5) Determine the structure of the learners (small groups, large groups, pairs, or individuals).

6) Apply the appropriate methods.

IMPLEMENTATION EXAMPLES:

CREATE A GAME:
In order to create a game, the designer must have extensive knowledge of the content material that the game is based on. A very good way to learn content is to create a game about the subject matter.

Correlating Example:
Have students create a game simulating the battle of Gettysburg. Have them account for the following in their created game:
- Create a map of the battle that is geographically correct
- Label points of importance on the map correctly such as strategic locations
- Make tokens of all the military units that fought in the battle and correctly identify them
- Account for movement of the military units, such as cavalry being more mobile than artillery
- Account for the strength and moral of the military units, such as a larger division having higher power
- Place the tokens on the map so that they are positioned historically correct
- Determine a way to resolve combat, such as with dice or the flip of a coin
- Create a point system to determine success, such as unit damage or occupying strategic locations
- Create a system that determines a winner based on historical accuracy, such as the confederates failure to break the union line of defense

VIRTUAL SCENARIO:
Creating a virtual scenario can enhance a learning environment while instilling digital game aspects. This can give students an opportunity to experience the content in a more realistic way while also having real world relevance.

Correlating Example:
Have students build a virtual art museum. As a group, have the students create a floor plan for an
art museum and identify stations that will display particular pieces of art. For instance, if a student is focusing on Monet, their station should include a comprehensive study of Monet, his life history and his art pieces. This can be posted on a wiki page which will include the projects of each student. Then the entire class can “tour” the virtual museum, study all of the stations and learn about the various artists. Then give a test covering the content of the virtual museum.

**LEVELS AND EXPERIENCE POINTS:**
Having students work through levels of a lesson and gaining experience points and rewards for each level is a good way to give frequent feedback and rewards. Structure a lesson through levels and provide experience points for the mastery of each level. Give the students the goal of obtaining a certain number of experience points in order to complete the lesson. Also provide emblems or tokens for the accomplishments.

**Correlating Example:**
If students are studying the solar system, make the learning of each planet in the solar system a level from the smallest planet to the largest. Level one being the mastery of the smallest planet and level two being the mastery of the next largest planet. Award an experience point for achieving the required knowledge on each planet with a time limit to complete each level. Use something such as a quiz or short essay to earn the experience point. Once the experience point is earned, give the students an emblem representing a constellation which can then be posted to their own Facebook or Twitter page rewarding them for completing the level. This will provide identifiable, positive feedback which can be displayed by the student in a social learning atmosphere.

**LEARNER-CENTERED SOCIAL NETWORK GAME:**
Give students the option of creating a group blog, wiki page or Facebook page to display their project of the assigned material. Once this is completed, allow the other groups to view their classmates’ pages and post questions about their content. Require that each group post one question to each project page and have the instructor post two questions to each content page. The group will then be required to answer the posted questions within a time limit and will be judged on their thoroughness of the answers. Develop a point system to account for how quickly the question is responded to and also how well it is responded to. If the group performs well and achieves enough points through this process the members of the group can throw out their worst quiz score of the semester. This system provides options for the learner, responsibility to respond
to questions in a timely manner, working with others, demonstrating their knowledge of the content and also providing a reward for good performance.

**Correlating Example:**
In a geography class studying Europe, have the class divide into small groups or pairs of students and choose a country to focus on. Then give the group the option of displaying their outline of that country on a wiki page, Facebook page or blog. Once they have researched their country and created a page about that country have all the groups do a peer review of each others projects. Upon completion of the peer review, have each group post a question about the country to the page of one the other groups so that each group receives one question. At that point give each group 24 hours to answer the question. Upon completion of this process, the instructor can then post one question to each group page and again give the group 24 hours to answer the question. Assign one point for creating the page, one point for posting a question to another page and one to three points for the answers to the questions posted. If a group completes a page, posts a question and answers the questions posted to their page within the time allotment and provides a thorough answer they will receive all the points possible. If they accomplish this they can choose to throw out their worst quiz score of the semester. Groups that do not obtain all the available points will not get to throw out their worst quiz score of the semester.

**UNLOCKING REWARDS:**
Giving students rewards to unlock which will enhance their performance has much intrinsic motivational value and can gamify a class. Instructors can determine certain rewards that can be available to students only after they have achieved the required goals. This is a simple but very powerful element of digital game design. It can let the student know that there are rewards available for good progress and the rewards will be beneficial to them in the class; however, there remains an intrigue of not knowing exactly what the reward is.

**Correlating Example:**
In a statistics or algebra class there are a number of different formulas. These formulas should be learned in long or hand written form but can also be digitally computed. As students do homework assignments, advise them that earning a B or higher on the homework assignments will “unlock” one or more computing devices that they can use on later homework assignments. Since it is easier to use some kind of calculator for the problems, students will be motivated to learn the long form formulas as quickly as they can so that they can be rewarded with the use of
a formula computer. For instance, if students in a statistics class learn how to calculate the median and mean by hand, they will unlock the privilege to calculate the median or mean on future assignments with Statcrunch or some other calculating software.

**EARNING VIRTUAL MONEY:**
One component of digital game design is the idea of earning virtual money in order to buy perks for the game. In many cases, buying perks will help a player succeed later in the game. In an educational setting, have a system of earning virtual money for later rewards can assist in gamifying a curriculum.

**Correlating Example:**
If an instructor is teaching the constitution in a class, they can teach the elements of the constitution for the regular class work but then offer students the option to do a biography on each of the founding fathers. Each biography completed on a founding father will earn the student a specified amount of virtual money. With this virtual money a student can purchase extra credit questions on a test of the material or perhaps purchase their choice of test format (multiple choice, essay or presentation). Students who do not earn any or enough virtual money would be given the regular test.

**PURE GAMES:**
Pure games can also be used to enhance an educational setting. In not all cases will an off-the-shelf game work in an academic setting; however, it is still an option to gamification. There are a number of educational games that can be integrated into a class for some benefit. One good use of pure games is to have learners play a portion of the game and then be given a quiz on the information shortly after. This can give the instructor a chance to limit which portion of the game that would actually benefit the user.

**Correlating Example:**
Games like Math Blaster, Carmen San Diego and Civilization can be good pure games to use for education. Also consider only portions of a pure game. For example, the digital turn based game Civil War Generals can allow the player to play one scenario. Having the students play Little Round Top, one part of the Battle of Gettysburg, can be a quick and fun way to learn the content instead of a text reading.

**CAMPAIGN GAME MAINTENANCE:**
In a digital game, a campaign is normally a more lengthy game mode in which a player will play
the game over an extended period of time to reach a number of short- and long-term goals. If a curriculum has a lot of content to cover on a certain subject and it can be covered over a period of time, a campaign style structure and delivery could be effective. This can bring high levels of collaboration, problem solving, and decision making.

**Correlating Example:**

In a Principles of Insurance course, an instructor can divide the class into groups having each group represent the main components of an insurance company. For instance, a group to represent each of the following: claims, underwriting, marketing, finance and legal. Throughout the semester each group can be given challenging scenarios to solve, solve them and then present what they did to the rest of the class. Therefore, the instructor is teaching the class about the workings of an insurance company and how each department relates to the other. Some ideas could include:

Claims Department-Giving weekly claim scenarios to the group and having them resolve those claims including how much they would pay, writing estimates for damage and determining if the claim should be referred to the legal department for defense.

Underwriting Department-Creating insurance policies and updating the policies to meet the needs of the finance and marketing departments.

Marketing Department-Creating marketing projects to increase sales and company exposure.

Finance Department-Taking virtual money, investing that money in mock stocks and monitoring the profits and losses and reacting accordingly.

Legal Department-Keeping up with the constantly changing laws and advising the underwriting and claims departments of the changes and handling mock law suites filed against the company. At the end of the semester, the students could see how they progressed in their learning and how effectively they managed the company. They could also identify what areas they would need to improve on to ensure solvency of the company.
APPENDIX C: FINAL MODEL

GAMIFICATION:
A GUIDELINE FOR ALIGNING AND INTEGRATING DIGITAL GAME ELEMENTS INTO A CURRICULUM

**ATTRIBUTES**—Attributes are cognitive factors of digital game design that are used to engage the player.

<table>
<thead>
<tr>
<th>ATTRIBUTE: APPLICATION:</th>
<th>DIGITAL GAME APPLICATION:</th>
<th>TEACHING APPLICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collaboration</strong>- Students learning together in order to achieve goals</td>
<td>Players collaborating during gameplay in order to achieve a goal or complete a mission. Players must work with other players and compliment their attributes in order to be successful. One player cannot win alone. Example- World of Warcraft</td>
<td>Having students learn together via groups and partners to go through the learning process. This can help students with problem solving, working in groups and having to consider the ideas of others.</td>
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<tr>
<td><strong>Socialization</strong>- Students socializing during the learning process to enhance engagement</td>
<td>Players constantly associating and socializing with other players in order to play the game and succeed in the game. This can also include sharing of items to help other players succeed. Example- Farmville</td>
<td>Having learners complete assignments and tasks in part outside the classroom using social network tools such as Twitter and Facebook. This can utilize digital social skills and allow students to learn in a familiar environment and learn from each other through socialization.</td>
</tr>
<tr>
<td><strong>Competition</strong>- Students completing to achieve</td>
<td>Players competing against the</td>
<td>Digital game designers often use</td>
</tr>
<tr>
<td><strong>Goals to enhance engagement and motivation</strong></td>
<td><strong>Computer artificial intelligence</strong></td>
<td><strong>Forms of competition in games.</strong></td>
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<tr>
<td>A player can compete by themselves or with other players. Example- Plants Verses Zombies</td>
<td>The use of a digital game or a facilitator as the “person to beat” can accomplish this. Students will be motivated to overachieve through competition.</td>
<td></td>
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| **Simulation-**
Simulating actual situations to see what would happen | Players simulating a real life event in order to replay the event to their liking or mock an event that has not yet taken place. Example- The Sims | Use simulation to replicate a learning experience. It is important to note that the more genuine the simulation the more genuine the experience for the learner. An educator can create an activity where learners can replay a historical event or run a virtual business that mirrors a real business. Learners will be able to experience content in a way that is relevant to real life situations. |

| **Feedback-**
Monitoring the learning process through frequent communication | Players getting continuous feedback from the game which can serve as positive feedback, negative feedback, hints or guidance. Example- Elder Scrolls | Feedback can come in the form of hints, tips, guidance, praise and rewards. It is important that a lesson plan accounts for frequent feedback to the learner on how they are progressing. Feedback is |
<table>
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<tr>
<th>Choices - Giving the learner options on how to meet the learning goals</th>
<th>Players having a multitude of options available in order to be successful at the game. The player can use a variety of different strategies to win the game. Example- Mass Effect</th>
<th>Players have options throughout a game, including how their character looks, what the character will be equipped with, how they want to complete the mission and which ways they can achieve success. Give the learner choices. Let the learner help design the syllabus, projects and lessons. Let the learner assist in determining the best path to a successful learning outcome to increase engagement and create a learner-centered environment.</th>
</tr>
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<tbody>
<tr>
<td>Challenge - Creating a patterned set of challenges within a learning environment</td>
<td>A player is challenged throughout the game at a number of different levels of challenge and difficulty. This keeps the player engaged and interested in proceeding with the game. Example- Gears of War Campaign Mode</td>
<td>Players want to be challenged at the right time with the right degree of difficulty. This can also be done in an educational setting with frequent challenges to the learner that are not too simple that they are boring but also not so difficult that they are frustrating. The correct balance of challenge will keep the learner engaged in the material.</td>
</tr>
<tr>
<td>Motivation - Factors which keep a learner constantly engaged</td>
<td>A system of progressive levels, challenges, unknown and unpredictable elements,</td>
<td>Digital games are designed to make the player want to play the game and succeed. It should be</td>
</tr>
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</table>
Unlockable features and various rewards foster motivation in a player. The combination of these attributes in a digital game leads to high player motivation. Example- *Call of Duty Online* 

Player Modes

Note that digital game design is based on intrinsic motivation. There is rarely a tangible reward in digital games, just the intrinsic reward of succeeding at the game in one form or another. By structuring a class like a digital game the intrinsic motivation of learners will most likely be triggered. Learners will become motivated to learn more and work harder to achieve the academic goals of the curriculum.

### Goals-
The learning outcomes that are trying to be achieved

A game with clear goals throughout and a clear ultimate goal at the end helps a player progress through the game and remain interested in playing the game for long periods of time. Example- *Final Fantasy*

Goals in a digital game are always clear at the start of the game and provide constant feedback to the player on the progress of meeting these goals. A lesson plan can be structured in the same way, identifying clear goals at the beginning and reinforcing the progress of the learner with constant feedback. These goals will assist the student in learning smaller amounts of information at a time which will produce a higher level of engagement.

### Bonuses-

Bonuses in a digital game are

Bonuses can come in many
<table>
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<tr>
<th>Chances for the learner to earn additional perks and rewards</th>
<th>different forms of perks that can be obtained by the player which will ultimately assist them in being successful in the game. This can be found in most every digital game in some form. Example- <em>Zelda</em></th>
<th>forms, however they all have one thing in common: the bonus awarded to the player will assist the player in reaching the goals. An educator can do this by setting up occasional opportunities for the learner to earn bonuses. These bonuses must factor into a larger goal. A learner will be more engaged and motivated in a system that offers chances to improve success.</th>
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<tbody>
<tr>
<td><strong>Unknown Elements-</strong> Unknown or unexpected occurrences during learning which enhances engagement</td>
<td>Some digital games have extreme elements of unknown and unexpected attributes. Many of these games are story lines which twist and turn throughout leading to high levels of player engagement. Example- <em>Bioshock</em></td>
<td>A game can become more dynamic to a player if there are unknown or unexpected moments during the game. The same can hold true for learners in an educational setting. After the learning goals are clearly indicated, a facilitator can use some unexpected content to help learners deal with adversity and problem solving. This can force the learner to get a better sense of real situations and solve the problem accordingly. Unknown elements can also lead to a higher degree of attention by the learner if they do not always know what to expect.</td>
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**Problem Solving**
The ability to solve complex problems and challenges

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<tr>
<th>Digital games which feature aspects of problem solving are also considered to be strategic games. These games are based on the idea that the player must solve a number of challenges that are presented throughout the game in order to achieve success. Example- Portal</th>
</tr>
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<tbody>
<tr>
<td>With clear goals a learner will be willing to solve problems to meet the goals. Educators should keep in mind that learners, like game players, are more than willing to do a lot of problem solving activities if it leads to the completion of a goal and is relevant to attaining that goal. Problems should be transferred to challenging steps within the process of final success.</td>
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**CHARACTERISTICS**
Characteristics are specific terms and attributes within digital games.

| CHARACTERISTIC: Experience Points- Experience points are a common way in which digital games measure progress, success and achievement |
| DIGITAL GAME APPLICATION: Experience points are used in digital games to demonstrate the player's progress in the game. Typically the more experience points that are earned the more the player has accomplished in the game. Example- Pokemon |
| TEACHING APPLICATION: Most of today's learners can relate well to the term “experience point.” To them, it indicates the measure of progress towards a goal. Educators who use experience points in academic settings can better connect with the gamer generation and introduce an additional way to organize their content and delivery. |
| **Levels**-  
Levels are typically used in digital games to indicate progression through the game | Most all digital games have some type of a level system. Typically the levels progress from lower numerals to higher numerals. Levels are a way to track the progress of the player, provide feedback, break the game up into logical formats and create built in goals. Digital game level systems can range from simple to complex. Example- Pac Man | Today's learners relate to the idea that a person at level ten of a game is further advanced than a person who is at level two. Not only this, today's learners are accustomed to measuring progress through “level” systems. This would result in a better relation with the learners understanding of progress and also allow the educator to alter lessons and incorporate digital game attributes. For instance, instead of learning a subject on the basis of reading chapters in succession, an educator could incorporate a level system into the classroom which would be very understandable to learners, allow for movement through the lesson in a logical order and also allow for a structure that is much like a digital game experience. Using levels can also enable an educator to break up content to naturally create short-term goals within a learning outcome. |
|---|---|---|
| **Loadouts**-  
Loadouts are a term used in video game design that has the intention of giving the player a | Loadout is a familiar term in first person shooter and role playing games. The loadout is the | If someone is playing the role of a soldier in a game, the loadout would allow the player to pick |
choice options provided to the player to help create his or her character in the game. Loadouts can include clothing, armor, weapons, spells, special powers and other character attributes. **Example- Call of Duty Modern Warfare 3**

| **Gameplay Modes**-Gameplay Modes are options given to the player on how they want to play the game. Some game options include online games, multiplayer games, team based games, solitary campaign games and modes with | Gameplay modes are the specific types of modes within a game that a player can choose to play. Modes can include single player, multiplayer, online, campaigns, stories, scenarios and cooperative. The mode provides | The player is given a multitude of options on how to succeed in a digital game. The same principles could be applied to a curriculum. There should be a variety of different ways in which the learner can master the |
| Multiple Paths, One Goal- Creating multiple ways in which the player can succeed in the game | Many games do not give the player a set way to achieve goals and win a game. These digital games are sometimes referred to as “open ended” genres. Within these games the player can begin and end the game almost any way they want. They are games which include a number of goals. | A game in which there is only one way to play and one way to win becomes redundant and boring. Game designers have realized that variety helps engagement. For example, in a digital golf game there are normally a number of different courses to play, a number of... |
but no structured way to achieve them. Example- Grand Theft Auto

different game modes such as skins games, tournament games, best ball, careers and one single game. They all have different ways to achieve and in a sense they all lead to a different outcome. However, it should be noted that no matter which mode the player chooses, they have to do the same thing to succeed: play good golf. Thus educators should always look to make their class more dynamic by offering the learner a menu of how to learn the content while maintaining focus on the intended learning outcome. This becomes a more learner specific atmosphere. Also, it never hurts to ask the learner if they have a suggestion on an effective way to learn the content

| Rewards- A recognition of accomplishment | Some digital games are very reward heavy. In these types of games obtaining or unlocking the rewards is more prominent than achieving goals. They are usually faster paced games with less strategy and thinking however they are very | Rewards come to the player very frequently during the game to give the player feedback on progress. The key point of rewards is that it gives the player continuous feedback and praises accomplishments. This characteristic should be |
Achievements- Rewards a player and indicates how a player is progressing through the game

Achievements are rewards that a player receives during gameplay. Achievements can be found in most any digital game in one form or another. In most cases an achievement is a recognition to the player that he or she has completed a goal or it indicates that the player has completed a challenge beyond what is normally required. This is usually relayed to the player as an “achievement unlocked.”

Example- Madden 2012

In many cases, achievements are “unlocked” in a digital game indicating that the player has earned an achievement. Also, the “unlocked” achievement will usually be required for the player to move to the next level or the achievement will enable the player to gain an advantage in reaching later goals. It is important to factor a system of identifiable achievements to learners within an educational setting. Achievements are a critical part of motivation.

Unlockable Features- Unlockables are items or perks that are available to the player but only after the player has succeeded in a task to unlock the

Some digital games have unlockable items included in the game. Most of the time these items are either critical to the success of the game or provide certain features. Unlockable perks serve a number of important purposes including keeping the player engaged in the game, giving the player short term goals to meet, giving the
perk

the player with an added bonus to give them an advantage in the game. Unlockable features typically involve reaching a certain amount of points or level of progress prior to unlocking the item or they are scattered randomly throughout the game. Example- Call of Duty Series

player a sense of achievement and in some cases surprising the player with a perk that they were unaware of. The overall existence of unlockable perks in digital games is to allow for multiple goals during gameplay. Just as important is that these unlockable perks are relative to the overall goal of the player. The perks need to enhance the chances of success in the game to be motivational. If used in education, these unlockable achievements can be very effective. They can give the learner a short-term goal that will provide positive feedback and will be relevant to the overall learning outcome. Educators should incorporate unlockable features into a lesson to steer learners in the desired direction and give learners the satisfaction of “unlocking” a component of the lesson that will be critical to the overall success of learning the content. This gives the learner a number of short term goals and gives the learner the motivation to unlock the perk
| **Emblems**  
Emblems are tokens within a digital game that signify some kind of achievement in the game. | Emblems are tangible rewards awarded to the player in the game. Emblems almost always accompany a goal or accomplishment. They can also serve to establish a set of identifiable items for a player to obtain.  
Example- **Mario and Sonic at the Winter Olympic Games** | In the popular game Farmville there are many tokens that are obtained by the player while playing the game. These emblems identify how much the player has progressed in the game. Though they have no real tangible value, emblems are a very important part of digital game play. The gamer generation is very accustomed to the idea of completing a task and then receiving something that indicates they have completed that task. Something that makes them unique in a way. Other players tend to strive to obtain the same emblems as a more accomplished player, a sort of motivation through competition. Much like military badges, it lets other players know what you have accomplished. The goal is to be a decorated player, and you have the emblems to prove it. Therefore it is a good idea to include emblems for the
successes of students. They understand it, relate to it and it is a part of their culture. Emblems can signify that a student has made an accomplishment. This shows frequent, identifiable and positive feedback which results in motivation and the feeling of success. It also gives the learner the opportunity to show others their success. This is a core component of social learning.

**STRUCTURE**-Structure is the general process in which gamification of a curriculum can take place.

<table>
<thead>
<tr>
<th>STRUCTURAL ELEMENT:</th>
<th>TEACHING APPLICATION:</th>
</tr>
</thead>
</table>
| **Short-Term Goals**| -used to keep learners engaged  
-used to provide frequent goals  
-used to provide frequent feedback  
-used to advise the learner of their progress  
-should always include a reward  
-helps to provide the learner with a clear understanding of the learning outcome |
| **Long-Term Goals**  | -provides the learner with an overall goal which should be the same as the learning outcome  
-the learner should be periodically reminded of the long-term goals throughout the lesson  
-keeps the learner motivated during the accomplishment of short-term goals |
| **Short-Term Goals Within Long-Term Goals** | -long-term goals should include a built-in system of short-term goals along the way  
-short-term goals should directly impact the succession to the long-term goal  
-”levels” should be used to chunk short-term learning goals while having relevance to the long-term goal  
-awards should be included with short-term goals  
-short-term goal awards should be essential to |
| Levels and Phases | - levels or phases serve to organize a learning strategy  
|                  | - levels or phases can be used to emphasize short-term goals  
|                  | - levels and phases are an understandable concept to today's learners  
|                  | - levels can be used to replace chapters or individual lessons |
| Experience Points | - experience points can be used to measure the progression of learning  
|                  | - experience points are a common concept to today's learners  
|                  | - experience points serve as a reward or achievement to learners  
|                  | - experience points can motivate learners with short-term goals  
|                  | - total experience points needed can establish a identifiable long-term goal  
|                  | - experience points can be collected to earn extra rewards such as extra credit questions on exams |
| Progression      | - progression can include levels, experience points, phases, rewards, unlockables, achievements, and perks  
|                  | - a system of progression can clearly identify short- and long-term learning goals  
|                  | - progression should include short-term goals leading to a long-term goal  
|                  | - progression should increase in difficulty  
|                  | - today's learners understand the system of progression and expect it to become more difficult as the progression progresses  
|                  | - progression provides facilitators a way to deliver content systematically from easy to difficult |
| Learner Centered | - focusing on the learner keeps the learner engaged  
|                  | - includes frequent rewards and feedback to the learner  
|                  | - allows the learner to have a choice in the learning process  
|                  | - learner-centered structure should include a set of rules while allowing the learner flexibility on how they can best learn the content  
|                  | - transfers the learning process and responsibility |
| Time Allotted Elements | - can include a limited amount of time for learners to complete a task  
|                        | - can include consistent maintenance of a task required by the learner  
|                        | - helps promote time management and organization  
|                        | - can keep learners engaged in the lesson  
|                        | - forces learners to invest time and effort into their own success  
|                        | - time restraints on tasks are inherently motivational  
|                        | - provide students two minutes to answer a question for a chance to earn extra bonuses  
|                        | - structure a lesson that requires frequent attention by students in order to succeed at a task  
| Earning Extras         | - earning extra things is satisfying to learners  
|                        | - earning extra rewards and achievements is motivational to learners  
|                        | - provide occasional opportunities to earn extra things such as emblems, perks, advantages or extra credit  
|                        | - promotes a learner-centered environment  
|                        | - promotes additional learning  
|                        | - extra perks can stimulate short-term goals  
|                        | - extra perks can provide advantages to long-term goals  

**IMPLEMENTATION** - Implementation are specific ways in which digital game attributes can be implemented into an academic or educational setting. This section will include the initial steps needed in which to prepare for gamification of a curriculum, generalized examples of an application, and a detailed example of exactly how the applications can be implemented.

**INITIAL PREPARATORY STEPS:**

1) Determine the content which is to be delivered to the learner.
2) Determine what the learning outcomes will be.

3) Determine the attributes and characteristics which needed.

4) Determine the content delivery structure which is needed.

5) Determine the structure of the learners (small groups, large groups, pairs, or individuals).

6) Apply the appropriate methods.

**IMPLEMENTATION EXAMPLES:**

**CREATE A GAME:**
In order to create a game, the designer must have extensive knowledge of the content material that the game is based on. A very good way to learn content is to create a game about the subject matter.

**Correlating Example:**
Have students create a game simulating the battle of Gettysburg. Have them account for the following in their created game:
- Create a map of the battle that is geographically correct
- Label points of importance on the map correctly such as strategic locations
- Make tokens of all the military units that fought in the battle and correctly identify them
- Account for movement of the military units, such as cavalry being more mobile than artillery
- Account for the strength and moral of the military units, such as a larger division having higher power
- Place the tokens on the map so that they are positioned historically correct
- Determine a way to resolve combat, such as with dice or the flip of a coin
- Create a point system to determine success, such as unit damage or occupying strategic locations
- Create a system that determines a winner based on historical accuracy, such as the confederates failure to break the union line of defense

**VIRTUAL SCENARIO:**
Creating a virtual scenario can enhance a learning environment while instilling digital game aspects. This can give students an opportunity to experience the content in a more realistic way
while also having real world relevance.

**Correlating Example:**
Have students build a virtual art museum. As a group, have the students create a floor plan for an art museum and identify stations that will display particular pieces of art. For instance, if a student is focusing on Monet, their station should include a comprehensive study of Monet, his life history and his art pieces. This can be posted on a wiki page which will include the projects of each student. Then the entire class can “tour” the virtual museum, study all of the stations and learn about the various artists. Then give a test covering the content of the virtual museum.

**LEVELS AND EXPERIENCE POINTS:**
Having students work through levels of a lesson and gaining experience points and rewards for each level is a good way to give frequent feedback and rewards. Structure a lesson through levels and provide experience points for the mastery of each level. Give the students the goal of obtaining a certain number of experience points in order to complete the lesson. Also provide emblems or tokens for the accomplishments.

**Correlating Example:**
If students are studying the solar system, make the learning of each planet in the solar system a level from the smallest planet to the largest. Level one being the mastery of the smallest planet and level two being the mastery of the next largest planet. Award an experience point for achieving the required knowledge on each planet with a time limit to complete each level. Use something such as a quiz or short essay to earn the experience point. Once the experience point is earned, give the students an emblem representing a constellation which can then be posted to their own Facebook or Twitter page rewarding them for completing the level. This will provide identifiable, positive feedback which can be displayed by the student in a social learning atmosphere.

**LEARNER-CENTERED SOCIAL NETWORK GAME:**
Give students the option of creating a group blog, wiki page or Facebook page to display their project of the assigned material. Once this is completed, allow the other groups to view their classmates’ pages and post questions about their content. Require that each group post one question to each project page and have the instructor post two questions to each content page. The group will then be required to answer the posted questions within a time limit and will be judged on their thoroughness of the answers. Develop a point system to account for how quickly
the question is responded to and also how well it is responded to. If the group performs well and achieves enough points through this process the members of the group can throw out their worst quiz score of the semester. This system provides options for the learner, responsibility to respond to questions in a timely manner, working with others, demonstrating their knowledge of the content and also providing a reward for good performance.

**Correlating Example:**
In a geography class studying Europe, have the class divide into small groups or pairs of students and choose a country to focus on. Then give the group the option of displaying their outline of that country on a wiki page, Facebook page or blog. Once they have researched their country and created a page about that country have all the groups do a peer review of each other’s projects. Upon completion of the peer review, have each group post a question about the country to the page of one the other groups so that each group receives one question. At that point give each group 24 hours to answer the question. Upon completion of this process, the instructor can then post one question to each group page and again give the group 24 hours to answer the question. Assign one point for creating the page, one point for posting a question to another page and one to three points for the answers to the questions posted. If a group completes a page, posts a question and answers the questions posted to their page within the time allotment and provides a thorough answer they will receive all the points possible. If they accomplish this they can choose to throw out their worst quiz score of the semester. Groups that do not obtain all the available points will not get to throw out their worst quiz score of the semester.

**UNLOCKING REWARDS:**
Giving students rewards to unlock which will enhance their performance has much intrinsic motivational value and can gamify a class. Instructors can determine certain rewards that can be available to students only after they have achieved the required goals. This is a simple but very powerful element of digital game design. It can let the student know that there are rewards available for good progress and the rewards will be beneficial to them in the class, however there remains an intrigue of not knowing exactly what the reward is.

**Correlating Example:**
In a statistics or algebra class there are a number of different formulas. These formulas should be learned in long or hand written form but can also be digitally computed. As students do homework assignments, advise them that earning a B or higher on the homework assignments
will “unlock” one or more computing devices that they can use on later homework assignments. Since it is easier to use some kind of calculator for the problems, students will be motivated to learn the long form formulas as quickly as they can so that they can be rewarded with the use of a formula computer. For instance, if students in a statistics class learn how to calculate the median and mean by hand, they will unlock the privilege to calculate the median or mean on future assignments with StatCrunch or some other calculating software.

**EARNING VIRTUAL MONEY:**

One component of digital game design is the idea of earning virtual money in order to buy perks for the game. In many cases, buying perks will help a player succeed later in the game. In an educational setting, have a system of earning virtual money for later rewards can assist in gamifying a curriculum.

**Correlating Example:**

If an instructor is teaching the constitution in a class, they can teach the elements of the constitution for the regular class work but then offer students the option to do a biography on each of the founding fathers. Each biography completed on a founding father will earn the student a specified amount of virtual money. With this virtual money a student can purchase extra credit questions on a test of the material or perhaps purchase their choice of test format (multiple choice, essay or presentation). Students who do not earn any or enough virtual money would be given the regular test.

**PURE GAMES:**

Pure games can also be used to enhance an educational setting. In not all cases will an off-the-shelf game work in an academic setting; however, it is still an option to gamification. There are a number of educational games that can be integrated into a class for some benefit. One good use of pure games is to have learners play a portion of the game and then be given a quiz on the information shortly after. This can give the instructor a chance to limit which portion of the game that would actually benefit the user.

**Correlating Example:**

Games like Math Blaster, Carmen San Diego, and Civilization can be good pure games to use for education. Also consider only portions of a pure game. For example, the digital turn based game Civil War Generals can allow the player to play one scenario. Having the students play Little
Round Top, one part of the Battle of Gettysburg, can be a quick and fun way to learn the content instead of a text reading.

CAMPAIGN GAME MAINTENANCE:
In a digital game, a campaign is normally a more lengthy game mode in which a player will play the game over an extended period of time to reach a number of short- and long-term goals. If a curriculum has a lot of content to cover on a certain subject and it can be covered over a period of time, a campaign style structure and delivery could be effective. This can bring high levels of collaboration, problem solving, and decision making.

Correlating Example:
In a Principles of Insurance course, an instructor can divide the class into groups having each group represent the main components of an insurance company. For instance, a group to represent each of the following: claims, underwriting, marketing, finance, and legal. Throughout the semester each group can be given challenging scenarios to solve, solve them and then present what they did to the rest of the class. Therefore, the instructor is teaching the class about the workings of an insurance company and how each department relates to the other. Some ideas could include:

Claims Department-Giving weekly claim scenarios to the group and having them resolve those claims including how much they would pay, writing estimates for damage and determining if the claim should be referred to the legal department for defense.

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Legal Department-Keeping up with the constantly changing laws and advising the underwriting and claims departments of the changes and handling mock law suites filed against the company.

At the end of the semester, the students could see how they progressed in their learning and how effectively they managed the company. They could also identify what areas they would need to improve on to ensure solvency of the company.
APPENDIX D: EXPERT PANEL INVITATION

Expert Panel Review Request

Addressed to:

Dear Panel,

My name is Matthew Mieure. I am a graduate student in the Learning Design program at Bowling Green State University in the process of completing my thesis project. Knowing that each one of you has the expertise to assist in my research I am requesting that you serve on my expert panel.

I have completed my thesis proposal and the proposal has been approved by my committee which includes Doctor Terry Herman, Doctor Larry Hatch and Doctor Paul Cesarini. At this time I am attempting to complete an expert review of my educational model which will include an Alpha review by an expert panel, revisions made to the model based on the review recommendations, a Beta review and final revisions to the model based on the review recommendations.

In my thesis research I have tried to identify ways in which digital game attributes can be effectively integrated into educational settings. Upon completion of my research I have developed a model which is intended to serve as basic guideline of how to incorporate digital game attributes into higher education. The model is intended to be comprehensive in nature, meaning that it encompasses a number of different attributes but leaves flexibility to a facilitator to apply which specific components they feel would be beneficial. My goal is to create a model that can ultimately serve as an effective guideline for facilitators to refer to when attempting to make their course or syllabus more dynamic and engaging to learners.

Below is an outline of my thesis project:

**Title**-Gamification: Adapting To The New Age Curriculum

**Problem Statement**- The problem of this study is to identify and analyze how specific digital game attributes can be crafted into a best practices guideline, which could be used in the gamification of a higher education curriculum for the purpose of increasing collaboration, engagement and effective learning.

**Objectives**-

1) To identify video game attributes that can be effective strategies in the delivery of content to students.
2) Create a guideline of best practices utilizing the cognitive factors of video game design which can effectively be integrated into a curriculum.

3) Convene an expert panel of six individuals with expertise in instructional design, engagement and game-based learning to review the model in an alpha/beta iterative testing methodology.

I have attached a copy of the proposed model for review by the panel members. The model should be evaluated on the basis of cognitive engagement, instructional design and digital game-based learning elements.

The evaluation should measure the prospective effectiveness of the model if it were to be introduced into an educational setting for use by facilitators and/or instructional designers. The researcher welcomes any criticism, suggested alterations or recommended additions to the model.

The panel members should focus on the following:

**Instructional Design Aspects**-

- Are there any ways in which this model can be improved based on the principles of instructional design?
- How effective would this model be if utilized in the development of higher education courses and/or delivery of content to learners?

**Cognitive Engagement Aspects**-

- Are there any ways in which this model can be improved based on the principles of learner engagement?
- How effective would this model be in regards to increasing student engagement and learning in a higher educational setting?

**Digital game-based learning Aspects**-

- Are there any ways in which this model can be improved based on the principles of digital game-based learning?
- How effective would this model be if used by facilitators in higher educational settings to assist them in creating a game like atmosphere for their courses?

**Timeline for Panel Reviews:**

*Alpha Review/Evaluation of the Model* completed and returned to the researcher via e-mail by *Friday February 24, 2012.*
Alpha review Revisions completed by the researcher and returned to the panel members via e-mail for the Beta Review by Monday February 27, 2012.

Beta Review/Evaluation of the Model completed and returned to the researcher via e-mail by Friday March 2, 2012.

Final Revisions completed by the researcher by March 4, 2012.

Thank you very much for your time in this matter.

Matthew Mieure