Game Play in Education: An Exploration of the What, How, and Why

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Gameplay in K–12 Education:

An Exploration of the What, How, and Why

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Concordia University–Portland

College of Education

Dissertation submitted to the Faculty of the College of Education

in partial fulfillment of the requirements of the degree of

Doctor of Education in

Higher Education

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Concordia University–Portland

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Abstract

This study explored whether teachers utilize games in the classroom, known as gamification and, if so, whether they used games according to game theory that exists in the field of gaming and game design. In higher education and secondary environments, educators report that problems exist as far as student behavior and engagement. Many students do not want to learn. The literature review conducted as part of this study indicated that when teachers gamified their classrooms few empirical investigations were conducted in the K-12 setting; another shortcoming was a lack of a uniform classification system for game elements among the literature, causing confusion in the research as to the approaches applied during each study and how conclusions were reached. The lack of practical application was important in this study because in order for game elements to engage and motivate students to trigger desired behavior, gamification should draw from the motivational qualities of good games as outlined by game designer McGonigal. Therefore, when a teacher opts to use gamification, a standard classification of game elements should be developed as part of educational game theory so that the what, how, and why is evident. In other words, teachers can benefit from this study by gaining an understanding of what constitutes a game element, how each element should be utilized, and for what purpose.

Keywords: gamification, gamify, games in education

Dedication

To all those gamers out there who wished that their educational world could be half as riveting as their virtual world.

absolute, macabre-like terror. I did my best to keep it to myself. In hindsight, I know that my feelings arose from selfishness on my part because I should have been happy for you during the monumental occasion of your motherhood. Yet, I was absolutely panicked. I only had faith in *you* to get me through the process.

I had the experience of working with Dr. Parsons, and I do value that time with her as she helped me with qualitative aspects of my dissertation proposal. However, she was not *you*, Dr. Booker. When you returned, I was still a bit affected by your departure. I wasn't sure what to feel or do. Slowly but surely, I rebuilt my trust and confidence in your ability to manage my dissertation. Today, I sit rewriting my proposal chapters and Chapter Four, after hearing that I am on track to graduate in December. I know that I owe all of this to you. I could never have made it without your guidance and support. You keep your students a bit at arms-length, striving to keep relationships professional at all times. But in reality, your kindness and love shines through and we feel that. Yes, your love oozes through the professionalism and it comforts your students. Never do I doubt my ability to finish when you're there by my side. I am eternally grateful for you, Dr. Booker. You are an absolutely inspiration and I hope you keep doing what you're doing because doctorate students need you! Much love and kindness to you, always!!!

Thank you as well to my content specialist, lorabla Morerro, Ed.D and my content reader, Leavery Y. Davidson, Ed.D.

Dr. Mererro, honestly, when you first stepped into my dissertation this fall, I kind of wanted to scream. You pointed out the weaknesses in my work, particularly with my qualitative research. I was so frustrated with the weaknesses, but the frustration was not truly toward you. It was in knowing that my work needed some work. I am so grateful to you for you stepping in

and helping me make my study stronger and better. I feel so much prouder and more confident

going into my defense. I truly thank you from the bottom of my heart, Dr. Morerro!

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reader of my dissertation. I appreciate you coming along on this journey and taking your time to

help me improve my writing and content. Your insight has been greatly appreciated and I thank

you!

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Chapter 1: Introduction

A young girl at the age of 13 years old starts high school, younger than many of her ninth-grade peers due to her late October birthday. Up until this point in her life, she has done well in school, earning A grades and impressing her parents and sister with her good marks, intelligence, and overall conformity. Yet on that first day of ninth grade, she goes to her English, math, history, and other general education classes, as is required, and at the end of it all thinks to herself wryly, her entire body shuttering with absolute dread, "Really, this all over again and for four more years? You've got to be kidding!" Yes, the young adolescent student realizes in that moment that she will have to endure the same old subjects, taught in the same old way, for a dreary four long years. However, she decides, "I cannot take it," and rebels, never to be part of the high school population as one is intended to be. In fact, she misses much of her freshman year, getting ejected from the mainstream school due to her rebellion, and is sent off to a continuation school, an alternative high school program for children over the age of 16. Her behavior is deemed inappropriate and dangerous.

The young lady's parents and sister cannot believe that she has been thrown out of school. They are mortified. They try to intervene to no avail. She will hear none of it. She no longer trusts adults and no longer cares about her wellbeing. She thinks that if anyone truly cares about her, then they will see that they are punishing her for no good reason. She hates school and, therefore, comes to hate life. She turns to the wrong crowd and drugs. It is not until she attempts suicide that she fortunately wakes up from her bad dream and, at 15 years old, returns to her old high school to give it a go again. Her family is relieved and they start to rebuild their relationship with her. Unfortunately, the adolescent has missed so many high school credits that during her senior year she finds out that she will not graduate and walk the stage along with her peers. As a

result, she signs up for the California High School Proficiency Examination, and moves on to community college.

Much to her utter dismay, the young 17-year-old discovers that higher education is no different than high school—it is, perhaps, worse. The general education classes include the same boring general education subjects, but this time the environment is even more dreadful, with instruction taught in lecture format: cold and impersonal. She could not be more bored and dismayed. She drops out of her five classes and enters the working world, always feeling inept and like a failure.

This real-world scenario happens every day as school largely fails to trigger students to want to learn academic topics, yet these same students who are disengaged and unmotivated in the classroom work hard, learning in other ways: through the Internet or their cellular devices, from their peers, and other media outlets (McGonigal, 2011; Prensky, 2012; Zimbardo, 2010). For instance, according to the National Center for Education Statistics (2014), from October of 2013 to October of 2014, the number of students between the ages of 15 and 24 who left school without earning a high school diploma was approximately 567,000. This large number of drop-outs equates to 1,553 students per day deciding to exit high school without a degree. Undoubtedly, students drop out of high school for myriad reasons, yet according to Prensky (2010), and other educational researchers and scholars (e.g., Bogost, 2011; De Schutter & Abeele, 2014; Leong & Luo, 2011; Lister, 2015; McGonigal, 2011; Sheldon, 2012; Zimbardo, 2010), for those students who opt out due to a lack of intellectual stimulation, as with the above hypothetical scenario, the problem is not usually with the student; the problem tends to be education not evolving to keep up with the rest of the world, making it dreadfully boring for most adolescents.

Conceptual Framework

Prensky (2010) asserted that, despite claims to the contrary, young people today do not have short attention spans; in fact, evidence has pointed to the opposite situation, as one can glean from adolescents' oftentimes total and complete cognitive emersion in digital technology. In order to investigate the discrepancy between student disenchanted behavior in the classroom compared to when they are engaged in their own digital studies, scholars such as Prensky (2012) have meshed video game behaviors with school curriculum, known as gamification of education. Part of gamifying education involves the study of game theory, a theory derived largely from the work of McGonigal (2010, 2011, 2015), who is a trailblazer in psychological game research as both a scholar and game designer. As such, game theory was used as a framework to guide this dissertation project.

To grasp the main tenets of game theory, one must contemplate McGonigal's (2011) main premise surrounding human fulfilment found through digital games, a type of human satisfaction that usually cannot be attained in the real world, but that is often discovered through gameplay and a virtual world. Along these same lines, Zimbardo (2010), a renowned psychologist, explained that today's youth had their brains rewired digitally, and yet society expects these same kids to sit in what he termed an analogue, or utterly antiquated, classroom. Psychologists (such as Zimbardo), and game designers and theorists (such as McGonigal), and educational researchers (such as Prensky (2010)) have stimulated educational researchers in the field to investigate the type of satiation found through playing digital games and how to simulate it in a classroom environment. Educational researchers such as Dicheva, Dicheva, Agre, and Angelova (2014) and O'Donovan, Gain, and Marais (2013) explained that gamification in a learning environment strives to mimic the concentration players experience when playing a game by applying game elements in curriculum

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design to help increase learner engagement and motivation. These researchers noted that learning should be transformed for all types of learners by mirroring game traits and how these traits affect thinking and behavior during gameplay.

In addition to game theory, Fogg's Behavior Model (FBM) provided a conceptual framework for investigating McGonigal's (2011, 2015) psychological basis for why games can potentially create a transformation in learning by motivating students to carry out tasks to reach desired goals. Fogg argued that one must understand what exactly triggers desired action and the accomplishment of a task. Therefore, Fogg's model contained an approach to help understand what drives human behavior that was used in this study. FBM has three primary factors: motivation, ability and triggers (Fogg, 2009, p. 1). Figure 1 below shows the two axes, with the vertical axis for motivation and the horizontal axis for ability. A person with low ability to perform a target behavior would be reflected on the left and a person with high ability would be reflected on the right, with triggers affecting outcomes. Fogg explained that in order for a person to perform a target behavior, the person must possess adequate ability, motivation, and a catalyst. The goal is for behavior to become automated through what Fogg calls "persuasive technology" that fulfills all three of these important human drivers (p. 1). Chapter Two of this study will provide an in-depth explanation of how FBM worked in conjunction with game theory as a foundation for studying gamification of the classroom and how to potentially trigger desired student behavior.
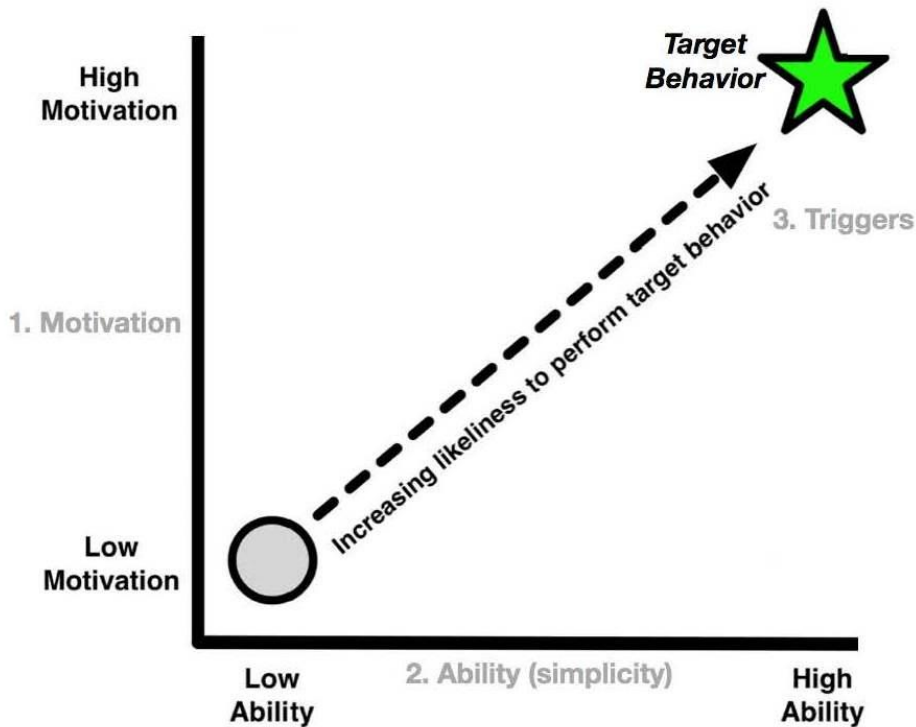
Figure 1: The Fogg Behavior Model has three factors: motivation, ability, and triggers.

Figure 1 Fogg's Behavior Model (2009)

Statement of the Problem

Few empirical investigations into gamification of the classroom have been conducted in the K-12 setting; moreover, a lack of a uniform classification system for game elements existed in the literature on gamification of the classroom, creating confusion in the research as to the approaches applied during each study and how conclusions were reached. For instance, researchers stressed a lack of streamlined reporting guidelines to aid researchers in detailing specific game criteria, how each criterion should be utilized, and for what purpose (Looyestyn, Kernot, Boshoff, Ryan, Edney, & Maher, 2017). This lack of practical application was important because in order for game elements to engage and motivate students to trigger desired behavior, gamification needs to draw

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from the motivational qualities of good games (Barata, Gama, Fonseca, & Gonçalves, 2013). Furthermore, controversy existed as to whether or not one can even claim that game elements enhance learning and teaching, or whether the concept is anything new in education, since many game attributes were present under a different guise in traditional educational modes, such as feedback, personalization, and hierarchized tasks (Dicheva et al., 2014). Therefore, when a teacher opts to use gamification, a standard classification of game elements is needed as part of educational game theory so that the what, how, and why is evident. In other words, what constitutes a game element, how should each element be utilized, and for what purpose (Loovestyn et al., 2017)?

Purpose of the Study

The goal of this study is to supplement the current body of educational research by examining how rural, public high school educators feel toward gamification and, when teachers utilize gamification in this setting, whether they consistently understand the what, how, and why of game mechanisms. This investigation is important in a rural high school setting because little research has been done in the K-12 arena, yet a gamified curriculum can potentially motivate learners by enriching the educational experience (Dicheva et al., 2014). In an effort to add to the body of literature on gamification research and practicum, this qualitative case study further adds to the body of research by filling a gap that exists as far as the why, how, and for what purpose game elements trigger desired behavior (McMillan, 2012). The goal of this investigation was accomplished by triangulating qualitative data obtained in a high school environment, located in a rural agricultural town on the West Coast. The study focused on teachers of grades ninth through 12th. The interviews and observation were structured so that the participants responded to a set number of close-ended, teacher demographic questions and open-ended questions of the same

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content (See Appendixes A and B). A different set of concerns were part of the observation and were likewise uniform in nature, utilizing a teacher observation checklist provided by Merriam and Tisdell (2016) (See Appendix C). Similarly, participants were presented with a set number of identical open-ended questions during the follow-up interview. However, these questions varied in nature from the initial interview questions and were merely to be used as conversation starters, with the hope that participants would engage in a conversation about their experiences.

Research Questions

The research questions created a thematic thread throughout this study and aligned, synthesized, and supported the methodologies and findings. The research questions were as follows:

1. How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?
2. How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?
    i. What elements of gaming add or detract from effective learning in the classroom?
    ii. What are the strategies and software programs that benefit student achievement and why?
3. What are teachers' perceptions toward using games to improve student skills and achievement?

Significance of the Study

This explanatory qualitative case study attempted to identify whether teachers use games in their classroom curriculum; if not, then why they opt out of using games, and, if they do use

games, the how and why. The case study research was based on the framework of Fogg's Behavior Model (2009) and McGonigal's game theory. McGonigal, a game designer and theorist, along with experts in the field of education (e.g., Prensky, 2012; Sheldon, 2012), highlighted the effect games can have in the classroom on motivation and engagement to trigger desired behavior. For this study's investigation to take place as far as whether teachers were aware of the potential for games in the classroom, teacher participants were interviewed and then observed using games in the classroom. Because the goal of the study was to find out if teachers perceive games as an effective tool in the area of school curriculum, a follow-up interview was conducted after participants using games were observed in their natural classroom setting where the behavior occurred (McMillan, 2012). The follow-up interview consisted of probing questions pertaining to their experience with games in the classroom (See Appendix B). The qualitative data prompted discovery for any distinctions or commonalities with classroom experience of games as a learning tool. As a fourth data source, archival information was analyzed as to the overall use of technology in the classroom. This fourth data source was made available by the school site and enabled an additional lens to examine overall technology trends on the campus. Creswell (2013) stressed that case study data should be rather extensive, derivative of myriad sources including: interviews, observations, documents, and archival data records.

This investigative research was significant because the previous body of literature on the use of gamification in a classroom setting emphasized that research in the 9–12 setting was needed as all students could potentially benefit from gamified curriculum, not merely college students studying STEM fields, as much of the empirical research predominately targets STEM fields (e.g., Haaranen, Ihantola, Hakulinen, & Korhonen, 2014; Hentenryck & Coffrin, 2014; Holman, Aguilar, & Fishman, 2013; Iosup & Epema, 2014; Landers & Callan, 2011; Leong & Luo, 2011).

Furthermore, the literature revealed that teachers alter or supplement curriculum to include games or game elements, but no standardization exists (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The lack of consistency among practitioners was indicative that a conceptual framework surrounding gamification would help explain why certain game characteristics could be used and for what specific purpose: the targeted behavior in the classroom that game theory could help catalyze (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The information gleaned from this case study research will help educators and students alike benefit from gameplay in the classroom.

Definition of Terms

For the purpose of this qualitative case study, the below terms were defined as follows:

Meaningful choices and alternatives: choice is a crucial part of what makes a game, a game (McGonigal, 2011). McGonigal described this as players understanding the rules, the goal, and the feedback, and willingly accepting the game parameters. McGonigal emphasized that the voluntariness of a game equates to challenging work experienced as a fun and safe activity.

Goals and sense of purpose: a sense of purpose experienced through a goal, or set of goals, is a crucial game element (McGonigal, 2011). McGonigal defined a goal, or set of goals, as specific tasks players work to achieve that provide players a sense of purpose (McGonigal, 2011).

Rules of the game: rules are a vital part of the game experience (McGonigal, 2011). Limitations must be placed on how players can achieve their goals because "the rules push players to explore previously uncharted possibility spaces" (McGonigal, 2011, p. 21). In sum, rules, as McGonigal wrote, "unleash creativity and foster strategic thinking" (2011, p. 21).

Feedback system: feedback must be provided to keep players informed about goal status and how close they are to achieving their goal, or goals (McGonigal, 2011). McGonigal described

this as gamers requiring constant and immediate feedback to serve as a promise that their goal is achievable, providing motivation to keep going (McGonigal, 2011).

Connectedness: working together as a community in the same virtual space toward the same goals is an important game experience (McGonigal, 2011). McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal).

Power and strength: people seek out strength when facing a challenge in life, or in a game, making power an important aspect of gameplay as players face many obstacles as they attempt to reach their goal, or goals (McGonigal, 2015).

Challenge mindset: a gamer's willingness to engage with obstacles, perceiving them as a challenge rather than a threat (McGonigal, 2015).

Heroism: heroic characters and their stories inspire and motivate players to try harder in their game pursuits to become a better version of themselves (McGonigal, 2015).

Limitations and Delimitations

This qualitative study focused on how high school teachers utilize gamification in the classroom and for what purpose. A limitation of this research design was the fact that the data collection instruments, Appendix A and Appendix B, were not part of a prior study. The literature review elucidated that previous research studies focused on students, rather than teacher perspective. Therefore, the initial interview questions and follow-up interview questions were designed specifically for this study, and pilot-tested, without the benefit of prior use and noted proven reliability that is derived from repeated use in other research investigations. However, the

observation was conducted utilizing a teacher observation checklist form created by Merriam and Tisdell (2016).

Moreover, the population created an additional limitation of the research design. The teachers who were interviewed and observed as part of this case study were part of the same school campus and West Coast region. Therefore, school culture and professional development opportunities, and other training offered by the school and school district, particularly with regard to technology, may have affected perspectives toward the use of games in the classroom in a negative or positive way. Therefore, teacher volunteer responses and observations may have proved to be similar among the study's participants.

Summary

In this case study research, a unique conceptual framework weaved together three important ideologies: personal experience, behavior theory, and game theory. The weaving together of concepts created a lens through which to examine what might assist educators, educational researchers, and administrators in tapping the captivation found through digital games and applying it to school curriculum. As will be seen in Chapter Two, the review of the literature pointed to sufficient reasons for examining whether educators who claim to utilize gamification in a classroom environment designed curricula around existing game theory, and if so, how and why. If they did not utilize gamification, their reasons for opting out of gamification were explored. Importantly, due to a lack of prior research, a rural, public high school setting yielded significant findings.

As such, in Chapter Three, the methodology for this qualitative case study is outlined in great detail. Next, in Chapter Four, the research findings for each of the study's research questions

are discussed. Lastly, in Chapter Five, conclusions and suggestions for future research are

provided.

Chapter 2: Literature Review

Introduction

Although over one billion people play digital games worldwide for at least one hour per day (McGonigal, 2015), and collectively over three billion hours a week are spent on gaming (McGonigal, 2011), few classroom environments around the globe utilize game theory—defined as the psychological benefits gamers experience when immersed in play (McGonigal, 2015)—in their curricula (Prensky, 2012). In fact, most people are unfamiliar with game theory, and even tend to have a negative preconception that games lead to a dysfunctional lifestyle (Kim & Lee, 2013). For instance, Kim and Lee pointed out that in South Korea a statute was passed, known as the Shutdown Law, or Cinderella Law (Youth Protection Revision Bill, 2011), that bans children under the age of 16 from playing online games between the hours of midnight and six o'clock in the morning; the authors highlight that the law arose from the government's fear that children will become adversely affected if over-immersed in online gaming (Kim & Lee). Similar to the South Korean government's fear surrounding games, in the United States, politicians in various states, such as Texas and New Mexico, have proposed heavy taxation on video games to deter the gamer lifestyle (McGonigal, 2011). McGonigal (2011, 2015) highlighted that preconceptions about gaming prompt such government censorship, with non-gamers perceiving games as a mere distraction and time usurper, or even as an unhealthy addiction. However, empirical research shows that games can treat illness, increase resilience (McGonigal, 2015), and, when used effectively, engage students in learning and trigger desired behavior (Kim & Lee).

Study Topic. The purpose of this dissertation was to investigate whether or not teachers claiming to utilize gamification in a classroom environment used game theory in their curricula design, and if so, how and why. In this qualitative study, teachers who claimed to embed game

elements in their teaching methodologies were interviewed and then observed in action while teaching to see if game elements were in fact used, and if so, how they were used, and for what purpose. Likewise, teachers not utilizing game elements were interviewed to glean insight into reasons why some educators choose to opt out of gamification altogether. Teachers who claimed to use games were interviewed, observed when using games, and then interviewed again following the observation. The case study research was conducted in a rural, public high school setting, targeting teachers teaching general education subjects to ninth through 12th graders, as a review of the literature elucidated that most of the empirical research was conducted in a university setting.

  Context. Games engage people of all ages all over the world by fulfilling "genuine human needs that the real world is currently unable to satisfy" (McGonigal, 2011, p. 4). McGonigal (2011) emphasized that game developers seek to satiate life fulfillment through their game designs and, in doing so, expertly motivate people to work extremely hard, facilitate collaboration at unimaginable levels, and inspire people to be gritty and resilient when facing obstacles. As of relatively recently, educators began to ponder whether the type of satiation found through playing digital games can be applied in the classroom setting. Kim and Lee (2013) defined gamification as "the use of game design elements, characteristic for games, in non-game contexts," and then continued to explain that the goal of gamification is to add enjoyment and enrichment to an everyday task by increasing engagement (Kim & Lee, 2013, p. 8484). Along these same lines, Dicheva et al. (2014) contended that gamification "suggests using game thinking and game design elements to improve learners' engagement and motivation" (p. 75). The explanations of gamification in education provided by Kim and Lee and Dicheva et al. focused on engagement and motivation—crucial elements of game theory. This qualitative case study relied on Fogg's Behavior Model (FBM) as a framework for investigating McGonigal's (2011, 2015) psychological

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basis for why games engage people through the use of challenges that motivate people to carry out tasks to reach their desired goals, the very same engagement needed in a learning environment.

Significance. The major stakeholders who specifically benefit from knowing that this study was made available would be educators in any setting, from kindergarten through eighth grade, secondary school teachers, and then continuing to professors in the postsecondary setting. In addition to educators, administrators, parents, policy makers, and educational researchers, anyone interested in student success would gain insight into how and why some teachers utilize games as instructional tools while others do not.   This study extended the body of literature on game theory to rural high school settings and explored teacher beliefs and practices with respect to how and why gamification can be used as an instructional tool to support learning.

Statement of the Problem. A problem that existed in gamification of education, in addition to the few empirical investigations conducted in the K-12 setting, was the lack of a uniform classification system for game elements among the literature, which created confusion in the research as to the approaches applied during each study and how conclusions were reached. For instance, researchers stressed a lack of streamlined reporting guidelines to aid researchers in detailing specific game criteria, how each criterion should be utilized, and for what purpose (Looyestyn et al., 2017). This lack of practical application was important because for game elements to engage and trigger desired behavior in students, gamification needs to draw from the motivational qualities of good games (Barata et al., 2013). Moreover, controversy existed as to whether or not one can even claim that game elements added to learning and teaching. Would gamification be anything new in education since many game attributes already exist in traditional educational modes under a different guise, such as feedback, personalization, and hierarchized tasks (Dicheva et al., 2014). Therefore, when a teacher opts to use gamification, a standard

classification of game elements as needed to be developed as part of educational game theory so that the what, how, and why could become more evident to teachers. In other words, defining what constitutes a game element, how each element should be utilized, and for what purpose (Loovestyn et al., 2017).

The goal of this study is to supplement the current body of educational research by examining how rural, public high school educators feel toward gamification and, when teachers utilize gamification in this setting, whether they consistently understand the what, how, and why of game mechanisms. This investigation is important in a rural high school setting because little research has been done in the K-12 arena, yet gamified curriculum can potentially motivate learners by enriching the educational experience (Dicheva et al., 2014).

Organization. This study is organized so that the literature review on gamification in education is introduced, followed by the conceptual framework that undergirded the investigation. Next, a review of research literature and methodological literature is provided. After the literature and methodologies contained in the study are explained, the important methodological issues arising from the literature and methodological review is critiqued, followed by a synthesis of the research findings, which is then followed up with a critique of the previous research. To end Chapter Two, a recap of the literature review and significant findings is presented.

Personal Connection

The researcher plays some digital games—*Candy Crush*, *Solitaire*, and *Tetris* to describe a few—and grew up in the age of *Atari* and *Pacman*, with *Mrs. Pacman* being a favorite as a teenager; however, the researcher has not played popular online games, such as *World of Warcraft*, or many of the popular video games of today. However, as an educator, the researcher sees the value of games and is interested in how integrating game elements in education may increase

student learning outcomes. The researcher points out, as well as many educational practitioners and researchers, that today's students tend to suffer from disengagement as learners who find the material irrelevant to their everyday lives (e.g., De Schutter & Abeele, 2014; Prensky, 2012; Christensen & Eyring, 2011; Fullan & Scott, 2009; Rhoads, 2015); yet many of these same students are engaged in gameplay, with 99% of boys under the age of 18 playing digital games over 13 hours per week and 92% of girls under the age of 18 playing video games at least eight hours per week (McGonigal, 2015). These statistics point to the possibility that gamifying education may work as a trigger to motivate students to perform targeted learning tasks, as Fogg's Behavior Model (FBM) described below predicates, when combined with McGonigal (2015, 2011, 2010) as a theoretical lens that focuses on the effect of games on the human psyche. This qualitative case study sought to investigate the extent of the gamification phenomenon in a K-12, rural setting.

Theoretical Framework

Game theory is derived largely from the work of McGonigal (2010, 2011, 2015), who is a trailblazer in psychological game research as both a scholar and game designer, and was used as a framework to guide this study. As McGonigal (2011) stated, "[I]n today's society, computer and video games are fulfilling genuine human needs that the real world is currently unable to satisfy. Games are providing rewards that reality is not" (p. 4). Along these same lines, Philip Zimbardo, a renowned psychologist, explained in a 2010 TED Talk, *The Secret Powers of Time*, that youth today are playing Warcraft, a very exciting game, and that these games will soon become 3D, making them even more powerful and riveting for our youth. In other words, Zimbardo stressed, "their brains are being digitally rewired," and yet they are expected to sit in an analogue classroom. Psychologists, such as Zimbardo, and game designers and theorists, such as

McGonigal, stimulated researchers in the educational realm to investigate the potentiality of replicating in a classroom setting the type of satiation found through playing digital games. For instance, Dicheva et al. (2014) suggested that gamification in a learning environment uses, "game thinking and game design elements to improve learners' engagement and motivation" (p. 75). Similarly, O'Donovan, Gain, and Marais (2013) indicated that learning could be transformed for all types of learners by mirroring game traits and how these traits affect thinking and behavior during gameplay.

Prensky (2006) discussed gameplay as a powerful learning tool that has not gone unnoticed by educational policymakers as they continue to work to inform the public, including parents and educators, of the enormous potentiality of integrating videogames and game-based learning into the classroom. The concept of games as a mechanism to train students to think and behave in a way that is conducive to proper learning connected well to McGonigal (2011), who emphasized that game developers seek to satiate life fulfillment through their game designs and, in doing so, expertly motivate people to work extremely hard, facilitate collaboration at unimaginable levels, and inspire people to be resilient and powerful when facing tough obstacles or failures. In fact, Prensky (2006) pointed to Dr. Rosser, the physician who runs the laparoscopic training at New York City's Beth Israel Hospital, and a claim that surgeons who played videogames as kids commit 40% fewer mistakes during surgery (p. 7). Unlike Prensky, McGonigal's (2011) psychological theory of the effect of games did not solely focus on the educational realm, but was derivative of Csikszentmihalyi's work and, in particular, a 1975 scientific study, *Beyond Boredom and Anxiety*. In research studies, Csikszentmihalyi coined the concept of *flow*, described as a state of alternative reality or ecstasy resulting from a sense of joyous engagement (as cited in McGonigal, 2011). McGonigal (2011) accentuated Csikszentmihalyi's discovery that flow is

produced through gameplay derived from a specific combination of criteria found in games—self-selected goals, constant feedback, and challenges—claiming that flow is achieved when gamers work at the very limits of their ability.

Fogg's Behavior Model (FBM) provided a framework for investigating McGonigal's (2011, 2015) psychological basis for why games create flow through challenges and, therefore, motivate people to carry out tasks to reach their desired goals. Fogg contended that many attempts to design experiences that influence behavior fail due to a lack of understanding of what exactly influences desired action. Therefore, Fogg's model contains a novel approach to understanding what drives human behavior. FBM has three primary factors: motivation, ability and triggers (Fogg, 2009, p. 1). Figure 1 shows the two axes, with the vertical axis for motivation and the horizontal axis for ability. A person with low ability to perform a target behavior would be reflected on the left and a person with high ability would be reflected on the right, with triggers affecting outcomes. Fogg explained that in order for a person to perform target behavior, the person must possess adequate ability, motivation, and a trigger. The goal is for behavior to become automated through what Fogg calls "persuasive technology" that fulfills all three of these important human drivers (p. 1).

Fogg explained that motivation reflected on the vertical axis contains no units of measure because the framework is conceptual to elucidate relationships between the three factors. A low-motivated person would be reflected at the lower portion of the axis, and a highly motivated individual would be located toward the upper portion of the axis. Similarly, a person who is not easily able to perform a task would be on the left side of the axis and a highly skilled individual would be on the right side. The two axes together create a plane with the target behavior reflected in the upper right-hand corner marked with a star. This reveals that the more skilled and motivated

a person is, or becomes, the more likely the target behavior will be carried out. However, a trigger must be present as well, as indicated below the target behavior depiction.

According to FBM, triggers have three key characteristics: the trigger is noticed, it is associated with the target behavior, and it occurs at the right time (Fogg, p. 2). As part of their conceptual framework surrounding gamification, O'Donovan et al. (2013) applied FBM as a model for human behavior. The researchers emphasized that for an action to be carried out, a person must reach a certain level of ability and motivation, but a trigger, such as found through games, would be effective in inducing the desired behavior (O'Donovan et al.). In other words, proper gamification elements could work to trigger students to perform desired behavior in conjunction with their studies, as depicted in Figure 1, as long as the persuasive design of the technology was undergirded by the factors that drive human behavior using FBM.
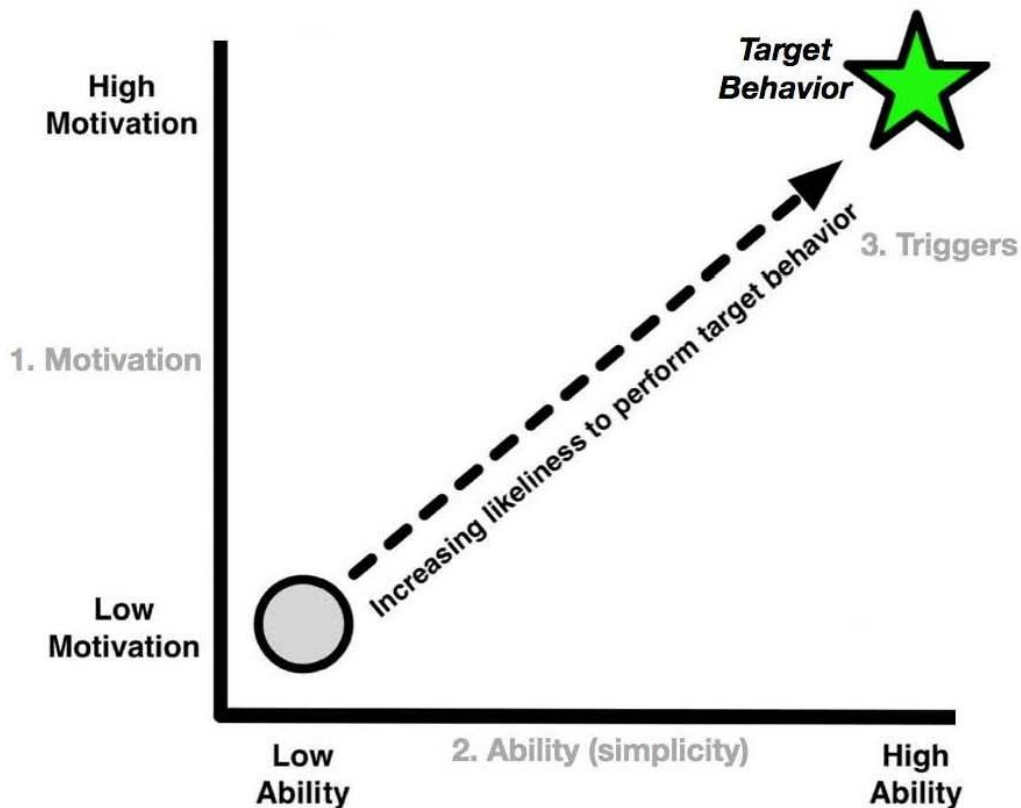
Figure 1: The Fogg Behavior Model has three factors: motivation, ability, and triggers.

Figure 1 Fogg's Behavior Model (2009)

For an educational game to effectively trigger students to perform tasks, gamified elements/mechanics must be developed in conjunction with game theories of what makes gameplay effective as an automation device for targeted human behavior. McGonigal (2010) claimed that the world of gaming has the potential to positively affect collaboration, thinking, and problem-solving skills and Dicheva et al. (2014) asserted that a gamified curriculum can potentially engage learners by enriching the educational experience. Yet, empirical studies revealed that no streamlined theoretical framework existed to aid educational researchers in detailing what specific game mechanisms should be used in the classroom setting, how each

mechanism should be utilized, and for what motivational purpose (Looyestyn et al., 2017). The theoretical framework for this qualitative case study was developed as described below, which is also summarized on Table 1 — Game Mechanics: The What, How, and Why. The left column detailed common game elements used in learning environments, although a lack of consistency existed among the research as far as labeling each; the middle column provided an explanation of how each works in conjunction with curriculum; and the right column aligned each with McGonigal's (2011, 2015) psychological game theory and why each works as a trigger to induce a gameplayer to carry out targeted thinking and behavior.

A theoretical framework that undergirded this qualitative study was derived from personal beliefs and experiences and by utilizing topical literature surrounding gamified pedagogy, McGonigal's (2010, 2011, 2015) scholarly psychological work surrounding games, and Fogg's Behavior Model (FBM). The eight significant ways thinking and behavior occur when humans play a game were thoroughly classified and compiled using McGonigal's (2011, 2015) texts as well as educational research outlining targeted behaviors sought in an educational setting. To explain the theoretical framework, a game element, referred to interchangeably within this study as a data attribute, was described, also referred to interchangeably throughout this study and other studies as a game mechanic or game mechanism. Secondly, behavior the game element purportedly triggers was thoroughly described. Next, why the game element works as a trigger, according to McGonigal's game theory, was summarized. Next, insight was provided as to how the game element could be, or has been applied, in an educational setting based on the literature review. Lastly, how the game element works in conjunction with FBM was elucidated along with the three factors affecting human behavior: motivation, ability, and triggers (Fogg, 2009).

Meaningful Choices and Alternatives. First, a gamer's way of thinking or acting

described in the literature as well as in McGonigal's (2015) text was prompted by *Meaningful*

Choices and Alternatives. In other words, choice is an important aspect of what makes a game, a

game (McGonigal, 2011). McGonigal described this as players understanding the rules, the goal,

and the feedback, and willingly accepting the game parameters. In sum, McGonigal stressed that

the voluntariness of the game ensures that challenging work can be experienced as a fun and safe

activity. This game element was described in the literature on gamification in varying ways. For

instance, one research team posited to give students choices in what assignments they do, what

books they read, what projects they carry out, and even how they earn points; some form of

voluntariness should be part of the gamification approach (Barata, Gama, Jorge, and Gonçalves,

2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered:

motivation, ability, and trigger. The scenario of choice and an individual student will vary, but one

such would be a high school Advanced Placement (AP) English student, in this hypothetical case,

a female, who is an avid reader of magical realism; however, in school she is forced to read classic

literature and then write about it. In a gamified classroom, the teacher offers a choice of readings

in varying genres, including magical realism. A novel is on the list that she has wanted to read, but

has not had time due to schoolwork. The student's reading ability is high, but her motivation

remains low even though she can read her favorite genre because an essay will follow on the

reading, which she dreads. However, the teacher gives students a choice of projects on the reading

as well, including creating an animated video reviewing the book, creating a trigger. The student

now feels highly motivated and is highly skilled to complete the task and do well on the

assignment.

Goals and Sense of Purpose. Second, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Goals*. In other words, a sense of purpose experienced through a goal, or set of goals, is an important game trait (McGonigal, 2011). McGonigal described a goal, or set of goals, as specific tasks players work to achieve, providing them with a sense of purpose (McGonigal, 2011). For gamers, a "quest" creates and maintains focus and commitment toward the goal that matters most (McGonigal, 2015). In sum, humans want to feel a sense of accomplishment. This game element was described in the literature on gamification in varying ways. For instance, Sheldon (2011) reversed traditional grading by having students work from an "F" with the goal of "A" by earning points to provide students a sense of purpose and a tangible goal or "quest" to work toward by the end of a term (as cited in Barata et al., 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of prompting a sense of purpose in an individual student will vary, but one such would be a male student, who is highly motivated, but has low ability in math. His teacher starts students in the course off with an "F," explaining that students will move up a grade with each level successfully completed. Rather than traditional units, the course is structured as levels so that as students achieve the objective of a level, they move up with the idea that by the end of the course, they reach their "quest" of an "A." The course is scaffolded through gamification so that the student, as a motivated student, devotes much time toward practice and, hence, his ability increases. Each level he moves up works as a trigger for him to keep practicing, as he is now "hooked" and his behavior is automated, the goal of any persuasive technology (Fogg, 2009).

Rules of the Game. Third, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Rules of the Game*. In other words, rules are a vital part of the gamer's experience (McGonigal, 2011). Limitations must be placed on how players can achieve their goals because "the rules push players to explore previously uncharted possibility spaces" (McGonigal, 2011, p. 21). In sum, rules, as McGonigal writes, "unleash creativity and foster strategic thinking" (2011, p. 21). This game element was described in the literature on gamification in varying ways. For instance, one research team explained that class rules and expectations and clear instructions must be provided to students regarding gamified elements of the class and how they achieve their learning goals and objectives, yet this must not be in the traditional form of a syllabus (de Byl & Hooper, 2013). The course must be fully set up as a game, not just the title of the document altered.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of game rules and how each individual student experiences them will vary, but one such would be a student who is moderately skilled and moderately motivated in a college online history class. The student is provided with the rules of the gamified course and told that he can work through the curriculum at this own pace and potentially finish the class whenever, as long as it is prior to the end of the semester. At first the student works through the curriculum at a regular pace, on track to end by the last week. However, during the sixth week, his employer offers him a full-time position, but he will have to travel and work around the clock. This unexpected opportunity triggers the student to review the rules of the game and then work hard and diligently to finish his classwork over the weekend so he can begin his new job. His focus on the rules of the game, along with his newly triggered determination, prompt him to successfully achieve the targeted behavior.

Feedback System. Fourth, a gamer's way of thinking or acting described in the literature, as well as in McGonigal's (2015) text, was prompted by *Feedback System.* In other words, feedback must be provided to keep players informed about goal status and how close they are to achieving their goal, or goals (McGonigal, 2011). McGonigal described this as gamers requiring constant and immediate feedback to serve as a promise that their goal is achievable, providing motivation to keep going (McGonigal, 2011). Part of the feedback system is also the idea that gamers seek "epic wins" or positive outcomes that often arise when least expected (McGonigal, 2015). In sum, gamers feed on progress when trying to overcome obstacles and reach their goals. This game element was described in the literature on gamification in varying ways, but often takes form through the use of leaderboards. For instance, one research team pointed out that leaderboards often provide immediate feedback to learners through avatars that progress on a scale with other class members' points anonymously displayed as well (Barata, Gama, Jorge, & Goncalves, 2014). Leaderboards provide real-time feedback and a tracking system to show players how close they are to achieving their course goal, as well as where they stand compared to their peers.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of feedback and an individual student will vary, but one such would be a student who is highly skilled but unmotivated to complete a required political science course. The student enrolls in an online class, thinking it will be easier because she is highly skilled in technology. The professor creates a gamified course, including a leaderboard. The student completes the first module on political philosophies shaping the U.S. Constitution, putting in little effort to review the material provided by the professor, only watching the first 30 seconds or so of the assigned videos. Following completion of the module, the student

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immediately tracks her progress on the leaderboard and sees that she has received the lowest amount of points possible due to not watching the videos all the way through (the professor could track her progress). Compared to the rest of the class and also where she wants to be as far as her individual success in the class, she is far from goal achievement. This realization instantaneously triggers her to be motivated to utilize her skills and she accomplishes the professor's targeted behavior and finishes the class with an "A" grade and knowledge about the U.S. government that will serve her well in college and in life.

Connectedness. Fifth, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Connectedness*. In other words, working together as a community in the same virtual space toward the same goals is an important game experience (McGonigal, 2011). McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal). In sum, when communities were formed among students in a course sharing the same goal, bonds were formed as students helped each other. For instance, one research team described guilds that created a multiplayer environment. The authors described guilds as a group of students who work together, toward a common goal, but may or may not team up to reach the goal. Guilds were similar to multiplayer games where players do not compete against each other but occupy the same virtual space (Barata et al., 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of guilds and how they impact individual students will vary, but one such would be a student who is moderately skilled and motivated. This hypothetical student enrolls in a gamified liberal studies course needed toward his teaching degree.

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The students are seniors and have been together in the cohort since they started the program as freshmen. This particular course has guilds established, but the teacher has created the guilds based on cumulative GPA. This student wants to be with his friend Sam as they work well together and have a strong support system in place, but due to Sam's GPA being higher, he cannot be part of the same guild. His desire to work with his peer and be part of the same guild in the next class triggers him to work harder in all of his classes over the term to increase his cumulative GPA.

Power and Strength. Sixth, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Strength.* In other words, people seek out strength when facing a challenge in life, or in a game, making power an important aspect of gameplay as players face many obstacles as they attempt to reach their goal, or goals (McGonigal, 2015). McGonigal (2015) put forth that gamers seek out "power-ups"—items that make their character stronger, more powerful, and faster. In sum, in an education setting, for a true game experience, a student needs to have access to "power-ups" to strengthen their character's play. For instance, some research teams posit using Experience Points (XP). Barata et al. (2015) defined XP as points awarded to students, typically enabling them to advance to the next level of the course once they achieve a certain number.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of Experience Points (XP) and an individual student will vary, but one such would be a student who is highly skilled but only moderately motivated. XP works in conjunction with providing choice, a sense of purpose, and so forth, but can be used as a "power-up" in a class. In traditional education, this would be similar to a student seeking over 100% in the class and then not even needing to take the final examination to still receive a high

mark in the class. For the highly skilled but only moderately motivated student, these power-ups can trigger intense motivation in that the final examination is often dreaded.

  Challenge Mindset. Seventh, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Challenge Mindset*. In other words, "accepting the challenge to play" is an important game experience (McGonigal, 2015, p. 8). McGonigal (2015) explained this acceptance of challenge as a gamer's willingness to engage with obstacles, perceiving them as a challenge rather than a threat. McGonigal (2011) explained that gamers always play at the brink of their skill, risking falling off. In sum, this challenge mindset that risks failure could be adopted in the gamified classroom environment. For instance, one research team posited that optional quests can be added to courses so that challenging tasks are added to the course as optional, allowing students to earn higher points when the task is seen as a larger obstacle (Barata et al., 2017).

  In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of optional quests that challenge students and how these will be perceived will vary student by student. However, for a student who is highly motivated and moderately skilled, an optional challenge perceived as a quest could work as a trigger. For example, a student enrolls in a coding course, hoping to work in Silicon Valley upon graduation. The instructor has challenging tasks set up for her gamified course, informing students that if the tasks are completed, not only will the student earn a predetermined amount of points in the course, but the student's work will be submitted to well-known tech companies. The optional quest puts the student's grade at risk with less time spent on required work; however, it works as a trigger for the student to increase her ability by spending extra time to study and learn coding, as oftentimes the motivated, low-skilled student may merely seek a grade, rather than skill

attainment. This increased skill along with high motivation will lead the student toward the targeted behavior: the learning objectives and a skilled future tech industry employee or entrepreneur.

Heroism. Eighth, a gamer's way of thinking or acting described in the literature as well as in McGonigal's (2015) text was prompted by *Heroism*. In other words, McGonigal (2015) explained, "In games, heroic stories abound" (p. 8). In games, heroic characters and their stories inspire and motivate players to try harder in their pursuits and to also become a better version of themselves (McGonigal, 2015). McGonigal described this as seeking a heroic story. In sum, students could see a better version of themselves through a fantastical persona they help create and develop. For instance, one research team discusses avatars as a way to create a fantasy world and autonomy in a gamified classroom environment, allowing students to become heroes, friends, or foes in that world (de Byl & Hooper, 2013).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of the effect of avatars on an individual student will vary, but one such would be a student who is shy and moderately motivated and skilled. The course is a gamified online chemistry course. The student does not talk much in a live class due to shyness and often will not ask for clarification, causing his grades to be mediocre. However, due to the anonymity afforded by the avatar, he develops a character online that his peers perceive as the foe people love to hate. As the student moves up levels, his peers covet his strength and perceive his character as powerful. This type of heroism in his character triggers him to work harder and harder.

The game elements as discussed in this section—choice, starting with an "F," classroom game rules, constant and immediate feedback, connectedness, powering up through experience

points, obstacles, and avatars—all work as persuasive technologies in line with Fogg's behavior

model (FBM) and work as triggers to increase student motivation and/or ability so that targeted

behavior is carried out in a classroom setting. However, in order for a gamified classroom to be

effective in increasing learning outcomes, teachers must be aware of what game elements to use,

for what purpose, and how they should be used. In line with Prensky (2012), McGonigal (2011)

emphasized that it is not enough to merely supplement existing traditional curriculum with a few

game elements, as this is "at best a temporary solution" (p. 128). Instead, the ideal educational

environment is a game from beginning to end: every assignment, every activity, every moment of

instruction and assessment (McGonigal, 2011).

As previously stated, the conceptual framework undergirding this qualitative case study

research derived from personal beliefs, the literature review, McGonigal (2010, 2011, 2015), and

Fogg's Behavior Model (FBM). The eight significant ways of thinking and behaviors were crucial

in understanding how gamification can work in the classroom and provided a streamlined guide as

summarized in Table 1, and ultimately became the significant data attributes of this study. Game

mechanisms may be sporadically used in some classrooms around the world; however, researchers

and educators need to connect the targeted behavior to the game element that can work as a trigger.

Table 1

Game Mechanics: The What, How, and Why

Game Element (What)	Description (How)	Attributable to Traits of a Game (Why)
Meaningful choices and alternatives	Give students choices in what assignments they do, how they earn points, and some form of voluntariness should be part of the gamification approach (Barata, Gama, Jorge, and Gonçalves, 2017).	Choice. Players understand the rules, the goal, and the feedback and willingly accept the game parameters (McGonigal, 2011). McGonigal stresses that the voluntariness of the game ensure that challenging work can be experienced as a fun and safe activity.

Starting with an "F"	Sheldon (2011) reverses traditional grading by having students work from an "F" with the goal of "A" by earning points to give students a sense of purpose (as cited in Barata et al., 2017).	Purpose. The specific tasks players work to achieve, providing players with a sense of purpose (McGonigal, 2011). For gamers, a "quest" creates and maintains focus and commitment toward the goal that matters most (McGonigal, 2015).
Class rules and expectations	Clear instructions must be provided to students regarding gamified elements of the class and how they achieve their goals (de Byl & Hooper, 2013).	Rules. Limitations placed on how players achieve their goals (McGonigal, 2011).
Guild or multiplayer games	Guilds are a group of students who work together toward a common goal, but may or may not team up to reach that goal. Guilds are similar to multiplayer games where players do not compete against each other but occupy the same virtual space (Barata et al., 2017).	Connectedness. In multiplayer games, gamers form allies, people who face similar obstacles, or at least relate to them, and who watch out for each other.

Game Element (What)	Description (How)	Attributable to Traits of a Game (Why)
Experience points (XP)	These are points awarded to students, and typically students move to the next level of the course once they achieve a certain number (Barata et al., 2017).	Strength. McGonigal (2015) puts forth that gamers seek out "power-ups"—items that make their character stronger, more powerful, and faster.
Optional quests	Challenging tasks that can be added to the course as optional, allowing students to earn higher points when the task is seen as a larger obstacle (Barata et al., 2017).	Challenge mindset. McGonigal (2015) explains that a gamer is willing to engage with obstacles, perceiving them as a challenge rather than a threat.
Avatars	Avatars create a fantasy world and autonomy, allowing students to become heroes, friends, or foes	Heroism. In games, heroic characters and their stories inspire and motivate players to try harder and to be a better

| in that world (de Byl & Hooper, 2013). | version of themselves (McGonigal, 2015). |

Review of Research Literature and Methodological Literature

This section presents a review of the research literature and methodological literature used to elucidate findings of this study and provide grounding for needed research within the realm of gamification in an educational setting by identifying the dissertation's positional framework within previous research on the topic. The review substantiated that the area of study guided by the research question to be investigated surrounding gamification had not been adequately studied, particularly in the K-12 setting outside university STEM classes with an emphasis on educators and administrators, rather than student perspective experience, and, importantly, as a pedagogical theory grounded in game and behavior theory (Fogg, 2009) with specific guidelines outlined. These guidelines include why a particular game element, how to use the particular game element in curricula, and for what purpose (i.e., how does the game element motivate students, increase target behavior, and trigger targeted learning behavior).

Why Gamification?

Today's generation of students purportedly overall lack the desire to learn the material presented to them in school, especially in the traditional teacher-centered format with the sage on the stage lecture (McGonigal, 2011; Prensky, 2012; Zimbardo, 2010). Contained within the existing body of literature on gamification in the classroom environment, as well as in education generally, a perception saturated the literature that students do not enjoy school, resulting in them not meeting learning outcomes in traditional pedagogical formats in K-12 and post-secondary academic settings (e.g., Christensen & Eyring, 2011; De Schutter & Abeele, 2014; Fullan & Scott, 2009; Leong & Luo, 2011; Lister, 2015; Prensky, 2012; Rhoads, 2015). A contributing factor for

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the lack of student stimulation and interest in academics cannot be neatly pinned down, although many scholars pointed to the idea that the traditional forms of teaching, such as sitting in a classroom listening to a teacher, fails to engage today's students (e.g., De Schutter & Abeele, 2014; Leong & Luo, 2011; Lister, 2015; Prensky, 2012). Such traditional lecture methods prove to be less effective than they were in the past (e.g., Leong & Luo, 2011; Prensky, 2012). The cause many researchers pointed to was that today's generation of students—who grew up in a world saturated with digital technology—are, simply put, bored of the old telling paradigm approach to teaching (e.g., Prensky, 2012; Zimbardo, 2010).

In the review of the literature on the topic of gamification in education, the catalyst for many of the empirical studies was a desire for students to find learning enjoyable and enriching (e.g., De Schutter & Abeele, 2014; Looyestyn et al., 2017; Xu, 2012). For instance, educational researcher Xu (2012) quoted Schell, a professor at Carnegie Mellon University, who purportedly initiated the first wave of gamification in the classroom due to a keynote speech at the 2010 Design Innovate Communicate Entertain (DICE) Summit. Schell (2010) claimed that society transitioned from a time all about survival due to lack of resources, to a time all about efficiency as technology saturated our lives, and has since evolved to a time that is all about pleasure. Gamification can be seen by some as a means to integrate pleasure into school curriculum and make the experience more enjoyable and, hence, meaningful for students (De Schutter & Abeele).

Along these same lines, in her book *Reality is Broken* (2011), McGonigal investigated Quest to Learn, a public charter school located in New York, which was the first game-based school in the world. McGonigal visited the school, conducting qualitative research by interviewing the owner, employees, and students. McGonigal (2011) hoped that Quest to Learn would be a model for other schools, as it is not enough to merely use games to teach kids; rather,

schools must *be* a game from start to finish in order to "truly marry good game design with strong

educational content" (p. 128). McGonigal argued that today's school children suffer because their

total inundation with digital technology since birth conflicts with the traditional classroom

environment and teacher-dominated approach to teaching, citing Prensky's 2012 work, *Teaching*

Digital Natives. McGonigal claimed, "School today for the most part is just one long series of

necessary obstacles that produce negative stress. The work is mandatory and standardized, and

failure goes on your permanent record" (McGonigal, 2011, p. 127). A vast disconnect exists

between how children live immersed in the digital world during their personal experiences versus

their school lives that they often find boring and frustrating (McGonigal, 2011; Zimbardo, 2010;

Prensky 2012). A potential solution educational researchers have glommed onto is gamification

because, as most researchers in the literature review pointed out, video games have become an

increasingly popular activity (Barata et al., 2014; Burkey, Anastasio, & Suresh, 2013), with

millions of hours invested in digital gameplay (McGonigal, 2010, 2011, 2015).

Educational Settings and Gamification Research

A review of the body of literature revealed that empirical studies have recently taken place

since 2010 as to the effect of gamification in the classroom; these studies have been predominately

conducted in the university setting (e.g., Hentenryck & Coffrin, 2014; Holman et al., 2013;

Landers & Callan, 2011). The literature review consisted of over 50 peer-reviewed articles,

including predominately empirical research, as well as literature reviews, and several book-length

texts on gamification in education. The literature was searched using the following search engines:

ERIC, Proquest, and Google Scholar, with keywords "gamification" and "education" as well as

"McGonigal" and "education." Based on abstracts, unrelated publications were filtered and then

also identified sources utilized in pertinent articles to build a robust and complete compilation of

literature. Of these sources contained in the literature review and methodological review, only one study specifically targeted K-12 learners (Abramovich, Schunn, & Higashi, 2013). Additionally, another study included K-12 learners in its large source population data, conducted by Morrison and DiSalvo (2014), who relied on quantitative data from Khan Academy. The data was collected based on students from all levels, consisting of over 15 million registered users. The body of research elucidated a lack of empirical data on the impact of gamification on K-12 learners.

In addition to empirical research targeting university-level students, most of the empirical investigations were conducted in STEM fields (e.g., Haaranen et al., 2014; Hentenryck & Coffrin, 2014; Iosup & Epema, 2014; Leong & Luo, 2011). University professors teaching in the STEM disciplines implemented gamification in their classroom curriculum, particularly those professors teaching in online platforms (e.g., Hakulinen & Auvinen, 2014; Li & Fitzmaurice, 2014; Li, Dong, Untch, & Chasteen, 2013). These professors sometimes utilized a control group (e.g., Frost, Matta, & MacIvor, 2015; Li, Grossman, & Fitzmaurice, 2014), whereas others implemented a gamified curriculum without utilizing a control group (e.g., Akpolat & Slany, 2014; Iosup & Epema, 2014). Hamari, Koivisto, and Sarsa (2014) stressed that context of gamification matters. The researchers reached this conclusion based on their review of the literature on gamification and their research question: Does gamification work? As Hamari et al. emphasized, social environment matters, as well as individual interest and skills; therefore, the researchers explained that in certain environments, and only with certain users, "gamification had significant effects" (Hamari et al., p. 3030). In other words, without utilizing control groups in empirical research, it is difficult to determine the effect of gamification. The review of the literature revealed a need to investigate how gamification impacts learners across disciplines and social demographics.

In STEM fields, students may have more experience with playing digital games than perhaps students taking a humanities course. In order to determine whether gamification was effective in increasing student engagement and enjoyment in learning, studies would occur within varying contexts, including within varying disciplines. Moreover, the courses would be taught by teachers within varying contexts, including within varying disciplines. Of the over 50 peer-reviewed articles included in the literature review, only one of the sources specifically included teacher attitude toward gamification as found in the empirical investigation conducted by De Schutter and Abeele (2014). De Schutter and Abeele utilized their own course to collect and measure data. Their research question asked how intrinsically motivated and engaged their students were. They created their qualitative study by recording the instructor's perspective on a log, focusing on whether the gamified course was effective and, additionally, in what ways it was difficult or was not working. Other researchers involved the teachers gamifying the curriculum and then teaching the courses themselves, or they involved teachers in the study, but the impact of gamification focused on student reaction, ignoring the impact that instructors have on whether gamification can be successful or not (e.g., Goehle, 2013; Gordon, Brayshaw, & Grey, 2013; Haaranen et al., 2014). The literature review and methodological review emphasized a need to research how teachers feel about gamification of the classroom (i.e., whether they enjoy the experience and find it satisfying and, most importantly, whether they feel that gamification helps or hinders learning).

As researchers such as De Schutter and Abeele (2014) have indicated, one of the criticisms of gamification in the classroom hinged on the notion that using games as a pedagogical approach to teach students subject matter relies heavily on extrinsic motivation, rather than intrinsic motivation. De Schutter and Abeele's critique of gamification connected well with Deci and

Ryan's (2000) Self-Determination Theory (SDT) and their findings that social contexts that fulfill basic needs and intrinsically motivate individuals, while also integrating extrinsic motivations, work to catalyze growth naturally. On the other hand, social contexts that usurp autonomy, competence, or relatedness result in low motivation, outcomes, and overall well-being (Deci & Ryan, 2000). Along these same lines, de Byl and Hooper (2013) emphasized that primary engagement attributes were synonymous, whether in an education setting or in a game; however, the researchers stressed that engagement in a gamified classroom varied according to individual playfulness as well as their acceptance of a new and innovative teaching modality. What this means for gamification in the classroom was that, as Deci and Ryan (2000) stressed, the gamified classroom must first and foremost meet the basic needs of students to feel autonomous, competent, and related. Otherwise, a gamified classroom largely relies on extrinsic motivation factors (De Schutter and Abeele, 2014).

Gamification and Conceptual Frameworks

The body of literature on gamification reveals that varying conceptual frameworks have been applied by academic researchers when conducting empirical studies surrounding the use of gamification in a classroom environment, whether through an online course or in a traditional setting. The conceptual frameworks vastly impacted how researchers conducted their studies and how they interpreted results, particularly in the social sciences (Ratvitch & Riggan, 2017). Whether researchers explicitly identified their underlying theoretical framework used in their study was particularly relevant in the realm of gamification in education because it was a new area of investigation, with few theoretical guidelines about how game elements affected learning outcomes. Scholars and game designers, such as McGonigal (2010, 2011, 2015), provided a psychological lens to investigate the impact of games on the human psyche; however, very little

streamlined theory existed as far as how to utilize the psychological lens provided by McGonigal, and other game designers and theorists, in an educational environment. As a result, the literature review and methodological review revealed that some researchers explicitly stated their conceptual framework early on in their studies (e.g., Abramovich et al., 2013; Hakulinen & Auvinen, 2014), while other researchers implied their use of game theory without explicitly applying it to their studies and subsequently tying their conclusions to their results based upon game theory (e.g., Goehle, 2013; Haaranen, 2014; Hanus & Fox, 2015). When researchers relied implicitly on game theory to analyze their data, due to the lack of a streamlined guide about how to use game elements in the classroom and for what purpose, the transferability of the study diminished.

Self-Determination Theory (SDT). The research review revealed that some educational researchers utilized Self-Determination Theory (SDT) and Deci and Ryan (2000) as a lens through which to investigate the impact of gamification in education (e.g., Barata et al., 2014, 2015; Deterding, 2015; Frost, Matta, & MacIvor, 2015). Ryan and Deci (2000) defined SDT as a cognitive theory identifying psychological needs that, if fulfilled, create engagement and, hence, behavior that is self-induced and self-regulated. Researchers utilizing SDT as a theoretical framework to study the impact of gamified curriculum identified three primary psychological needs: relatedness, competence, and autonomy, as identified in Deci and Ryan's (2000) work (e.g., Aguilar, Holman, & Fishman, 2014; Deterding, 2015; Frost et al., 2015). Researchers such as Frost et al. conducted a study in their university course, attempting to design their class toward meeting the three primary psychological needs as identified by SDT: relatedness, competence, and autonomy. However, by focusing on SDT in their course design, researchers such as Frost et al. neglected to explicitly integrate traits of what makes a game, a game, as outlined by McGonigal (2010, 2011, 2015). While relatedness, competence, and autonomy were cited by McGonigal

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(2011) as important psychological fulfillment provided through gameplay, a vital aspect of gamifying a classroom is mimicry of the specific elements of a game in order for it to create an automated trigger by modifying the classroom curriculum and environment accordingly for desired behavior to occur (Fogg, 2009). In short, to examine the effect of gamification in the classroom and increase transferability, researchers should link a traditional theory, such as SDT, with game theory to examine how games are utilized in teaching methodologies and the course structure and for what purpose.

Achievement Goal Theory. In the body of literature reviewed, Hakulinen et al. (2014) and Abramovich et al. (2013) explicitly applied Achievement Goal Theory (Elliot, 1999) to their study and interpretation of the results of their pedagogical experiments. For instance, Abramovich et al. cite Elliot (1999), claiming that Achievement Goal Theory has been a successful framework for studying motivation in conjunction with learning. Achievement Goal frames Abramovich et al.'s research, which specifically investigated the effect of educational badges as an alternative assessment and how this modification in traditional grading affected student motivation (Abramovich et al.). A potential shortcoming within the body of research can be found in many of the studies (e.g., Abramovich et al.).

Abramovich et al. (2013) utilized Achievement Goal Theory to examine badges as a game element to help students reach their goals; however, as with other studies, the researchers did not explicitly tie the use of badges to game psychology as outlined by game designers and theorists (McGonigal, 2011). The researchers stated, "Similar to videogame achievements, badges can be awarded for incidental activity in addition to mastery of skills or demonstration of knowledge" (Abramovich et al., 2013, p. 219). The study's findings were loosely connected to how badges worked as a motivator in their course, yet the piece missing was that the findings were not at all

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connected to how the badges worked as a motivating element found in a game. The motivating

elements of a game were distinct from traditional teaching approaches that use a grading system to

extrinsically motivate students (Dicheva et al., 2014). For instance, Abramovich et al. explained

that students have the ability prior to beginning their course to determine how quickly and easily

they can earn badges throughout the course (p. 220). Based on these studies, a question arose as to

how earning badges work any differently than a traditional course that awards points or

percentages toward a grade. In other words, when examining the effect of gamification on

learning and to increase transferability of a study, researchers should link a traditional theory, such

as Achievement Goal Theory, to game theory, as outlined by game designers and researchers such

as McGonigal (2010, 2011, 2015), to examine how game elements, in this case badges, were

utilized in teaching methodologies and the course structure and for what gamer's psychological

purpose.

     Constructivism. Mitchell and May (2013) and Caton and Greenhill (2013) investigated

their research questions surrounding a gamified classroom by synthesizing their results with

constructivist theory. In fact, Caton and Greenhill relied on constructivism layered through the

lens of Kapp provided in a 2012 book, *The Gamification of Learning and Instruction: Game-Based*

Methods and Strategies for Training and Education. Caton and Greenhill defined constructivist

learning as "an active, producing student in a situation where knowledge is not transmitted to the

student, say via lectures, but constructed through activity or social interaction" (p. 90). The

research specifically targeted increasing attendance in a university course, studying the effect of an

award system over a penalty-based attendance system. The shortfall of implementing

constructivism in this study, as well as others centered on gamification, was that it is difficult to

decipher how the course modifications mimic game elements and differ from traditional teaching

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approaches (Dicheva et al., 2014). In other words, changing a course to be delivered via active content does not make the course a game, nor does a reward-based system of attendance. More specificity is needed regarding how course modifications mimic game traits and their psychological impacts on the human brain (McGonigal, 2011).

      Engagement Theory. A review of the literature revealed that researchers Anderson, Huttenlocher, Kleinberg, and Leskovec (2014) and Looyestyn et al. (2017) conducted their research on gamification in education through the theoretical framework known as Engagement Theory. For example, Anderson et al. (2014) emphasized five distinct styles of engagement: "Viewers, Solvers, All-rounders, Collectors, and Bystanders" (p. 688). The researchers created a visual of their taxonomy and connected it to their study of gamifying Massive Open Online Courses (MOOCs) and how they incorporated badges into their online forums to increase student engagement (Anderson et al., 2014). While the idea of badges was connected to their theoretical framework surrounding disparate types of student engagement, they did not explain how badges would work as a game element to engage students. In other words, what precisely about badges incentivizes students as an element of a game, incentivizes players to keep playing. In sum, the discussion does not address how the modified course mimics game elements and strays from traditional teaching methodologies (Dicheva et al., 2014).

      Goal-Setting Theory. Landers and Callan (2011) and Giannetto, Chao, and Fontana (2013) investigated how gamification affected learners by relying on Goal-Setting Theory as a framework. Giannetto et al. cited Locke (1991) and the notion that goal-oriented pursuits encourage human engagement in tasks that would otherwise be deemed drudgery and unworthy of being successfully carried out. The researchers then integrated McGonigal (2010, 2011) and similar ideas about how games motivate players to perform tasks in a virtual world they would not

willingly perform in the real world, devoting a total of 5.93 million years in the *World of Warcraft*. Next, the researchers made a distinction between play and games, pointing out that games involve rules, whereas play does not, as a free-form activity (Giannetto et al.). This framework provided the lens through which Giannetto et al. designed their system of gamification, QizBox. Goal-setting theory works well in conjunction with McGonigal's ideas about the psychology of games, yet it is broad in scope when it comes to designing a framework to be used in a classroom environment because it primarily focused on the effect of goal-setting, leaving out the other seven important psychological factors underlying gameplay as described in Table 1.

Giannetto et al. (2013) deciphered dozens of what they deemed game mechanics and settled on what they purported as the three most popular: in-game, achievements, and levels. The researchers described these game elements and reported that each has a goal or objective at its core. They emphasized how each of these game elements centered on game traits in a broad sense, but did not specifically match up each of the three mechanisms found in games that they utilized in their gamification experiment with how each would work in the classroom environment to mirror gameplay. Moreover, goals represent merely one important trait of a game that makes players want to reach oftentimes unimaginable feats (McGonigal, 2015). Many more game traits exist that work symbiotically to impart huge psychological impacts on the human brain (McGonigal, 2011), eight of which were described and connected to the classroom in Table 1.

Motivational Theory. Several groups of researchers utilized motivational theory to investigate the effect of gamification in a classroom environment (e.g., Aguilar et al., 2013; Berkling & Thomas, 2013; Holman et al., 2013). However, like Goal-Setting Theory, Motivational Theory is broad in scope, particularly when it comes to researching educational approaches and how game elements affect student behavior. For instance, Berkling and Thomas

(2013) mentioned Daniel Pink's motivational theory concerning intrinsic and extrinsic motivational factors in their study's abstract, but failed to go into detail about these factors in the body of their paper. A brief overview was provided for each game element implemented in their course, but little information was provided about how each differed from traditional teaching approaches and assessments and how each was tied to an intrinsic motivational factor (Dicheva et al., 2014). In other words, when examining the effect of gamification on learning and to increase the transferability of a study, researchers should link a traditional theory, such as Motivational Theory, to game theory, as outlined by game designers and researchers such as McGonigal (2010, 2011, 2015). Furthermore, it should be investigated how the course modifications of adding game elements to study motivation mimic game traits and their impacts on the human psyche in conjunction with the desire to keep playing (McGonigal, 2011).

Behavior Theory. Several studies implement Behavior Theory as a theoretical lens to examine the effects of gamification in a learning environment (e.g., Gordon, Brayshaw, & Grey, 2013; O'Donovan, Gain, & Marais, 2013; Xu, 2012). Of particular interest was a study that used Fogg's Behavior Model (FBM) to investigate a gamified classroom (O'Donovan et al., 2013). O'Donovan et al. provided an important definition of an effective game: it "must be motivating, addictive and provide encouragement through very short-term goals, so that the player can fail and try again until they succeed" (p. 242). Unlike some of the other research studies in the literature review, O'Donovan et al. set clear criteria of what makes a game appealing to players. One will note that it is not merely its motivational aspects or goal-setting traits; rather, the goals of an effective game are short-term, the game is addictive in that the player finds it captivating and difficult to cease, and failure is merely an obstacle to overcome. The traits of an effective game

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can be examined through the lens of Behavior Theory and an excellent model can be found in

Fogg's Behavior Model (FBM) (e.g., O'Donovan et al., 2013; Xu, 2012).

Fogg's Behavior Model (FBM) was utilized in this qualitative case study research to

highlight game elements that may all work as persuasive technologies in line with FBM and

catalysts to increase student motivation and/or ability so that targeted behavior is carried out in a

classroom setting. This study explored whether participant teachers are aware of game theory and,

if not, how they utilize games in their classroom and for what purpose. If teacher participants

reported to not use games, then reasons for opting out were explored, including whether they were

aware of game theory or experienced gameplay themselves. Review of the literature revealed that

an effective gamified classroom may increase learning outcomes, but in order to accomplish this

important feat, teachers should be educated on what game elements to use, for what purpose, and

how they should be used. McGonigal (2011) emphasized, as did Prensky (2012), that educators

and policymakers cannot merely supplement existing traditional curriculum with a few game

elements. Rather, every assignment, every activity, every moment of instruction and assessment

should be designed with the distinct purpose of replicating the psychological effect of digital

games and usurping that same addictive, goal-thriving, challenge mindset into persuasive

technologies that will increase student motivation and the ability to trigger targeted behaviors

(McGonigal, 2011).

Game Theory. A review of the body of literature on gamification in education revealed

that many researchers perceived gamification as an established theoretical framework in and of

itself (e.g., de Byl & Hooper, 2013; Denny, 2013; Harman, 2014). As a result, oftentimes

educational researchers in the realm of investigating the impact of gamification on learning relied

on game theory, either implicitly or explicitly. These theoretical frameworks appeared derivative

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of video game theory created by game designers and game theorists, including the work of McGonigal (2010, 2011, 2015). In fact, a shortcoming found in the literature on the topic was that while gamification was defined rather consistently as "the application of game mechanics and player incentives to non-game environments" (e.g., Dicheva et al., 2014; Diterding, Dixon, Khaled, & Nacke, 2011; O'Donovan et al., 2013), a lack of standardization existed in how game mechanics should be used, which game mechanics should be used, and for what purpose. This qualitative case study contributed to the existing field of research through the use of a standardized theoretical framework concerning the what, how, and why of gamification when it comes to an educational setting by synthesizing game theory, behavior theory, and curriculum. The traits of an effective game were elucidated through a Behavior Theory framework and an excellent model was found in Fogg's Behavior Model (FBM) (e.g., O'Donovan et al., 2013; Xu, 2012). Game elements defined by McGonigal (2010, 2011, 2015) can work as persuasive technologies in line with Fogg's behavior model (FBM) as triggers to enhance student motivation and ability so that targeted behavior can be successfully completed in an educational environment.

Gamification's Impact on Learning. Gamification may have a positive effect on student behavior and, hence, learning. Over half of the empirical studies found pointed to a positive impact on learner engagement and behavior (e.g., Caponetto, Earp, & Ott, 2014; Dicheva et al., 2014; Frost, Matta, & MacIvor, 2015). The majority of research findings in the literature review of gamification in education reported encouraging results from their empirical experiments, including increased student engagement and, hence, behavior (e.g., Akpolat & Slany, 2014; Barata et al., 2014, 2015, 2017; Burkey et al., 2013; Caton & Greenhill, 2013), with most of the mixed findings pointing to critical gaming motivational elements missing when applying gamification in an educational setting (e.g., Abramovich et al., 2013; de Byl & Hooper, 2013; Domínguez, Saenz-

de-Navarrete, de-Marcos, Fernández-Sanz, Pagés, & Martínez-Herráiz, 2013). What this means for the field of education and implementing gamification in the classroom is that while many educators have conducted experiments and the majority have reported positive results, these findings should be considered preliminary at best. Morrison and DiSalvo (2014) noted that combining gaming with an informal learning environment proved complex and augmenting the complexity was the added layer of creating a learner-centered environment on top of it, a nearly impossible feat, particularly without a framework for motivational factors related to game elements. In their work, Simões, Redondo, and Vilas (2013) likewise concluded with the need for critical frameworks in gamification.

As researchers, such as De Schutter and Abeele (2014), pointed out, one of the criticisms toward gamification in the classroom hinged on the notion that using games as a pedagogical approach to teach students subject matter relies heavily on extrinsic motivation, rather than intrinsic motivation. De Schutter and Abeele's critique of gamification connects well with Deci and Ryan's (2000) Self-Determination Theory (SDT) and their findings that social contexts that fulfill basic needs and intrinsically motivate individuals, while also integrating extrinsic motivations, work to catalyze growth naturally. On the other hand, social contexts that usurp autonomy, competence, or relatedness result in low motivation, outcomes, and overall well-being (Deci & Ryan, 2000). Along these same lines, de Byl and Hooper (2013) emphasized that primary engagement attributes were synonymous, whether in an education setting or in a game; however, the researchers stressed that engagement in a gamified classroom varies according to individual playfulness as well as the individual student's acceptance of a new and innovative teaching modality. What this means for gamification in the classroom is that, as Deci and Ryan (2000) emphasized, the gamified classroom must first and foremost meet the basic needs of students to

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feel autonomous, competent, and related. Otherwise, a gamified classroom will largely rely on extrinsic motivation factors (De Schutter & Abeele, 2014).

Ian Bogost (2011), a game scholar and designer, claimed that gamification in education thus far misses the point by focusing on a number of easily implemented game traits without truly capturing the essence of what playing a game is all about. Bogost and McGonigal (2011), both game designers, pointed to a similar problem of implementing games in the classroom without understanding how games tap into basic human needs. Without understanding how game designers hone in on what makes a game satisfying for a human, intrinsic motivation will not be triggered (Deci & Ryan, 2000). Critics and researchers, such as De Schutter and Abeele (2014), accentuated that merely relabeling traditional motivational approaches used in education as elements found in a game and calling it "gamification" will only add to the running list of extrinsic motivators found on school campuses across the nation (i.e., fear of punishment, standardized assessment scores, course cumulative points, formative exams, and overall grades) and will fail to solve the student engagement problem, a problem that many educational researchers point out (e.g., Bogust, 2011; Prensky, 2012; Zimbardo, 2010).

Existing Gamification in Education Research

To be effective in education, gamification requires streamlined theory and practicum. No uniformity existed among the research concerning theoretical frameworks for gamified classrooms (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). Moreover, based on the literature review on gamification in the classroom and the plethora of empirical studies conducted in the higher education setting, sufficient evidence pointed to the significant finding that research about the use of gamification by educators in the K-12 setting was lacking. Therefore, a claim was made that the literature review provided strong support for pursuing a research project in a K-12 setting to

contribute toward the implementation of a standardized theoretical framework concerning the what, how, and why of gamification in an educational environment.

The body of literature on the topic of gamification in education revealed that most empirical research studies to date were conducted in a university setting (e.g., Hentenryck & Coffrin, 2014; Holman et al., 2013; Landers & Callan, 2011), with only one study specifically set in a K-12 environment, which focused on middle school math classes (Abramovich et al., 2013). Abramovich et al. examined their math classes, namely 36 seventh graders and 15 eighth graders at the charter school where they teach. The school serves a low-income suburb of a large East Coast city. The researchers utilized mixed-methods to examine the use of badges as a motivator and included students in their study of varying performance and skill level (Abramovich et al.). During their investigation, Abramovich et al. found conclusive evidence to theorize that badges affected low-performing students differently than high-performing students when it came to motivational changes, with the high-performing more positively motivated by the badges. The researchers also surmised that the use of varying badges may have affected mindset toward success, yet badges also proved counter-productive with some students who had a negative attitude toward badges from the onset. Abramovich et al.'s investigation of the use of badges as a motivational game element in a middle school environment represents the sole study in the body of research that specifically examines a K-12 setting. This additional study, in a setting other than higher education, significantly adds to the current body of research on gamification.

While Abramovich et al.'s (2013) study represents the only investigation of the effect of gamification in a K-12 environment, taking place in a middle school, it was primarily focused on how badges as a game element affected motivation, limiting its significance in the field due to there being many diverse game elements discussed in the realm of game theory, such as

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leaderboards, avatars, and so forth as outlined in Table 1. Additionally, Abramovich et al. examined an urban suburb on the East Coast. Conversely, this qualitative case study examined a rural low-income area on the West Coast of the U.S., targeting a local secondary school. High school was an optimum age bracket (13 years old to 18 years old) to study the effects of gamification because, for one, McGonigal (2011) stressed that today's children were the first generation fully immersed in the digital age, causing them to crave gameplay in a way older generations do not. Additionally, a secondary setting was optimal based on the statistic that today, in countries where gaming is popular, a younger woman or man spends on average 10,000 hours playing games on the Internet (McGonigal, 2010). As McGonigal pointed out in her 2010 TED Talk, children in the United States spend 10,080 hours in school from fifth grade through high school graduation, if they have perfect attendance. In other words, McGonigal (2010) emphasized that children spend about as much time in school as they do gaming. However, both of these tasks, gaming and attending school, result in learning because as McGonigal accentuates, "young people are learning as much about what it takes to be a good gamer as they're learning about everything else in school." McGonigal discussed Malcolm Gladwell's *Outliers: The Story of Success*. According to Gladwell's (2008) theory of success, 10,000 hours leads to mastery of a skill. Gladwell based theory on cognitive-science research that points to the accomplishment of virtuoso status, the end result of spending 10,000 hours on any task by the time a person reaches the age of 21. In other words, as McGonigal (2010) highlighted, an entire generation of young people who enjoy online games have achieved a level of virtuoso when it comes to gaming. The goal of this case study was to look at the elements of a game: the how, why, and what of what game theorists attribute to the joy found in games and apply these triggers in a high school setting.

Prior to conducting educational research, it was imperative to choose the proper setting to study the effect of altering curriculum, such as through gamification. High school was an excellent target, containing the proper population demographics as far as age as discussed above with so many hours devoted toward mastery of the skill of gaming. But, perhaps even more importantly, secondary education is under intense scrutiny as "an 'obsolete' institution, out of touch with the global world of work and the demands of higher education" (Ryan, Cooper, & Bolick, 2016, p. 371). Ryan et al. indicated that most public-school reforms of the last two decades occurred around the nation in K-6 schools and, to a smaller degree, seventh and eighth grades, with no reform taking place in high schools until 2005 when a campaign was launched by a group of state governors, along with business leaders, such as Bill Gates, and other foundation directors. This group launched the *American Diploma Project Network* to improve high school standards and accountability systems (Ryan et al., 2016). To date, the partnership has not proven successful in its reform efforts (Ryan et al., 2016). However, if substantial educational literature points to gamification improving student learning outcomes in a high school learning environment, secondary curriculum may eventually include successful gamification strategies.

The high school classroom straddles two domains in the rural low-income area of the West Coast where the study took place. Ryan et al. (2016) pointed out that students in today's middle schools and high schools are byproducts of the *No Child Left Behind Act of 2001* (NCLB). Under NCLB, U.S. schools had to describe their academic success in conjunction with what every single child in their school accomplished, with the accomplishment being measured by a standardized test (Ryan et al.). Critics of NCLB complained that a singular focus on testing whether each student learned a narrow amount of material "sucked all the joy out of education and turned it into mere training" (Ryan et al., p. 367). In response to NCLB and its perceived shortcomings, former U.S.

President Barack Obama enacted the *Every Student Succeeds Act* (ESSA) on December 10, 2015. ESSA encapsulates several goals. One in particular that contrasted NCLB is a target toward rigorous academic standards to better prepare students for college or, alternatively, a career right after graduation. Another primary difference between ESSA and NCLB is greater emphasis on allotting local municipalities, businesses, and foundations more input and control over school curriculum and programs (U.S. Department of Education, 2015). The changes implemented by ESSA were in line with the idea that students need to master subjects at higher levels in order to compete in today's entrepreneurial, competitive global marketplace (Ryan et al., 2016). The notion that students need to engage globally connects to McGonigal's (2010) theory that video games can lead to players solving real-world problems.

McGonigal (2011) reasoned that, unlike everyday life, computer and video games inspire and engage people; they satisfy human needs in a way that today's reality fails. Along these same lines, Prensky (2012) posited that most of today's youth understand what true engagement feels like thanks to gaming and know what they are missing out on when in school. By and large, students find school to be not as intellectually engaging. To investigate any potential engagement through gaming, the setting of a single high school located in a rural low-income area of the West Coast was examined using qualitative methodology, which included the examination of multiple sources to triangulate data. The current high school curriculum in the rural low-income area of the West Coast requires youth to actively solve quantitative problems, engage, critically think, analyze, and synthesize multiple fiction and nonfiction literary sources. This qualitative study sought to investigate whether elements found in gaming could help modernize the educational content in such a way as to trigger desired active engagement in the material.

This qualitative study examined whether game elements, as outlined by game designers and theorists, such as McGonigal (2010, 2011, 2015), could potentially trigger student engagement and active participation. Fogg's Behavior Model (FBM) provided a model for how public secondary teachers could implement game elements. FBM diagramed how a low motivated, or low ability student, typically does not perform well on any task, including schoolwork. On the other hand, a low-motivated and low-skilled student can be triggered in such a way to work at their capacity, while simultaneously gaining new skills. In a gaming environment, McGonigal (2015) analyzed triggers, from wanting to feel connected, to wanting to persevere in the face of obstacles. McGonigal presented these as potentially universal human triggers: "they are ways we commonly think and act when we play games" (p. 8). In games, the triggers come in the form of epic wins, multiplayer platforms, and levelling up, to name a few. In a classroom, similar triggers already exist: assessments, competition among peers, pressure from parents, and so on. However, as Deci and Ryan (2000) indicated, social contexts that usurp autonomy and connectedness result in low motivation and, hence, decreased outcomes (Deci & Ryan, 2000). In other words, to trigger desired behavior in the classroom setting, social contexts need to fulfill basic needs, while working to intrinsically motivate individuals (Deci & Ryan). The combination of extrinsic and intrinsic motivators works symbiotically to catalyze growth naturally.

For a blend of extrinsic and intrinsic motivators to instigate natural growth in education, game elements can work as a trigger in line with Fogg's Behavior Model (FBM). Sheldon (2012) provided a practicum of why, how, and for what purpose one might use a particular game element in conjunction with coursework design. For instance, Sheldon described how a syllabus can be gamified. In particular, Sheldon provided a syllabus for a computer science class on game design. While this particular syllabus was for a computer science curriculum, it could be modified for any

course. The first distinction was that rather than a class format, the course was designed as a

multiplayer game, with students immediately choosing an individual avatar and forming guilds.

The guilds were composed of certain character classes, with each character responsible for a

certain role in the guild (Sheldon, 2012). In any high school class, the roles of each character

could revolve around group work that typically takes place in a composition and literature class or

a world history class. For instance, during a literature circle, an approach implemented by many of

today's Language Arts instructors, students are typically assigned roles from scriber, quote

analyzer, vocabulary selector, drawer, to questioner. These guilds could be formed at the start of

each quarter and then reassigned as needed. The avatar and guild fulfill two intrinsic motivators

found through gaming that can trigger desired student behavior in line with FBM. Namely, the

avatar creates anonymity but, more importantly, it allows a player to put on the face of a hero

(McGonigal, 2015). Conversely, the guild builds connectedness, an intrinsic motivator found

through gaming, known as making "allies" (McGonigal, 2015).

The next distinguishing feature of Sheldon's (2012) course syllabus would be the grade

breakdown. To begin the class, every player started at Level 1 and could level-up to Level 16 by

the end of the class (Sheldon, p. 98). The idea of leveling up connected with McGonigal's (2015)

idea of the adoption of a challenge mindset, or as McGonigal explains, "accepting the challenge to

play" (p. 8). Once a student accepts a challenge, leveling up becomes a motivator and works as a

Fogg's Behavior Model (FBM) (2009) trigger. The key to the gamified class then was for the

modifications to trigger motivators found in gaming. McGonigal (2011) asserted that "when they

[educators and policymakers] marry good game design with strong education content—they

provide a welcome relief to students who otherwise feel underengaged in their daily school lives"

(p. 128). Game elements may work in a secondary classroom as a trigger to motivate students to

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carry out desired tasks due to increased engagement created by the psychological impact of good games (McGonigal, 2011).

Literature Review Critique

The review of the body of literature accentuated the lack of uniformity when educators gamify classroom curriculum (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The game elements used, why they were used, and how they were used was inconsistent among the literature, indicating that a conceptual framework surrounding gamification would aid in future studies and implementation (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). Moreover, the literature review evidenced that research in the K-12 setting was needed as all students could potentially benefit from gamified curriculum, not merely four-year college students (e.g., Holman et al., 2013; Hentenryck & Coffrin, 2014; Landers & Callan, 2011). In fact, the settings in the literature review were four-year colleges and universities, not community colleges. Future studies should be conducted in the two-year college and technical training settings as well.

In addition to empirical research predominately targeting four-year university students, the bulk of the empirical investigations were conducted in STEM fields (e.g., Haaranen et al., 2014; Hentenryck & Coffrin, 2014; Iosup & Epema, 2014; Leong & Luo, 2011). University professors teaching in the STEM disciplines implemented gamified curriculum in their own classrooms, particularly those professors teaching in online platforms. With professors gamifying their own curriculum, researcher bias exists in their studies. As an instructor involved in qualitative research, particularly when the instructor has high stakes in designing gamified curriculum, it can be difficult not to skew results in favor of gamification. Unfortunately, many of the qualitative studies found in the body of research involved instructor–student observation and feedback. While some of the professors utilized a control group (e.g., Frost, Matta, & MacIvor, 2015; Li, Grossman,

& Fitzmaurice, 2014), a vast number of instructors implemented gamified curriculum without utilization of a control group (e.g., Akpolat & Slany, 2014; Iosup & Epema, 2014). This qualitative study investigated potential engagement found through gaming, utilizing multiple data sources found outside of the researcher's own classroom setting to reduce researcher bias.

The theme in the literature pointed to a possibility that gamification enhances learning, yet many problems were likewise highlighted. For one, most researchers pointed to a lack of streamlined theory with the why, how, and for what purpose game elements may or may not work to engage and motivate students (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The lack of a streamlined theory to apply toward empirical results outlined in the literature review accentuated a body of literature that does not neatly sync, creating disjointedness. The incongruence wreaks havoc when attempting to examine one particular game element and the conclusions of how it did, or did not, work to engage students in a classroom to trigger desired behavior. Without a practical guide on the why, how and for what purpose for each game element, researchers utilized disparate conceptual frameworks, from motivational theory environment (e.g., Aguilar et al., 2013; Berkling & Thomas, 2013; Holman et al., 2013), to Self-Determination theory (e.g., Barata et al., 2014, 2015; Deterding, 2015; Frost, Matta, & MacIvor, 2015), modifying traditional pedagogical practices and relabeling them as gamified curriculum. Conversely, other researchers perceived game theory as a theory in and of itself and implicitly or explicitly relied on its foundation for their implementation of gamification and analysis of the results despite the lack of it being streamlined for an educational setting (e.g., Harman, 2014; de Byl & Hooper, 2013; Denny, 2013). In sum, the research on gamification represented an exploration of unchartered territory of how game theory can be practically applied in a real-world classroom. Many areas remained in flux, including a

clear guide of how to utilize game elements in education, which elements to use, and for what motivational purpose.

In an effort to add to the body of literature on gamification research and practicum, this qualitative study sought to fill a gap that exists as far as the why, how, and for what purpose game elements trigger desired behavior. The goal was to accomplish this by triangulating qualitative data obtained in a high school environment, located in a rural town on the West Coast in California, while examining curriculum for grades 9–12, game theory derived from game designers and theorists, such as McGonigal (2010, 2011, 2015), as well as Fogg's Behavior Model (FBM) (2009). FBM worked well as a framework in conjunction with McGonigal's game theory because behavior theory can explore why game elements work as a trigger that can become automated. In other words, FBM provided a foundation for how to apply gamer psychology toward student psychology when learning in the classroom. The data obtained investigated whether rural, public high school teachers utilized games in their classroom instruction methodologies and curricula and, if not, why not. If so, then how the games were used and for what purpose.

Summary of Chapter Two Literature Review

This investigation of the body of literature on gamification in an educational environment revealed the relatively recent interest was catalyzed by the growing interest in how games could potentially impact learning in a positive way to help students find learning enjoyable and enriching (e.g., De Schutter & Abeele, 2014; Looyestyn et al., 2017; Xu, 2012). Educational researchers glommed onto gamification as a potential solution because, as most researchers in the literature review pointed out, video games have become an increasingly popular activity (Burkey et al., 2013; Barata et al., 2014), with millions of hours invested in digital gameplay (McGonigal, 2010,

2011, 2015). Following the discussion of gamification and how it involves the use of incorporating elements of a game in non-game contexts, a conceptual framework undergirding the study was described. Then a significant literature and methodological review was provided. Subsequent to the literature and methodological review, the methodologies contained in the study were critiqued with the methodological shortcomings and gaps in the findings highlighted, including an emphasis placed on a need to investigate gamification in different contexts using qualitative data sources. Following the methodological issues section, a literature synthesis and a critique of the research reviewed were provided.

While the reasons for studying gamification of a classroom environment were relatively streamlined in the literature as a desire to help students find learning enjoyable, the review of the literature pointed to drawbacks in the field of study, such as only one empirical investigation being conducted in the K-12 setting. In addition to the field of research targeting university-level students, most of the empirical investigations were conducted in STEM fields (e.g., Haaranen et al., 2014; Hentenryck & Coffrin, 2014; Iosup & Epema, 2014; Leong & Luo, 2011). This narrowing of gamification to investigating primarily STEM fields created shortcomings because STEM field students potentially have more experience with playing digital games than perhaps students taking a social science course. In order to determine whether gamification can be effective in increasing student engagement and enjoyment in learning, studies should occur across disciplines and across varying grade levels from elementary school, middle school, secondary school, to the post-secondary setting. Moreover, only one of the reviewed sources specifically included teacher attitude toward gamification as found in the empirical investigation conducted by De Schutter and Abeele (2014). Conversely, other researchers involved the teachers gamifying the curriculum and then teaching the courses themselves, with the impact of gamification focused on

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student reaction, ignoring the impact that instructors have on whether gamification can be successful or not (e.g., Brayshaw, & Grey, 2013; Goehle, 2013; Gordon, Haaranen et al., 2014). The literature review and methodological review emphasized a need to research how teachers feel about gamification of the classroom (i.e., whether they enjoy the experience and find it satisfying and whether they perceive games as motivating for students).

In addition to only one empirical investigation being conducted in the K-12 setting and student impact leading most investigations, the review of the literature also revealed a lack of a uniform classification system as far as what game elements to use in a classroom environment, how to use them, and for what purpose. The lack of streamlined practicum likely arose from studies contained in the body of literature relying on varying conceptual frameworks when conducting their empirical studies. Ratvitch and Riggan (2017) accentuated how much conceptual frameworks impact, not only how researchers conducted their studies but, even more importantly, how they interpreted the results of their studies. What this meant in the realm of gamification was that many researchers investigating how games impact learning, either implicitly or explicitly, relied on game theory derivative of video game theory created by game designers and game theorists, including the work of McGonigal (2010, 2011, 2015); however, game theory was not fleshed out as far as what makes a game, a game, and then converted over to elements of learning so that each act of thinking and behavior that happened in the classroom was broken down into an act of thinking and behavior that occurs in the alternative universe of a game. This lack of streamlined information wreaked havoc on educational research because the application of game theory in a practical setting in the classroom should be more consistent in order to test hypotheses and draw conclusions across studies (Looyestyn et al., 2017).

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Based on this review of literature, which developed a unique conceptual framework using personal experience, behavior theory, and game theory to understand what might assist educators, educational researchers, and administrators, sufficient reasons existed for thinking that an investigation examining whether educators who claim to utilize gamification in a classroom environment design curricula around existing game theory, and if so, how and why. If they do not utilize gamification, their reasons for opting out of gamification were explored. Importantly, due to a lack of prior research, a rural, public high school setting yielded significant findings. Therefore, the literature review provided strong support for pursuing a research project to understand whether teachers in a high school setting understood game theory in conjunction with gamification of the classroom.

Chapter 3: Methodology

This chapter details how this qualitative case study on gamification in an educational setting was conducted, including a thorough justification and discussion concerning design choice, methodologies for data collection, and data analysis. The selection of data collection and analysis methods determined the study's conclusions and the responses to the research questions that guided this investigation. The qualitative approach undergirding this study was case study research as described by Creswell (2013) and, more specifically, a single instrumental case study that focused on gamification in the classroom, using one setting to illustrate how games were used, why, and how, or why they were not used.

This investigation triangulated qualitative data obtained in a single high school environment, located in a rural town on the West Coast, while examining curriculum for grades nine through 12 in conjunction with McGonigal's (2010, 2011, 2015) game theory and the concept of flow—often defined in the world of gaming as a heightened, invigorated psychological state experienced by gamers when they play video games—and Fogg's Behavior Model (FBM) (2009). McMillan (2012) stressed the importance of triangulation in a qualitative study, noting that cross-validation among various data sources and methodologies of data collection assists researchers in establishing credible findings. As the focal point of the study, this methodology chapter parallels the process of data collection to the in-depth analysis of the qualitative data, and, lastly, aligns the conclusions to the conceptual framework undergirding this case study.

Research Questions

The research questions created a thematic thread throughout this study that aligned, synthesized, and supported the choice methodologies and findings. As with optimal case study design, the research questions continued to evolve throughout the investigation prior to the data

collection process, finally settling on the questions and the sub-questions below. Creswell (2013) explained that case study research questions change during the conduction of the study as new information emerges. The finalized research questions were as follows:

1. How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?

2. How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?

     i. What elements of gaming do teachers understand add or detract from effective learning in the classroom?

    ii. What are the strategies and software programs that benefit student achievement and why?

3. What are teachers' perceptions toward using games to improve student skills and achievement?

Purpose and Design of the Study

The purpose of this study was to explore the use of games in a classroom environment. Due to the stated purpose, the researcher selected a qualitative approach. In particular, case study research as described by Creswell (2013) and, more specifically, a single instrumental case study that focused on gamification in the classroom, using one setting to illustrate how games were used, why, and how, or why they were not used. Creswell explained that the intent of a case study is to illustrate a specific issue within what he terms "a bounded system" (p. 73). Creswell cautioned that some qualitative experts perceive case studies as merely what will be studied, rather than a methodology, but relying on Denzin and Lincoln (2005), Merriam (1998), and Yin (2003), Creswell put forth that a case study is a methodology, "a type of design in qualitative research, or

an object of study, as well as a product of the inquiry" (p. 73). The choice methodology selected for this investigative study was case study research, with the investigation taking place within a bounded system, the school site, through thorough and detailed data collection that integrated several data sources in the form of teacher interviews and classroom observations at a single site— what Creswell termed a "within-site study."

The body of literature on gamification research and practicum revealed that both quantitative and qualitative methods have been used. Quantitative studies contained in the literature focused on student perspective, namely college students, with some teachers utilizing control groups in their own classrooms (e.g., Frost, Matta, & MacIvor, 2015; Li, Grossman, & Fitzmaurice, 2014). Therefore, this qualitative within-site case study filled a gap as far as teacher perspective, as well as gamification in a K-12 setting. The researcher investigated how and why teachers use games, while conversing with teachers on the topic and observing them in their natural classroom setting where the behavior occured (McMillan, 2012).

The researcher investigated the study's topic—how and why, or why not, teachers used games in the classroom—from a qualitative perspective. Creswell (2013) detailed that qualitative research should be conducted when a problem or issue exists that needs to be investigated. Creswell explains, "This exploration is needed, in turn, because of a need to study a group or population, identify variables which cannot be easily measured . . . because we need a complex, detailed understanding of the issue (Creswell, 2013, p. 47–48). Qualitative research was appropriate due to the complex and intricate nature of games and their effect on the gamer's psyche, as well as the complex position games hold in today's society. For instance, McGonigal (2011, 2015) highlighted stereotypes that non-gamers hold, perceiving games as mere distractions and time usurpers, and even as an unhealthy addiction. In sum, due to the complexity surrounding

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games in American culture, as well as the complexity surrounding a school environment, qualitative case study research was the most appropriate methodology.

Moreover, within the realm of education, case study research was regularly utilized to explore teaching methodologies. For instance, Morrison and DiSalvo (2014) utilized a qualitative design when exploring the impact of Khan Academy on students. The researchers put forth that with Khan Academy being a forerunner in gamification, the single site platform provided credible data to analyze qualitatively. Similarly, in the book, *Reality is Broken*, McGonigal (2011) explored a single site school, Quest to Learn, a charter school in New York, to explore a gamified curriculum in that particular setting. The researcher sought to add the current investigation to the existing body of research on gamification of the classroom, and case study research is often selected within the educational realm as the methodology to examine certain populations, such as teachers, situated in the complex school environment. The goal of this investigation was accomplished by triangulating qualitative data obtained in a secondary school environment, located in a rural agricultural town on the West Coast. The study focused on teachers of grades nine to 12. The following section describes the single instrumental case study design that was utilized during the research.

Research Population and Sampling Method

From a qualitative perspective, this section detailed the research population and sampling methodologies that were used to investigate gamification of the classroom within the single instrumental case study. The demographics of the teacher participants were provided as well as the process used for population sampling.

Research population. The population of the study was part of a rural school district on the West Coast that serves approximately 14,000 students from pre-kindergarten through grade 12.

The subject site was a Title I high school that serves approximately 1,400 students of grades nine to 12. The teacher participants were high school teachers. As far as ethnicity/race, the school population of 60 teachers did not include teachers who identify as black or African American. Fifty-eight percent of the teachers at the school site self-identified as white, 25% reported to be Latino/Hispanic, and 17% reported to be "other." Forty-six percent of the teacher population at this school site are male and 54% are female. Recruitment targeted the same demographic as the whole school population, with no expected bias related to the recruitment method.

Case selection. This high school was targeted due to it being one of the three major high schools in the district. The school site is known in the community as being avant-garde with regard to technology and pedagogy. For instance, the site selected has one-to-one devices, meaning that technology would not be an impediment to using digital games. All of the students receive a Chromebook upon enrollment as freshmen and they maintain the device through to graduation. The devices are often upgraded so that the technology remains current. Moreover, the school site was one of the first high schools in the nation to implement an educational career pathway. Educational career pathways are comprised of sequential courses students take in a chosen career, known as Career and Technical Education (CTE) courses, which are designed to prepare students for careers and continued education in the field. The school's pathway has received national recognition and represents a model to other schools throughout the U.S. who seek to implement educational career pathways. In sum, the chosen site was an optimal case study to examine how and why, or why not, teachers utilize games on campus because of the available technology in the hands of the students and due to their modernized approaches in curriculum considering their progress with regard to educational career pathways.

Sampling method. During a staff meeting, the researcher announced the purpose of the

case study research to solicit teacher volunteers. The use of certain terminology during the announcement to staff was avoided; such terms as "gamification" could confuse teachers who were unfamiliar with the jargon used in specialized industries. Instead, technology in general was discussed along with common educational games like *Kahoot!*, *Quizziz*, and *Quia*; in addition, game terms that many teachers may be more familiar with were mentioned: leaderboards, avatars, leveling-up, badges, and so forth. Following the announcement, of the 60 teachers on the school site, 18 were purposefully engaged as participants. The teacher participants were purposefully selected with an anticipated sample size goal set at 15 to 20 teachers. Merriam and Tisdell (2016) emphasized that saturation is the most important consideration when deciding on when to cease data collection. The authors noted that saturation occurs when analysis indicates that additional data will bring no new insights. Saturation occurred once 18 teachers were interviewed as it was determined by the researcher that no new insight would result from additional teacher interviews.

Creswell (2013) and Merriam and Tisdell (2016) recommend purposeful sampling, if available. Creswell suggested selecting different cases in order to showcase varying perspectives on the phenomena studied. In the study investigated, varying grade levels, years teaching, and disciplines were purposefully selected, as well as social demographics, such as ethnicity and gender. This unique sample provided insight into whether grade-level, years of experience, or subject area affect gameplay, the "phenomenon of interest," and ensured an "information-rich case" (Merriam & Tisdell, 2016, p. 97). Furthermore, in order to enhance transferability, Merriam and Tisdell (2016) recommend maximum variation in the purposeful sample to allow for a large range of participants to enable a greater span of readers who can apply the research to their own lives and experiences. The authors recommend maximum variation when a diverse range of cases will reveal commonalities across diverse sampling (Merriam & Tisdell).

Instrumentation

The investigative research was composed of three phases: An initial interview, observation, and a follow-up interview. Face-to-face interviews provided more in-depth responses, as interviewees were able to share more information when discussing their experience with a live being than with a computer, as is the case with surveys (Creswell, 2013; McMillan, 2012). Moreover, the observation allowed for the researcher to witness gameplay firsthand in the classroom. These qualitative tools were used in conjunction with archival data in order to examine gamification in the classroom through the triangulation of data.

Phase 1: Initial interview. The interviews were structured so that the participants responded to six general data collection questions pertaining to demographics, such as subject matter, years teaching, and grades taught, with one open-ended question for teachers not using games and 13 open-ended, test-piloted questions for teachers using games (Table 2 below). The open-ended questions were designed to address the study's research questions with the goal that the respondent would be in control during the interview, not the interviewer, with the interviewee providing in-depth detail about their experiences with games (McMillan, 2012). The hope was to elicit feedback, not only about games in the classroom setting, but their perception about games in general. The in-depth interviews were the primary source of data collection.

The interview questions were piloted by a high school teacher in the district, but not someone who was part of the case study site. The pilot interview occurred prior to commencement of the case study research. The piloting of the questions worked to ensure clarity, non-bias, and, most importantly, that the questions elicited thick description responses to help ensure transferability (Creswell, 2013). Merriam and Tisdell (2016) advised that effective interviewers practice before the interview by striving to perfect the interview questions with the goal of

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reworking or eliminating confusing, repetitive, or dead-end questions. Yin (2015) emphasized utilization of a pilot study in order to help refine data content and streamline procedures. Likewise, Merriam and Tisdell (2016) recommend that each instrument used to collect data be piloted.

The open-ended questions, such as "What elements of gaming add to effective learning in the classroom?" and "What elements of gaming detract from effective learning in the classroom?" elicited much discussion. However, the interview question, "Have you heard of game theory?" confused most of the participants who were largely unfamiliar with theory related to gameplay; this prompted the researcher to offer a brief explanation of common game elements. The primary effect of games addressed by the teacher participants was related to competition with others. Interestingly, this aspect of games is largely omitted from McGonigal's (2010, 2011, 2015) discussion of the primary elements of games that prompt a gamer to experience flow, which is discussed in further detail in Chapter Five. The researcher anticipated that the interviews would last anywhere from 15 to 30 minutes; however, some of the interviews lasted nearly two hours. The average interview was approximately 45 minutes.

Teacher respondents who indicated that they do not use games in their curriculum during the initial face-to-face interview were asked an open-ended question: "Why not?" This question sparked interesting discussions about games in the classroom and various reasons why teachers choose not to use games. Another interesting result of this question was that some teachers reported that they used to use games, but stopped. Following the discussion of why teachers do not use games, the researcher ended their involvement in the investigation as no more interaction occurred with the participant, except during the transcript review stage. These responses of teachers who do not use games in the classroom ended up providing thick description. The audio-

recordings were transcribed by the researcher and logged using MaxQDA, the online data analysis

tool used throughout this study's data collection and analysis.

Table 2

Phase 1: Initial Interview Questions

Questions	
What is your name?	What grade do you teach?
What subject/s do you teach?	How long have you been teaching?
How long at this school site?	How long in this district?
Do you use games as part of your instruction?	If not, why not?
	If so, describe the kinds of games you use?
Have you heard of game theory?	
	If yes, what game elements do you incorporate? Can you explain each in detail?
If no, explain a bit about wanting to be part of a team, leaderboards, quests, leveling up, and so forth.	
	If no (after explanation), do you incorporate any of these elements in your games?
What elements of gaming add to effective learning in the classroom?	What elements of gaming detract from effective learning in the classroom?
What is your perception of how to use games to improve student learning?	What is your perception of how to use games to increase student assessment?
What is your perception of how to use games to improve student behavior?	What online games benefit student learning and why?
Do you use any non-online games in the classroom?	Overall, please tell me what you think of using games in the classroom.

Phase 2: Classroom observation. An observation protocol (See Appendix B) was used

that was derived from Merriam and Tisdell (2016) for selected classroom observations. Seven

classroom observations were conducted based on responses to the initial interview questions.

During the initial face-to-face interviews, eight teachers indicated that they presently used games

in the classroom; however, one of the teachers was no longer a teacher in the classroom following the interview. The criterion of utilizing games was an essential variable in determining whether teachers would be observed while playing games. The observation took place in the natural setting, the classroom, where normal behavior happens (McMillan, 2012). The researcher completed the observation protocol as well as diligent field notes during the observations. Saldaña (2015) and McMillan (2012) both emphasized that an observer's field notes should be factual and objective with personal feelings and interpretations embedded within the field notes as a type of memo. Field notes and these memos were equally important and both were coded (Saldaña, 2015).

Phase 3: Follow-up interview. The post-interviews were structured so that the seven teacher participants who were observed were presented with a set number of identical open-ended questions (Table 7 below) that were part of the same test pilot as the questions for the initial interview. As with the initial interview questions, they were constructed as conversation starters, with the hope that participants would engage in a conversation about their experience and in order to elicit thick description (Creswell, 2013). As with the first interviews, these interviews were longer than expected, with an average of around one hour. Although some teacher participants indicated knowledge of game theory during the initial interview, the question "Can you explain the game and elements used during my visit?", and the other questions related to game elements, were received with confusion, causing the researcher to have to explain different game elements and their purported effect according to game theory. As with the first interview, teacher participants largely highlighted "competition" as the game element that they felt most affects learning and behavior in a positive way.

Table 3

Phase 3: Follow-up Interview Questions

Questions

1. Which games were used during my visit?
2. Can you explain the game and elements used during my visit?
3. What is your perception of how the games you used improved student learning?
4. What is your perception of how the games you used increased student assessment?
5. What is your perception of how the games you used improved student behavior?
6. What elements of the games you used detracted from effective learning in the classroom?
7. Overall, please tell me what you think of how using games in the classroom went during my classroom observation?

Data Collection

This section explains how the evidence was collected in this case study from a multitude of sources: interviews, observations, and archival data. By using differentiated data sources and methodologies for collection, data triangulation occurred (McMillan, 2012). Moreover, in lieu of surveys that are often not answered or that provide superficial responses, this study relied on human interaction, observation, and experience.

First interview. Teachers were purposefully selected to be interviewed after the announcement was made at a staff meeting. Many teachers volunteered; however, grade level, discipline, and teacher demographics were criterion for purposeful sampling to achieve maximum variation (Merriam & Tisdell, 2016). Participants were made well aware of the research questions and the process, and had an opportunity to respond to any questions or concerns they might have prior to, and during their involvement in, the research project. The researcher designed interview

protocol that allowed for extensive note taking during the interviews. An audio-recording device was utilized to record the interviews upon signed permission granted by the interviewee. The interviewees were provided with the Institutional Review Board (IRB) consent form. Additionally, although the audio recording consent was part of the IRB form, the researcher had interviewees sign a separate consent form agreeing to be audio-recorded.

None of the interviewees expressed any concern about participating in the study, and all interviewees agreed to the audio recordings, yet to ensure accuracy, a copy of the transcript was forwarded to each participant for their perusal and approval. For qualitative research, the participant verification of the interview contents enhances credibility of the study. Creswell (2013) suggested that a researcher should understand his/her role as an outsider and establish ethical, respectful, and honest relationships, report all issues honestly, and provide copies of the study to participants. McMillan (2012) termed this latter ethical approach as "member checking" (p. 303). Therefore, each participant signed a statement attesting that the interview transcript was accurately received and documented. Upon receipt of their verifications, the responses were uploaded to MaxQDA, the online data analysis tool used in this qualitative study.

Observation. Direct observations of games being played in the classroom were conducted. Of the 18 teachers interviewed, eight teachers reported playing games. However, only seven classroom observations were conducted because one of the teachers was no longer a teacher in the classroom. An observation protocol (See Appendix B) was used that was derived from Merriam and Tisdell (2016) for selected classroom observations. The researcher spent many hours in teacher classrooms, assuming the role of non-participant observer. The researcher was a non-participant observer, but was still considered part of the action in the classroom while observing students using games because, as Merriam and Tisdell (2016) emphasized, it is impossible to

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observe a classroom without having an impact on the setting and its inhabitants. Once all of the observations were completed, the data was exported to MaxQDA. Data analysis was used to sort the observation notes according to qualitative labels that were continuously updated as the data was collected (Merriam & Tisdell, 2016). The goal of the observations was to partially answer research question number two based on the observation data: How do the instructional practices of rural public high school teachers, grades 9–12, align with game theory?

Follow-up interview. Creswell (2013) recommended member checking following observations and the follow-up interviews allowed the researcher to briefly share classroom observation findings with the teacher participants to confirm that both parties interpreted what was happening in the class in the same way. The post-interviews were designed to allow for more in-depth discussion as the participants answered open-ended questions after being observed in their classroom using games (See Appendix B). It was anticipated that the teachers who were observed would ask their own set of questions and an in-depth, organic, and intimate conversation would ensue, resulting in thick description. As with the first interview, participants were made well aware of the research questions and the process, and had an opportunity to respond to any questions or concerns they might have prior to the onset of the interview. The researcher again designed the interview protocol to allow for extensive note taking during the interviews. An audio-recording device was again utilized to record the interviews upon signed permission granted by the interviewee. Although the interviewees were provided with the Institutional Review Board (IRB) approved consent form previously, the researcher had interviewees sign a separate consent form agreeing to be audio recorded for the second interview, which all interviewees agreed to sign. To ensure accuracy, a copy of the second transcript was forwarded to each participant for perusal and approval to enhance the credibility of the study (Creswell, 2013). Upon receipt of their

verifications, the recorded responses to the second interview were uploaded to MaxQDA.

Archival data. In addition to the interviews and observations, a fourth data source was derived from classroom walkthroughs as far as who uses technology. The walkthroughs are conducted by administration on a daily basis and the subject high school conducts four instructional rounds per year, with the entire faculty observed throughout these rounds. The instructional rounds are conducted by teachers. Part of the observation of instructional rounds involves the use of technology in the classroom. This type of archival record collection added credibility to the study. Creswell (2013), Yin (2017), and Merriam and Tisdell (2016) recommend that case study data collection and research be rather extensive, drawing from a multitude of sources, such as interviews, observations, documents, and archival records. Along these same lines, Altritcher, Posch, and Somekh (1996) stressed that triangulation creates a form of checks and balances wherein researchers establish validity in their studies by analyzing a research question from multiple forms of data collection, such as interviews, observations and document review, ultimately strengthening the credibility and validity of the results.

Identification of Attributes

In an effort to understand how and why, or why not, teachers utilize games in the classroom setting and answer the study's research questions, the following attributes defined this research study: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. These attributes are common elements of a game, as outlined by McGonigal (2011, 2015). The researcher used aspects of each of these attributes during all of the data collection phases: the initial interviews, the classroom observations, the follow-up interviews, and the analysis of

archival data. As such, each of these attributes guided the study's line of inquiry and the data coding as described below.

Meaningful choices and alternatives. Choice is a crucial part of what makes a game, a game (McGonigal, 2011). In a traditional educational environment, meaningful choices can be provided by the teacher as far as assignment choices, seating arrangement, and so forth. As part of this study, the researcher was interested in how teachers incorporate choice in a classroom environment through gameplay in order to trigger desired student behavior. To measure whether teachers seek to offer choice to their students through gameplay, the researcher used face-to-face interviews and classroom observations.

Goals and sense of purpose. A sense of purpose experienced through a goal, or set of goals, is a crucial game element (McGonigal, 2011). McGonigal defined a goal, or set of goals, as specific tasks players work to achieve that provide players a sense of purpose (McGonigal, 2011). McGonigal described this as players understanding the rules, the goal, and the feedback and willingly accepting the game parameters. McGonigal emphasized that the voluntariness of a game equates to challenging work experienced as a fun and safe activity. As part of this study, the researcher was interested in how teachers incorporate goals and a sense of purpose in a classroom environment through gameplay in order to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to offer voluntariness to their students prior to gameplay.

Rules of the game. Rules are a vital part of the game experience (McGonigal, 2011). Limitations must be placed on how players can achieve their goals because "the rules push players to explore previously uncharted possibility spaces" (McGonigal, 2011, p. 21). In sum, rules, as McGonigal (2011) described, "unleash creativity and foster strategic thinking" (p. 21). In a

traditional classroom environment, the rules are identified on course syllabi and as classroom norms. As part of this study, the researcher was interested in how teachers incorporate the rules of the game in a classroom environment through gameplay in order to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to offer the rules of the games to their students prior to gameplay.

Feedback system. Feedback must be provided to keep players informed about goal status and how close they are to achieving their goal, or goals (McGonigal, 2011). McGonigal described this as gamers requiring constant and immediate feedback to serve as a promise that their goal is achievable, providing motivation to keep going (McGonigal, 2011). In a traditional classroom environment, feedback is provided to students in the form of a grade, and possibly a rubric and teacher comments. As part of this study, the researcher was interested in how teachers incorporate feedback in a classroom environment through gameplay, particularly immediate feedback, to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to offer immediate feedback to their students through gameplay.

Connectedness. Working together as a community in the same virtual space toward the same goals is an important game experience (McGonigal, 2011). McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal). In a traditional classroom environment, connectedness is established through a sense of classroom community, a "we are all in this together" type of atmosphere. As part of this study, the researcher was interested in how teachers incorporate connectedness in a classroom environment through gameplay in order to trigger desired student behavior. In other words,

whether teachers have students work together toward a common goal or students compete against one another to reach an individualized goal. The researcher used face-to-face interviews and classroom observations to measure whether teachers incorporate connectedness into their gameplay.

Power and strength. People seek out strength when facing a challenge in life, or in a game, making power an important aspect of gameplay as players face many obstacles as they attempt to reach their goal, or goals (McGonigal, 2015). In a traditional classroom environment, power and strength is achieved through grades. A student with an "A" will have more power and strength in the classroom than a student with an "F." As part of this study, the researcher was interested in how teachers incorporate power and strength in a classroom environment through gameplay in order to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to offer ways to increase power and strength to their students through gameplay.

Challenge mindset. This involves a gamer's willingness to engage with obstacles, perceiving them as a challenge rather than a threat (McGonigal, 2015). In a traditional classroom environment, challenges and obstacles are largely perceived as threats. Students tend to not want to work too hard to achieve their learning goals. Carol Dweck, an educational researcher on growth and fixed mindset, puts forth that a fixed mindset, common in American culture, believes that learning should be easy. As part of this study, the researcher was interested in how teachers incorporate a challenge mindset in a classroom environment through gameplay in order to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to instill a challenge mindset in their students through gameplay.

Heroism. Heroic characters and their stories inspire and motivate players to try harder in their game pursuits to become a better version of themselves (McGonigal, 2015). In a traditional classroom environment, heroism would be reserved for the teacher, students with the highest marks, or perhaps a student who is the joker in the room. As part of this study, the researcher was interested in how teachers incorporate the notion of heroism in a classroom environment through gameplay in order to trigger desired student behavior. The researcher used face-to-face interviews and classroom observations to measure whether teachers seek to instill the notion of heroism in their students through gameplay.

Data Analysis Procedures

In this case study, all four data types were analyzed: the archival data along with the data from the interviews and classroom observations. A reputable online software, MaxQDA, was used to assist the researcher in ascertaining themes, and sorting and coding the data. The data analysis procedures are described further in the following sections.

Organization of the data. The qualitative data received from the face-to-face interviews and classroom observations was transcribed from audio files into text files, along with the transcribed notes. The audio files were transcribed by the researcher using the MaxQDA software, an online qualitative sorting and coding tool. Data was summarized, analyzed, and coded in MaxQDA using techniques described by Richards and Morse (2013) for use with typological data.

Coding of data. Richards and Morse (2013) defined coding as a strategy that organizes data from a disorganized mess to an organized pattern of ideas. This organizational exercise was crucial in this study, as with most qualitative research, because unlike quantitative researchers, data was collected first and then the data was used to formulate hypotheses after observing emergent patterns that arose out of the coding process (McMillan, 2012; Richards & Morse, 2013).

Proper coding was crucial as it enabled the researcher to see the entire picture the data formed; however, consistency and purpose was maintained throughout the coding process for the analysis to be effective (Richards & Morse). To begin coding the data, the researcher relied heavily on the study's key attributes as main categories for coding: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. Next, the researcher scrutinized each interview question and observation notation as a potential sub-category and then analyzed according to connections between participant responses and the classroom observations. In other words, the researcher scrutinized, summarized, and then synthesized each potential variable to provide an understanding of how the variables symbiotically worked together to exemplify how teachers utilize games in their classrooms.

Analysis of data. Following the advice of Merriam and Tisdell (2016), the researcher analyzed data throughout the data collection process. After each interview and classroom observation, the researcher made constant connections, habitually returning to the key attributes and emerging categories. Three types of data coding were included in the analysis using MaxQDA: descriptive coding, topic coding, and analytic coding. Descriptive coding included the major categories, which were crucial in providing general labels for the data, and then topic coding, which enabled the researcher to organize the data into specific topics under the larger headers. Finally, the researcher utilized the key data attributes to engage in a more in-depth coding level, analytic coding, enabling even deeper delving into the data to analyze emerging themes based on observed patterns (Richards & Morse, 2013).

Deep data analysis and triangulation occurred during all three phases of analysis due to the observation and face-to-face interviews (McMillan, 2012). To further build relationships between

participant responses and classroom observations, if a teacher participant provided various reasons in response to a question, the researcher separated each reason into a typology to be able to make connections between the qualitative teacher responses. MaxQDA enabled for a system of analysis that helped minimize human error (McMillan, 2012). After all data was collected, the researcher continued to follow techniques for inductive data analysis as recommended by Richards and Morse (2013) to analyze the data for connections by starting small and working out to a broader category. The emerging themes continued to evolve as deeper and deeper commonalities could be linked.

Validation

This section described ways in which the researcher sought validation of the case study. Internal validation referred to credibility and dependability, while external validation referred to the transferability of the study.

Credibility

The researcher ensured credibility of the data by taking steps to maintain confidentiality of the research study, including interview responses and classroom observation reports. Any information uploaded to MaxQDA, the researcher password-protected, because to access the website a password is required. Additionally, any data downloaded from MaxQDA or saved on a computer or in a cloud, the researcher stored in password-protected files and on password-protected devices. Moreover, the researcher stored the interview transcripts and classroom observations in password-protected files that were then destroyed following the study. Along these same lines, participants received copies of the transcripts via a sealed envelope. When the participants read and agreed to the true and correct nature of the transcripts, they confirmed this through a sealed envelope, ensuring confidentiality.

Dependability

      Face-to-face interviews were a dependable method of gathering rich qualitative data, particularly when participants develop a rapport with the interviewer (McMillan 2012). Additionally, respondents who claimed to utilize games in the classroom were observed in action in their natural setting, and then followed up with another face-to-face interview, adding to the richness of the case study through extensive member checking (McMillan). Moreover, an additional data source about utilizing games in the classroom was sought as far as what has been observed in the classrooms at the subject high school with regard to overall technology use. Having this additional data set provided insight as far as technology trends over time and whether technology use has increased or decreased each year.

Transferability

      Merriam and Tisdell (2016) and Yin (2017) indicated that qualitative research is more difficult to generalize than quantitative research. For example, Yin stressed that the generalizability of a qualitative case study derived from the overall case study, not from the specific case. Instead, the theoretical framework, data collection and analysis, and researcher credibility work together to determine the quality of case study research. Similarly, Merriam and Tisdell cautioned that the researcher should refrain from generalizing conclusions of a study as being transferable to other situations and settings. Rather, the selection of the study setting and sample is the determining factor as to whether readers transfer the findings to their own lives. One method to ensure that a larger number of readers can apply the research to their own interests is through maximum variation sampling, the purposeful sampling used in this case research study. Furthermore, to enhance transferability, Merriam and Tisdell (2016) recommend maximum variation to allow for a large range of participants, resulting in a broader span of readers who can

apply the research to their own lived experiences. Maximum variation worked well in this case study due to the diverse range of participants sampled who revealed commonalities across varied cases (Merriam & Tisdell).

Limitations and Delimitations of the Research Design

The focus of this in-depth qualitative case study was on high school teachers of ninth graders through twelfth graders due to the body of literature on the topic of gamification lacking in K-12 education. A limitation of this research design was the fact that the instruments, the initial interview, and follow-up interview questions detailed in Appendixes A and B were not part of a prior study, but were pilot tested. The literature review elucidated that previous research studies predominately focused on students and their reaction to a gamified course, rather than on teacher perspective. As a result, the researcher was unable to locate uniform interview questions from a prior study. Therefore, the initial interview questions (See Appendix A) and follow-up interview questions (See Appendix B) were designed specifically for this research without the benefit of prior use and noted proven reliability derived from repeated use in other research investigations.

Expected Findings

Throughout this research, the expectation was that teachers in a high school setting use games in the classroom environment, perhaps more so than they are used in a higher education classroom. It appeared likely that teachers who were newer to teaching would have a more open mindset when it comes to utilizing games to engage and motivate students. These expected results were determined by comparing the participant responses against their reported age and years of teaching experience.

Another expected discovery was that teachers who use technology in the classroom do so without knowledge of the what, how, and why when it comes to game elements. It seemed

unlikely that they would have the knowledge and training about why games motivate and engage people through both intrinsic and extrinsic triggers (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). It was also anticipated that during the follow-up interviews participants would ask many questions about games and why there is such a great interest in how they work in the classroom. Another anticipated discovery was that technology trainings offered to participants by the high school and district where they teach may not have included gamification. The above expectations reached fruition, meaning that the results informed the body of literature by drawing attention to a need to train all teachers in gamification.

Ethical Issues

Conflict of Interest Assessment. The researcher had previous knowledge of the participants as an employee of the district and campus at the time the research study occurred. However, due to the researcher's non-tenure teacher status and relatively recent hire, the researcher did not place any undue influence on the participants in the study.

Researcher's Position. The researcher's intentions were to add to the existing literature pertaining to gamification in education, particularly pertaining to high school teachers in grades nine through 12. The Code of Ethics for conducting qualitative research as outlined by the American Psychological Association's (APA) Ethical Principles of Psychologists and Code of Conduct (2017) were adhered to throughout the course of this qualitative research study.

Ethical issues in the study. As with any research study, ethical issues arising from this investigation were a potential risk due to the use of human beings as participants. However, the potentiality of risk was eliminated by adhering to APA's Ethical Concerns of Psychologists and Code of Conduct (2017) and by avoiding any type of discrimination against volunteer teacher participants on the basis of "age, gender, gender identity, race, ethnicity, culture, national origin,

religion, sexual orientation, disability, socioeconomic status or any basis proscribed by law" (APA, 2017, p. 6).

During the data collection and data analysis stages, the findings were documented as combined, cumulative, and anonymous data, posing minimal threat to the teacher participants. McMillan (2012) cautioned researchers concerning the sensitive nature of the case study approach. Therefore, every attempt was made to protect the privacy of the teacher participants. One such precaution to protect the identity of all teacher participants was by removing all personal identifiers; instead, identifying digits were utilized. The use of numbers to represent each teacher participant helped to eliminate identifying information and protect anonymity.

Summary

This chapter has described the choice methodology of qualitative research, an explanatory case study established in an effort to identify the how and why, or why not, teachers use games in classroom curriculum. As stated in Chapter Two, this case study was based on the framework of Fogg's Behavior Model (2009) and McGonigal's game theory (2010, 2011, 2015). McGonigal, a game designer and theorist, along with experts in the field of education (e.g., Prensky, 2012; Sheldon, 2012), highlighted the effect games can have in the classroom on motivation and engagement to trigger desired student behavior. For this study's investigation to take place as far as whether teachers were aware of the potential for games in the classroom, teacher participants were interviewed and observed on how gaming was used in their instructional practices.

The goal of the study was to understand if teachers perceived games as an effective tool in the area of school curriculum. A follow-up interview was conducted after participants using games were observed in their natural classroom setting where the behavior occurs (McMillan, 2012). The follow-up interview consisted of probing questions pertaining to their experience with

games in the classroom. The qualitative data prompted discovery for any distinctions or commonalities with classroom experience of using games as a teaching and learning tool. As a fourth data source, archival data was collected as to the use of technology in the classroom. This fourth data source enabled a lens through which to examine technology trends, as most of today's games are played digitally.

The present body of literature on the use of gamification in a classroom setting emphasized that research in the 9–12 setting was needed as all students could potentially benefit from gamified curriculum, not merely college students studying STEM fields, as much of the empirical research predominately targets STEM fields (e.g., Haaranen et al., 2014; Holman et al., 2013; Hentenryck & Coffrin, 2014; Iosup & Epema, 2014; Landers & Callan, 2011; Leong & Luo, 2011). Furthermore, the literature revealed that teachers altered or supplemented curriculum to include games or game elements, but no standardization existed (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The lack of consistency among practitioners was an indication that a conceptual framework surrounding gamification would help to explain why certain game characteristics could be used and for what specific purpose: what is the targeted behavior in the classroom that game theory could help catalyze (e.g., Dicheva et al., 2014; Looyestyn et al., 2017).

The data was collected in the field at the site of the social issue investigated, in this case a high school setting, rather than using contrived situations, as in control groups. Instead, as part of this study, teachers were part of the interaction and observed in their natural setting (Creswell, 2013), yet no underage students were participants, nor was their data used. The participants of this study were educators and the data was derived through face-to-face interviews and classroom observation of pedagogical approaches surrounding games. The data obtained was evaluated and analyzed using MaxQDA, an online data analysis tool. The primary questions examined how

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rural, public high school teachers utilize games in their classroom instruction methodologies and

curricula and, if they do not use games, why not.

Chapter 4: Data Analysis and Results

The purpose of this chapter is to describe the qualitative research case study's sample population and size, and the research methodologies used, as well as the study's results. This research case study was utilized to help identify whether teachers in a high school setting incorporate games in their classroom curriculum and, if so, how they use games and for what purpose. If teachers in a high school setting reported to not use games in their high school lesson plans, then this research case study also explored reasons for them opting out of using games in their classroom. Data was collected through face-to-face interviews, classroom observations, and archival data. In an effort to examine the research questions, this chapter served as a platform to detail the results of the data collection and analysis, focusing on the eight data attributes identified: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism—all game elements identified by game designer and researcher, McGonigal (2011, 2015). The researcher identified these eight attributes and deeply analyzed them throughout the data collection process and analytical coding. Additionally, the researcher applied the data attributes to Fogg's Behavior Model (FBM) (2009) to determine whether teachers tap into the aspects of games that gamers find riveting to trigger desired student behavior.

Description of the Sample

The teacher participants were recruited from a high school site on the West Coast. The target research population was ninth through 12th grade teachers. The purposeful sampling targeted the same demographic as the whole school population, with no expected bias related to the recruitment method.

Race and gender demographics. The enrollment obtained an even distribution of individuals participating in each ethnicity/race as well as gender (Table 3). All teacher participants were adults. With respect to ethnicity/race, the school population of 60 teachers did not include teachers who identified as black or African American. Of the teachers at the school site, 56% self-identified as white. Additionally, of the 60 teachers at the school site, 25% reported as Latino/Hispanic descent and, of the teacher participants, 39% reported as Latino/Hispanic descent. While 17% of the 60 teachers reported to be "other," 5% of the teacher participants reported to be of Asian origins. With regard to gender, 46% of the teachers at the school site reported themselves to be male and 54% reported themselves to be female. The teacher participants represented similar demographics, with approximately 56% reported as female and approximately 44% reported as male. Table 3 below provides a description of race and gender completed for each of the case study's participants.

Table 3

Teacher Participants by Ethnicity and Gender

Number of Participants	Ethnicity	Gender
5	White	Female
5	White	Male
5	Hispanic	Female
2	Hispanic	Male
1	Asian	Male

Years of teaching experience. A criterion for considering game use in the classroom was years of classroom experience, particularly with the use of technology. Scholars such as Prensky (2010) pointed to boredom as one of the primary reasons that school fails to engage youth due to today's generation being digital natives, born in a time of complete immersion in technology.

Prensky claimed that students are bored in class due to their ability to learn outside of school in other, more exciting ways through the Internet, cellular devices, and other media outlets (Prensky, 2010). With Prensky's claim in mind, one of the maximum variants was years of teaching experience and the possibility that less experienced teachers may be more apt to use games (Table 4). Approximately 5% of the campus teacher population was classified as first- or second-year teachers. Of the sample population of 18 high school teachers, 14.6 years was the average number of teaching experience recorded; two of the teachers were recorded in their first two years of teaching and three of the teachers were recorded in their 25th year, or more, of teaching. Data provided in this study was based on the information obtained from all of the 18 teacher participants from the school site. Table 4 below provides a description of the years of classroom teaching experience completed for each of the case study's participants.

Table 4

Teacher Participants by Years of Experience

Number of Participants	Years in the classroom
3	25–30
3	20–24
3	16–20
3	10–15
2	5–9
4	1–4

Grade level and discipline. A distinct criterion for considering game use in the classroom was grade level and discipline, and whether certain grade levels or subjects made it easier, or more likely, that a teacher used games in teaching methodologies and vice versa. For maximum variation, these two considerations were part of the close-ended interview questions that explored whether subject and grade had any effect on a teacher opting, or not opting, to integrate games into

their classroom pedagogy. At the school site, subjects were broken down as follows: Physical

Education/Health, Social Sciences, Language Arts, Math, and Science and grade levels ranged

from ninth, tenth, eleventh and twelfth. Table 5 below provides a description of the subject and

grade levels for each of the case study's participants.

Table 5

Teacher Participants by Grade Levels and Disciplines

Number of Participants	Academic Subject	Grade Levels
1	Science	9, 10, 11, 12
1	Science	10, 11
1	Special Ed	9, 10, 11, 12
2	Social Science	11, 12
1	Social Science	10, 11, 12
1	Social Science	10, 11
2	Math	9, 10, 11, 12
1	Math	10, 11, 12
1	Math	9, 10
1	PE	9, 10, 11, 12
1	English	10, 11
1	English	9, 10, 12
2	English	9, 10, 11, 12
2	English	9, 10

Summary of sample. For this study's investigation, teacher participants were

interviewed and then observed using games in their classroom pedagogy. In the study

investigated, varying grade levels, years teaching, and disciplines were purposefully selected,

as well as social demographics, such as ethnicity and gender. This unique sample provided

insight into whether grade-level, years of experience, or subject area affect gameplay, the

"phenomenon of interest," and ensured an "information-rich case" (Merriam & Tisdell, 2016,

p. 97). Furthermore, to enhance transferability, Merriam and Tisdell (2016) recommend

maximum variation in the purposeful sample to allow for a large range of participants so that

a greater span of readers can apply the research to their own lives and experiences. Table 6

below provides a snapshot of the case study's participant demographics.

Table 6

Summary of Teacher Participants

Teacher Demographics

By Ethnicity	Number of Participants
White	10
Hispanic	7
Asian	1
By Academic Subject	
Math	4
English	6
Social Science	4
Science	2
Special Education	1
Physical Education	1
By Gender	
Female	10
Male	8
Years of Teaching	
25–30	3
20–24	3
16–20	3
10–15	3
5–9	2
0–4	4
Grade Levels	
11,12	2
9, 10	3
10,11	3
10–12	3
9–12	7

Research Methodology and Analysis

Following the attainment of permission to conduct the study as granted by the site principal and by Concordia University Internal Review Board (IRB), the research investigation began. The explanatory qualitative case study was based on the framework of Fogg's Behavior Model (2009) to examine how to use games to trigger desired student behavior in a classroom setting. In conjunction with Fogg's Behavior Model, the case study relied on game theory developed by game designers and theorists and, in particular, the ideas of McGonigal (2011, 2015). McGonigal, a game designer and theorist, as well as experts in the field of education (e.g., Prensky, 2012; Sheldon, 2012), have highlighted the potential ramifications games may have on triggering desired student behavior when utilized by teachers in the classroom.

For this study's investigation, teacher participants were interviewed and then observed using games in their classroom pedagogy. The goal of this study was to determine whether teachers perceive games as a teaching tool that can be effectively used in curricula and, if not, why they do not believe that games can be used in the classroom to increase learning and improve student behavior and engagement. For those teachers reporting the use of games, an observation was scheduled to witness students playing a game as part of their learning so that the teacher participants were observed in their natural classroom setting while the game behavior occurred (McMillan, 2012). During the face-to-face interviews and classroom observations, the research explored whether teachers incorporated any of the eight data attributes, game elements, identified as the line of inquiry in this study. This latter identification was important to this study because the eight data attributes, or game elements, were identified by game designers and theorists as what makes a game, a game (McGonigal, 2011, 2015). However, in prior research studies, as identified

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in the literature review, no streamlined guide for game elements and how to incorporate them into classroom curriculum was available as a practicum for educators.

In the context of this specific case study, in an effort to investigate the research questions and analyze the eight data attributes, interviews were conducted to help identify whether teachers utilize gameplay in their classroom and, if so, how and why; alternatively, for teachers not using games in their teaching toolbox, the researcher explored reasons for why they choose not to play games in their classroom. The initial face-to-face interviews, the primary source of data collection, classroom observations, follow-up interviews, and archival data all worked symbiotically to examine the research questions:

1. How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?

2. How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?

   iii. What elements of gaming add or detract from effective learning in the classroom?

   iv. What are the strategies and software programs that benefit student achievement and why?

3. What are teachers' perceptions toward using games to improve student skills and achievement?

Participant interviews. Following receipt of the recruitment at a teacher staff meeting, 18 of the 25 teachers agreed to be interviewed. The researcher purposefully selected teacher participants to achieve maximum variation and improve transferability (Merriam & Tisdell, 2016). The sampling criteria included social demographics, ethnicity and gender, as well as years of

teaching, academic subjects taught, and grade level. Merriam and Tisdell (2016) emphasized that saturation is the most important consideration when deciding when to cease data collection. The authors noted that saturation occurs when analysis indicates that additional data would bring no new insights. Saturation occurred once 18 teachers were interviewed as the researcher determined that no new insight would result from additional data sources in the form of teacher participants at the school site.

When each of the teacher participants agreed to be interviewed about their use of games in the classroom, a mutually convenient day and time for the interview was scheduled. Upon sitting down for the interview, the teacher participants immediately signed the required consent form, consenting to be audio recorded, as well as becoming once again informed about the study and their rights as participants. In particular, the researcher briefly explained the purpose of the study and the participant's right to withdraw from the study at any time. The researcher also explained to the participant that the audio recording would remain confidential and would be stored on a password-protected device and destroyed at the conclusion of the study. Each of the initial interviews occurred on the campus of the school site in the teacher participant's classroom during the participant's preparatory period—a period devoted to prepping for classes and grading—or outside of school hours.

The interviews were conducted face-to-face with an audio recording, and as reiterated to the participants before interviews began, stored on a cellular device that was password protected at all times. The questions administered to the teacher participants during the initial interview were open-ended, as detailed in Appendix A, except for five general data collection questions (such as years taught, subject matter and grades taught), and one open-ended question for teachers not using

games, and 11 or so open-ended test-piloted questions of the same content for teachers using games.

Moreover, the open-ended questions outlined in Appendix A were used as starter questions, as the respondent was in control of the interview, not the interviewee. In other words, the interviewees expanded on their responses by providing in-depth detail about their experiences, or lack of experience, using games in their classroom (McMillan, 2012). The interview instrument was designed and test-piloted to inquire whether teachers utilize games in their classroom to illicit intimate discussion on the topic between respondent and interviewer (See Appendix A). If teachers reported to not use games, the interview instrument was designed to discuss the reasons for not using games. The initial interview lasted anywhere from 15 to 40 minutes, with the longest interview lasting nearly two hours.

During the initial interview, some of the teacher respondents indicated that they do not regularly use games in their curriculum. Following this response, the interviewer asked an open-ended question as to why not. The interviewee described varying reasons for not using games in their classroom. After the interviewee explained through a narrative their reasons in detail, the interviewer prompted an end to their involvement in the investigation since no follow-up interview or classroom observation would take place. The participant would have no cause to be involved in the study except during the transcript review stage. The responses of the interviewees who reported not using games at the time of the interview were logged using MaxQDA, the online data analysis tool.

Upon completion of all of the initial interviews, the researcher uploaded each of the 18 password-protected interview audio files to the online data analysis tool, MaxQDA. The researcher then transcribed the data contained in the audio file using the MaxQDA software

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transcription feature. Once each interview was transcribed, the researcher handed over the transcript to each respective interviewee in a sealed envelope, allowing him or her to verify that the information was true and correct. This verification allowed member checking to occur, an important criterion in qualitative research to enhance credibility of the study (McMillan, 2012). Once each participant verified the transcript for accuracy, the teacher participant returned the transcript to the researcher in a sealed envelope. The researcher presented all names in this study as pseudonyms to create anonymity to protect the identity of the teacher participants.

Classroom observation. The researcher derived an observation protocol (See Appendix B) from Merriam and Tisdell (2016) for selected classroom observations. The researcher conducted seven classroom observations based on responses to the initial interview questions. During the initial face-to-face interviews, eight teachers indicated that they presently use games in the classroom; however, one of the teachers is no longer a teacher in the classroom. The seven teacher participants who were observed indicated during the first face-to-face interview that they used games in the classroom. This criterion was an essential variable in determining whether teachers would be observed playing games. The observation took place in the natural setting, the classroom, where normal behavior happened (McMillan, 2012). The researcher completed the observation protocol as well as diligent field notes during the observations. Saldaña (2015) and McMillan (2012) both emphasized that an observer's field notes should be factual and objective with personal feelings and interpretations embedded within the field notes as a type of memo. Field notes and these memos were equally important and were both coded (Saldaña, 2015).

The researcher spent many hours in teacher classrooms, assuming the role of non-participant observer. The researcher was a non-participant observer, but was still considered part of the action in the classroom while observing students using games because, as Merriam and

Tisdell (2016) emphasized, it is impossible to observe a classroom without having an impact on the setting and its inhabitants. Once all of the observations were completed, the researcher exported the data to MaxQDA and then transcribed it using the program's transcription feature. The researcher used data analysis to sort the observation notes according to qualitative labels that were continuously updated as the data was collected (Merriam & Tisdell, 2016). The goal of the observations was for the researcher to examine research question number two—How do the instructional practices of rural public high school teachers, grades 9–12, align with game theory?—based on the collected data and to investigate the eight data attributes, game elements, crucial to this study.

Follow-up interviews. Creswell (2013) recommended member checking following observations; the follow-up interviews allowed the researcher to briefly share observations with the teacher participants to confirm that both parties interpreted what was happening in the class in the same way. The researcher structured the post-interviews so that the seven teacher participants who were observed were presented with a set number of identical open-ended questions (See Appendix B) that were part of the same test pilot as the questions for the initial interview. As with most of the initial interview questions, the researcher constructed these questions as conversation starters, with the hope that the teacher participants would engage in a conversation about their experience and to elicit thick description (Creswell, 2013). As with the first interviews, these interviews were longer than expected, with an average of around one hour.

Member checking. The researcher transcribed the interview transcripts and then handed them over to each participant for them to verify the transcripts. Once each participant had time to peruse the transcripts for accuracy, the researcher collected the transcripts from the participants. All of the transcript exchanges were made using sealed envelopes. When the hard copies of the

transcripts were kept for analysis and perusal, they were kept in a locked safe at all times to ensure the confidentiality of the teacher participants. Furthermore, the researcher uploaded the interview transcripts and then transcribed them using MaxQDA, the online data analysis tool used in this study, so that the researcher could code and analyze the data. The recruiting process, initial interviews, observations, classroom observations and transcript verification exchanges occurred over a period of 16 weeks.

Triangulation occurred through differentiated data sources and methodologies for data collection (McMillan, 2012). Moreover, in lieu of surveys that are often not answered, or that provide superficial responses, this study relied on human interaction, observation, and experience. As such, the researcher made the teacher participants aware of the research questions, explained the process, and afforded them an opportunity to respond to any questions or concerns they had prior to, and during their involvement, in the research project. However, the researcher in this qualitative study utilized technology in the form of an online data analysis tool, MaxQDA, to expedite the process and to reduce human error that could arise from attempting to quantify qualitative data.

Archival data. As a fourth data source, the researcher analyzed archival information on the overall use of technology in the classroom. The school site provided a fourth data source that enabled an additional lens through which to examine overall technology use on the campus. The school's data included percentages of overall technology use. The school site is one-to-one, meaning the students receive their own individual devices, namely a Dell Chromebook with Google applications and other educational programs installed. This information on technology was vital to this case study because of the noteworthiness of each student possessing a device that can be used for technology-based games in the classroom. Despite each student having a device in

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their possession inside and outside of the classroom, data collected indicated that students on the

school site only use their devices 30% of the time to perform work in the classroom. This

percentage highlighted that, overall, not all teachers rely on technology in their classroom despite

its ready availability.

Data Analysis and Results

The researcher coded the responses to the interview questions following the protocol

provided by Richards and Morse (2013). The researcher utilized three types of coding: descriptive

coding, topic coding, and analytic coding. Descriptive coding, the most basic form of coding,

provided general labels. The researcher divided the data at the descriptive level into three parts:

used games, no games used, and used games in the past. Next, topic coding enabled the researcher

to organize the data into specific topics. The researcher began examining reasons provided under

the three descriptive levels. The researcher explored these reasons, with the themes emerging, and

continuing to evolve and change. For instance, under the topic coding, "No games used," the

researcher created topic coding: subject, teacher preparatory time, grade level, lack of familiarity,

no worthy games, and fear of losing control.

The researcher then implemented a more in-depth coding level, analytic coding, to delve

even deeper into the data, analyzing emerging themes based on observed patterns (Richards &

Morse, 2013). Arising from the literature review, interviews, observations, and archival data, data

attributes emerged that guided the line of inquiry throughout the study: meaningful choices and

alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power

and strength, challenge mindset, and heroism. These data attributes evolved from terms derived

from the literature review into deep analytical themes that the researcher used to analyze the

collected data as far as how and why teachers utilize games in the classroom. The analytical

themes were specific to the data collected during this research. Once the researcher applied topic

coding to the data, the researcher was able to delve even deeper to analyze specifically for the data

attributes to examine whether teachers had an understanding of these important game elements.

The researcher intentionally designed the pilot-tested interview questions to target the

study's research questions. When the researcher interviewed teachers, if teachers reported not

utilizing game elements, the next question the researcher asked was, "What is your perception of

how to use games to improve student learning?" For those teachers reporting not to use games, the

researcher shifted the direction of the interview to "Why don't you use games?" This question led

to narrative responses, loaded with thick description. Following the insight gained as far as why

the teachers do not use games, the interview ended and the participant was free to leave the study.

The teachers who reported that they used to use games in the classroom in the past, but no longer

use them, completed the entire interview. An unexpected outcome of this research investigation

was that some teachers used to use games in the classroom, but during the interview reported not

to use them any longer.

Descriptive and Topic Themes

Games or not? When the researcher asked interviewees the question, "Do you use games

as part of your instruction?" of the 18 teacher participants interviewed, over half (10 participants)

responded "No," that they did not use games as part of their classroom teaching methodologies;

however, the other eight teacher participants reported that they used games as part of their

instruction. When teachers who do not use games were asked why they opt out of using games,

five of the ten participants reported that they previously used games. Four of these five indicated

that they stopped using games despite feeling like games had a positive impact on learning in their

classroom. Reasons provided for not using games in the classroom include preparation time

(22%), concern about grade level appropriateness (20%), and trepidation over subject area appropriateness (40%). Despite these reasons for opting out, the researcher concluded that no relationship exists between game usage and grade level as indicative on the data displayed on Table 8 below. There does, however, seem to be a relationship between game usage and subject area as depicted on Table 9 below, with social studies teachers reporting to be more apt to use games, with three out of the four (or 75%) of social studies teachers interviewed reporting to use games on a regular basis. Moreover, as reflected on Table 10 below, years of teaching did not appear to influence whether teachers utilize games in their classroom or not.

Table 8

Sorted by Grade Level and Game Usage

Number of Participants	Grade Level	Used Games
3	9–12	Yes
4	9–12	No
1	9,10	No
2	9,10	Yes
1	9,10,12	No
2	10,11	No
2	10,11	Yes
1	10,11,12	No
1	10,11,12	Yes
1	11,12	Yes
1	11,12	No

Table 9

Sorted by Subject Area and Game Usage

Number of Participants	Academic Subject	Used Games
2	Science	No
1	Special Ed	Yes
3	Social Studies	Yes
1	Social Studies	No
2	Math	Yes
2	Math	No
1	PE	No
4	English	No
2	English	Yes

Table 10

Sorted by Years Teaching and Game Usage

Number of Participants	Years of Teaching	Used Games
1	26–30	Yes
4	21–25	No
1	21–25	Yes
1	16–20	No
2	16–20	Yes
2	11–15	No
1	6–10	No
2	6–10	Yes
2	0–5	No
2	0–5	Yes

Reasons for games or not. In addition to examining reasons for teachers not using games in the classroom, the face-to-face, open-ended interview questions prompted a holistic discussion about how teacher participants used games, either then or in the past. When analyzing the open-ended interview participant response data, the researcher transcribed all of the responses and coded them using MaxQDA, an online data sorting

tool. Within each of the questions, the researcher first identified common themes and then sorted the data. The researcher depicted the recurring themes that emerged below on Table 11. When the researcher asked teacher participants the question, "What is your perception of how to use games to improve student learning?" the 13 teachers who reported using games, then or in the past, provided varying responses, but common themes included using the games as a general teaching tool, as reported by 22% of interviewees; using games for teambuilding, as stated by 11% of interviewees; using games for vocabulary review, as reported by 22% of interviewees; and using games to review for upcoming tests, as reported by 44% of interviewees.

Knowledge of game theory. When the researcher asked the question, "Have you heard of game theory?" most teacher participants had not heard of game theory, with 66% responding that they had not heard of it, 17% replying with "somewhat," and 17% answering in the affirmative. After the researcher investigated whether teachers were familiar with game theory, the researcher explained to teacher participants the tenets surrounding game theory to provide a cursory debriefing of game elements and McGonigal's (2010, 2011, 2015) theory surrounding games and the elements of games that lead to people playing them obsessively to conquer them. Following this brief conversation of game theory, the researcher posed the following question, "What elements of gaming add to effective learning in the classroom?" In response to this question, many of the teacher interviewees—50% of the 13 participants who reported to use games, or used them in the past—pointed to competitiveness as the most effective component of a game. Teacher participants also reported positive connections, along with increased engagement and fun.

Games as a potential detraction. The question, "What elements of gaming detract from effective learning in the classroom?" prompted varying teacher participant responses, with 54% of the 13 teacher participants who reported to use games, then or in the past, stating that no elements of a game detract from effective learning; for those reporting elements that detract from effective learning, emerging themes included: when groups were ineffectively formed with no heterogeneity (31%) or when no clear learning goal was tied to the outcome of the game (15%). The interviewees felt that these aspects were important for a game to be effective in the classroom and that when these components were absent the games did not add to learning, but instead detracted from learning. When the researcher asked the question, "What is your perception of how to use games to improve student learning?" teacher participants commonly brought up competition again, with 38% of the 13 teachers who reported to use games, then or in the past, noting competitiveness among individuals and 62% highlighting competitiveness among teams. Some teacher participants of the 13 teacher participants who use games, then or in the past, also reported offering incentives, with 31% offering extra credit to the winner/s, 31% offering a prize, and 8% offering more game time. Contrarily, 31% reported that they do not offer rewards other than the reward of winning.

Games as an assessment. The researcher inquired, "What is your perception of how to use games to increase student assessment?" This question incited varying responses. Twenty-three percent of the 13 teacher participants who reported to use games, then or in the past, were indifferent on whether games allowed for effective checking for understanding (CFU), 15% indicated that games were somewhat effective for CFU, 31% stated that games were effective for CFU, and 31% suggested that games were ineffective for CFU. Reasons stated for ineffectiveness included the difficulty in assessing individual learning if students were teamed up. For example, Jose (a pseudonym was used, as with all teacher respondents in this study), a social studies teacher,

noted that during his *Jeopardy* games shy people were left out of CFU, "Because of the teams. Because of how some students are just shy and they're not going to raise their hands. And because they don't raise their hands doesn't mean they don't know the answer." This teacher participant stopped using games, despite him finding that they overall had a positive effect on learning. His reason for not using games was largely due to preparation time and concern over grade level, feeling that seniors may not enjoy games due to concern over social image and the pressure to remain indifferent during class.

Games and behavior. With regard to how games affect student behavior, teachers were asked, "What is your perception of how to use games to improve student behavior?" Teacher participant Cynthia responded, "Games affect behavior positively because they have this friendly competition going on. But negatively with them getting out of control? Or putting bad names up there during Kahoot or anything? No, they do great actually." This teacher participant referenced *Kahoot*, a game-based tool designed for learning in the classroom. Of the 13 teachers interviewed who reported using games, then or in the past, 56% reported that games positively affect behavior, 7% reported that games had a negative effect, 15% indicated that games have no effect on behavior, and 31% responded that games may or may not affect behavior, depending on the classroom student population as a whole and its overarching personality.

Which games? The researcher asked respondents about what types of games they used. The specific question posed was, "What online games benefit student learning and why?" Sixty-two percent of the 13 teacher respondents who reported to use games, then or in the past, reported to use *Kahoot*, 23% reported to use *Jeopardy*, and 15% reported to use other online games designed for learning. Specifically, Ron, a special education reading teacher, and Rhonda, a math teacher, both reported using specific websites to help improve skills in their subject area. The

follow-up question was, "Do you use any non-online games in the classroom?" Of those 13 teacher respondents reporting to use games regularly, or having used them in the past, 46% indicated that they do use other non-online games and 54% do not use non-online games.

       Games overall. To conclude the interview, the researcher provided respondents with a summative prompt: "Overall, please tell me what you think of using games in the classroom." Seventy-seven percent of teacher respondents who use games, or used them in the past, indicated that overall games have a positive effect on the classroom environment and learning, and 23% of the teacher respondents answered that games can have both a positive and negative effect in the classroom. The latter group pointed to issues such as grade level and overall classroom personality that can wreak havoc on games being effective teaching tools.

       Summary of interviews. The researcher designed the interview questions and then test-piloted them with the goal of gaining insight surrounding the how and why teachers use games, answering the research question, "How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?" The questions asked during the interview provided information to also answer the second research question, "How do rural, public high school teachers, grades 9–12, understand and describe their use of game elements in their instructional practices align with game theory?" and the important sub-questions that were part of the second research question: "What elements of gaming add or detract from effective learning in the classroom?" and "What are the strategies and software programs that benefit student achievement and why?" Additionally, the third research question was targeted: "What are teachers' perceptions toward using games to improve student skills and achievement?"

Table 11

Open-Ended Interview Questions and Participant Responses

Question Number	Open-Ended Interview Question	Participant Responses	Number of Participants
1	Do you use games as part of your instruction?	Yes No	8 10
2	What is your perception of how to use games to improve student learning?	Teaching tool Teambuilding Vocabulary review Review for test	4 2 4 8
3	Have you heard of game theory?	Somewhat No Yes	3 12 3
4	What elements of gaming add to effective learning in the classroom?	Competitiveness Positive connections Fun	13 2 3
5	What elements of gaming detract from effective learning in the classroom?	Ineffective grouping No learning goals No elements	4 2 7
6	What is your perception of how to use games to improve student learning?	Individual competition Team competition No incentives Offer extra credit Offer prize More game time	5 8 4 4 4 1
7	What is your perception of how to use games to increase student assessment?	Somewhat effective Effective Ineffective for CFU Indifferent	2 4 4 3

Question Number	Open-Ended Interview Question	Participant Responses	Number of Participants
8	What is your perception of how to use games to improve student behavior?	Depends on class No effect on behavior Negative effect Positive Effect	4 2 1 6
9	What online games benefit student learning and why?	Kahoot Jeopardy Other	8 3 2
10	Do you use any non-online games in the classroom?	Yes No	6 7
11	Overall, please tell me what you think of using games in the classroom.	Positive effect Positive and negative	10 3

Summation of the Findings

The data attributes, which were game elements, as discussed in this section—choice, goals, rules, constant and immediate feedback, connectedness, power, challenge mindset, and heroism—may all work as persuasive technologies in line with Fogg's behavior model (FBM) and work as triggers to increase student motivation and/or ability so that targeted behavior is carried out in a classroom setting. However, for a gamified classroom to be effective in increasing learning outcomes, teachers must be aware of what game elements to use, for what purpose, and how they should be used. In line with Prensky (2012), McGonigal (2011) emphasized, it is not enough to merely supplement existing traditional curriculum with a few game elements as this is "at best a temporary solution" (p. 128). Instead, the ideal educational environment is a game from beginning to end: every assignment, every activity, every moment of instruction and assessment (McGonigal, 2011). As observed in the classroom and based on the insight provided by the face-to-face

interviews, educators were largely unaware of elements of a game that trigger motivation and increased ability in the classroom, other than perhaps competitive elements of a game.

The conceptual framework undergirding this qualitative case study research derived from personal beliefs, the literature review, McGonigal (2010, 2011, 2015), and Fogg's Behavior Model (FBM). The eight data attributes, or game elements, represent significant ways of thinking and behaviors that were crucial in understanding how gamification can work in the classroom and provided a streamlined guide as summarized in Table 1. The researcher used this guide as a lens to explore the case study's research questions as presented through the face-to-face interviews and classroom observations. The study's findings revealed that game elements may be sporadically used in the school site's classrooms as well as other classrooms around the globe, yet educators may not explicitly connect the targeted student behavior and/or ability to a game element so that it can work as a trigger.

Table 1

Game Mechanics: The What, How, and Why

Game Element (What)	Description (How)	Attributable to Traits of a Game (Why)
Meaningful choices and alternatives	Give students choices in what assignments they do, how they earn points, and some form of voluntariness should be part of the gamification approach (Barata, Gama, Jorge, & Gonçalves, 2017).	Choice. Players understand the rules, the goal, and the feedback and willingly accept the game parameters (McGonigal, 2011). McGonigal stresses that the voluntariness of the game ensure that challenging work can be experienced as a fun and safe activity.
Class Rules and Expectations	Clear instructions must be provided to students regarding gamified elements of the class and how they achieve their goals (de Byl & Hooper, 2013).	Rules. Limitations placed on how players achieve their goals (McGonigal, 2011).

Game Element (What)	Description (How)	Attributable to Traits of a Game (Why)
Leaderboards	Leaderboards often provide immediate feedback to learners through avatars that progress on a scale with other class members' points displayed as well (Barata, Gama, Jorge, & Gonçalves, 2014).	Feedback. For gamers, constant and immediate feedback is needed about progress toward their goals (McGonigal, 2011). Gamers seek "epic wins" or positive outcomes that often arise when least expected (McGonigal, 2015).
Guild or Multiplayer Games	Guilds are a group of students who work together, toward a common goal, but may or may not team up to reach that goal. Guilds are similar to multiplayer games where players do not compete against each other but occupy the same virtual space (Barata et al., 2017).	Connectedness. In multiplayer games, gamers form allies, people who face similar obstacles, or at least relate to them, and who watch out for each other.
Experience Points (XP)	These are points awarded to students, and typically students move to the next level of the course once they achieve a certain number (Barata et al., 2017).	Strength. McGonigal (2015) puts forth that gamers seek out "power-ups"—items that make their character stronger, more powerful, and faster.
Optional Quests	Challenging tasks that can be added to the course as optional, allowing students to earn higher points when the task is seen as a larger obstacle (Barata et al., 2017).	Challenge mindset. McGonigal (2015) explains that a gamer is willing to engage with obstacles, perceiving them as a challenge rather than a threat.
Avatars	Avatars create a fantasy world and autonomy, allowing students to become heroes, friends, or foes in that world (de Byl & Hooper, 2013).	Heroism. In games, heroic characters and their stories inspire and motivate players to try harder and to be a better version of themselves (McGonigal, 2015).

During the face-to-face interviews, the researcher asked the participants approximately

seventeen questions: six were close-ended demographic information questions and the remaining

questions were open-ended questions related to their use of games in the classroom (See Appendix A). The ultimate objective of the test-piloted interview questions was to provide answers to the three research questions.

How are games used. The first research question, "How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?" was examined in part from both the interview responses and classroom observations. As far as the data analyzed, the 13 teachers who reported using games, then or in the past, provided varying responses, but common ways teacher respondents utilized games include: using the games as a general teaching tool, as reported by 22% of interviewees; using games for teambuilding, as stated by 11% of interviewees; using games for vocabulary review, as reported by 22% of interviewees; and using games to review for upcoming tests, as reported by 44% of interviewees.

Instructional practices and game theory. The second interview question, "How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?" was targeted when the researcher asked the 18 teacher interviewees the question, "Have you heard of game theory?" Most teacher participants had not heard of game theory, with 66% responding that they had not, 17% replying they had a cursory understanding of game theory, and 17% answering in the affirmative. After the researcher investigated whether teachers were familiar with game theory during the initial interview, the researcher provided teacher participants with a cursory debriefing of game elements and McGonigal's (2010, 2011, 2015) game theory and what incites people to play games obsessively to conquer them. Following this brief conversation of game theory, the researcher posed interviewees the following question: "What elements of gaming add to effective learning in the classroom?" The researcher used this question to target the first sub-question of the second interview question, "What elements of gaming add or detract from

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effective learning in the classroom?" In response to this question, many of the teacher interviewees (50%) who reported to use games, or used them in the past, pointed to competitiveness as the most effective component of a game. Teacher participants also reported positive connections, fun, and increased engagement. For those reporting elements that detract from effective learning, emerging themes included: when groups were ineffectively formed with no heterogeneity (31%) or when no clear learning goal was tied to the outcome of the game (15%).

   Strategies when using games. The second sub-question of the second interview question was: "What are the strategies and software programs that benefit student achievement and why?" To arrive at an answer to this research question, the researcher asked teacher participants, "What online games benefit student learning and why?" Sixty-two percent of the teacher respondents who reported to use games regularly play the online game, *Kahoot*, in their classroom; 23% of the teacher respondents who reported to use online games regularly play the online game, *Jeopardy*, in their classroom; and 15% of the teacher respondents used online games regularly play other online games designed for learning. Specifically, Ron, a special education reading teacher, and Randy, a mathematics teacher, both reported using specific websites to help improve skills in their subject area.

   Student skills and achievement. The third interview question, "What are teachers' perceptions toward using games to improve student skills and achievement?" was targeted through varying interview questions about skills, assessment, and behavior. The researcher asked the question about learning skills, "What is your perception of how to use games to improve student learning?" When posed this question, 13 teacher participants who reported to use games, then or in the past, commonly brought up the element of competition as increasing skills, with 38% noting competitiveness among individuals and 62% highlighting competitiveness among teams.

Furthermore, the researcher inquired, "What is your perception of how to use games to increase student assessment?" In response, 23% of the 13 teacher participants who reported to use games, then or in the past, were indifferent on whether games allowed for effective checking of for understanding (CFU), 15% indicated that games are somewhat effective for CFU, 31% stated that games are effective for CFU, and 31% suggested that games are ineffective for CFU. With regard to how games affect student behavior, the researcher asked teachers, "What is your perception of how to use games to improve student behavior?" Of the 13 teachers interviewed who reported using games, then or in the past, 56% reported that games positively affect behavior, 7% reported that games had a negative effect, 15% indicated that games have no effect on behavior, and 31% responded that games may or may not affect behavior, depending on the classroom student population as a whole and its overarching personality. Overall, it appeared that the 13 teacher participants who reported to use games, then or in the past, regularly utilized games to improve student skills, assessment, and behavior.

Presentation of the Research Results

Arising from the literature review, interviews, observations, and archival data, data attributes emerged that guided the line of inquiry throughout the study: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. These data attributes evolved from terms derived from the literature review into deep analytical themes that the researcher used to analyze the collected data as far as how and why teachers utilize games in the classroom. The analytical themes were specific to the data collected during this research and were the organizational structure of the discussion of the emerging data themes discussed below, as they align with the study's data collection and analysis.

Analytical Themes

Meaningful choices and alternatives. A gamer's cognition and behavior, or a gamer's mode of acting and reacting, can be affected by meaningful choices, as detailed in the literature review as well as in McGonigal's (2015) text. Choice is a crucial part of what makes a game, a game (McGonigal, 2011). McGonigal described this as players understanding the rules, the goal, and the feedback, and willingly accepting the game parameters. McGonigal emphasized that the voluntariness of a game equates to challenging work experienced as a fun and safe activity. This game element was described in the literature on gamification in myriad ways. For instance, one research team posited to give students choices in what assignments they do, what books they read, what projects they carry out, and even how they earn points; some form of voluntariness should be part of the gamification approach (Barata, Gama, Jorge, and Gonçalves, 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of choice and an individual student will vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, the teacher participant explained to the students the rules, goal, and the feedback of the game beforehand, but no real sense of choice was offered as part of the game as far as alternatives for assignments or projects, thereby possibly hindering the game to work as a trigger in line with FBM when it came to important game element of choice. As a result of the lack of choice, the highly skilled and highly motivated students may be benefiting more from the gameplay than others in the classroom who need a trigger to increase their subject area ability and/or motivation.

Goals and sense of purpose. Goals and purpose affect a gamer's cognition and behavior, as described in the literature review as well as in McGonigal's (2015) game theory. In other

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words, a sense of purpose experienced through a goal, or set of goals, is a crucial game element (McGonigal, 2011). McGonigal defined a goal, or set of goals, as specific tasks players work to achieve that provide players a sense of purpose (McGonigal, 2011). For example, for gamers, a "quest" creates and maintains focus and commitment toward the goal that matters most (McGonigal, 2015). In sum, humans want to feel a sense of accomplishment. This game element was described in the literature on gamification in education through a variety of ways. For example, Sheldon (2011) reversed traditional grading by having students work from an "F" with the goal of "A" by earning points to provide students a sense of purpose and a tangible goal or "quest" to work toward by the end of a term (as cited in Barata et al., 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of prompting a sense of purpose in an individual student will vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, the purpose of the games at the subject school site were described when interviewees were asked the question: "What is your perception of how to use games to improve student learning?" Participant responses provided common themes, including the use of games for a general teaching tool by 22% of interviewees, teambuilding by 11% of interviewees, vocabulary review by 22% of interviewees, and a study guide by 44% of interviewees. These reported goals may or may not act as a trigger in line with FBM and game theory as these purposes described by the participant teachers, and observed in the classroom during gameplay, may not give students a sense of quest or accomplishment (McGonigal, 2015), particularly if the game was viewed by students in the generalized sense of a mere teaching tool or as a team builder. The quest should feel like a set of goals to reach an ultimate goal (McGonigal, 2015). Contrary to the teacher participants' stated goals of their games, Sheldon's (2011) course

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was scaffolded through gamification so that the student, as a motivated student, devoted much time toward practice and, hence, their ability increases. Each level they moved up worked as a trigger to keep practicing, as they were now "hooked" and behavior became automated, the goal of any persuasive technology (Fogg, 2009). The games described by teacher participants and observed in the classroom lacked an element of quest and did not work as a trigger to motivate desired student behavior and ability as would be found in a game with a sense of purpose that enraptures a student.

Rules of the game. A gamer's mode of thinking and behavior detailed in the literature review as well as in McGonigal's (2015) text was prompted by *Rules of the Game*. In other words, rules are a vital part of the game experience (McGonigal, 2011). Limitations must be placed on how players can achieve their goals because "the rules push players to explore previously uncharted possibility spaces" (McGonigal, 2011, p. 21). In sum, rules, as McGonigal wrote, "unleash creativity and foster strategic thinking" (2011, p. 21). This game element was described in the literature on gamification of education in a variety of ways. For instance, one research team explained that class rules and expectations and clear instructions must be provided to students regarding gamified elements of the class and how they achieve their learning goals and objectives, yet this must not be in the traditional form of a syllabus (de Byl & Hooper, 2013). The course must be fully set up as a game, not just the title of the document altered.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of game rules and how each individual student experiences them will vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, the entire course was not gamified. Rather, the games were used as a teaching tool by 22% of interviewees, teambuilding by 11% of interviewees, vocabulary review by 22% of interviewees, and a study guide by 44% of interviewees. Moreover,

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in line with McGonigal's (2010, 2011, 2015) theory of rules of the game, parameters of the game need to feel fair to gamers. Teacher participants reported that if students perceived the game as unfair due to student groupings, many would disengage from the activity. For example, teacher participant Samantha, explained:

> Games that involve teamwork where they can work as a team. Games that are competitive where a team has a chance to compete with another team. And with the games it has to be fair. I have to be sure there's enough of each level; that the teams are equivalent or they won't participate because it isn't competitive and fair to them.

The teacher participant's observation concerning fairness revealed the importance of the rules of the game and that to trigger desired learning behavior, the students needed to perceive the game parameters as fair, including the team composition. As such, teacher participants commonly reported the need to form heterogeneous groups and this type of planning was observed in the classroom as it seemed that overall the teams were equally balanced based on skill level and extroverted personalities. This type of beforehand preparation of teams and the ensuing feeling of fairness over the rules of the game increased the likelihood of the game working as a trigger in line with FBM so that desired student motivation and ability elevated during play.

Feedback system. A gamer's behavior and cognition detailed in the literature review as well as in McGonigal's (2015) game theory becomes prompted by a system of feedback. In other words, feedback must be provided to keep players informed about goal status and how close they are to achieving their goal, or goals (McGonigal, 2011). McGonigal described this as gamers requiring constant and immediate feedback to serve as a promise that their goal is achievable, providing motivation to keep going (McGonigal, 2011). Part of the feedback system is also the idea that gamers seek "epic wins" or positive outcomes that often arise when least expected

(McGonigal, 2015). In sum, gamers feed on progress when trying to overcome obstacles and reach their goals. This game element was described in the literature on gamification in varying ways, but often took form through the use of leaderboards. For instance, one research team pointed out that leaderboards often provided immediate feedback to learners through avatars that progress on a scale with other class members' points anonymously displayed as well (Barata, Gama, Jorge, & Goncalves, 2014). Leaderboards provide real-time feedback and a tracking system to show players how close they are to achieving their course goal as well as where they stand compared to their peers.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of feedback and an individual student may vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, *Kahoot* (as played by 62% of the 13 teacher respondents who reported to use games, then or in the past) provided a leaderboard to reveal student progress compared to the rest of the class throughout the game. In fact, following each question, a leaderboard was displayed in front of the entire class that showed the top five players. At the end of the game, the top three players were displayed on the screen. Moreover, throughout the entire game, the researcher observed that students received individualized feedback on their screen from *Kahoot* that showed their standing compared to the rest of the class. The *Kahoot* leaderboard also let them know if they were on a correct answer streak. This information also showed on the whole class leaderboard. The realization of game status displayed on the leaderboard, both to the individual and entire class, may instantaneously trigger students to be motivated to utilize skills throughout the game. During observations the researcher noted, however, that some students were negatively affected by the leaderboard if they fell behind the rest of their peers during the game. Furthermore,

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the *Kahoot* leaderboard was merely relevant during the gameplay and moot once the game was over. An effective leaderboard would occur throughout the duration of the course. For example, teacher participant Ron indicated:

> Of the game-based programs I am using, one of them is called Freckle, and the students are competing against one another and their grade is based on how well they do against the other members of the class. So, they get to see where they are against other students in the class.

The type of leaderboard described by Ron could potentially work as a trigger in line with FBM throughout the duration of the course to trigger desired student motivation and/or subject area skills. On the other hand, a *Kahoot* leaderboard can work as a trigger for desired student behavior and/or ability throughout the duration of the gameplay and not throughout the duration of the course.

Connectedness. A gamer's way of behaving and thinking according to the literature review as well as in McGonigal's (2015) text was prompted by *Connectedness*. In other words, working together as a community in the same virtual space toward the same goals is an important game experience (McGonigal, 2011). McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal). In sum, when communities were formed among students in a course sharing the same goal, bonds were formed as students help each other. For instance, one research team described guilds that create a multiplayer environment. The authors described guilds as a group of students who work together, toward a common goal, but may or may not team up to reach the goal. Guilds were

similar to multiplayer games where players do not compete against each other but occupy the same virtual space (Barata et al., 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of guilds and how they impact individual students may vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, 11% of teacher participants explicitly reported using games for teambuilding, while many others, 62% of teachers utilizing games, reported forming teams to play games against one another. This type of community bonding during gameplay could potentially work as a trigger in line with FBM to increase student motivation and skills in the subject area. Moreover, the community bond built during the game could carry over into other aspects of the class throughout the duration of the course (Barata et al., 2017).

Power and strength. A gamer's way of thinking or acting detailed in the literature review as well as in McGonigal's (2015) game theory was prompted by *Strength*. In other words, people seek out strength when facing a challenge in life, or in a game, making power an important aspect of gameplay as players face many obstacles as they attempt to reach their goal, or goals (McGonigal, 2015). McGonigal (2015) asserted that gamers seek out "power-ups"—items that make their character stronger, more powerful, and faster. In sum, in an education setting, for a true game experience, students need to have access to "power-ups" to strengthen their character's play. For instance, some research teams posited using Experience Points (XP). Barata et al. (2015) defined XP as points awarded to students, typically enabling students to advance to the next level of the course once they achieve a certain number.

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of strength and power and an individual student may

vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, power-ups can trigger intense motivation and these were offered by teacher participants in the form of awarding winning individuals or teams with extra credit points. Of the teacher participants reporting to use games, then or in the past, 69% offered a reward, and of those nine teacher participants offering a reward, 31% offered extra credit or added points on an upcoming test. This type of incentive could work as a power-up and perhaps trigger desired student motivation and/or ability.

Challenge mindset. A gamer's cognition and behavior outlined in the literature review as well as in McGonigal's (2015) theoretical text on games was prompted by *Challenge Mindset*. In other words, "accepting the challenge to play" was an important game experience (McGonigal, 2015, p. 8). McGonigal (2015) explained this acceptance of challenge as a gamer's willingness to engage with obstacles, perceiving them as a challenge rather than a threat. McGonigal explained that gamers always play at the brink of their skill, risking falling off (McGonigal, 2011). In sum, this challenge mindset that risks failure could be adopted in the gamified classroom environment. For instance, one research team posited that optional quests can be added to courses so that challenging tasks are added to the course as optional, allowing students to earn higher points when the task is seen as a larger obstacle (Barata et al., 2017).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of optional quests that challenge students and how these will be perceived may vary student by student, but in conjunction with what was discovered during this research case study's interviews and classroom observations, the challenge mindset would be elucidated through a general sense of competition among peers and a desire to be a winner. All of the 13 teacher participants who reported using games, or using games in the past,

indicated that competition was a huge motivator for most students. This competitive challenge mindset could work as a trigger for desired student motivation and/or ability throughout the gameplay; however, once the game is over, the challenge mindset may cease and will not continue throughout the duration of the course except during actual gameplay (Barata et al., 2017).

Heroism. A gamer's way of thinking or acting described in the literature review as well as in McGonigal's (2015) work was prompted by *Heroism.* In other words, McGonigal (2015) explains, "In games, heroic stories abound" (p. 8). In games, heroic characters and their stories inspire and motivate players to try harder in their pursuits and to also become a better version of themselves (McGonigal, 2015). McGonigal described this as seeking a heroic story. In sum, students could see a better version of themselves through a fantastical persona they helped create and develop. For instance, one research team discussed avatars as a way to create a fantasy world and autonomy in a gamified classroom environment, allowing students to become heroes, friends, or foes in that world (de Byl & Hooper, 2013).

In line with FBM (Fogg, 2009), the three factors of behavior must be considered: motivation, ability, and trigger. The scenario of the effect of avatars or heroism on an individual student may vary, but in conjunction with what was discovered during this research case study's interviews and classroom observations, a student who is shy and moderately motivated and skilled may opt out of playing a game in class altogether if anonymity is not offered. All 13 of the teacher participants at the school site who reported using games now, or in the past, in their classroom, did not allow students to play games using an avatar or anonymously. For instance, during *Kahoot*, the researcher observed in the classroom that students were required to use their real names. The lack of anonymity when teacher participants utilized games in their classroom omitted heroism as

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a game element and thereby this aspect of gameplay did not work as a trigger for students to work harder and harder.

Summary

This chapter thoroughly detailed this research case study's sample population, its research methodologies, and the results and findings as analyzed through a theoretical framework that hinged on McGonigal's (2010, 2011, 2015) theoretical work on games and Fogg's Behavior Model (2009). This qualitative research case study sought to identify whether high school teachers utilized games in their classroom and, if so, how and for what purpose. For teachers who reported to not use games in the teaching methodologies, then the reasons for opting out were explored. The research questions were as follows:

1. How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?

4. How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?

    i. What elements of gaming add or detract from effective learning in the classroom?

    ii. What are the strategies and software programs that benefit student achievement and why?

5. What are teachers' perceptions toward using games to improve student skills and achievement?

The research questions were analyzed through the case study's data derived from teacher participant face-to-face interviews, classroom observations observing gameplay in the classroom, and archival data. The researcher then analyzed the collected data through a conceptual

framework lens that explored the elements of a game that incite intellectual curiosity and motivation. The research data elucidated that, in general and on the subject school site, games can have a positive effect on student motivation and behavior due largely to the game element tied to competition and power. These findings were reflected in both the teacher participant interviews and classroom observations while games were being played as the competitive spirit of the game shone through during gameplay in the classroom.

Utilizing games in classroom teaching methodologies can be considered a challenge for any teacher of any subject, particularly when most teachers are unaware of game theory that exists outside of the realm of education, and what makes a game a game and how to use elements to trigger desired learning behavior. However, teacher participants who use games, or used to use games in the class, reported that their use of games overall has a positive effect on learning and behavior in the classroom.

Chapter 5: Discussion and Conclusion

The goal of this case study was to supplement the current body of educational research to examine how rural, public high school educators feel toward gamification. Questions perused included investigating teachers who utilize gamification in a classroom setting and examining whether they consistently understand the what, how, and why of game elements, detailed in this study as eight data attributes that emerged from the research and data collection and analysis: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. Furthermore, for those who reported to not use games, the researcher collected and analyzed the reasons teachers reported for not using games. This particular chapter summarized and discussed the qualitative case study's results and findings, including an evaluation of the study's results in relation to the literature on gamification of the classroom and the study's limitations. Lastly, this chapter discussed the study's implications concerning the results for everyday teaching practices, policies, and theories as well as recommendations for further research on gamified school curriculum. All names presented in this study were pseudonyms to create anonymity and protect the identity of teacher participants.

Summary of the Results

This investigation was important in a rural high school setting because little research has been conducted in the K-12 arena, yet gamified curricula can potentially motivate learners by enriching the educational experience (Dicheva et al., 2014). This qualitative case study further adds to the body of research, attempting to fill a gap concerning the why, how, and for what purpose game elements trigger desired behavior (McMillan, 2012). The researcher triangulated qualitative data obtained in a high school environment, located on the West Coast, to accomplish

the goal of this case study. The findings of this study indicated that many of the participant teachers find games useful in teaching and learning, even if they do not currently use them in their classroom. However, teacher participants seemingly used games without knowledge of game elements. These game elements, following data collection and analysis, emerged as the study's eight data attributes: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. According to game designers and theorists, such as McGonigal (2010, 2011, 2015), these eight elements are what truly makes a game captivating for players.

Discussion of Results

The research questions created a thematic thread throughout this study that aligned, synthesized, and supported the choice methodologies and findings. As with optimal case study design, the research questions continued to evolve throughout the investigation prior to the data collection process, finally settling on the three questions and two sub-questions below. Creswell (2013) explained that case study research questions change during the conduction of the study as new information emerges. The finalized research questions were as follows:

1.   How do rural, public high school teachers, grades 9–12, utilize games in their classroom instruction methodologies and curricula?

2.   How do the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?

   i. What elements of gaming do teachers understand add or detract from effective learning in the classroom?

   ii. What are the strategies and software programs that benefit student achievement and why?

3.   What are teachers' perceptions toward using games to improve student skills and

         achievement?

The research questions created the sub-headers used to discuss the study's results in conjunction

with the eight data attributes, or game elements, that created the line of inquiry for this case study

research: meaningful choices and alternatives, goals and sense of purpose, rules of the game,

feedback system, connectedness, power and strength, challenge mindset, and heroism.

How high school teachers utilize games. The first research question, "How do rural,

public high school teachers, grades 9–12, utilize games in their classroom instruction

methodologies and curricula?" was examined in part from both the interview responses and

classroom observations.

Through digital technology. During face-to-face interviews, of the teachers who reported

to use games, then or in the past, only two indicated that they sometimes use non-digital games to

teach content. The digital aspect of the game may be projecting a portion of the game onto the

shared screen in the front of the classroom, while other teachers reported using fully-digital games

designed for educational purposes, such as *Kahoot*, *Quizziz*, *Freckle*, and so forth. During

classroom observations, the researcher observed students playing games, predominately *Kahoot*,

an online game that displays the quiz questions to the class through digital projection, but also

Quizziz, and a game of Bingo that was partially digitized through digital projection.

When observing a game of *Kahoot*, the researcher noted that to begin the game, students

used their devices to log onto the game using a code that was displayed on the shared screen. The

teachers either instructed their students to use their real names (no nick names), or the students

were already aware of this rule and the teacher did not have to tell them to use their real names. In

no classroom observation were students allowed to use anonymous screen names. This was

noteworthy as it related to one of the eight data attributes: heroism. One of the ways in which students experienced heroism, according to the research, was through the use of an avatar, creating anonymity for the player (McGonigal, 2015). According to McGonigal (2015), an avatar not only creates anonymity for the gamer, but it also allows the player to put on the face of a hero. In games, heroic characters and their stories inspire and motivate players to try harder in their pursuits and to also become a better version of themselves (McGonigal, 2015). For example, one research team in the body of literature on gamification described avatars as a way to create a fantasy world and autonomy in a gamified classroom environment, allowing students to become heroes, friends, or foes in that world (de Byl & Hooper, 2013). If students were required to use their real names during gameplay, then heroism, at least according to game theory, was omitted from play as observed in the classroom observations that were part of this study.

After they joined the game of *Kahoot*, students responded to the questions on their individual devices by selecting the appropriate shape and color. The actual multiple-choice options were only displayed on the shared screen, not on their individual devices. After each question, the teacher had to move to the next question, at which time the leaderboard was displayed so that students could see their class standing; at least the top five student standings were displayed. These top five students changed as the leaderboard shifted throughout the questions. Students could also see, as displayed on the shared screen, if a student was on an answer streak. As a non-participant observer, the researcher was able to be a bystander in the room, although was still considered part of the action in the classroom because, as Merriam and Tisdell (2016) emphasized, one cannot observe a classroom without having an impact on the students and the activity. The researcher noted that each time a Kahoot was observed, the students were fully engaged in the activity.

The researcher also observed students while playing *Quizziz*, an online game similar to *Kahoot*. As with *Kahoot*, the digital projector displays the game join code. The students were then asked to enter their real names (again, no anonymity was observed, and hence the data attribute of heroism was not observed). Once the game started, the only aspect of the game displayed on the shared screen was the leaderboard. The leaderboard displayed all student progress as they answered the questions on their individual devices. The questions were not displayed on the classroom screen. During *Quizziz*, the teacher did not do anything other than observe the gameplay and wait for the last student to finish to end the game. As a non-participant observer during *Quizziz*, the researcher ascertained that the students were engaged in the game, yet the room was not quite as lively, with the competition mostly displayed through the leaderboard, and with students moving through the questions at their own pace.

As a teaching tool. As far as the face-to-face interview data analyzed, varying responses were provided by the 13 teachers who reported using games, then or in the past, but common ways teacher respondents indicated they use games included implementing the games as a general teaching tool, as reported by 22% of interviewees. This response was also common during the follow-up interviews of the seven teachers who the researcher observed using games in their classroom. To explore what teachers meant by "teaching tool," the researcher examined the body of research on gamification and found that a teaching tool was synonymous with gamification. In other words, teachers utilized a method to teach subject material and this method was referred to as a "tool." For a case in point, Vassileva (2012), Kim and Lee (2013), and Denny (2013), examined the use of gamification as a teaching tool.

When analyzing the use of gamification as a teaching tool, the researcher explored the reasons for using a game in this way. Of the teachers who use games now, or in the past, 44%

reported that they used games to review for an upcoming summative assessment, which would be indicative of a teaching tool, although not labeled as such during the face-to-face interviews. These types of tests included math content as well as building content-specific vocabulary in the social science and language arts classroom. During the classroom observations when students were playing *Kahoot* and *Quizziz*, the content of the assessments were indeed math-based and vocabulary-based review.

When describing gamification as a teaching tool, the teachers explained that they used games because the students became engaged in the material during games. For instance, Rhonda, a math teacher, indicated, "I also see that it [a game] has to be engaging and incorporate things they like to do. They do like to use the computer. They like to use electronic devices like their phones. They love to use their phones." This teacher participant indicated that it was the use of technology that made the game fun and engaging. Another example would be from Samantha, a social science teacher, who explained, "I use BINGO where I put the definition on the smartboard and then they find it on the BINGO card and then they get prizes so it's a great vocabulary builder." The researcher observed Samantha's classroom during a game of BINGO. The room environment and tempo was very similar to when witnessing students playing *Kahoot*. The individualized competition seemed to fully engage students.

While teachers reported using gamification as a teaching tool, or preparatory tool, for a summative assessment, during the face-to-face interviews and classroom observations, no mention of the eight data attributes, or game elements—meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism—were mentioned during discussions of why the teachers utilized gamification for a teaching tool. This particular outcome of the study indicated that the theoretical

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models that undergird this investigation, and gameplay in general, were not taught to educators during professional development opportunities. Conversely, teachers were not afforded professional development opportunities centered on how to effectively use games as a teaching and learning tool to trigger desired behavior in the classroom.

As a teambuilder. Half of the teacher participants who were initially interviewed and reported using games, then or in the past, indicated that they oftentimes form groups when playing games in their classrooms. Of the teachers who reported to regularly use games, or used them in the past, two indicated that they use games for teambuilding purposes. For example, Cynthia, a language arts teacher, stated, "They work together in groups, they learn each other's names, they learn their strengths, and they learn to work together as a group." The two participant responses that indicated use of games for teambuilding connects to the data attribute, and game element, connectedness. According to the research on gamification and McGonigal (2015), connectedness alters a gamer's way of behaving and thinking. In the world of digital gaming, connectedness equates to working together as a community in the same virtual space toward the same goals (McGonigal, 2011). McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal).

When examining connectedness as it connected to the teacher face-to-face interviews and classroom observations, only two of the teacher participants, one of whom reported to no longer use games, implemented gameplay to help form classroom communities among students in their course. The use of games as a teambuilder relates to connectedness found through gaming; after all, with students sharing the same goal, bonds were formed as students help each other. For instance, one research team described guilds that create a multiplayer environment. The authors

described guilds as a group of students who work together toward a common goal, but may or may not team up to reach the goal. Guilds are similar to multiplayer games where players do not compete against each other, but occupy the same virtual space (Barata et al., 2017). During the classroom observations, digital games were played with students competing against each other individually, not in teams. The researcher was unable to witness teachers using games as it connects to the game element, and data attribute, connectedness, as the games observed were individualized games.

Offering incentives. During the face-to-face interviews and classroom observations, many of the teacher participants indicated that they offer incentives to the winners of games. The incentives were in the form of prizes and/or extra credit. In all, nearly half of the teachers initially interviewed (seven) indicated that they offer, or offered when they played games, a reward to the winner or winners. Specifically, four respondents reported rewarding students with a prize, such as candy, and three indicated that they reward winners with extra credit. For instance, Jose, a social studies teacher stated, "Then there's like a team prize with the firstplace team getting 10 extra points on their test, second place 8 points and then last, you owe me points. They like it. As you know, it doesn't take much to incentivize them." Amanda, a language arts teacher, explained, "There's candy involved and I always give it out for the top three. They'll do anything for food."

As detailed in the literature on gamification and the eight data attributes that led the inquiry behind this study—meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism—no mention was made of incentivizing gamers outside of the game parameters to play and continue playing. The incentive to gamers is the mere conquest. For instance, one of the eight data attributes that led the inquiry in this study was referred to as goals and a sense of purpose. For

gamers, a "quest" creates and maintains focus and commitment toward the goal that matters most (McGonigal, 2015). Along these same lines, when considering team sports, such as volleyball, the incentive to win typically occurs within the context of the game. Team members simply want to win and that is the incentive. During the classroom observations, two of the teacher respondents did not offer an incentive to the winning team. Based on what the researcher witnessed during gameplay, both incentivized and non-incentivized game structures, the students did not seem more or less engaged while playing.

To instill competition. Half of the teacher respondents (four) who reported to regularly use games during the initial face-to-face interviews, indicated that they seek to instill competitive behavior in their students to trigger desired behavior. Ron, a language arts special education teacher explained, "It's [a game] called Freckle; the students are competing against one another and their grade is based on how well they do against the other members of the class. So, they get to see where they are against other students in the class." The majority of teacher respondents indicated that they believe that competition among others is what makes a game fun and engaging.

As detailed in the literature on gamification and in the eight data attributes that led the inquiry behind this study, no mention was made of competition, except the type of competition found within oneself to continue toward a desired goal, found in the data attributes goals and sense of purpose or heroism. Self-determination researchers Deci and Ryan (2000) indicated that social contexts instilling individualized competition usurp autonomy and connectedness, resulting in low motivation and, hence, decreased outcomes (Deci & Ryan, 2000). In other words, to trigger desired behavior in the classroom setting, social contexts need to fulfill basic needs, while working to intrinsically motivate individuals (Deci & Ryan). The researchers pointed out that competition with others was an extrinsic motivator, whereas intrinsic motivators were found in game elements

identified interchangeably as data attributes as part of this study: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. These game elements worked symbiotically to catalyze growth and engagement naturally, unlike extrinsic motivation found in competition against other individuals. In sum, teacher participants used games as an extrinsic motivator, rather than as an intrinsic motivator, to trigger desired student behavior in their classroom.

Instructional practice alignment with game elements. The second interview question, "How the instructional practices of rural, public high school teachers, grades 9–12, align with game theory?" was addressed by the initial face-to-face interview test-piloted question that asked of all of the 18 teacher respondents, "Have you heard of game theory?" Most of the teacher participants had not heard of game theory prior to the researcher's inquiry, with 66% responding that they had not, 17% replying they had a cursory understanding of game theory, and 17% answering in the affirmative. After investigating whether teachers were familiar with game theory during the initial interview, teacher participants received a cursory debriefing of game elements and McGonigal's (2010, 2011, 2015) game theory and what incites people to play games obsessively to conquer them, including a description of the data attributes or game elements that guide this study's line of inquiry: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. The researcher mentioned some of the common game elements used in the educational field, such as leaderboards, badges, and avatars. However, most of the teachers were unfamiliar with these aspects of a game, leading to the conclusion for the second research question that most of the instructional practices of rural, public high school teachers, grades 9–12, do not align with

game theory and that most rural, public high school teachers, grades 9–12, are unaware of game elements and how they can work to trigger desired student behavior in the classroom.

During the seven follow-up interviews, the question was posed, "Can you explain the game and elements used during my visit?" The teacher respondents answered this question in a way similar to the preceding research questions. The teacher respondents addressed the game played during the classroom observation and the rules of that particular game, focusing on how students played the game, as if one were to write out instructions to a novice player or novice game facilitator. When the researcher pushed the question forward a bit by mentioning common elements of gameplay in layman terms, such as leaderboards, avatars, choice, and so forth, of the five teachers who had their students play *Kahoot* and the one teacher who had their students play *Quizziz* during the classroom observation, only one mentioned a leaderboard, which was referred to as a scoreboard, despite its prominence during both of these online games. This data led the researcher to conclude that although rural, public high school teachers may often utilize games in the classroom, they largely do not purposefully design their instructional games centered on game elements.

Game elements that positively affect learning. During the initial face-to-face interviews, the researcher debriefed teacher participants on game theory, cursorily describing the elements of a game, also referred to in this study as data attributes: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism. Following a brief overview of game theory, the researcher asked a question to target the first sub-question under research question two: "What elements of gaming add or detract from effective learning in the classroom?" The question used to target this sub-question was: "What elements of gaming add to effective learning in the classroom?" In response

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to this question, many of the teacher interviewees (50%) who reported to use games, or used them in the past, pointed to competitiveness as the most effective component of a game.

As mentioned above, competition with others was not an intrinsic behavioral trigger found in games. As previously stated, self-determination researchers Deci and Ryan (2000) posited instilling individualized competition within social contexts usurps autonomy and connectedness, often resulting in low motivating factors and learning outcomes (Deci & Ryan, 2000). The researcher explained to teacher participants that intrinsic competition, competition within oneself, can be found in games, according to game researchers through heroic quests, a challenge mindset, and defined goals and purpose (McGonigal, 2015).

Two teacher respondents did indicate that some of their students were motivated to do well due to competition with oneself; however, according to these two teacher respondents, those same students were intrinsically motivated on a regular basis without gameplay. For instance, Cynthia, a language arts teacher explained during her follow-up interview, "Most of my best students do well during games, but also work to do their best work all the time."

Based on the teacher respondents' responses during the follow-up interviews and initial interviews concerning game elements, the researcher was able to examine the first sub-question under research question two: "What elements of gaming add or detract from effective learning in the classroom?" by indicating that by and large, public high school teachers, grades 9–12, were unfamiliar with game elements; therefore, those who utilized games in the classroom may do so to tap into extrinsic motivation found through elements of competition against others within the social context of a school.

Game elements that detract from learning. For those teacher respondents during the initial face-to-face interviews reporting game elements that detract from effective learning,

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emerging themes included: when groups were ineffectively formed with no heterogeneity (31%), and when no clear learning goal was tied to the outcome of the game (15%). Both of these emerging themes connected to game elements. Forming heterogeneous grouping related to connectedness and rules of the game while stating a clear learning goal also tied to goals and sense of purpose.

Thirty-one percent of teacher respondents indicated that in order for games to be effective, the teacher must form heterogeneous groups. One of the teacher respondents indicated that this was the primary reason why he no longer plays games in his classroom. For instance, John, a language arts teacher, put forth, "I find it [team gameplay] good in the sense that it boosts student morale, but then I made the mistake of not grouping students well and you would see esteem issues. So I have to make sure that teams are well-stacked, a heterogeneous spread." John pointed out that for teams to be effective, he had to take the time to form heterogeneous groups or students would feel like the game was unfair: "I feel like I set up certain teams for failure. I try to sneak in a handicap so it's hard because then the other students get upset." The latter portion of John's proclamation concerning fairness connected to the game element, rules of the game, a vital part of the gamer's experience (McGonigal, 2011). According to game theory, limitations must be placed on how players can achieve their goals because "the rules push players to explore previously uncharted possibility spaces" (McGonigal, 2011, p. 21). Rules work as a motivating factor in games because, as McGonigal highlighted, rules intrinsically incentivize gamers to push boundaries. If gamers perceived the rules to be unfair, then intrinsic motivation was deflated and gameplay ceased. Teacher respondent John was, therefore, correctly concerned with ensuring that his groups were heterogeneous and, most importantly, equitable, ensuring a sense of fairness as students went about achieving their goals.

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In the context of game theory, connectedness was defined as working together as a community in the same virtual space toward the same goals (McGonigal, 2011). As previously indicated, McGonigal described this gaming experience found in multiplayer games, or online game communities, where gamers form allies: people who face similar obstacles, or at least relate to them, and who watch out for each other (McGonigal). In a classroom setting, heterogeneous groups can be complex in that the higher-level students often feel that they are carrying the weight of lower-level students, as indicated in John's comment about students getting upset if they perceived certain students as a "handicap." In a gamer's culture, as described by McGonigal, players work together to overcome obstacles. However, players have varying skill levels, and due to skill level, often occupy a separate virtual space. Only players with homogeneous skills occupy the same virtual space.

The other issue that teacher respondents, such as John, pointed out when it came to game elements detracting from learning was the teacher's omission of a learning goal tied to the game. A learning objective as the outcome of a game also connected to the game element, a sense of purpose. For gamers, a "quest" creates and maintains focus and commitment toward the goal that matters most (McGonigal, 2015). In an educational setting, a learning objective provides a quest much in the same way as a game quest, as long as students have buy-in when it comes to the objective. As John indicated, if a learning goal was not included as part of the purpose of the game, the game did not work to trigger desired student behavior and instead detracted from effective learning in the classroom. At the time of classroom observations, during gameplay, the researcher identified learning objectives posted. In several of the classrooms, the learning objective was for a lesson or unit and not necessarily for the game itself. However, the students

seemed to understand the goal and objective of the game based on the student engagement the researcher witnessed and noted.

During follow-up interviews, the seven interviewees were asked the question, "What elements of the games you used detracted from effective learning in the classroom?" Of the teacher respondents interviewed following the classroom observations, not one indicated that any element of a game detracted from effective learning in the classroom. Most expressed the high level of engagement that their students exhibit during games. For instance, Tina, a social studies teacher, expressed, "My kids just love it."

Games that advance student achievement. The second sub-question of the second interview question was: "What are the strategies and software programs that benefit student achievement and why?" This research sub-question was addressed during the initial interviews with the question: "What online games benefit student learning and why?" During the initial interviews, 62% of the teacher respondents who reported to use games regularly, or used to play games in the past, play the online game, *Kahoot*, in their classroom, 23% of the teacher respondents who reported to use online games regularly play the online game, *Jeopardy*, in their classroom, and 15% of the teacher respondents use online games regularly play other online games designed for learning. Specifically, Ron, a language arts special education teacher, and Rhonda, a math teacher, both reported using specific learning websites to help improve skills in their subject area.

This research question was also partially addressed through the archival data received from the subject school site. The researcher analyzed the archival information as to the overall use of technology in the classroom. This fourth data source enabled an additional lens to examine overall technology trends on the school campus. The school data indicated the percentages of overall

technology use. At the school site, students were one-to-one with devices, meaning that each

student had a technological device, namely a Dell Chromebook with Google applications and other

educational programs installed. Despite each student attending the school having a device in their

possession inside and outside of the classroom, the collected data suggested that students on the

school site only use their devices 30% of the time to perform classwork. This percentage indicated

that digital games were not commonly incorporated into classroom pedagogy.

Perception of increasing skills and achievement through games. The third interview

question, "What are teachers' perceptions toward using games to improve student skills and

achievement?" was targeted through varying interview questions about skills, assessment, and

behavior during both the initial interviews, classroom observations, and follow-up interviews.

Using games to improve student learning. During the initial interviews, the researcher

asked teacher respondents the question about learning skills, "What is your perception of how to

use games to improve student learning?" The 13 teacher participants who reported to use games,

then or in the past, commonly brought up the competition found in games as increasing skills, with

38% noting competitiveness among individuals and 62% highlighting competitiveness among

teams. As discussed previously, many of the teacher respondents highlighted competition as what

makes a game fun and engaging. As detailed in the literature on gamification and within this

study, the game elements and eight data attributes that led the inquiry behind this study—

meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback

system, connectedness, power and strength, challenge mindset, and heroism—make no mention of

competition, except the type of competition found within oneself to continue toward a desired

goal, found in the data attributes: challenge mindset, goals and sense of purpose, heroism, and so

forth. As mentioned, self-determination researchers Deci and Ryan (2000) indicated that social

contexts instilling individualized competition usurp autonomy and connectedness, resulting in low motivation and, hence, decreased outcomes (Deci & Ryan, 2000). The researchers pointed out that competition with others was an extrinsic motivator.

During follow-up interviews, the researcher asked the seven interviewees the question, "What is your perception of how the games you used improved student learning?" Five of the seven respondents referred to competition, while two of the seven noted engagement. For instance, Samantha, a social science teacher, indicated, "During the class you visited, one student is not motivated at all. But as soon as she heard there was a game, then she wanted to play." This type of student reaction to games can be tied to game theory. After all, McGonigal (2010, 2011) explained an astonishing statistic about how games motivate players to perform tasks in a virtual world, devoting a total of 5.93 million years in the *World of Warcraft*.

Games and student assessment. The inquiry from the initial interviews, "What is your perception of how to use games to increase student assessment?" led to a response of 23% of the 13 teacher participants reporting to use games, then or in the past, who were indifferent as to whether games allowed for effective checking for understanding (CFU), 15% indicated that games were somewhat effective for CFU, 31% stated that games were effective for CFU, and 31% suggested that games were ineffective for CFU. Reasons stated for effectiveness included the ability to use formative assessments in a gaming format to figure out what to reteach. For instance, Cynthia, a language arts teacher, explained: "Yes, because for example we were doing figurative language on it the other day and if there's one where a lot of them aren't getting it, we will go back and review those certain terms." Stated reasons for why games were ineffective for CFU included forming groups and finding it difficult to decipher who understood the material, and who needed more instruction and guidance.

During follow-up interviews, the researcher asked the seven interviewees the question, "What is your perception of how the games you used increased student assessment?" The teachers observed reported that they did feel that the games that the researcher observed in action allowed them to assess student learning. For example, Amanda, a language arts teacher, indicated, "I feel like the Kahoot was effective in assessing learning. The figurative language showed where a lot of them aren't getting it, so we will go back and review those certain terms." Amanda's response represented the typical response of the seven interviewees.

Games and student behavior. With regard to how games affect student behavior, the researcher asked teachers, "What is your perception of how to use games to improve student behavior?" Of the 13 teachers interviewed who reported using games, then or in the past, 56% reported that games positively affect behavior, 7% reported that games had a negative effect, 15% indicated that games have no effect on behavior, and 31% responded that games may or may not affect behavior, depending on the classroom student population as a whole and its overarching personality. Mixed responses were provided in response to this question with most of the interviewees indicating that games can wreak havoc on student behavior, depending on the grade level. For instance, Carmen, a social studies teacher, responded with:

> Only with the seniors it [games] improves student behavior because they seem to be checked out. But I would not use games with sophomores because they are very juvenile. They are less mature and they take the games less serious. They see it as an opportunity to act out and seek attention.

Overall, it appears that the 13 teacher participants who reported to use games, then or in the past, regularly utilize games to improve behavior, but it may depend on the student demographics.

During follow-up interviews, the researcher asked the seven interviewees the question, "What is your perception of how the games you used improved student behavior?" Two of the seven teachers who were observed using games reported that grade level affects whether they interject games into their curriculum, while the other five teachers reported that they regularly integrate games regardless of student demographics and feel satisfied with the overall effect on behavior.

Teachers reporting to not use games. The reasons for teachers opting out of games altogether were explored as part of the study's data collection and analysis. The researcher asked teacher respondents this question during the initial interviews: "Do you use games as part of your instruction?" Of the 18 teacher participants interviewed, over half, ten participants, responded with "No." When the researcher asked these teachers why, five of the ten participants reported that they previously used games. Four of these five indicated that they stopped using games despite positive findings. Reasons provided for not using games in the classroom were explored.

Lack of preparatory time. Of the teachers who reported not using games, 20% reported a lack of preparatory time (two of 10). Both of the teachers who indicated that they do not have time to design games for their class do not have a preparatory period because they have been assigned an extra class above a full load and receive additional compensation.

Grade level. Of the teachers who reported not using games, 40% of the teachers reported feeling that their grade level was not appropriate for games (four of 10). The grade level was both higher grades as well as lower grades. For instance, one social studies teacher indicated that seniors enjoy playing games and become more engaged, while another social studies teacher indicated that seniors feel that games are too juvenile.

Subject area. Of the teachers who reported not using games, 40% of teachers reported

trepidation over subject area appropriateness (four of 10). The teachers who pointed to subject

area felt that educational games were nonexistent in their field of study.

Summary of the Study's Results

The results and findings of this case study research were analyzed through a theoretical

framework that hinged on McGonigal's (2010, 2011, 2015) game design theory and Fogg's

Behavior Model (2009). This qualitative research case study was designed to identify whether

high school teachers utilize games in their classroom and, if so, how and for what purpose, as tied

to game elements, referred to interchangeably throughout this study as data attributes: meaningful

choices and alternatives, goals and sense of purpose, rules of the game, feedback system,

connectedness, power and strength, challenge mindset, and heroism. Furthermore, for teachers

who reported to not use games in the teaching methodologies, the researcher explored reasons for

opting out.

The researcher examined the research questions through the case study's data collection

and analysis derived from teacher participant face-to-face interviews, classroom observations,

observing gameplay in the classroom, and archival data provided by the school site. The data was

analyzed through a conceptual lens that explored elements of a game that incite intellectual

curiosity and motivation as detailed in the eight data attributes, or game elements: meaningful

choices and alternatives, goals and sense of purpose, rules of the game, feedback system,

connectedness, power and strength, challenge mindset, and heroism (McGonigal, 2010, 2011,

2015), in conjunction with Fogg's Behavior Model (FBM) (2009). The researcher applied the data

attributes to situations found in the educational realm in an attempt to create a practical guide for

future researchers.

The research data elucidated that, on the subject school site, games can have a positive effect on student motivation and behavior, but that teachers largely used games for extrinsic motivational purposes tied to competition in a social context, rather than tapping into the intrinsic motivational aspects found in games (Deci & Ryan, 2000). These findings were reflected in both the teacher participant interviews and classroom observations while games were being played, as the competitive spirit of the game shone through during gameplay in the classroom.

Utilizing games in classroom teaching methodologies can be considered a challenge for any teacher of any subject, particularly when most teachers are unaware of game theory that exists outside of the realm of education and what makes a game, a game, and how to use those elements to trigger desired learning behavior. However, teacher participants who use games, or used to use games in the class, reported that their use of games overall had a positive effect on learning and behavior in the classroom.

Discussion of the Study's Results and the Literature

Through the literature review, interviews, observations, and archival data, data attributes emerged that guided the line of inquiry throughout the study:

- Meaningful choices and alternatives: Choice makes a game, a game.

- Goals and sense of purpose: A sense of purpose and set of goals are needed in a game.

- Rules of the game: Rules are a vital part of the game experience.

- Feedback system: Constant feedback is needed in a game to keep players informed about goal status.

- Connectedness: Working together as a community toward the same goals is an important game experience.

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- Power and strength: People seek out strength when facing a challenge in a game, making power an important aspect of gameplay.

- Challenge mindset: Gamers are willing to engage with obstacles because they see them as a challenge, rather than a threat.

- Heroism: Heroic characters inspire and motivate players to try harder in their game pursuits.

The above data attributes evolved from terms derived from the literature review into deep analytical themes that the researcher used to analyze the collected data as far as how and why teachers utilize games in the classroom. The analytical themes were specific to the data collected during this research and were included in the discussion of the literature on gamification.

Meaningful choices and alternatives. During the face-to-face interviews and classroom observations, the notion derived from game theory of meaningful choices and alternatives was at the forefront of the researcher's mind. This attribute was part of the ongoing line of inquiry as an important aspect of gaming (McGonigal, 2011, 2015). The classroom observations and interviews revealed to the researcher that teacher participants were unaware of this game attribute as, based on the data collected, students were not afforded choice during gameplay. Instead, competition, an extrinsic motivator when used between groups or individuals, was utilized as an outcome of games. In the body of research, educational researchers likewise pointed to extrinsic motivators found in games. For instance, Hamari et al. (2014) pointed out that extrinsic motivators can undermine gamification and, in particular, pointed to choice as a vital intrinsic motivating force experienced through gameplay. However, the authors noted that oftentimes choice was a problematic game trait when it comes to gamifying the classroom because choice and alternatives were often not part of the educational realm when it comes to pedagogy. As observed during

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gameplay and based on the interview responses, it was evident that the teachers at the school site did not integrate choice and alternatives into gameplay. However, choice and alternatives could be afforded to students outside the realm of games, but that data was beyond the scope of this study.

Goals and sense of purpose. Goals and a sense of purpose were an important part of gameplay as noted in the body of research on gamification. For instance, Berkling and Thomas (2013) relied on Daniel Pink's (2009) Motivational Theory when examining gamification factors. The researchers noted that autonomy, mastery and purpose led to the achievement of goals during gameplay inside and outside of the classroom. During the face-to-face interviews, multiple teacher respondents pointed out that a learning goal must be tied to a game in order for learning to occur. While the teacher respondents may not have realized that they were highlighting a necessary game trait by pointing out that a learning objective was needed, they were indeed emphasizing the need for a goal and sense of purpose. At the time of classroom observations, the researcher also identified learning objectives posted. In several of the classrooms, the learning objective was for a lesson or unit and not necessarily for the game itself. However, the students seemed to understand the goal and objective of the game, based on student engagement witnessed and noted by the researcher.

Rules of the game. Rules were a vital part of the game experience as noted throughout the body of literature on gamification. When gamifying the classroom, the rules of the game can be surprisingly difficult to convey as detailed by educational researchers De Schutter and Abeele (2014). De Schutter and Abeele gamified an online course through a site called *Gamequest*. The results of their study were contradictory in that the students seemed to appreciate the game elements, but with mixed results. The researchers believed this was due to not all of the students thoroughly reading the game instructions. During the face-to-face interviews and the classroom

observations, rules did likewise surface as a problem. As previously noted, students often complained if they felt their groups were not created fairly. As far as the actual rules of the game when it came to the games observed, students appeared to be well-versed in playing the games, as the teacher did not review the rules prior to the start of the game.

Feedback system. Constant feedback in a game keeps players informed about goal status. This can be a problem, particularly in a school setting, when teachers have hundreds of students and cannot quickly provide feedback. According to the literature, some teachers were tackling this in myriad ways. For instance, Lister (2015) reviewed 19 sources from selected peer-reviewed articles on gamification. The results were provided for each game element, including those related to feedback systems. Lister's findings concluded that during a game: points increase motivation due to instant feedback; badges provide instant feedback, but were received with mixed results; and leaderboards provide instant feedback, but were received with mixed results. The body of literature indicated that badges, leaderboards, and point systems, as Lister highlighted, are ways in which teachers gamify classrooms and attempt to provide constant feedback; however, Xu (2012) asserted that most gamification experts agree that these types of feedback systems create extrinsic motivation, and that deeper research needs to be conducted on intrinsic motivators.

The issue with the feedback system was observed during face-to-face interviews and classroom observation. The participant teachers at the school site primarily used points and leaderboards (badges were not mentioned nor observed). As previously discussed, the leaderboard and point systems publicized in the classroom during gameplay evoked competition, which the teacher respondents highlighted as an important part of what makes a game fun and engaging. However, as detailed in the literature on gamification, self-determination researchers Deci and Ryan (2000) indicated that social contexts instilling individualized competition usurp autonomy

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and connectedness, resulting in low motivation and, hence, decreased outcomes (Deci & Ryan, 2000). As targeted in the body of research and as elucidated through this case study, more research is needed on how to trigger desired student behavior intrinsically through constant and immediate feedback.

Connectedness. The body of literature and this case study indicated that working together as a community toward the same goals was an important gamer experience. As far as the body of literature and connectedness, Li et al. (2014) stated that to-date gamified approaches missed out on the benefit of social learning due to gamified curriculum largely being set to a "single-player" mode. Conversely, Frost et al. (2015) claimed that connectedness increased in their gamified class, which was reported to be a new concept for students, so it may not be fully embraced by them right away. During the classroom observations, the games observed were all in "single-player" mode, as Li et al. described, rather than connectedness increasing as Frost et al. described. What this meant was that the notion of connectedness was not part of the gamified classroom. Instead, as previously mentioned, students competed against one another, rather than experiencing common goals. On the other hand, during the face-to-face interviews teacher participants did report using games for teambuilding, while others reported creating teams during gameplay. These latter approaches to gamifying the classroom will work to build connectedness, with players working simultaneously toward the same goals.

Power and strength. People seek out strength when facing a challenge in a game, making power an important aspect of gameplay. Power-ups are not part of traditional education, making this a difficult game element to incorporate in gamification of the classroom. Barata et al. (2015) detailed one such approach when the researchers examined a gamified curriculum of a university-level engineering course, which offered students experience points (XP) as they completed course

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modules and advanced to the next level of the course. The researchers concluded that whether the

XP points worked as a trigger to motivate students depended upon how intrinsically motivated

they were. Based on the face-to-face interviews and classroom observations, one way in which XP

points were offered to students was through extra credit as an incentive to the winning team. Extra

credit points could be perceived as a form of power and strength. However, one could also argue

that extra credit, like competition, is an extrinsic motivator, rather than intrinsic, as found through

the game element, power and strength.

       Challenge mindset. Gamers are willing to engage with obstacles because they see them as

a challenge, rather than a threat. In a school setting, as outlined in the body of research, obstacles

students face in school were often perceived as threats, rather than mere challenges. Educational

researchers Akpolat and Slany (2014) pointed to a scenario of a gamified classroom that evoked a

challenge mindset in students. They detailed that a curriculum topic was made part of a weekly

challenge and tied to game points, prompting the students to focus on the topic. The researchers

stressed that the gamified approach had a somewhat lasting effect on students (Akpolat & Slany).

As part of the challenge, the 50 students in the course were divided into five teams, competing for

a challenge cup awarded each week; however, competition was strictly between teams not within

teams in order to draw on multiple game elements, including connectedness and challenge

mindset. During the classroom observations and face-to-face interviews, teachers did not mention

games as a challenge to students. Instead, the focus was largely on fun and engagement derived

from individualized competition during the classroom observation. Although, as previously

mentioned, during the face-to-face interviews teacher participants did report creating teams during

gameplay. This latter approach to gamifying the classroom could work to build a challenge

mindset, with players working simultaneously toward the same goals.

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Heroism. Heroic characters inspire and motivate players to try harder in their game pursuits, as mentioned in the body of literature. For example, Barata et al. (2013) pointed to results of using AvatarWorld, noting that the use of avatars was embraced during the first weeks of the gamified classroom, but the students soon grew tired of it. As far as what was observed during the classroom observations and the insight gained from the face-to-face interviews, the teacher participants at the school site did not attempt the use of avatars, nor anonymity during gameplay, neglecting the game element of heroism altogether.

Summary of the discussion of the study's results and the literature. The body of literature revealed that teachers alter or supplement curriculum to include games or game elements, but no standardization exists (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). The lack of consistency among practitioners was indicative that a conceptual framework surrounding gamification would help explain why certain game characteristics could be used and for what specific purpose: what was the targeted behavior in the classroom that game theory could help catalyze (e.g., Dicheva et al., 2014; Looyestyn et al., 2017). Based on the need for a streamlined practicum to apply in the classroom, this case study research attempted to put together a guide for educators and researchers.

Limitations of the Study

The researcher established the parameters for the study as a single-site case study. The focus of this qualitative study was toward high school teachers of ninth graders through twelfth graders due the body of literature on the topic of gamification lacking in the K-12 education area and instead focusing nearly solely on higher education settings. As a qualitative research study, the researcher's intent was not to create a generalization, but to examine how teachers at the school

site gamify curriculum and to try to create a practical guide of the data attributes that guided the inquiry throughout this study.

This case study research's bounded area of study and timeframe limited its scope and findings because it was completed in approximately 16 weeks. As a result, the data gathered in the form of interviews, classroom observations, and archival data as related to teachers utilizing games in their classroom represented a short period of time—a mere snapshot. An additional limitation of this research design was the fact that the data collection instruments, both Appendix A and Appendix B, were not part of a prior study. The literature review elucidated that previous research studies focused on students, rather than teacher perspective. Therefore, the researcher specifically designed the pre-interview questions and post-interview questions for this study, and pilot-tested them, without the benefit of prior use and noted proven reliability that derives from repeated use in other research investigations. However, the observation was conducted utilizing a teacher observation checklist form derived from Merriam and Tisdell (2016).

Implication of the Results for Practice

This case study's conceptual framework relied on game theory derived from game designers and theorists and, in particular, the pioneering work of McGonigal (2010, 2011, 2015). In addition to McGonigal's game theory, Fogg's Behavior Model (2009) was utilized as a conceptual framework in this study. In other words, the researcher merged two distinct theories— game theory (McGonigal) and behavior theory (Fogg)—to investigate whether teachers deliberately and purposefully use games in their classroom to trigger desired student behavior and performance. Game theory explains how certain elements of a game intrinsically trigger players to want to keep playing the game, whereas behavior theory explores how certain events or procedures can trigger desired actions. By coalescing these two theories, the researcher hoped to analyze how

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varying game elements can work to intrinsically trigger desired student action to increase

engagement and performance in a classroom setting.

It was important to examine potential triggers to increase performance in school because

educational researchers in higher education and K-12 settings indicate that today's students

oftentimes suffer from boredom throughout the school day. Researchers claim that boredom may

be the result of a chasm between how children live immersed in the digital world during their

personal experiences versus their lived school experiences largely deprived of digital technology

(McGonigal, 2011; Zimbardo, 2010; Prensky 2012). Prensky (2012) claimed that the educational

realm has failed to keep up with the rest of the world, particularly with regard to technology. A

potential solution to bridge the chasm between student lived personal experience and student lived

school experience has been gamification of the classroom.

In this study, the researcher explored how teachers implement gamification and for what

purpose. In other words, the researcher probed whether teachers who utilized games were familiar

with the intrinsic motivators found in games. To examine the how and why, the researcher

focused on game elements discussed throughout the body of research on gamification of the

classroom and on games in general. These major intrinsic motivating elements found in a game, as

denoted by McGonigal (2010, 2011, 2015), evolved throughout the study to eventually morph into

eight data attributes. As elucidated through this case study, more research is needed on how to

trigger desired student behavior intrinsically by using these eight data attributes experienced

during gameplay: meaningful choices and alternatives, goals and sense of purpose, rules of the

game, feedback system, connectedness, power and strength, challenge mindset, and heroism.

The aspect of gamification concerning the eight data attributes was particularly relevant

due to the literature review revealing that no streamlined guide of how to use game elements to

intrinsically motivate students existed. Instead, the body of research showed that educational

researchers gamified their classroom through varying game elements, but the labeling of the

elements and how to implement the element in curriculum varied significantly. The variation was

a result of a lack of a practical guide to identify major game elements and how to tie these

elements to learning in the classroom. The study's results were consistent with the body of

research on gamification, revealing that the high school teacher participants at the subject school

site were unaware of game theory, such as McGonigal's (2010, 2011, 2015) theoretical framework

concerning games.

Moreover, the study results revealed that teacher participants were largely unaware, as

indicated in their responses during the face-to-face interviews and teaching practices during

gameplay, that motivational and behavior research that can aid in connecting gameplay with

successful practices in the classroom exists. In that regard, this case study will help future

researchers and educators to use the appropriate game element as a trigger in line with Fogg's

Behavior Model (FBM) (2009). The game element will work as a trigger to provoke desired

educational behavior and ability. Table 1 provided a framework that synthesized McGonigal's

game theory, FBM, and gamification educational research to date, to work as a practicum and

guide. Figure 2 below depicts the overall study methodologies.

Figure 2 Qualitative Research Methodologies

Provide teacher training on game theory. During classroom observations and face-to-face interviews, the data highlighted a lack of understanding concerning game theory among teacher participants. Teacher participants did not have knowledge about how to get the most out of games they play in their classroom to trigger effective learning. In particular, based on the results of the study, problems exist in the field of education as far as how to intrinsically motivate students through games—how to get students to want to perform well and achieve goals while playing

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games and simultaneously meet learning objectives and state standards. Instead, teachers who played games largely relied on extrinsic motivation found through competition with others (Deci & Ryan, 2000). As such, it would be beneficial for school districts to provide training to teachers on how certain elements of a game intrinsically motivate players to want to be the conqueror, to increase skills, and to solve problems (McGonigal, 2010). Gamers want to reach an end-goal and that desire comes from within. These elements of gaming could then be transposed into elements of learning: turning unit objectives into epic goals, turning grades into leaderboards, creating anonymity to incorporate heroism, working cooperatively toward the same goal, and so forth. Through deliberate training, teachers could become versed in game theory and potentially use their knowledge to intrinsically motivate students to perform and be engaged: to learn through gamification.

Provide teacher training on games and particular subject areas. The study's results revealed that teachers, particularly social science teachers of varying grade levels and teaching experience, tend to utilize games in the classroom to check for understanding of a particular skill or material or as a study guide prior to a summative assessment. It would be beneficial if teachers versed in game theory could then receive training in their specific academic subject area. The reasons why social science teachers are more apt to use games in the classroom could be explored as the subject of future research. However, in the interim, high school teachers in various academic disciplines would benefit from attending specific training in their field. In other words, science teachers, after receiving training in game theory, would benefit from receiving training on how to use games specifically in a science classroom. The incorporation of game elements to intrinsically motivate students and how to transpose this practice into curriculum guides will significantly vary depending on subject matter, as each has distinct material to cover and a distinct

classroom structure. As such, separate practical guides for varying academic subjects would benefit teachers and students.

Provide opportunities for collaboration of gameplay. Collaboration opportunities often work as an effective mode to provide teachers with new classroom strategies. School administrators would benefit teachers and students by providing these opportunities among teachers so that they can learn from each other, particularly if a teacher has undergone training in game theory and subject area training and has successfully gamified their classroom. The experienced teacher would provide mentorship for new teachers, or novice teachers, when it comes to gamification. Furthermore, school administrators would benefit teachers by enabling opportunities for observation of gameplay in action. As a researcher, classroom observations provided rich and invaluable insight into teaching practices. For teachers interested in gamification, witnessing other teachers in action as their students immerse in gameplay can provide powerful learning opportunities and insight.

Understand the benefits of games and advocate for gameplay. Part of the success of gamification of the classroom will arise when administrators, teachers, parents, and students have buy-in for how games could potentially revolutionize education. In order for this to occur, school districts would benefit school administrators, parents, teachers, and students by providing information about how the integration of gameplay could further educational endeavors and enhance the student lived experience while in school. Games have the potential to make learning fun and engaging (Prensky, 2012, Sheldon, 2012, McGonigal 2011). However, without the support of all parties involved, games will not be fully explored as a potential way to increase learning.

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Implication of the results for practice summation. The case study's results indicated that teacher participants did not have knowledge of game theory and what elements of a game intrinsically trigger certain behavior. Rather, during classroom observations and based on the face-to-face interview responses, games were utilized as extrinsic motivators during play in the classrooms. The implication of these findings indicated that school districts would benefit teachers and students by instigating gamification through a more formal process by letting all parties involved know of the general tenets of game theory and how games could work to trigger desired student performance. After providing an overview to build buy-in, game theory professional development would benefit school site administrators and teachers. Next, teachers would benefit from an opportunity afforded to attend specific subject area training, if available, and to collaborate within their departments and across academic disciplines to build a gamified curriculum using specific game elements to trigger desired student performance and skill-building. Figure 3 below depicts the study's implications of the results for practice.
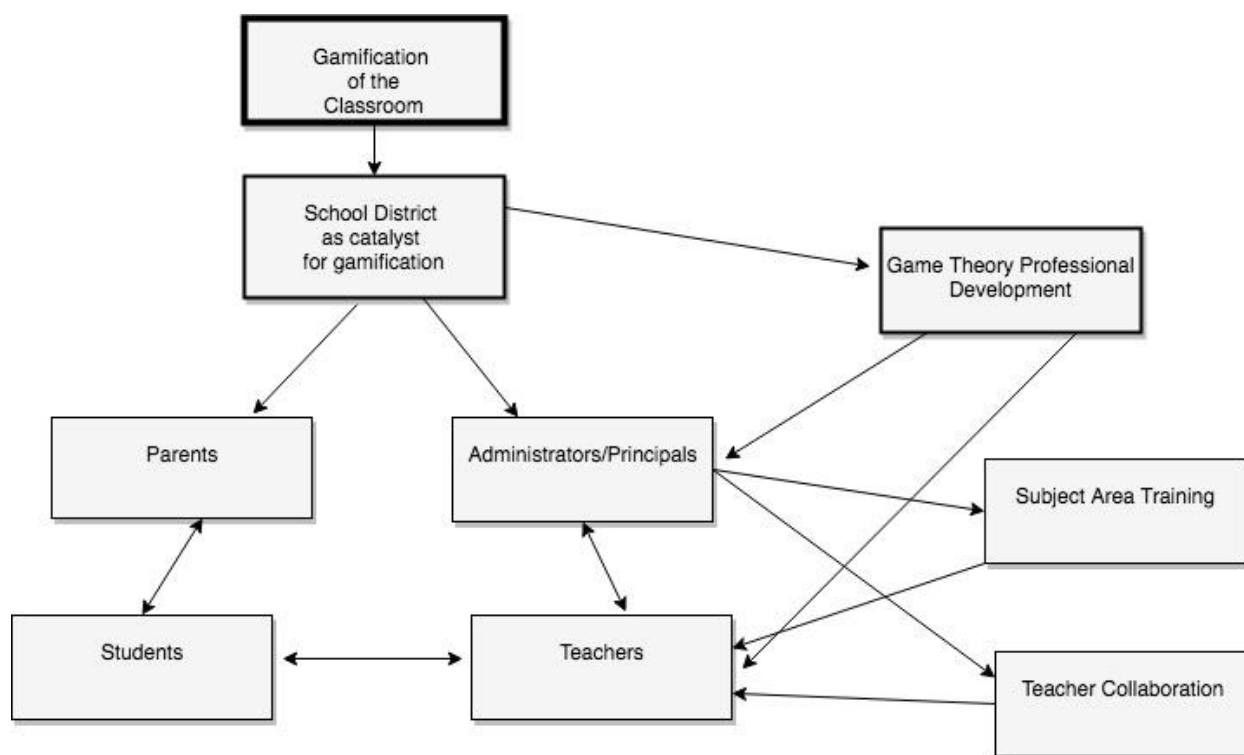
Figure 3 Implication of the Results for Practice

Recommendations for Further Research

The researcher recommends longitudinal studies of teacher use of games in the classroom for further research. Moreover, the literature review evidenced that research in the K-12 setting was needed as all students could potentially benefit from gamified curriculum, not merely four-year college students (e.g., Holman et al., 2013; Hentenryck & Coffrin, 2014; Landers & Callan, 2011). In fact, the settings in the literature review were four-year colleges and universities, not community colleges. Future studies should be conducted in the two-year college and technical training settings as well. By doing so, researchers may find additional support for the data results derived from this study. As this study considered how and why teachers use games in the high school setting, a longitudinal study and more studies in the K-12 setting and other high education settings could uncover specific strategies that connect games to effective learning that tie to game

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theory concepts. This case research study represented a mere snapshot in time, producing evidence of how and why teachers use games in a high school environment; a longitudinal study would likely produce more results and further evidence that a stream-lined practicum has been implemented, aiding teachers in using games more effectively in their classrooms.

While this case research study examined a sample population of high school teachers at a single site, what Creswell (2013) terms a "within-site study," future research should examine gamification in the classroom among other high school teachers in different geographical regions, middle school teachers, elementary school teachers, preschool teachers, and potentially private school teachers as well. By doing so, further research can be gleaned about how other teachers in the K-12 setting utilize games in their classroom instruction methodologies and curricula and perhaps more teachers will be able to take advantage of existing research, in particular, with regard to the effect each game element has on the human thought process and resultant behavior.

As targeted in the body of research and as elucidated through this case study, more research is needed on how to trigger desired student behavior intrinsically, as detailed in the eight data attributes, or game elements: meaningful choices and alternatives, goals and sense of purpose, rules of the game, feedback system, connectedness, power and strength, challenge mindset, and heroism.

Impact on the Researcher

The researcher will switch from third person voice as "the researcher" to first person in order to complete this section. I have a unique background as an educator who first started teaching at the community college level, after teaching for the first time during graduate school. When I first started this doctoral journey, I was a full-time community college teacher. After some years in the field, I realized that it was not a good fit for me and segued into a high school

environment. This unique career change caused me to see the world of education in a different way. I realized that students were by and large disengaged in the classroom, despite my trying my best to engage them through active learning strategies. Due to my interest in games, I decided to begin the journey of examining whether games in the classroom could transform education.

I began to research the literature and discovered a field that was new, exciting, and alive. My goal was to explore fairly unchartered territory and see where I ended up. After nearly four years of study and over a year of writing this dissertation, I feel as though I have no more answers than I did when I started out—only more questions. Perhaps questioning the use of games in the classroom was a good place to end up. I hope to one day begin a longitudinal study on gamification to gain more answers to the pending questions that loom over the field of gamification of the classroom.

Conclusion

This chapter provided a discussion of the resolution of the research questions as well as a discussion on the data attributes juxtaposed with the body of literature on gamification. The study's limitations, implications for practice, and recommendations for future research were also detailed. Although over one billion people play digital games worldwide for at least one hour per day (McGonigal, 2015), and collectively over three billion hours a week are spent on gaming (McGonigal, 2011), few classroom environments around the globe utilize game theory in their curricula (Prensky, 2012). In fact, as revealed by this case study, most people, including the teacher participants who were part of this study, were unfamiliar with game theory. While under half of the teacher participants reported to use games in their classrooms, few of the teachers were familiar with game theory and how to effectively utilize certain elements of a game to trigger desired behavior and ability in the classroom. The study revealed that when rural, public high

school teachers, grades 9–12, utilized games in their classroom instruction methodologies and curricula, they relied largely on competition as an extrinsic driver for increased engagement.

Moreover, the case study elucidated that rural, public high school teachers, grades 9–12, largely do not align their instructional practices with game theory, namely game elements. This may be due to a lack of streamlined theory and/or a lack of professional development in this area of knowledge. Yet, games engage people of all ages all over the world by fulfilling "genuine human needs that the real world is currently unable to satisfy" (McGonigal, 2011, p. 4). McGonigal (2011) emphasizes that game developers seek to satiate life fulfillment through their game designs and, in doing so, expertly motivate people to work extremely hard, facilitate collaboration at unimaginable levels, and inspire people to be gritty and resilient when facing obstacles. The study did, overall, reveal that the teacher participants had a mostly positive outlook toward games in the classroom that was not affected by years of experience or grade level, with social studies teachers reporting to use games more than other subject areas. However, it would be great if educators could use games to their fullest potential in the classroom.

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Appendix A: Questions for Initial Interview

1. What is your name?

2. What grade do you teach?

3. What subject/s do you teach?

4. How long have you been teaching?

5. How long at this school site?

6. How long in this district?

7. Do you use games as part of your instruction?

8. If not, why not? If so —Describe the kinds of games you use.

9. Have you heard of game theory?

10. If yes, what game elements do you incorporate?

11. Can you explain each in detail?

12. If no, explain a bit about wanting to be part of a team, leaderboards, quests, leveling up, and so forth.

13. If no—after explanation—do you incorporate any of these elements in your games?

14. What elements of gaming add to effective learning in the classroom?

15. What elements of gaming detract from effective learning in the classroom?

16. What is your perception of how to use games to improve student learning?

17. What is your perception of how to use games to increase student assessment?

18. What is your perception of how to use games to improve student behavior?

19. What online games benefit student learning and why?

20. Do you use any non-online games in the classroom?

21. Overall, please tell me what you think of using games in the classroom.

Appendix B: Questions for Post-Interview

You claim to have used games in your classroom methodologies and curriculum during my classroom observation. Please explain:

1. Which games were used during my visit?

2. Can you explain the game and elements used during my visit?

3. What is your perception of how the games you used improved student learning?

4. What is your perception of how the games you used increased student assessment?

5. What is your perception of how the games you used improved student behavior?

6. What elements of the games you used detracted from effective learning in the classroom?

7. Overall, please tell me what you think of how using games in the classroom went during my classroom observation.

Appendix C: Classroom Observation Checklist (Merriam and Tisdell, 2016)

1. *The physical setting*:

   o   What is the physical setting like?

   o   What is the context?

   o   What kinds of behavior is the setting designed for?

   o   How is space allocated?

   o   What objects, resources, technologies are in the setting?

2. *The participants* (describe who is in the scene):

   o   How many people?

   o   What are their roles?

   o   What brings these people together?

   o   Who is allowed here?

   o   Who is not here that you would expect to be here?

   o   What are the relevant characteristics of the participants?

   o   What are the ways in which people in this setting organize themselves?

3. *Activities and interactions*:

   o   What is going on?

   o   Is there a definable sequence of activities?

   o   How do the people interact with the activity and with one another?

   o   How are people and activities connected?

   o   What norms or rules structure the activities and interactions?

- When did the activity begin?

- How long does it last?

- Is it a typical activity, or unusual?

4. *Conversation*:

- What is the content of conversations in this setting?

- Who speaks to whom?

- Who listens?

- Quote directly, paraphrase, and summarize conversations, noting silences and non-verbal behavior to add meaning to the exchange.

5. *Subtle factors* (Less obvious but perhaps as important to the observation):

- Informal and unplanned activities

- Symbolic and connotative meanings of words

- Nonverbal communication such as dress and physical space

- Unobtrusive measures such as physical clues

- What does *not* happen if certain things ought to happen or are expected to happen (cited Patton, 2015, p. 379)?

6. *Your own behavior*:

- How is your role as a participant as observer affecting the scene?

- What do you say and do?

- What thoughts are you having?

Appendix D: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously- researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

Statement of academic integrity.

As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

Explanations:

What does "fraudulent" mean?

"Fraudulent" work is any material submitted for evaluation that is falsely or improperly presented as one's own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate's final work without full and complete documentation.

What is "unauthorized" assistance?

"Unauthorized assistance" refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:

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Statement of Original Work (Continued)

- Use of unauthorized notes or another's work during an online test

- Use of unauthorized notes or personal assistance in an online exam setting

- Inappropriate collaboration in preparation and/or completion of a project

- Unauthorized solicitation of professional resources for the completion of the work.

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University- Portland Academic Integrity Policy during the development and writing of this dissertation.

2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*

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Carrin L. Blyth

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Name (Typed)

11/20/2018

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  Date