Effects of the Implementation of a Video Game Curriculum on Attendance and Student Perceptions of Their Engagement

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Abstract

It is widely documented that engagement in the school community and attendance are critical factors in academic success for students. It is also widely documented that over the past decade gaming has exponentially increased in popularity around the world. These two facts have led some educators to wonder if incorporating gaming into the educational environment might increase engagement and attendance rates among students. This study was performed to examine how offering a structured gaming course to high school students would affect the perceptions of their engagement in school and how offering gaming in school would affect attendance rates as compared to non-gaming peers.

Two research questions were used in this mixed-methods study. The first question was qualitative and focused on student interviews regarding students' perceptions of how enrollment in the gaming course would affect their engagement in high school. The second research question was quantitative and addressed how enrollment in the gaming course might affect attendance rates. The quantitative question had two hypotheses designed for statistical testing.

The results of the qualitative portion of the study did show increased engagement among all students enrolled in the curriculum. Levels of engagement and how the students were engaged varied, but several themes did emerge. Quantitative results for two school years did demonstrate a statistically significant higher attendance rate among those students enrolled in the course, compared to their peers.

Dedication

This dissertation is dedicated to every "gamer" that had to endure the negativity that comes with being known as a "gamer." Gaming has provided me, and others like me, with extraordinary opportunities to excel in life. It is my hope that this research will highlight some of the many positive aspects of gaming.

I would like to dedicate this dissertation to my parents. Mom, thank you for showing me that no matter how hard life gets, we must keep moving forward. Dad, thanks for demonstrating to me that anything is possible, and showing me that hard work does pay off in the end. Most importantly, I want to thank you both for supporting my love for video games and encouraging me to follow my dreams.

Lastly, I would like to dedicate this work to my wife Connie, and my daughters Sydney and Makayla. They have all sacrificed much so that I could finish this work and complete my degree. Never once did they question my ability to complete this study, nor did they criticize me for the time it took away from them as they pursued their own dreams. I know it was worth the effort, but I also know that I could not have finished without their encouragement and their patience, particularly Connie who is always beside me when I want to try or do something crazy! I love you all very much!

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Chapter 1

Introduction

With the invention of the game *Tennis for Two* by physicist William Higinbotham in 1958, video games became a source of entertainment for people of all ages (Tretkoff, 2008). Following *Tennis for Two,* "*Lemonade Stand* was created in 1973 as a business simulation game and taught players basic economics" (Needleman, 2017, p. 2). In the game *Lemonade Stand,* students operated their own lemonade stand and worked to overcome variables related to weather, supply and demand, and price sensitivity to ensure the success of their stand. "*Oregon Trail* quickly followed in 1982 and had arguably the biggest impact on educational games" (Needleman, 2017, p. 2). Oregon Trail followed a family leaving St. Louis on the trail to Oregon in the wagon train era. Players purchased supplies, oxen, medicine, and food for the long trek through the Midwest and over the mountains. During the journey, players were faced with numerous obstacles that would determine if they were successful in their adventure. Hunger, snake bites, medical ailments, and river crossings were just a few examples of what players would encounter.

Oregon Trail utilizes what is referred to today as gamification. By "employing design techniques such as role-playing and narrative environment, gamification can transform a learning environment to a practice field where students can learn knowledge through performing authentic tasks" (Cheng, 2019, p. 9). While gamification is a useful tool in creating greater understanding of curriculum by students, it does very little to encourage students to have greater engagement in school or enhance attendance rates. The next evolution for video games in schools is using the games themselves to teach students real-world skills.

Video games have also been great sources of innovation by those who were not recognized for their inventiveness, until recently. Pioneers in the gaming industry such as Jerry Lawson, an African-American electronics engineer, created the video game cartridge for the Channel F gaming console in 1976. This video game console, "paved the way for systems such as the Atari 2600, Nintendo, Xbox and PlayStation" (Lawson, 2020). The researcher of this study was unaware of the substantial contribution that Mr. Lawson made to the gaming community until the recent series *High Score* appeared on the streaming service, Netflix. Mr. Lawson truly accelerated the pace in which video games were developed, and it is unfortunate that his contribution has gone unnoticed until recently.

Background

The focus of this study is a small alternative school with a population of 65 students and 10 staff members who are all dedicated to thinking "outside of the box". This school has utilized the *Gaming Concepts* curriculum to provide college and employment opportunities to students, specifically in acquisition of college scholarships for esports and career opportunities in STEAM related fields. The *Gaming Concepts* curriculum consists of 81 lesson plans that focus on the areas of social-emotional learning, college and careers, technical aspects, health, fitness, sleep, digital citizenship, engagement, and purposeful play. During the implementation of the course, anecdotal evidence began to show improvements in overall engagement in students enrolled in the *Gaming Concepts* curriculum, as well as increased attendance compared to their peers who were not enrolled in the curriculum. The *Gaming Concepts* curriculum has been implemented in multiple school districts throughout the United States. Through informal

conversation, these schools also appear to support the anecdotal claims that were witnessed in the initial school of implementation. There is a need to perform scientific research to confirm or deny the existence of any effect that the *Gaming Concepts* curriculum has on student attendance and engagement.

Statement of the Problem

Too little is known about the effect that structured video game curriculum may have on high school attendance rates and student engagement. Video game courses heretofore have been limited to design and structure of the video game and learning technical skills. However, the video games have had very little use in a structured school setting to address specific student concerns, especially in areas such as student attendance rates and student engagement.

Purpose of the Study

The purpose for this mixed-methods study was to examine what effect, if any, student participation in a structured video gaming curriculum had on high school student attendance and engagement.

Significance of the Study

The results of this study may further the understanding of the effects video game curriculum have on student attendance by analyzing student records and student engagement via first person interviews. Furthermore, the study may help educators implement and/or change current practices to increase engagement among identified student populations.

Delimitations

According to Lunenburg and Irby (2008), "Delimitations are self-imposed boundaries set by the researcher on the purpose and scope of the study" (p. 134). Due to the innovative nature of the *Gaming Concepts* curriculum and the pace at which curriculum is approved, the study is limited to one high school, located in the Midwest United States. Numerous schools across the world have adopted the curriculum, but insufficient archival data was available for inclusion in this study. Student interviews were conducted with graduates and current enrollees of the *Gaming Concepts* curriculum.

Assumptions

Student feedback during the interview process was assumed to be given with integrity and honesty. Additionally, it was assumed that all attendance data provided by the school district involved in the study were truthful and without manipulation.

Research Questions

RQ1. What are the perceptions of high school students enrolled in a structured video game curriculum regarding their engagement in the overall high school experience?

RQ2. To what extent is there a difference in attendance between high school students enrolled in a structured video game curriculum and high school students not enrolled in a structured video game curriculum?

Definition of Terms

Cutscene. "Cinematic animation used to bridge levels and create motivation to drive a story forward" (Venturebeat, 2020. para.3).

Gamification. **"**Employing design techniques such as role-playing and narrative environment, gamification can transform a learning environment to a practice field where students can learn knowledge through performing authentic tasks" (Cheng, 2019. p. 9).

MMORPG. "A type of digital game that takes place in a virtual world where large numbers of players develop their characters in a role-playing environment. One of the features that distinguish mmorpgs from traditional console-based role-playing games is that mmorpg game play is essentially based on alliances of players. This type of game requires collaboration, strategizing, planning and interacting with objects and resources" (Go, 2016, p.204).

MOBA (Multi-player Online Battle Arena). **"**These games feature two teams of 5 players facing off against each other. The goal is usually to take over the other team's base. Each player controls a single unit on the field of battle and that unit can be any one of innumerable characters with unique abilities and moves. By communicating with their team players can engage in complex strategies in order to win the game" (Anderton, 2017. para. 2).

Speedrun. Completing a video game in as short amount as time as possible. "Finding a faster way to accomplish goals, a better route, a more efficient method of movement" (Muncy, 2017. para. 11).

Organization of the Study

Chapter 1 of this study provides an explanation of the problem and defines the scope and context of the study. Chapter 2 provides a review of how video games have developed from inception to the year 2020. Chapter 2 also explores extra-curricular participation and its effect on attendance and engagement, as well as individual student

behavior and the impact those behaviors can have on their attendance and engagement. Chapter 3 is the analysis of the methodology used to conduct the study and the specific tests used to measure the data against the research questions. Chapter 4 documents the results of the tests performed in chapter three. Chapter 5 is the analysis and summary of the study. Additionally, chapter 5 provides recommendations for continued research.

Chapter 2

Review of the Literature

Introduction

Few studies have been performed to determine a link between video game play in school and student outcomes. It is important to provide some background regarding video games, the evolution of those games, and the state of the esports industry in society. It is also important to point out that the timelines, evolution, and the esports industry, can be perceived differently by casual observers and people with a great depth of knowledge on these topics. Each person's perception of how esports and the video game industry evolved will be different. The following information in the History of Gaming and Esports section is the author's experience in gaming and how esports evolved. The dates and facts are accurate, but some may disagree with the effect that each event had on gaming or esports in general. This section is created to help administrators and other researchers, new to the topic of esports and gaming curriculum in schools, gain a greater understanding of the current state of esports in after school programs and in-school curriculum.

History of Gaming and Esports

Arguably the first successful home video game console for mass production, the Atari 2600, was introduced in October of 1977, for $199. According to Cowen (2020) on Lifewire.com the 2600 was released with the following options: "Main Console Unit, two joysticks controllers, two paddle controllers, the video game title *Combat*, and the necessary connectors to provide video and sound through the home television" (Cowen, 2020, para. 3). Lupton (2018) provided the following details in an article featured on Funstockretro:

> The Atari 2600 became the best-selling Christmas gift in North America in 1979 and brought home arcade classic *Space Invaders* in 1980. By 1982, the Atari 2600 had sold 10 million units and 7 million copies of *Pac Man* alone, its most popular game. The Atari 2600 was also leased out to companies like Sears which used it for their Tele-Games consoles. (para. 1)

A simple game, the basics of *Pac Man* could be taught in a matter of minutes, while offering players hours of continuous gameplay. The controller for the Atari 2600 was a joystick with one button, but *Pac Man* only required the use of the joystick. The premise of *Pac Man* was to navigate a map, while consuming "dots" and avoiding ghosts that would eliminate *Pac Man*, causing the player to lose one of their lives. As the player progressed through the game, the maps become more complex and the ghosts increased in speed, making it more difficult to consume the "dots."

A different style of game, "*Asteroids*, was released in 1981 for the Atari 2600" (Atari Age, n.d. para. 3). *Asteroids* involved thrust movements for the controller, 360-degree rotation, and use of the button to destroy oncoming asteroids. Players not only had to account for where asteroids were during a specific moment but were forced to plan for what direction the asteroids were moving to avoid collision with their space craft. Additionally, some asteroids would break up into smaller asteroids, creating further hazards to the player.

Both *Pac Man* and *Asteroids* were played by millions of people and were successful releases. The learning that could be gleaned from each game was entirely different. One, *Pac Man*, was about quick reaction time and some initial planning. *Asteroids* had the player more focused on the long strategy; which asteroids to destroy

first, how much thrust was needed, and would the ship be able to slow down before collision with the asteroid?

While esports and competitive online gaming were only a fantasy at the time of the corner arcade and the Atari 2600, there was considerable competition to be the best. Players would take great pride in placing their initials in the "top score" screen. Many players would find it unacceptable to not only be the "top" score, but every score listed beneath. Exceptional players would occupy all 10 top spots and would eagerly watch to see who would knock one of their scores off the list, only to retake it as soon as the previous player left, thus setting the stage for a competitive esports scene decades into the future.

On October 18, 1985, the Nintendo Entertainment System was released in New York City (Kohler, 2010, para. 1). The Nintendo Entertainment System for the remainder of this document will be referred to as "NES." A full listing of the initial 17 games will not be provided, but several notable games available at the time of release were: *Duck Hunt*, *Pinball*, *Excitebike*, and *Donkey Kong Math Jr* (Kohler, 2010, par. 10). While the previously mentioned games were important to establishing the NES in the United States, they were not the most influential. The most influential games will be detailed later in this section, but first it is important to discuss the difference in the mechanics of the NES and how it compares to the Atari 2600 system.

The NES was initially shipped as a package which included controllers, A/V cables, NES Control Deck, and adapter for $199 (List, n.d., para. 1). While every component listed is necessary for the deployment of this gaming system, it is the

controller that deserves the focus, specifically as it compares to the Atari 2600 controller and the evolution of gaming.

As previously mentioned, the Atari 2600 had a simple controller; a joystick and one button. The NES controller was equipped with; a four-way directional pad, two action buttons labeled "A" and "B," a "start" button, and a "select" button. This controller provided the user with significantly more options than the Atari 2600 joystick. Players could now move more accurately in a specific direction, assign various actions to different buttons, and in some cases, pause the game. More options on the controller provided more options in the game and greater opportunity to think about outcomes.

In 1988 Nintendo released the "action set," which sold for $149 and included everything in the package stated previously, with three exceptions. The "action set" included the "Zapper," the game *Duck Hunt*, and *Super Mario Brothers* (List of Nintendo, n.d., para. 3). The "Zapper" and *Duck Hunt* were innovative, but *Super Mario Brothers* is what propelled Nintendo to the front of home video gaming.

Super Mario Brothers was a side scrolling, two-dimensional game, with eight worlds. Each world contained a subset of areas which had to be cleared. The objective was for Mario, or his brother Luigi, to save princess Toadstool, who had been kidnapped by the Koopa King. The evolution from *Pac Man* to *Super Mario Brothers* was dramatic. In *Super Mario Brothers*, players were able to jump, run, or sprint to reach objectives. Timing was critical in this game, enhancing the need for critical thinking and planning, as some objectives or special events could not be completed if exact timings were not met. Further highlighting the appeal of *Super Mario Brothers* was the title's relevance in today's gaming culture. Streamers and competitive gamers have begun a relatively new

trend of conducting speedruns through video games. A speedrun is defined as "a session or instance of play in which the goal is to finish the game or level, or meet another game-play objective, as quickly as possible" (Muncy, 2017).

Contrasting the fast-paced game *Super Mario Brothers* was *The Legend of Zelda*, which was released for NES on February 21, 1986 (Webster, 2016). *The Legend of Zelda* was an adventure game in which players were tasked with finding unique items, while navigating complex dungeons to defeat Ganon and rescue Princess Zelda. The protagonist, Link, would search the world for dungeons and discover a unique end boss, who when defeated, would supply a piece of the Tri-Force to Link. The directional pad was utilized to navigate the map and perform movement during combat with the various enemies. Controller buttons were used to equip and use items such as: boomerangs, candles, and swords. *The Legend of Zelda* was created in a much different style of *Super Mario Brothers*, which highlights the diversity of learning that could be attained from these two games. Quick reaction time in *Super Mario Brothers* as opposed to the in-depth critical thinking required to complete *The Legend of Zelda*.

Numerous iterations of Nintendo systems have been developed and sold since the original NES in 1985. The purpose of this literature review is to provide some background into how gaming evolved to the point of offering gaming curriculum during school and esports for after school programming. It is not necessary to describe every console, game, or computer system for the reader to understand the effects that gaming may have on student outcomes. During the 1990s and early 2000s multiple consoles evolved along-side one another, as did computer games. The following section will

describe the evolution of those consoles into 2020. An additional section will highlight computer gaming and the evolution of esports from the 1990s to its current state.

According to the PlayStation website (2020):

> When PlayStation launched in Japan in 1994 (and the rest of the world in 1995), it redefined home console gaming. PlayStation games were the first to be released on CD and boasted advanced 3D polygon graphics and the ability to save your games with a removable 128k memory card. Within a decade, PlayStation became the first games console in history to sell more than 100 million units worldwide and, during its entire lifespan, had almost 8,000 games available to play. (para.1)

Sony, the owner, and producer of PlayStation had created a gaming system that was revolutionary and long lasting. Games being released on CD, removable memory cards, and the improved graphics pushed the technology for that time, providing an immersive experience for all gamers. Additionally, the controller that was designed for the PlayStation was also very technical, being equipped with 14 buttons, demonstrating a stark contrast to previous iterations of home gaming entertainment systems. Later versions of the controller would include 16 buttons and two analog joysticks, adding potential for different movements and varying gameplay.

Games being released on CD also allowed the addition of movie cutscenes into games. Cutscenes did exist on previous systems, but these were typically animated. PlayStation game creators utilized actors and created movie clips within games to create a story driven narrative during gameplay. Players were now required to make decisions that would affect the outcome of their game, which was different than the memorization

that occurred in prior systems. With nearly 8,000 games available, it is impossible to compare the various genres or narrow the games to two specific games to contrast the learning that might occur from these titles. As consoles evolved alongside the computer gaming scene, many games became available for multiple systems. Therefore, writing in the remainder of this section games will be discussed inclusive, or free from referencing a specific system. However, there is one additional console that should be mentioned, prior to delving into computer gaming and the further evolution of esports as it relates to students.

"On November 14, 2001, the Times Square branch of Toys 'R' Us played host to the official launch of the Xbox, with Bill Gates dropping by to kick off his company's grand experiment in gaming" (Marshall, 2020, para. 3). After years of focusing on the computer programming and operating system side of technology, Microsoft introduced their version of the home gaming entertainment system, the Xbox. Alongside the launch of the Xbox, Microsoft released the game *Halo*, which was exclusively available on the Xbox. *Halo* deserves to be discussed, due to the relevance that this series continues to maintain in gaming today. According to Steve Templeton, "there have been 11 different *Halo* games introduced since the inception of the series in 2001" (Templeton, 2019, para. 5). *Halo* has spanned a generation of gamers, allowing parents who played in their teens, to now play with their own children. This not only highlights the value of the gameplay but shows the importance of the social aspect that many students are looking for while they are participating in their gameplay experience. Longevity in the *Halo* series has also provided an opportunity for students who grew up playing the game, to become a part of

the game. Careers in the gaming field are limitless and will be discussed in moderate detail throughout this study.

As with the PlayStation, the Xbox has had numerous iterations since coming to the market in 2001. Again, thousands of gaming titles have been available to gamers and students over that same time period. The purpose for mentioning the various consoles is to guide the reader through a brief history of console gaming, while explaining the intricacies that have propelled gaming and esports into the industry it has become today. The next and final step in the timeline is to discuss computer gaming, its evolution along-side console gaming, and the birth of esports.

As mentioned in the introduction to this study, computer games have been utilized in schools, and to a smaller extent in homes, since the 1970s. Home computer gaming became more affordable and more easily navigable for the end user in the late 1980s and early 1990s, finally culminating with the products that are available today.

Esports, or competitive gaming had its beginnings in the form of Local Area Network parties, also known as LAN parties. A LAN party is gathering a group of gamers together in the same location and physically connecting computers together to form a group of computers. Gamers play competitively with or against one another while participating in a LAN party. Writer Patrick Cowles (2014) in an article featured on Gamecrate.com, provides a list of five LAN party games that he felt were among the most popular in the late 1990s:

- *Serious Sam*
- *Half-Life 2 Deathmatch*
- *Counter-Strike 1.6*

- *Baldur's Gate 2*
- *EverQuest*

Several of the games, *Serious Sam*, *Half-Life 2 Deathmatch*, and *Counter-Strike 1.6* were first person combat games. The remaining two games, *Baldur's Gate 2* and *EverQuest* were role-playing adventure games in which teams of players would explore dungeons and worlds to complete quests. As voice chat was not readily available, proficiency and accuracy with the keyboard were of paramount importance for communication and completion of these games. These early home computing games were the first to introduce teamwork and removed the single-player aspect that had been evident in the gaming industry until this era. Lastly, on the topic of LAN parties, many subsequent versions of these titles are still in existence and played competitively, namely among them, *Counter-Strike Global Offensive*, or *CSGO*. In 2019 *CSGO* awarded 21,000,000 in prize pool money to the various winners of its tournaments, which was the third highest amount on the list of prize money awarded by a game in that year (Hitt 2019, para. 6).

Near the end of the 1990s gaming and esports began to transition into online competition over the internet and would continue to evolve into the experience that is available to new and traditional gamers today. This shift to online gaming found its beginning in the nation of South Korea with a game called *Starcraft* and its expansion *Starcraft Brood War*, released by Blizzard Entertainment.

> *Starcraft* sold 120,000 copies in South Korea in 1998, more than one million in 1999, and 2.5 million over the next four years, as a virtuous circle took hold: The spread of broadband propelled *Starcraft* sales, and *Starcraft* sales propelled the spread of broadband. (Lindbergh, 2019, para. 32)

Technology advances in South Korea and the gameplay of *Starcraft* had created the perfect storm for esports. "Esports became one of the major activities among youth in their teens and twenties; the live broadcasting of competitions on cable networks has expedited the growth of online games" (Jin, 2010, pg. 13, para. 3). A gaming culture and a viable esports model began to form in South Korea and spread into the United States. According to David O'Keefe in Esports Observer, many South Korean players were able to secure sponsors and garner huge numbers of followers:

> In the early 2000s professional *Brood War* teams in South Korea were attracting sponsorships from the likes of Samsung, along with telecommunications giants like SK Telecom. Ongamenet and MBCGame broadcast their tournaments to millions of televisions and hosted finals in front of tens of thousands of fans. One of the game's earliest superstars, Lim "Boxer" Yo-hwan, is reputed to have had a fan club consisting of more than 600,000 members. (2018, para. 12)

Evolution from console and LAN parties had removed the need for competitors to meet face to face. It was now a simple task of logging in to *Starcraft*, queueing up, and being matched with an opponent. *Starcraft* has (the game is over twenty years old, but is still played across the globe in the original format, and has been re-released by Blizzard as a "remastered version") some unique features that should be discussed in the overall strategy of learning from esports and gaming in general.

In *Starcraft*, players have a choice of three different races to choose from when entering the competition. Typically, players become proficient on a competitive basis as Terran, Zerg, or Protoss, each having a unique set of structures, units and play styles. On the competitive *Starcraft* circuit, players will most likely know which of the three races

their opponent is going to use during a tournament. What the players will not know, is what strategy their opponent will choose during the game. Unlike other games which have been discussed in the research, every strategy could be available to both the player and their opponent. Players now had to prepare for everything that could happen, however unlikely. This is a departure from earlier gaming in that, the computer program or environment did not change. In most cases the player could memorize the computer actions and simply revise the strategy if the previous strategy failed. Now the strategy is constantly evolving and changing, often within seconds of the game beginning.

Many other consoles and games brought esports and competition into homes during the late 1990s and early 2000s. These will be mentioned in this section to bring awareness to the reader and keep consistent with the timeline. Sports games such as *Madden Football, NBA 2K*, *FIFA*, and *NHL* began to enter the competitive scene, albeit mostly in person and not across the internet. The game series *Command and Conquer* spawned numerous sequels which are still utilized in current day competitions, further demonstrating that each iteration pushes the boundaries of technology and increases the amount of skill required to achieve elite status.

Online gaming, and the learning that might be associated with it, reached a new level in 2004. In an article on Gaminscan.com, Stewart (2020) explained:

> When *World of Warcraft* first launched in 2004, following the release of the highly acclaimed *Warcraft III – The Frozen Throne*, it essentially brought the MMORPG genre into the mainstream spotlight. Sure, it wasn't the first MMORPG, but in true Blizzard fashion, they took an existing thing and then packaged and marketed it brilliantly. (para. 1)

Massively multi-player online role-playing game, or MMORPG is exactly what it sounds like. A large open world in which players can explore, interact with nonplayer characters or NPC's, and engage socially with other players in the game. At one point, *World of Warcraft* claimed to have 12,000,000 paid subscribers (World, 2019, para. 25). Subscribers could pay a fee monthly, quarterly, or semi-annually. Monthly subscribers paid a $15 per month fee and discounts were given for longer subscription times.

World of Warcraft is a quest-based game that offers some open world PvP interactions if players choose to participate. Questing in *World of Warcraft* involved interaction with NPC's reading copious amounts of text. The reading opportunities for young and middle-age learners are tremendous. The researcher of this study spoke with Dr. Stephen King of the Kansas State Department of Education during a past visit and he shared this, "I taught my daughter how to read while playing *World of Warcraft*" (February, 2017). This is further evidenced by a study done at Boise State University in Idaho. This study was performed to promote better understanding of qualitative research methods and collaboration among the participants. "Online collaboration was deemed as a merit and students opted to engage primarily in real time online interaction rather than through asynchronous discussion throughout the summer innovative practices course" (Snelson, C., Wertz, C. I., Onstott, K., & Bader, J. 2017, p. 1448). The promotion of collaboration and teamwork not only made the game more enjoyable, but also fulfilled the social-emotional need for cooperation and interaction with other players. *World of Warcraft* continues to release new expansions, and while it does not directly apply to the esports and competitive gaming conversation, it is relevant to the development of gaming culture as it exists, therefore making it relevant to be added to this literature review.

Esports and gaming continued to evolve into the late 2000s and early 2010s with the introduction of new styles games; multi-player online battle arena (MOBA) and the battle royale genre soared to the fore-front. Players were now able to win huge cash prizes, not only for playing, but by streaming their content to services such as Twitch and YouTube.

Before discussing the genres of battle arena and MOBA titles, it is important to mention one iteration of console that came onto the gaming scene on November 19, 2006, The Nintendo Wii (Sison, 2016, para. 1). The Wii is important to gaming and its relation to health and education, because it is the first console that required some form of physical activity from the player. *Wii Sports* was one title that was typically packaged with the console at the time of purchase and came with a host of games including; bowling, tennis, boxing and others. Players, in most cases, had to leave their seats and move around, if only for a short period of time. Opinions vary as to the efficacy of the Wii on overall health of those who played on the Wii console, never-the-less, the Wii belongs in the discussion of the evolution of gaming, simply because of the technology that was used to implement a more engaging experience for gamers, both casual and experienced.

Having discussed the Wii, the timeline continues with the introduction of MOBA, followed shortly by the battle royale. The two most well-known MOBAs are *Dota 2*, which was published by Valve in 2013 (Pinkerton, 2019, para. 19), and *League of Legends* (Lol), which was released by Riot Games in 2009 (Gamespot, 2020). While *Dota 2* has a very interesting back story, it is not necessary to cover those details to demonstrate the value that *Dota 2* plays in the evolution of gaming, education, and career opportunities.

MOBAs, such as *Dota 2* and *LoL* are 5v5, real time games with unique characteristics. Opposing teams are matched against each other in a virtual arena, consisting of three lanes, each lane leading through a series of barriers and towers that can damage or eliminate players if they get to close without the proper protection. The goal of the game is simple, but the strategy and skill required to accomplish this goal is far more complex. Each player on the five-person team has a position, each position can be filled by 15 to 20 different characters. Each character could be equipped with countless different items to increase lethality and survivability. The research and preparation performed by players to be successful in the MOBA genre was new to the gaming and educational world. Players began watching their opponents on services such as YouTube to evaluate strategies in order to find a superior strategy or find that one weakness that could bring an edge, and ultimately victory. Esports had begun to implement strategies that traditional sporting had adopted decades before. Scouting the opponent and preparing for what actions they may take to achieve victory had now become mainstream in the world of gaming and esports.

Prize money has provided a substantial motivation for players to hone their skills in the MOBA genre, with prize amounts growing every year. In 2019 "The International 9 *Dota 2* tournament in Shanghai will feature a life changing prize pool of more than $30 million. Five of the best players in the world will become multi-millionaires overnight and most likely the most financially successful esports athletes of all time" (Stubbs, 2019, par. 1). In 2018 the *League of Legends* "the prize pool was increased to $6.4 million overall, making it the largest event in the game's history in terms of prize money" (Heath

& Nordmark, 2020, para. 10). In conclusion, one final genre of gaming is discussed: the battle royale.

Battle royale style gaming involves pitting multiple, sometimes up to 100, in open world style combat scenario with one player ultimately outlasting every other player. In battle royale style game a player may only have one percent chance of winning. Compare this to previous team and one versus one games that were discussed in this chapter, where players had a theoretical 50% chance of winning. Some early versions of the battle royale emerged in the 2000s, but really gained popularity from early mods inside of other games. Hornshaw explained this on the website digitaltrends.com:

> We think of battle royale primarily as a type of shooter but the first of these mods was made for *Minecraft*. Survival Games, a competitive take on the game modeled after the Hunger Games movies, gained popularity and that community spread the idea to others. (para. 11)

Through the modification process, or modding, students and players were creating new game modes that utilized existing games. In the *Arma 2* mod, *DayZ*, players spawn into the game, in which the only goal is to survive. Players must learn to avoid zombies, acquire supplies, build bases and avoid other players who are trying to acquire those same supplies. While *DayZ* may not be recognized as the first battle royale, it certainly set the stage for what was to follow.

Player Unknown Battlegrounds or *PUBG* as it is commonly referred, is generally considered the first battle royale stand-alone game. In *PUBG*, 100 players are dropped onto an island, search for equipment and avoid being eliminated. In order to keep play moving, at specific intervals the zone in which the players have dropped will shrink.

This is done to force interaction among the various players. The value of this mechanic cannot be overstated, players would simply wait in hiding and eliminate those players who are searching, or worse yet, every player would hide, causing games to never reach a conclusion. The popularity of *PUBG* is evidenced in the sales numbers, "the game [*PUBG*] has sold over 50 million copies, while a mobile version has been downloaded by more than 200 million people" (Huddleston, 2019). The next iteration of battle royale was one that most educators had overheard their students discussing in the hallways, but what teachers did not understand, was the significance of what is being discussed.

Shortly after the announcement of the early access release of *PUBG* in March of 2017 another well-known game, *Fortnite*, was release in July of 2017 (Tucker, 2018). *Fortnite* was designed with the same gameplay style as many other battle royal games that are currently available, with one notable exception. Players could now utilize in-game materials to build fortifications, buildings, and obstacles. Now players had to focus on gathering material, building, evading opponents, timing the closure of the ring, and eliminating their opponents. As with many of the preceding games, *Fortnite* requires academic skills to achieve success such as computational math, geometry, keyboard/mouse control, and communication.

> According to Ben Gilbert in Business Insider:
>
> *Fortnite* made $1.8 billion in 2019, according to Nielsen's SuperData tracking arm. That's the second overall revenue number for *Fortnite* that we've seen for a full calendar year of availability — the game made just shy of $2.5 billion in 2018, according to SuperData. That's a drop of about 28% in 2019 versus the

> year prior. But make no mistake: Even with that drop-off, *Fortnite* is still the biggest game out there, the SuperData report suggests. (para. 2)

What is interesting about *Fortnite* is that the game is free to play. Players can download and play the game at no cost. How does Epic Games, the creator of *Fortnite* make billions on the game, if the game itself is free? Micro-transactions are not a new concept, but they were masterfully implemented by Epic Games. Instead of paying for the game, players purchase in game items such as; skins (understood as outfits), characters, emotes, and others. Players could now create their own character, which increases immersion into the game. This is evidenced by the amount of money generated by a game that is free to play.

Players of esports titles also have access to a new form of revenue, that of streaming. *Fortnite* pro, Tyler "Ninja" Blevins told CNBC's "Squawk Alley" about how he manages to earn more than $500,000 per month playing the *Fortnite* game (Kim, 2018, para. 2). Ninja broadcasts himself online while playing *Fortnite*, and he receives income based on the number of subscribers he has on his channel. "Ninja has more than 20 million subscribers on YouTube, and 12.5 million followers on Twitch" (Crook, 2019, para. 2). Students began utilizing streaming to learn how to become more proficient with specific games, while also beginning to stream themselves to earn additional income:

> One final note on *Fortnite* and the impact it has had on esports competition. Humphries wrote about the earning potential for competitors in PC magazine: If you think playing video games doesn't pay, go talk to 16-year-old Kyle "Bugha" Giersdorf. As Polygon reports, yesterday Bugha managed to win the Solos competition at the first *Fortnite* World Cup and walked away with $3

> million in prize money. He managed to score 59 points over six rounds, comfortably beating second place player Harrison "Psalm" Chang who scored just 33 points. (para. 2)

The purpose of this section is to provide a general timeline in the history of gaming and the evolution of gaming into esports. Innumerable games, consoles, and events have been left out of this portion of the literature review, simply for the sake of the reader. The researcher sought to provide enough information for school administrators and impassioned teachers to gain a better understanding of esports, so they can make an informed decision regarding esports and how it might be utilized in a school setting.

Extra-curricular and Co-curricular Activities

During this section of the literature review several activities and findings will be discussed to explain what benefits or liabilities, if any, extra-curricular and/or co-curricular activities have on: student academic success, social-emotional outcomes, post-secondary success, and attendance.

Going through the process of trying out for a team and finding out the results can be a taxing experience for high school students, particularly those who discover they have not been selected to be a part of the team. In a study published by Barnett (2007) female students auditioned for a dance team and the impact on their social-emotional health was characterized in this statement:

> The emotional state of the girls was immediately impacted by the announcement of the outcome. For the girls who were successful, positive emotions increased and negative emotions decreased immediately. For the girls who were not successful in making the team, their positive emotions decreased immediately,

> and remained significantly below those of the successful team members for the next two months. (p. 339)

Merely trying out for the team can produce positive impacts which are significant and immediate, while the negative impacts of not making the team can linger for months. Furthermore, a study of students in 9-12 grade showed that "Among the 9,347 athletes who reported their GPAs on the ACT questionnaire, 80.1% reported a GPA of 3.0 or higher, as compared to 70.5% of the 9,221 non-athletes who reported a 3.0 GPA or higher" (Lumpkin & Favor, 2015, para. 2). The same study also stated the following as it concerns high school athletes in Kansas:

> Using data from the Kansas State High School Activities Association and the Kansas State Department of Education, this study provided evidence that the academic performance of students in grades 9-12 in Kansas who were athletes (N = 62,297) exceeded the academic performance of students who were non-athletes (N = 77,052) during the 2008-2009 school year. Athletes earned higher grades, graduated at a higher rate, were much less likely to drop out of school, and scored higher on state assessments than nonathletes. (p.2 para. 1)

Unfortunately, this study does not break down the numbers for each sport specifically, nor does the study highlight the level of involvement in other extra-curricular or co-curricular activities. A study performed by Ritchie in 2018 provided additional insight into participation in multiple co-curricular and extra-curricular activities: "The longer students were involved in academic co-curricular activities, and as the number of these activities increased, it is likely to result in an improvement of GPA of .013 points" (Ritchie, 2018, p. 64). This study not only highlights the value of being

involved in multiple extra-curricular and co-curricular activities, it explains that longevity in that activity can also have an impact on student GPA. It is interesting to note that many gamers have been gamers for six to ten years by the time they reach high school. This is not dis-similar from many students who practice football, basketball, dance, or chess from the age of five. However, gamers have not been given the opportunity to use their skills in an extra-curricular or co-curricular format in their high schools.

One interesting comparison for offering a gaming curriculum during the school day and providing opportunity for students to compete after school, is that of marching band. Mack made this comment regarding marching band:

> The fact that band is a class as well as an extracurricular offers two advantages. One is that band students get a teacher that they'll have for all four years, which can be a real asset in terms of having a school adult who gets to know them particularly well. The other advantage is that, since their class schedule is built around band, band students tend to have other classes and their lunch period together, helping to reinforce band friendships. (2010, para.5)

Mack describes the correlation of sharing the same class schedule with multiple members of the band and its effect on the social-emotional learning that can be created by belonging to a co-curricular activity. In addition, the advantage of working with the same teacher in at least one class for the entirety of a student's high school career, will certainly impact the comfort level and wellness of students enrolled in marching band courses.

A second co-curricular activity in which students perform higher academically than their peers, is theatre/drama. As with marching band, theatre students typically have

one teacher throughout their high school career, while also having similar schedules to that of other students who participate in drama. Drama students are typically involved in two to three productions each year, again very similar to that of march band and other co-curricular activities. Furthermore, students enrolled in drama programs, "student(s) who participate in drama often experience improved reading comprehension, maintain better attendance records, and stay generally more engaged in school than their non-arts counterparts" (Putnam, 2018, para. 2).

Offering other co-curricular courses during a school year may provide opportunities for students to find a sense of belonging among their peers and let students find success in their studies, much like their peers in the marching band and theatre programs. As schools begin to offer gaming curriculum and promote esports as an after-school program, students will relate their ability to be successful in esports to being successful in school.

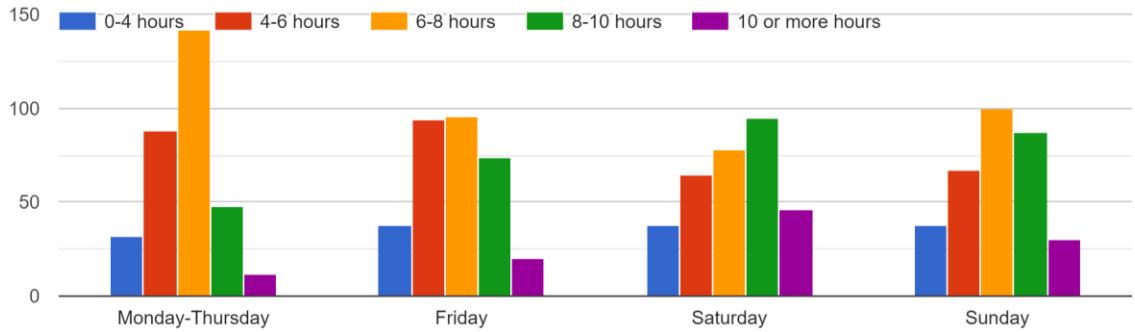
Student Behaviors Impact Attendance and Engagement

Sleep habits are continually mentioned when discussing high school students. The Centers for Disease Control recommends that students aged 13-18 should sleep no less than eight hours, every twenty-four hours (Sleep, 2018). However, a study by Wheaton, Jones, Cooper, and Croft, explained a "prevalence of short sleep duration among high school students in the national YRBS was 72.7%." Only 27% of high school students in the 30 states which were sampled, were receiving the recommended amount of sleep for this age group. This statistic is important to this literature review and this study due to the stereotype surrounding gamers and the fact that they put off sleep to participate in video game play. If gamers put off sleep in order to game, bringing

organized curriculum which stresses the importance of sleep and healthy habits could prove valuable in helping students to implement changes in their lifestyle to ensure they are getting the proper amount of sleep each day, through tracking in a written log or through wearable technology. A survey of 322 high school students who were enrolled, but had not completed, the *Gaming Concepts* curriculum found these results:

Figure 1

Approximately how many hours of sleep do you get per night?



(Custer & Russell, 2018).

Out of the 322 students surveyed, 60 stated they are receiving eight or more hours of sleep per night, Monday-Thursday. Which equates to 18% of the student population. However, the 6 to 8 hours category is quite large for the Monday-Thursday time slot which indicates students may be getting 8 hours of sleep per night, but these numbers cannot be included due to lack of clarity. As students enter the weekend, the amount of sleep they receive increases substantially, with 29% receiving more than 8 hours on Friday, 43.8% sleeping more than 8 hours on Saturday, and 33% receiving 8 hours of sleep on Sunday. This equates to an average of 31% of students receiving 8 or more

hours of sleep during the week, or roughly 4% more than the 27% that the CDC indicated in its study.

To further highlight the importance of health in students, it is important to examine the amount of physical activity recommended for students versus the amount the average student is getting on a weekly basis. The Centers for Disease Control recommends, "children and adolescents ages 6 to 17 years do 60 minutes or more of moderate-to-vigorous physical activity daily" (CDC, 2020, para. 1). Despite these recommendations the CDC provided the following information, "In 2017, only 26.1% of high school students participate in at least 60 minutes per day of physical activity on all 7 days of the previous week" (CDC, 2018, par. 4). The Centers for Disease Control lists the following adverse health effects which occur from lack of exercise:

- Lead to energy imbalance (e.g., expend less energy through physical activity than consumed through diet) and can increase the risk of becoming overweight or obese.
- Increase the risk of factors for cardiovascular disease, including hyperlipidemia (e.g., high cholesterol and triglyceride levels), high blood pressure, obesity, and insulin resistance and glucose intolerance.
- Increase the risk for developing type 2 diabetes.
- Increase the risk for developing breast, colon, endometrial, and lung cancers.
- Lead to low bone density, which in turn, leads to osteoporosis. (CDC, 2018, para. 3)

Another stereotype of gamers and esports players is their lack of exercise as compared to that of the level of their peers. However, in a study by Kari, Siutila & Karlhulahti (2019), which examined the exercise habits of 115 professional and high level esports players, revealed that 64.2 percent of players were participating in physical activity for a minimum of one hour per day. The addition of a structured gaming curriculum that places an emphasis on physical health and allows the students the opportunity to reflect, log their exercise and nutrition habits may bring greater understanding to students. Offering administrators and outsiders a look into the habit's gamers and esports players are truly exhibiting, may help in overcoming the stereotypes discussed in this literature review.

One final issue that will be highlighted in this section of the literature review is that of cell phone usage, specifically social media usage, among teens. Cellular phones are merely the vehicle that many teens use to access social media, and the effects on teenagers have been significant, particularly over the last five years. In a Pew Research Center report by Anderson and Jiang (2020), the following information was shared:

> 95% of teens now report they have a smartphone or access to one. These mobile connections are in turn fueling more-persistent online activities: 45% of teens now say they are online on a near-constant basis. (para. 2)

In *The Social Dilemma*, a documentary on Netflix, industry insiders detail how they attract and retain the attention of users on specific social media platforms. The film describes how notifications keep the user coming back for more interaction. More notifications equate to users checking their phone, in turn increasing revenue for the social media company. This constant barrage of notifications makes it difficult for users,

particularly young people, to put their phones down. The biggest piece of advice from *The Social Dilemma* was to turn off the notifications. One way to combat the phone usage among young people may be gaming. Gaming, typically, requires the use of all the tools required to operate a cell phone, making it impossible to do both at the same time. Even gamers who play mobile games on their phones, typically cannot switch back and forth between the game and other apps, without fear of negative outcomes in their gameplay. Gaming may be a tool for promoting better communication among young people, as well as, providing greater opportunity to practice socialization skills, which ironically, social media has struggled to do.

Summary

Gaming has been around for decades, as the early part of this literature review details. Until recently, gaming has been viewed by those outside of gaming in a negative light as, many outsiders view gaming as a waste of time and at the very best, a minor form of entertainment. For gamers, the opposite is true. If gaming is given a purpose inside school walls, it can give gamers, many of whom struggle with a sense of belonging, an opportunity to thrive and achieve success. One success may lead to further success. As was indicated in the literature review, students who belong to extra-curricular and co-curricular activities perform at a higher level in school. Those students have found their place, that sense of belonging. Gaming can provide that same opportunity to those students who identify as gamers but have not felt a connection to school.

Chapter 3

Methods

The purpose of this mixed-methods study was to analyze data collected from students at one Midwest high school to determine the extent to which students enrolled in a gaming course affects student engagement in school. Additionally, archive attendance data was analyzed to determine what extent enrollment in a gaming course would have on student attendance. Chapter 3 describes the design and procedures used to conduct the study. Chapter 3 is presented in several parts: research design, selection of participants, measurement, data collection procedures, data analysis and integration, reliability and trustworthiness, researcher's role, limitations, and a summary.

Research Design

A convergent mixed-methods research design was utilized for the completion of this study. According to Creswell, "Convergent mixed methods is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem", (2018).

This study sought to investigate the efficacy of a gaming course on student attendance through examination of archive attendance records, and engagement through student interviews of participants in the gaming course. A convergent mixed-methods approach was utilized for this study because data was collected simultaneously for both the qualitative and quantitative research questions. The data was then integrated and analyzed to determine the efficacy of the gaming course on student attendance and engagement.

Selection of Participants

The researcher chose to examine archive attendance records for all students enrolled in a Midwest High School in years 2017-2018 and 2018-2019. The variable of enrollment in the gaming course was the only additional variable considered for the quantitative portion of the study. The population analyzed for the quantitative portion of the study are 9th through 12th grade students. Student interviews were conducted to assess engagement of students, with the only requirement that the students must have been enrolled in the gaming course in years prior, or currently in the 2020-2021 school year. All students interviewed were 18 years of age or older.

Measurement

The measurement section describes how the instruments used to collect the data were appropriate for this mixed methods study. The measurement section also explains what tools were utilized to gather data, as well as, the process for creating the instruments and how that data relates to the research questions.

Qualitative measurement instrument. The interview questions were developed by the researcher and member checked by the research advisor and the research analyst assigned to the researcher. This was done to ensure the validity of, and relevance to the research question. Initially, the interview script consisted of 15 questions, but several were removed, as they did not directly address the research question of student engagement in the gaming course. All questions were open ended which allowed participants to address each question without a limit to their time and without interruption from the interviewer. As needed, follow up questions were asked during the interview

process, to provide greater understanding from participants. The final interview script with eight questions can be found in Appendix C.

Quantitative measurement instrument. Archive student attendance was analyzed to determine student attendance in the 2017-2018 and 2018-2019 school years. Attendance for those students enrolled in the gaming course for a minimum of one semester were compared to their peers who were never enrolled in the course for the corresponding years. Students enrolled in this school are provided the opportunity to graduate as they complete their coursework, which effects the calculation of the attendance rates for each student. For example, a student in this high school may have attended for 82 days, completed their work, and graduated. If this student attended school every day, their attendance rate would be calculated at 100%. Conversely, a student who completed the entire school year of 186 days, may have attended 172 days. The attendance rate for this student would have been 93%. For the purpose of this study the attendance rate was calculated by dividing the number of days attended, by the possible number of days a student would have attended in order to graduate, as explained in the examples above. In essence, each student could have a different number of attendance days from their peers.

Data Collection Procedures

This section details the procedures that were used to collect data from participants during the qualitative process and how attendance data was collected for the quantitative portion of this study. Creswell stated, “We encourage mixed methods procedures that involve creative qualitative data collection and the careful selection of quantitative instruments that do not extend beyond those needed to answer the research questions”,

(Creswell, 2011. p. 179). The following steps were performed during the collection of data:

1. Interview questions were created, and member checked for alignment and validity with research question one. Interview questions are listed in Appendix C.
2. An interview protocol was created as an explanation of the interview process for the students being interviewed. This protocol is listed in Appendix E.
3. A participant informed consent form was created to notify the interviewees of the expectations of them during the interview process. Primary headings for this document include: project title, Baker University faculty advisor information, information about the principal investigator, purpose of the research, procedures to be used in the interview process, extent of confidentiality, terms of participation, participant signature and printed name, and a parent signature if a participant was under the age of 18. For details on the full document see Appendix D. This item was also member checked for accuracy and relevance to the study.
4. Archived attendance data from the years 2017-2018 and 2018-2019 was collected from a school in the Midwest United States. Permission to utilize these records in the quantitative section of the study, was given by the director of secondary education for this district. A copy of this permission can be found in Appendix B.
5. Upon completion of the previous four steps, an IRB request form was created. This document was member checked for accuracy and validity, corrected by the researcher, and submitted and submitted on October 21, 2020. A copy of this document can be found in Appendix F.

6. An approval to proceed with the study was received from the IRB committee on December 3, 2020. A copy of his form is available in Appendix A.
7. All interviews were completed in person and a time which was deemed convenient by each participant. Interview responses were recorded digitally on a secure device. The interviews were also recorded utilizing voice to text software located on the researchers' computer. At the time of transcription, the researcher played back the audio file at 50% speed and compared that with the voice to text transcript. Errors and omissions were corrected to ensure proper transcription from the audio to the voice to text document. Each document is stored separately on the researchers' computer.

Data Analysis and Integration

Creswell (2011) stated "mixed methods data analysis consists of analytic techniques applied to both the quantitative and the qualitative data, as well as the mixing of the two forms" (p. 212). The data analysis and steps for integration are listed below each corresponding research question. Research question two will be followed two hypotheses, which will then be followed by the steps for analysis and integration.

RQ1. What are the perceptions of high school students enrolled in a structured video game curriculum regarding their engagement in the overall high school experience?

1. Each interview was transcribed using the steps explained in the data collection procedures section of this study.
2. Transcripts were uploaded to the online software, Dedoose. The Dedoose online account is password protected, with only the researcher having access.

3. Transcripts were analyzed using themes established during the reviewing process. Of the 45 themes created while analyzing the transcripts, nine were used in the qualitative portion of the study. These nine themes emerged as the prominent themes during the interviewing of the participants and are discussed in detail in the Findings for RQ1 section of Chapter 4.
4. Codes and categories were combined and separated to prevent overlapping of trends. Several codes emerged which the researcher determined could be nestled together under one code.
5. Themes were recoded and download to an excel file. Additional color coding was added by the researcher to aid with determining themes and to aid readers when examining the chart. The chart can be found in Appendix G of this study.
6. Interview transcripts were reviewed for quotes from the participants. These quotes were embedded within the results in Chapter 4 to provide added depth and understanding of the perceptions of engagement by the students.

The quantitative portion of the study examined attendance records for students attending a Midwest high school in the years 2017-2018 and 2018-2019. Research question two, comprises two hypotheses, one for each of the school years previously mentioned. The process for analyzing and integrating this data is listed in the steps below:

1. Attendance records for the school years 2017-2018 and 2018-219 were provided to the researcher. These records are archive data, which does not require permission from the individuals for whom this data represents.

Permission was granted by district level personnel to utilize this data in the study.

2. Attendance data was reviewed for errors and omissions. In two cases there were duplicate entries for students, both indicated a 0 out of 0 days attended in the 2018-2019 school year. After visitation with the registrar for the district, this was ruled to be a data entry error and these student data points were removed.
3. All student attendance records were uploaded to an Excel spreadsheet on a password protected file on the researchers' computer.
4. Students for each year were separated into two groups; those who participated in the gaming course and those who did not.
5. The groups for each year were compared using the Statistical Package for Social Sciences (SPSS) software. Descriptions of the tests run against each hypothesis are explained under each hypothesis statement, listed below.
6. Results from the test were formatted and explained in chapter 4, utilizing text and charts to enhance understanding for the reader.

RQ 2. To what extent is there a difference in attendance between high school students enrolled in a structured video game curriculum and high school students not enrolled in a structured video game curriculum?

H1. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2017-2018 school year.

An independent-samples *t* test was conducted to test H1. The two sample means for attendance were compared. An independent-samples *t* test was chosen for the hypothesis testing because the hypothesis test involves the examination of the mean difference between two mutually exclusive independent groups and the means are calculated using data for numerical variables. The level of significance was set at .05. When appropriate, an effect size is reported.

H2. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H1. The two sample means for attendance were compared. An independent-samples *t* test was chosen for the hypothesis testing because the hypothesis test involves the examination of the mean difference between two mutually exclusive independent groups and the means are calculated using data for numerical variables. The level of significance was set at .05. When appropriate, an effect size is reported.

Reliability and Trustworthiness

Several strategies were utilized to ensure reliability and trustworthiness within the study. Member checking as defined by Creswell is, “an approach, in which the investigator takes summaries of the findings back to key participants in the study and asks them whether the findings are an accurate reflection of their experiences”. Participants in the qualitative interview process were given transcripts of their interviews, so they could be reviewed for mistakes and omissions.

Purposive sampling was used by the researcher to obtain participants from different socio-economic backgrounds, varying levels of academic success, number of years of attendance at this specific school. The sample size of ten students is relatively small, however, these ten students represent 17% of the student population of this Midwest high school.

Quantitative data was acquired from the school registrar where the researcher teachers the gaming course. These records are only accessible to the registrar and administrators in the building, to ensure continuity of the data and secure the privacy of students. Attendance data was reviewed, tested, and member checked by peers of the researcher. One having a degree in statistical analysis, with another having a doctoral degree in educational leadership.

Researcher's Role

The researcher of this study does have a personal bias in this study. The curriculum that was utilized for the gaming course was designed by the researcher and one other educator. The curriculum has been used by the researcher for four years and has recently received national and international attention. It is this attention and personal observation that prompted the researcher to conduct this study.

Objectivity was maintained by the researcher during the interview process. Initially, it was thought that having a third party interview the students would be appropriate. This was later dismissed, due to the nature of the school culture where the interviews take place. Trust is very important, and it was felt by the researcher and his advisor, that students may not feel comfortable speaking openly with someone who the students were not familiar with. The depth and relevance of the interviews may have

been diminished had the researcher not performed the interviews, which may have affected the study.

Limitations

Participant interviews relied on the honesty of the students who were interviewed, as well as, the participants' ability to recall events accurately. Participants may have reflected on events and changed their opinion during the study, or upon conclusion of the study. Some participants may have been reluctant to discuss sensitive information, based on how much trust the interviewees had placed in the interviewer.

Attendance records for students were acquired from the school registrar. If these have been miscalculated or mislabeled this will affect the results. Learning management system changes, improper input of attendance records by teachers, and human error may have also altered the results.

Summary

This study was performed to provide greater understanding of the effect of offering a for-credit course, *Gaming Concepts*. To provide understanding, a mixed-methods approach was utilized to examine what effect, if any, a curriculum utilizing gaming would have on student attendance and their perceptions of how it affected their engagement in their own high school experiences.

Chapter 4

Results

The results of this mixed methods study regarding students' perceptions of what effect a gaming curriculum offered during school would have in their overall engagement was covered during the qualitative portion of this study. Interviews from ten students in one Midwest urban high school were conducted over the period from January 4, 2020 and concluded on February 3, 2020. All students interviewed have participated in the past, or were currently participating in, the gaming course at the time of their interviews. Interviews were analyzed with the computer program, Dedoose. The researcher uploaded the transcribed student interviews into the Dedoose program and created codes as found in Appendix F. These interviews were analyzed, and interview responses were coded to look for themes that may appear across the ten conducted interviews. It is these themes that will be discussed in detail during chapter 4.

Fulfilment of the quantitative portion of this mixed methods study was achieved through gathering archive attendance data, which was analyzed to determine what effect a gaming curriculum would have on student attendance. Attendance records for the same high school referenced above were acquired from the school years 2016-2017, 2017-2018, and 2018-2019. The 2016-2017 year was used as a baseline, as the gaming course was not offered to any student that academic year. Student attendance in 2016-2017 was then compared to student attendance in 2017-2018. The same analysis was performed to compare the 2018-2019 year to the 2017-2018 academic year. How each comparison was made, and the results will be further explained in chapter 4.

Descriptive Statistics

Information describing the participants in the qualitative study are listed in Table 1. Enrollment numbers for students enrolled in the course and those not enrolled in the course are listed in Table 2, along with the corresponding years that were studied.

Table 1

Student Demographic Information for Qualitative Sample

Student	Gender	Years at School
A	M	2
B	M	2
C	M	1
D	M	4
E	F	2
F	M	2
G	M	4
H	F	2
I	M	2
J	F	2

Table 2

Quantitative Sample

School Year	2017-2018	2018-2019
Enrolled in course	30	24
Not enrolled in course	62	72

RQ1. What are the perceptions of high school students enrolled in a structured video game curriculum regarding their engagement in the overall high school experience?

Engagement is a difficult and often subjective term in the education world. Engagement for one student, does not equate to engagement for another student. Before sharing the results of this study, the researcher believes it is important to place some

parameters on the term engagement as it relates to this study. A study performed by Grant Wiesner (2017) for the Turtle Mountain School Division provided this definition:

> Described engaged students as happy, enthusiastic, excited about the work they are doing, and enjoying the learning process. The students make the effort to construct meaning, are focused on tasks, use active listening skills, take risks, and demonstrate critical thinking. Engaged students also feel a sense of belonging and have positive relationships with their peers and teachers. These students participate in discussions, ask questions, and take an active role in learning and participation. The descriptors of engaged students paint a picture of students who want to be at school, desire to learn, participate and collaborate with others, and are actively involved, as they make learning enjoyable and applicable. (p.4)

Results from the interviews and the corresponding qualitative data is being shared using the description of engagement mentioned in the above quotation. Many students participating in the gaming curriculum will exhibit engagement utilizing the definition above, but as was stated previously, the level and type of engagement(s) will vary per student.

Findings for RQ1. The first research question was focused on the effect that gaming curriculum would have on student engagement. Student responses to the interview questions indicate that engagement did increase for every student, but the manner each student was engaged varied from student to student. Some themes did occur during the analysis that will demonstrate in what ways student engagement was increased among the entire interview pool, as well as, how the gaming curriculum effected engagement among individual students.

***Peer interaction*.** Each of the ten students interviewed agreed that their interaction with peers increased due to participation in the gaming curriculum. Specifically, every interviewee shared that they interacted with at least one other person that they would never have interacted with if it had not been for enrollment in the gaming curriculum. Student C stated, "Just being in class together I definitely think gaming made it easier meeting and talking to these people and relating to them you know, on my level." Student E described his experience with peers in this way:

> I don't really talk to that many people. Like the people that I talk to, I was already friends with. *Gaming Concepts*, kind of forced me to talk to everybody. Because of the teamwork, I kind of just talked to them and you kind of build a friendship with everybody in the classroom, that's kind of cool.

Increased positive peer interaction, provided these students with the sense of belonging that had eluded them for most of their school career. The sense of belonging that students were now feeling, increased their engagement in school and provided them with an opportunity to interact with peers that they would never have approached before taking the gaming course. A third student, Student G had this to add regarding peer interaction:

> I don't think I would have talked to literally anyone because of the way that I personally like categorize people. I kind of base it off of similar interest I have with people and if I think, like I don't have anything in common with someone I am probably not going to reach out to them or try to become acquaintances or even friends. There's a lot of students in *Gaming Concepts* that I would not have reached out to.

Additionally, the course is offered one time per day. This is significant because, as was mentioned in chapter two in regards to band, students began to see the same peers throughout the day, allowing them to build stronger ties, not only in the gaming course, but also in their other courses throughout the day.

***Increased class participation*.** Eight of the ten participants in the qualitative portion of this study shared that they felt they were more likely to have increased participation in their other courses, due to their participation in the gaming curriculum course. Student D shared, "I find myself leading other students more and like coaxing them into more discussions." Prior to taking the course this same student shared, "I would get involved in class discussion, if I was asked, but like never on my own." Increased confidence among one student, Student A, due to access to the gaming course, provided him an opportunity to become an active participant during his other coursework:

> I think in general I have gained more confidence in myself when I'm around other people so instead of like being too scared to voice my opinion on something or thinking that if I did, it might not put me in a safe position. Now I feel a lot more comfortable around people that just kind of say what I think, when I think it, so I'm more likely to interact with people in class and participate in discussions during class.

Classroom participation is one of the characteristics of engagement as defined earlier in chapter 4. This increase in participation in classroom discussion and activities, provided students with the confidence that they could be an active member in their school and were bringing value to their teachers and classmates.

Toxicity in gaming and in the school environment. The term toxicity is generally used in the realm of gaming. It is a broad term that can relate to bullying, cursing, slander, and the use of derogatory language towards teammates or opposing teams. However, this term can be applied to actions by others throughout a normal school day or in extra-curricular activities.

All 10 students reported having witnessed toxicity while gaming. Six of the students reported toxicity from opponents, two reported toxicity from teammates, and five reported themselves as being toxic at some point during the time they had spent gaming. The responses for this question are larger in quantity than the number of participants because students were not asked specifically about where the toxicity came from, but rather from, if they had witnessed any toxicity. Student B shared an example of this, "I've seen it (toxicity) come from other people and I've also seen it come from myself." Addressing toxicity in a school is very important to engagement, as toxicity can cause a lack of collaboration and sense of belonging among students which will inhibit the engagement of students in school. Toxicity is addressed as a major finding because it leads to an unexpected result of the gaming curriculum that will be shared in the next major finding in this chapter.

Anger management. Nine of the ten participants found that the gaming curriculum course aided them in identifying anger management strategies that were beneficial to them during and after school hours. Student A stated:

> At first, I was nervous about correcting others toxicity because I did not want them to get angry with me, but we talk about it in class a lot. People know when they are going too far and when we try to stop them, they usually listen.

Resolving the situation in a positive manner, with a teacher present, provides students the opportunity to resolve conflict and practice anger management skills in a school setting. Teachable moments that will lead to greater engagement and positive interaction with their peers. Student D added his thoughts on anger management and conflict resolution:

> Now I am a lot better with confrontation with some toxic people, but you know, not in a way that is negative but in a way that is like hey, maybe we should not do that.

Another example of anger management strategy and how it can be implemented is through mentoring of students by other students in the course. A newer student, Student C, offered his input regarding anger management and mentoring he observed in the gaming course:

> One guy online was talking online was getting mad so [redacted] commented one thing and this guy just went off and it wasn't even something big. He didn't even say anything mean at all. He was using reaper and I was like he is using his Reaper to get elims so chill out. So, this guy got mad, just blew up and then [redacted] just kind of left him alone. It taught me to just leave it alone, step back and we can learn something in from this.

A portion of the above quote has been redacted, to avoid identification of a former student. This quote demonstrates the value of modeling behavior by peers and the effect it can have on student engagement, both for the mentor and the mentee.

Extracurricular activities. Nine of the ten interviewees shared that they joined the after-school competitive gaming team, due to their participation in the gaming course

which was offered during the normal school day. Eight of the ten students interviewed had never participated in an after-school program, prior to joining the after school competitive gaming team. Again, this demonstrates that participation in the course has led to greater engagement in school through participation on the competitive gaming team. Student I shared, “I would never have stayed after school without that (gaming course). I never played sports, did not do choir. The one thing I was interested in was gaming.” This student was able to find their reason to stay and participate in school through the gaming course, but also found value in staying after school for participation on the competitive team. This student increased their engagement in a traditional school week by more than 8 hours, through their participation in practices and matches. Student G added this regarding their own experience:

> Yeah, well I'm on the Overwatch team and I don't think I would have been on any team ever had I not taken *Gaming Concepts*. The whole idea of like having to participate in like a tournament style setting with other people that I wasn't that familiar with was unappealing before, but after like playing with such a variety of people and getting their perspectives on things and just enjoying the atmosphere that the class had I wanted to participate on the team so that definitely was a reason that I join the Overwatch team.

Student D added this in response to a question about participating in extra-curricular opportunities, coaching, and mentoring:

> I never really thought of myself as the type of person to overlook someone else and do something. I kind of always considered myself as the follower and do what you’re told kind of person. But over time I have noticed myself kind of

> wanting to help people overcome things they are struggling with. When I coach people my mindset first is to look for the small mistakes. I'll look for the things that people are doing incorrectly and try and train those into being not as much of a problem. You know, just bang out the dents so to speak.

The sense of belonging, interaction with peers, and the ability to practice social skills through the gaming course allowed this student to have the confidence to try something, that prior to the course, he would not have even considered. This further fortifies the position that the gaming course provided increased engagement for students.

***Fun*.** Seven of the ten interview participants noted that they have fun in the gaming course. One would expect this number to be a ten. The students were engaged in video game play during part of their normal school day. The seven out of ten number could be, in the researchers' opinion, an omission from the interviewees. The students who did not specifically mention fun, did so because they assumed it was given. The interview questions never asked about the term fun. The questions revolved around engagement, which the researcher believes the students equated to fun. Student C said this, "It's fun there. It's like we could connect like as a class or a different way than regular school-work." Student A added this regarding fun during the course:

> We all had a blast and I did not expect that. Joining the course is one of the most fun times I think I've ever had at the school. Just hanging out with my friends, playing the games, and just having a blast while doing them. It had a great impact on my life, joining that class.

Educators should not underestimate the power of fun and the effect it will have on engagement. It is evident from this question that fun and engagement, for some students, is synonymous.

***Assignment completion*.** Six out of the ten students interviewed shared that taking the gaming course motivated them to turn in assignments in other courses on time. There is no pre-requisite or requirement to maintain a certain G.P.A to be in the in the course at the school represented in the study. Student G shared this, "I'm definitely turning in assignments. Before I would just not turn them in. I put more effort into work now than I did before." Offering the gaming course to students has helped them to be more engaged in school and to complete their course work on time. Highlighting the importance of feeling like they belong in school and they are a part of the larger school ecosystem.

***Attendance*.** Student attendance will be addressed in the quantitative portion of this study, but the researcher felt it was important to report some findings from the student interviews. There were several questions relating to attendance in the survey, but the following two questions are referenced in this section. "How was your attendance prior to the gaming course?" How was your attendance after the gaming course?" Four of the ten students felt that the course helped them to have improved attendance. It was also noted in the interviews that the same four students reported having poor attendance prior to taking the course. Student G shared:

> Well my attendance has gone has gotten a lot better, I think. I went from missing like sometimes whole weeks of school at a time to missing maybe like one or two days a whole semester, so I think that's an improvement.

> Student C followed up with this, "I missed a lot of all days actually. When I was in *Gaming Concepts* I kind of wanted to go to school more, so it definitely got better."

Attendance is critical to success in school. These students were able to improve their attendance and engagement, due to the sense of belonging that the gaming course instilled in them. More will be written regarding attendance later in this chapter, but the researcher felt it was important to hear directly from the students, how the course impacted their own school experience.

***Character traits*.** Per the definition earlier in chapter 4, engaged students have positive relationships with peers and teachers. All ten students expressed that they learned or practiced several character traits while they were participants in the gaming course. Specific numbers as to how many students expressed each character trait can be found in Appendix G. Students stated that they experienced, compassion, generosity, honesty, respect, leadership, perseverance, and teamwork. Student H shared, "I do think we talk a lot about respect for our classmates and the way we act online." Online behavior is a trait that is often not discussed in schools or with parents. Students are given technology, but little guidance is given on how to act in an appropriate manner online. Student H is highlighting a valuable skill that needs to be taught to students, and the gaming course can be an outlet for doing so. Student D made this statement regarding a character trait he experienced in the gaming course, "I think, perseverance. You know when you lose a game, but then you say all right we're going to keep going and we are going to win this time." Perseverance cannot be taught without failure. Students fail in the course during their active participation portion of the class, almost

daily. It does not mean they are terrible or bad, students are just learning how to critically think and find a solution to the problem, through failure in a safe, adult supervised environment. Honing character traits is important to student engagement in school and these student reflections demonstrate how each student can be engaged, through their unique experiences.

RQ2. To what extent is there a difference in attendance between high school students enrolled in a structured video game curriculum and high school students not enrolled in a structured video game curriculum?

Findings for RQ2. Attendance was studied due to its importance in engagement for students. The definition of engagement referenced earlier in Chapter 4, stated that "engaged students want to be at school", (Wiesner, 2017). Comparing students enrolled in the gaming course with their peers who were not enrolled in the gaming course, provides insight to the value of offering the gaming course, and what effect it will have on student engagement through analyzing student attendance data.

H1. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2017-2018 school year.

An independent-samples *t* test was conducted to test H1. The two sample means for attendance were compared. An independent-samples *t* test was chosen for the hypothesis testing because the hypothesis test involves the examination of the mean difference between two mutually exclusive independent groups and the means are calculated using data for numerical variables. The level of significance was set at .05. When appropriate, an effect size is reported.

Prior to conducting the *t* test, a Levine's test for equal variances was conducted. The results indicated the variances were not equal, $F(1, 90) = 6.056$, $p = .016$. Therefore, the results of the *t* test assuming unequal variances were used. The results of the independent samples *t* test indicated a statistically significant difference between the two means, $t(89.99) = 4.422$, $p = .000$, $d = .789$. The mean attendance for students who were enrolled in a structured video game curriculum was higher than the mean attendance for students who were not enrolled in a structured video game curriculum. H1 was supported. The effect size indicated a medium effect.

Table 3

Quantitative Results H1

Course Enrollment Status	*M*	*SD*	*N*
Enrolled	94.33	5.27	30
Not Enrolled	86.89	10.85	62

H2. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H1. The two sample means for attendance were compared. An independent-samples *t* test was chosen for the hypothesis testing because the hypothesis test involves the examination of the mean difference between two mutually exclusive independent groups and the means are calculated using data for numerical variables. The level of significance was set at .05. When appropriate, an effect size is reported.

Prior to conducting the t test, a Levine's test for equal variances was conducted. The results indicated the variances were not equal, $F(1, 94) = 5.937$, $p = .017$. Therefore, the results of the *t* test assuming unequal variances were used. The results of the independent samples *t* test indicated a statistically significant difference between the two means, $t(93.92) = 2.754$, $p = .007$, $d = 0.419$. The mean attendance for students who were enrolled in a structured video game curriculum was higher the mean attendance for students who were not enrolled in a structured video game curriculum. H2 was supported. The effect size indicated a small effect.

Table 4

Quantitative Results H2

Course Enrollment Status	*M*	*SD*	*N*
Enrolled	92.22	6.61	24
Not Enrolled	84.51	20.81	72

Summary

Student interviews indicated that every student had increased engagement due to their enrollment in the gaming course. The degree of engagement and precise way each student demonstrated increased engagement varied among the participants. This is encouraging to the researcher, due to the fact the students with different engagement needs can be reached through their enrollment in the gaming course. Much like individual plans of study, a new way of engagement can be implemented for all students. Plans of engagement could be utilized in schools to keep students engaged in their learning and enhance their educational experience.

The quantitative portion of the study did demonstrate a statistically significant difference in attendance between students enrolled in the gaming course in both the 2017-2018 and 2018-2019 school years. Students enrolled in the course during the 2017-2018 school year, had on average, 7.44% higher attendance over their peers who were not enrolled in the gaming course. Students enrolled in the course in the 2018-2019 school year had on average, 7.71% higher attendance over their peers who were not enrolled in the gaming course. In a typical school year of 186 days, this equates to a student enrolled in the gaming course attending school 13 more days per year than their peers who were not enrolled in the course.

Chapter 5

Interpretation and Recommendations

The researcher examined the effect that a gaming course would have on student engagement and student attendance. A mixed methods approach was employed to complete the research. Student interviews were done to complete the qualitative section of the study and student attendance records were analyzed to complete the quantitative section of the study. Chapter 5 is broken down into three main sections: a study summary, which includes a review of the problem and methodology, a summary of major findings, which connects findings to the literature, and a conclusion section with suggestions for future research and concluding remarks.

Study Summary

The following is a review of the major sections of research study including the problem, purpose, methods, and major findings. This is done to provide context for the implications, recommendations for future research, and concluding remarks at the end of the study.

Overview of the problem. Too little is known about the effect that structured video game curriculum may have on high school attendance rates and student engagement. Video game courses heretofore have been limited to design and structure of the video game, technical skills. However, the video games have had very little use in a structured school setting to address specific student concerns, areas such as student attendance rates and student engagement.

Purpose statement and research questions. The purpose for this mixed-methods study was to examine what effect, if any, student participation in a structured video gaming curriculum had on high school student attendance and engagement.

RQ1. What are the perceptions of high school students enrolled in a structured video game curriculum regarding their engagement in the overall high school experience?

RQ2. To what extent is there a difference in attendance between high school students enrolled in a structured video game curriculum and high school students not enrolled in a structured video game curriculum?

H1. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2017-2018 school year.

H2. There is a statistically significant difference in attendance between students enrolled in a structured video game curriculum and those students who were not enrolled in a structured video game curriculum during the 2018-2019 school year.

Review of the methodology. A mixed methods approach is was utilized for this study to gain understanding of the effect that a gaming course would have on student engagement and attendance. Individual face-to-face interviews were conducted with ten high school students who had been previously, or were currently, enrolled in the gaming course. Participants were asked to respond eight open-ended questions regarding their own perception of how their engagement in school was affected by their enrollment in the gaming course. After the transcription of the interviews, the interviews were uploaded to the online program Dedoose. Codes were then created to aid the researcher in analyzing

the interviews for common themes. These themes were then used to complete the major qualitative findings in chapter 4.

Student attendance data for 2017-2018 and 2018-2019 were analyzed for the quantitative portion of the study. Student attendance for those students enrolled in the course was compared to their peers who were not enrolled in the course. The total sample size for the 2017-2018 was (N=92), and during the school year 2018-2019 the sample size was (N=96). Two hypotheses were tested using *t* tests. Prior to performing the *t*-tests, a Levine's test for equal variances was conducted. The Levine's test indicated unequal variances, which led to *t*-tests with unequal variances being utilized to conduct the analysis for both hypotheses.

Major findings. Results for the qualitative portion of the study did indicate an increased level of engagement among all ten of the participants. However, the type of engagement varied from student to student. The variety of lessons and the nature of gaming itself, allowed for various types of engagement for each individual student. Several themes did gain prominence in the study: peer interaction, increased class participation, anger management strategies, fun, character trait development, attendance (from the student perspective), and participation in extra-curricular activities were all major themes in the study.

Results for the two hypotheses tested in the quantitative portion of this study were supported. Students enrolled in the gaming course did have statistically significant higher attendance than their peers who were not enrolled in the course, in both the 2017-2018 and 2018-2019 school years.

Findings Related to the Literature

Several findings of this study support the benefits of students being involved in extra-curricular and co-curricular activities. The increased engagement through the gaming curriculum gave student the confidence to interact with their peers and try out for after school programs, such as the competitive esports team. Mack described marching band in this way:

> The fact that band is a class as well as an extracurricular offers two advantages. One is that band students get a teacher that they'll have for all four years, which can be a real asset in terms of having a school adult who gets to know them particularly well. The other advantage is that, since their class schedule is built around band, band students tend to have other classes and their lunch period together, helping to reinforce band friendships. (2010, para.5)

This is an excellent comparison to the gaming curriculum. Many of the students participating in the gaming course, did participate on the after school esports competitive team. These students built strong bonds with members of the course and those who are on the competitive team. Typically, the educator who administers the course is also the coach of the competitive esports team, which gives students in the gaming course an opportunity to build a bond with one educator in the building. The increased peer interaction and connection to an educator will increase engagement. Wiesner summarized student engagement, "The descriptors of engaged students paint a picture of students who want to be at school, desire to learn, participate and collaborate with others, and are actively involved, as they make learning enjoyable and applicable" (2017).

This quote applies to the quantitative section of the study as well. Active involvement and the want by students to be at school is supported through enrollment in the gaming course, and the increase in attendance over their peers not enrolled in the gaming course. Drama is a course that is offered during school hours, but is typically enhanced through after school performances, like the gaming course and esports. Putnam stated, "Student(s) who participate in drama often experience improved reading comprehension, maintain better attendance records, and stay generally more engaged in school than their non-arts counterparts" (2018, para. 2).

Again, this demonstrates that engagement for each student is an individual experience. The sense of belonging to a group or activity will have an impact on student engagement and attendance. The gaming course and esports is a way that can be useful to reach those students who do not have that sense of belonging, or their "why" for attending school. Students in the gaming course were found to have statistically significant increase in attendance over their peers, much like the examples shared regarding band and drama. Offering as many extra-curricular and co-curricular activities as possible, helps to reach students where they are. Often-times students will take the initiative to create new programs themselves, because they are interested in the activity and it will help them to become more engaged in their school experience. The gaming course is one way to reach students, but every student is unique. More opportunities need to be made available to reach all students in schools. Plans of engagement should become an integral part of every students plan to navigate high school successfully.

Conclusions

The researcher is based in the home school where this study was conducted. When this study was undertaken, a gaming course did not exist anywhere, with the exception being the researchers' home school. However, during the process of performing the study and examining the results, the gaming course has taken hold in several areas around the nation, as well as, internationally. As the course began to be utilized in areas outside of the school where it began, teachers and administrators became curious regarding outcomes in several areas, including student engagement. The researcher chose to focus on engagement, attendance, and ultimately sense of belonging as the study progressed. Additionally, to provide opportunities for students to interact with their peers, build relationships with teachers, have fun, and participate in classroom discussion.

The researcher is not advocating only for offering a gaming course, but any extra-curricular or co-curricular activity that will bring kids to school. Learning will occur if the students feel the sense of belonging and are engaged. The gaming course is just one way to help students find their "why."

Implications for action. The research findings in this study demonstrate that students participating the gaming course did have increased engagement due to participation in the course. Additionally, students who were enrolled in the gaming course had statistically significant higher attendance than their peers who were not enrolled in the course.

Gaming and gamer are broad terms. While this study did not examine board gaming, people who participate in gameplay using board games, also identify as gamers.

However, video games are generally talked about with a negative connotation, as if they have no value for learning. Few people would argue that skills are not learned by participating in games such as Monopoly, Risk, Axis and Allies, or Dungeons and Dragons. Yet, video gamers who participate in Overwatch, CSGO, League of Legends, and others, are considered basement dwellers and ostracized. This study demonstrates that video gaming, along with a structured curriculum, can be harnessed to provide new opportunities for engagement and learning.

Careers in the video game industry are numerous and can be lucrative. Adding a new pathway for esports and gaming careers is on the horizon. Gaming careers do not only include design and competition. Relatively new careers in gaming have appeared, such as, shout-casting and esports coaching. Many traditional careers need to be fulfilled within the gaming industry as well. Careers in accounting, marketing, data-analytics, human resources, and executive positions all exist within the gaming industry. These are jobs that will need to be filled and schools should begin focusing on a pathway to ensure the students are prepared to enter the workforce in one of the largest industries in the world. The gaming course is one way to increase knowledge of the gaming industry, increase engagement in school, and encourage the students to attend school.

Recommendations for future research. Researchers into the subject of gaming and implementation of gaming courses in schools should look at several areas in their future research. First, replication of this study into high schools with larger student populations to determine if the results shared in this study are scalable. A second item for research is what other areas of academic performance can be measured from enrollment in the gaming course. One example is grade point average (GPA) among

students who are enrolled in the course and if there is an increase in GPA among those participants in the course. A third research question would be to study students who participate in after school esports athletic programs. Do esports athletes receive the same benefit of a higher GPA as their peers? According to Lumpkin and Favor, "Among the 9,347 athletes who reported their GPAs on the ACT questionnaire, 80.1% reported a GPA of 3.0 or higher, as compared to 70.5% of the 9,221 non-athletes who reported a 3.0 GPA or higher" (2015, para. 2). Lastly, it would be beneficial to study how gaming courses can contribute to sense of belonging among not only high school students, but middle and elementary students.

The answers to these additional research questions will prove invaluable to legitimizing gaming courses in high school, after-school esports programs, and those students who play video games as their only form of expression.

Concluding remarks. The goal is to find a way to engage those students who are not feeling that sense of belonging and determining if the gaming course is one way to do accomplish that goal. For this researcher, who has been a gamer for 38 years, this study was done to prove the value that gaming can have for some students. Some students love algebra, some football, and some want to march in the band. All these areas engage specific students, it is their "why" for coming to school. Gaming courses and esports allows schools to broaden their offerings to those students who are searching for their "why." Every school has these students who struggle with engagement and in most cases a teacher can identify these students. This study demonstrates that a structured gaming course will benefit those students who are on the fringe, by increasing their engagement

and school attendance. The goal of educators should be to prepare these students for careers and give students the “why” to be a part of their school community.

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Appendices

Appendix A. University Permission to Conduct the Study

Baker University Institutional Review Board

December 3rd, 2020

Dear Michael Russell and Harold Frye,

The Baker University IRB has reviewed your project application and approved this project under Expedited Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.
6. If this project is not completed within a year, you must renew IRB approval.

If you have any questions, please contact me at npoell@bakeru.edu or 785.594.4582.

Sincerely,

Nathan Poell, MLS
Chair, Baker University IRB

Baker University IRB Committee
Sara Crump, PhD
Nick Harris, MS
Christa Manson, PhD
Susan Rogers, PhD

Appendix B. District Approval to Perform the Study

Michael Russell <[redacted]> Tue, Oct 20, 9:59 AM

to Elizabeth

Here you go!

The archive data I need is just from our school and it is attendance for students who have taken the *Gaming Concepts* Course as compared to those who have not. I am placing my RQ's below. The archive data only pertains to the one question on attendance. I will be doing interviews for the qualitative portion. Thank you!

RQ1. What are the perceptions of high school students enrolled in a structured video game curriculum regarding their engagement in the overall high school experience?

RQ2. To what extent is there a difference in attendance between high school students participating in a structured video game curriculum course and high school students not participating in a structured video game curriculum course?

--------- Forwarded message ---------
From: **Michael Russell** <[redacted]>
Date: Mon, Oct 26, 2020 at 3:32 PM
Subject: Re: Archive Data for Dissertation
To: Elizabeth Parker <[redacted]>

Thank you so much Beth! I will get this sent over to my advisor so I can get started on the research.

On Mon, Oct 26, 2020 at 3:21 PM Elizabeth Parker <[redacted]> wrote:

Hi Mike -

Thank you for the extra information! Yes, you are able to use the archive data needed for your dissertation. Thank you for your patience!

Elizabeth Parker

Assistant Superintendent of Secondary Education

[redacted]

Appendix C. Interview Questions

Video Game Curriculum: Student Attendance and Student Engagement in High School

Student Survey Questions

1. Please describe your experiences during the *Gaming Concepts* course.

2. What character traits do you think are most often displayed when participating in the *Gaming Concepts* course? For example: respect, generosity, cooperation, toxicity, disrespect.

3. Please describe your experiences with your classmates during your participation in *Gaming Concepts*.

    3a. Please describe interaction with classmates that you have not traditionally interacted with prior to taking the *Gaming Concepts* course.

4. Describe how you felt about school prior to participating in the *Gaming Concepts* course.

    4a. How was your attendance?

    4b. Were you involved in class discussion?

    4c. Did you sleep often during class?

    4d. Were you completing assignments on time?

5. Describe how you felt about school after participating in the *Gaming Concepts* course.

5a. How was your attendance?

5b. Were you involved in class discussion?

5c. Did you sleep often during class?

5d. Were you completing assignments on time?

6. What specific skills, that you utilized in *Gaming Concepts*, have you found to be helpful in your career, schoolwork, or both?

7. During your participation in the *Gaming Concepts* course did you witness toxic behavior in person, or online? Please provide one specific example of the toxicity that you witnessed and how you responded to it.

7a. What specific strategies taught in *Gaming Concepts* helped you to become less toxic in your own gameplay and/or provided you an opportunity to help others address toxicity in their own gameplay.

7b. If you do not feel *Gaming Concepts* helped you in addressing toxicity, please indicate that and explain why you feel that way.

8. Since participating in *Gaming Concepts* what additional co-curricular or extra-curricular activities were you participating in? Are you participating in other activities due to your participation in *Gaming Concepts*? Please provide examples.

Appendix D. Participant Informed Consent

Written Informed Consent Form

PROJECT TITLE: The Effects of the Implementation of a Video Game Curriculum on Attendance and Student Perceptions of Their Engagement

Baker University Faculty Advisor: Dr. Harold Frye harold.frye@bakeru.edu

PRINCIPAL INVESTIGATOR: Michael Russell Email: topperman2003@yahoo.com

PURPOSE OF THE RESEARCH: The purpose for this mixed-methods study is to examine the effect, if any, of student participation in a structured video gaming curriculum will have on high school student attendance and engagement. Examples of engagement may include; class participation, completion of class work, sleeping during class, asking questions during class, or willingness to volunteer in other areas of the school.

PROCEDURES OR METHODS TO BE USED: The researcher will conduct interviews with participants. Participants should anticipate a commitment of one hour for the interview. Additional time, not to exceed 30 minutes, may be required to allow for interviewees to review their answers after the data has been transcribed from the voice recording. The data will then be coded, analyzed, and synthesized for meaning related to the research question. A copy of the interview questions has been attached to this document.

EXTENT OF CONFIDENTIALITY: The data will be treated confidentially and none of the data will be personally identifiable. The names of the participants will not be associated with the data. Participation is strictly voluntary, and participants may withdraw at any time. Data collected from the participants will only be available to the researcher.

TERMS OF PARTICIPATION: I understand this research project, and that my participation is completely voluntary. My decision to participate or not participate will be kept completely confidential. I also understand that if I decide to participate in this study, I may withdraw my consent at any time.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

Participant Signature_____

Participant Printed Name_____

Parent Signature (If under age 18) _____

Parent Printed Name_____

Appendix E. Interview Protocol

Interview Protocol

Thank you for participating in a research study examining the effects of the implementation of a video game curriculum on attendance and student perceptions of their engagement.

The interview session will take approximately 30 minutes and a second interview session will be conducted if there are any follow up questions. You will be assigned a pseudonym and no other identifiable information will be used within this study.

Each interview session will be recorded and the contents only accessible to myself, and my research committee. Please speak freely about your experiences. At any time you may request to stop the recorder. You may also decline to answer any question or ask for clarification about a topic. If you would like to remove yourself from the study at any time, I will not use any portion of your session within the study.

Do you have any questions or concerns before we get started?

Appendix F: Coding Sample

CODING SAMPLE

	Student A	Student B	Student C	Student D	Student E	Student F	Student G	Student H	Student I	Student J	Totals
Additional Activities Due to Gaming	0	0	0	0	0	0	0	0	0	0	0
Coaching	0	0	0	1	0	0	0	0	0	0	1
Overwatch Team	1	1	1	1	1	1	1	0	1	1	9
PC Gaming	0	0	0	0	1	0	0	0	0	0	1
Playing Instruments	1	0	0	0	0	0	0	0	0	0	1
Variety of Games Played	0	0	0	0	0	1	0	0	0	0	1
Assignment Completion	0	0	1	1	0	0	1	1	1	1	6
Character Traits	0	0	0	0	0	0	0	0	0	0	0
Compassion	1	0	0	0	0	0	0	0	0	0	1
Cooperation	0	1	1	0	1	0	0	0	0	1	4
Generosity	0	0	0	0	0	1	0	0	0	1	2
Honesty	0	0	0	0	0	0	1	0	1	0	2
Leadership	0	0	0	2	0	0	0	0	0	0	2
Mentoring	0	0	0	1	1	0	0	0	0	1	3
Motivation to do well	1	0	0	0	1	0	0	0	0	0	2
Respect	0	1	1	0	0	1	0	1	1	0	5
Teamwork	1	1	0	1	1	0	0	0	0	1	5
Fun	1	1	1	0	1	1	0	1	0	1	7
Improved Attendance After Gaming	0	0	1	1	1	0	1	0	0	0	4
Increase in Class Participation	1	0	1	1	1	0	1	1	1	1	8
Interacted Outside Peer Group	1	1	1	1	1	1	1	1	1	1	10
No	0	0	1	1	1	0	1	1	0	0	5
On Time	1	1	0	0	0	0	0	0	0	0	2
Perseverance	1	0	0	1	1	0	1	0	0	0	4
Poor	1	0	1	1	1	0	1	0	0	0	5
Poor Attendance Prior to Gaming	0	0	1	1	1	0	1	0	0	0	4
Anger Management Strategies	1	1	1	2	0	1	1	1	0	1	9
Communication	0	0	1	2	1	1	3	0	0	0	8
Feels more approachable	0	1	1	0	0	0	0	0	0	0	2
Hand-Eye Coordination	0	0	0	0	0	1	0	0	1	0	2
Health Nutrition	0	0	0	0	0	0	1	0	0	0	1
Organization	1	0	0	1	1	1	0	0	0	0	4
Typing	0	0	0	0	0	1	0	0	0	0	1
Sleeping In Class	0	0	0	0	0	0	0	0	0	0	0

After Gaming	0	0	0	0	0	0	0	0	0	0	0
Less Frequently	0	0	0	1	0	0	1	0	0	0	2
More Frequently	0	0	0	0	0	0	0	0	0	0	0
Before Gaming	0	0	0	0	0	0	0	0	0	0	0
Never	1	1	0	0	0	0	0	0	0	0	2
Yes	0	0	1	1	0	0	1	0	0	0	3
Toxicity	0	1	0	0	0	0	0	0	0	0	1
Correct Toxic Behavior	0	0	0	1	0	1	1	1	2	0	6
From Teammates	1	0	0	0	1	0	0	0	0	0	2
Opponents	1	1	1	0	0	0	1	0	0	0	4
Toxic Behavior In Themselves	0	2	0	0	0	0	0	1	1	0	4
Witness Toxicity	0	1	2	1	0	1	1	1	1	0	8
Totals	16	15	18	23	17	13	20	10	11	10	0