EXPLORING TEACHER AND ADMINISTRATOR PERCEPTION

REGARDING

GAME-BASED LEARNING

By

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Abstract

Although games have permeated our society and culture, they have yet to take their rightful place in education. Game-based learning (GBL) is associated with a myriad of benefits, including increased motivation, engagement, and varied skill development; yet it is not widely used in formal K-12 schooling. Therefore, it is critical to understand not only the educational value of games (board, social, and digital) but also stakeholders' perceptions of GBL as they may impact programs and implementation. Working from a constructivist paradigm, this research reviewed existing literature regarding GBL benefits, obstacles, use, and perceptions before shifting its attention to explore perceptions in one secondary education institution considering GBL as a common instructional practice. By focusing on research questions that examine teacher and administrator perceptions about, teacher use of, and administrative observations regarding GBL, the study aimed to support and inform this school in future GBL implementation initiatives. The study employed a mixed methods approach using surveys and focus group discussions in a cycle of explanatory sequential design that gathered targeted input from 10 teachers and 8 administrators from a 7-12 high school, as well as elements from an administrative review of teacher practice through historical data, to construct and confirm a collective stakeholder perception about GBL. Data was reviewed from all three approaches and themes emerged that connected findings across data sources as well as stakeholder subgroups. Critical information on game use, perceived benefits, potential obstacles, and the emergent generational gap between new and veteran teachers provided insightful results that ultimately addressed the core research questions and yielded interesting recommendations for future initiatives and research. While the study may not be able to define conclusively GBL's rightful place in the field of education, the research thoroughly explored the perceptions and realities that

influence the inconsistencies associated with game use as tool for teaching and learning in this

setting. As a result, this, or any, district can now build on the established foundation of

qualitative and quantitative data on perceptions, use, values, and concerns to drive GBL progress

in a direction that is manageable and meaningful.

The Dissertation Committee for Drexel University

Certifies that this is the approved version of the following dissertation:

Exploring Teacher and Administrator Perception

Regarding Game-Based Learning

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Dedication Page

This research study is dedicated to my father, Donald B. Russell. Even though I have essentially spent my entire life in the field of education, between my work and my continuing studies, my dad has always been my first and my best teacher. Leading by example, he taught me how to work hard, care about attention to detail, and persevere no matter the obstacle. Without inheriting his grit, this completed dissertation would not be a reality. Although I can never thank him enough for all the sacrifices he made both for me and for our family throughout his life, I do hope that I can honor his memory by dedicating this work to him and telling him this:

> Pop, I miss you more than words can describe. If I could have any wish, it would be for you to be here to share in this moment – I know you would be as proud of me as I am of you and your life. However, that is not possible at this time. Therefore, I promise that when we meet again, and I am absolutely sure we will, I will tell you all about the experience, and hopefully several more Super Bowl wins for the New York Giants!

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It would be wrong to proceed without first taking a moment to thank several individuals who were instrumental in helping me through this long journey to complete my dissertation work.

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Table of Contents

List of Figures

Chapter 1: Introduction to the Research

Introduction to the Problem

Games have become a major component of our society—in fact, the number of digital games sold in the U.S. has almost matched its population (Van Eck, 2006). Although experts verify that games are better suited to meet the needs of the current and future generation of learners (Dreubel, 2006), the tool is still largely underrepresented in many formal education programs in America. Unlike traditional instructional programs, game designs have mastered the art of cyclical learning loops that scaffold and provide "a buildup of cumulative difficulty, through which the student is guided by rewards and consequences" (Bloom, 2009, p. 19). Games can incorporate problem-based tasks (Echeverri & Sadler, 2011) as well as inquiry-based and experiential activities (Gee, 2003; Papert, 1980; Squire, 2013) into learning through a multi-sensory approach that appeals to the *Net Generation* or *digital natives* (Sharp, 2012; Tapscott, 1998; Van Eck, 2006). Furthermore, games can provide authentic experiences without the cost, consequences, or dangers that naturally arise in a real-world setting (Echeverri & Sadler, 2011) and afford students the chance to reflect on mistakes, revise their efforts, and measure improved success (Bloom, 2009)—an opportunity they seldom get through traditional practice. It is clear that games provide immense benefits and can meet emerging needs of new learners, yet the transition to using games for learning is still slow-occurring. In general, this may be a result of the fact that a shift toward a game-based learning (GBL) paradigm is more than just a change in medium, but a transformation from learning about content to experiencing situations that "stimulate new ways of thinking, acting, and being in the world" (Squire, 2013, p.109).

The notion of play is accepted as one of the original educational vehicles for all young children growing up. In fact, it is highly recognized as a natural constructivist tool through which students frame and test ideas, develop and master skills, and experience new social roles

(Crawford, 1984; Games & Squire, 2011; Piaget, 1962; Vygotsky, 1978). This learning construct is prevalent outside of school frameworks and in early elementary settings, but is less customary in intermediate and secondary learning institutions, and has failed to keep up with the evolution of advanced gaming options into the digital world. While educational video games date back to the 1960s, the first well-known example came in 1972 when *Oregon Trail* illustrated the lives of American pioneers in the 19th century (Games & Squire, 2011). Due to the game's popularity, educational interest in games arose, but slowly. In the late 1980s, connections from motivation theories used in gaming developed new forms of construction and simulation type games (Games & Squire, 2011). Still, setbacks to the successful union of gaming and learning continued. Most notably, the gaming industry's goal was never to collaborate with educators but rather cash in on a potential market. As a result, developers built quick, simple educational games that could not compete with the graphics and technology of the commercial games being sold (Lee, Lucchini, Michael, Norris, & Soloway, 2004, April) and the movement to infuse GBL into schools fell flat.

However, since the turn of the century, much has changed. As Van Eck (2006) noted, the trifecta of continued GBL research, learning needs of today's *digital natives*, and popularity of both recreational and educational video games brought society to a point where games are overcoming the stigma of being only for fun. Today, games are slowly finding their way into classrooms around the globe, used in a variety of ways to meet multiple purposes. Within the literature, studies report modified versions of *Tomb Raider* teaching math and chemistry to high school students in select classrooms (Kearney & Pivec, 2007). In some cases, students are using games as "experiential learning spaces, spaces where learners have rich, embodied, collaborative, and cooperative interactions" (Squire, 2013, p. 102). This level of experiential learning through games lets students interact in ways that would be otherwise impossible within

the classroom environment and without the cost or possible risk of real-world experiences (Echeverri & Sadler, 2011). Additionally, games can provide a context for discussion that circumvents concerns regarding factual accuracy. Students can compare the virtual reality presented in the game with the factual reality of the intended content and develop a stronger understanding of the topic through that analysis. Finally, games can provide students a tool with which to think (Squire, 2013), which was the case in one study where disadvantaged students used *Minecraft* as their brainstorming and prototyping process in responding to curriculum-related tasks (Elliott, 2014). While games are not ranked equal to other instructional techniques, they are clearly on the rise. However, it is essential that efforts continue to focus on meaningful integration of gaming and learning if this tool is destined to find its rightful place as a staple of formal educational programs.

Statement of the Problem

Despite the research-supported values of GBL as a learning tool that can increase student engagement, its use is still minimal and/or inconsistent in most schools. Therefore, it is necessary to understand not only the value of games in the classroom but also the perceptions of stakeholders of GBL in their specific reality as they may impact programs and implementation. Clearly, this increased interest in GBL is timely and critical because today's digital generation, raised in an environment immersed in media and technology, seem to struggle to learn through traditional methods such as lecture, discussion, and textbook-based practice activities (Schulman, 2005). Unlike those methods, however, GBL is a promising avenue to meet their emerging needs. Its multi-modal, highly social and interactive nature, makes GBL inherently well-suited to reach a wider range of learning styles, and therefore students. Since literature supports GBL benefits including motivation and engagement, enhanced self-efficacy and confidence, and even

specific academic skill improvement, it must be examined as a potential avenue for effective

teaching and learning (Dreubel, 2006; Gee, 2012; Sharp, 2012; Squire, 2013).

Purpose and Significance of the Problem

The purpose of this study is to explore and understand the perceptions of stakeholders

regarding the use of GBL since perception, either positive or negative, can ultimately impact

implementation efforts. Although beliefs regarding pedagogy might seem more subjective than

other forms of data, they can inform educational practices in ways that research cannot and

therefore serve as a critical construct of educational research (Fenstermacher, 1979; Pajares,

1992). Therefore, this study specifically aims to discover the perceptions of a select group of

secondary school teachers and administrators from an economically disadvantaged community

and use these combined perspectives to construct a collective framework on which future efforts

and research can expand. The study of GBL is contextually significant in this era of personalized

student learning, growth, and achievement because it is necessary for schools and instructional

designers to explore ways to differentiate learning paths. In addition, since today's student

population is comprised of digital learners that expect the infusion of technology or media, it is

more difficult to engage them with traditional instruction alone, which has been inconsistently

successful in cultivating a love of learning. GBL, on the other hand, may be far more effective in

those goals. Therefore, since implementation hinges on support, which can be largely influenced

by perception, it is critical to study the opinions of various stakeholders and understand patterns

and challenges to implementation.

When designing learning activities and tools, perceptions may have as much impact as

results and data. Even with a sound argument comprised of scientific data, collected in a distant

research study or laboratory experiment, pursuits cannot succeed without the support of the local

constituents. Although community stakeholders are capable of processing and analyzing research findings, their perceptions of the initiative and its value to the specific people and site involved may hold greater weight in their decision-making process. With regard to the use of GBL, it is imperative to address the viewpoints of key stakeholders; namely, teachers and administrators. Without addressing those viewpoints, any planned use of the new tool to engage disinterested learners will be at an uninformed disadvantage. Prior research completed in various locations, many overseas, examined the opinions of stakeholders in order to understand perceived benefits and obstacles affecting game use in the classroom (Dreubel, 2006; Squire, 2013; Van Eck, 2006). Overall, most existing research shows all participant groups voicing positive attitudes toward GBL, at least theoretically, regardless of stakeholder subgroup or experience with the strategy (Mifsud, Vella, & Camilleri, 2013). However, that hypothetical patronage does not necessarily translate into real-world support of actual classroom integration. This disconnect between hypothetical and real-world support is not clearly delineated or necessarily similar across research study or subgroup. In general, literature demonstrates that stakeholder interests regarding goal alignment, cost, and attitudes themselves are the main concerns reflecting negatively on the evolution of this promising instructional technique (Allsop, Yildirim, & Screpanti, 2013; Whitton, 2012).

Despite these overall findings, there are gaps and inconsistencies to explore in order to develop a stronger foundation of understanding regarding GBL perceptions. Specifically, a majority of the available research was completed overseas, with little focus on public education in America, let alone in economically disadvantaged communities where the struggle to achieve and grow academically is even more significant. Also, while several studies sought to understand the perceptions of teachers (Bourgonjon et al., 2013; Dreubel, 2006; Gerber & Price, 2013;

Mifsud et al., 2013), students (Hainey et al., 2013; Mifsud et al., 2013; Razak & Connolly, 2013), and even parents (Bourgonjon, Valcke, Soetaert, de Wever, & Schellens, 2011; Chaung, Chen, Chen, Shen, & Tsai, 2011; Mifsud et al., 2013), little or no research delved into the opinions of administrators who not only hold the proverbial purse strings in a school's programming, but also play an integral instructional role in selecting and acquiring the resources and tools their schools utilize. In reviewing stakeholder perceptions, teacher and parent research tended to present cohesive stakeholder views within their respective groups, while students demonstrated a greater variation in their responses. Overall student perceptions ranged from highly positive (Hainey et al., 2013; Mifsud et al., 2013) in some scenarios to debatable or even negative in others (Bourgonjon, Valcke, Soetaert, & Schellens, 2010). In contrast, administrators are thoroughly underrepresented as the target of any perceptual GBL research, making it nearly impossible to discern a baseline from that subgroup's perspective.

Therefore, this research aims to corroborate or question those areas already explored as well as begin to examine new characteristics of a focused audience and setting. Specifically, it will explore the perceptions of teachers and administrators in an urban secondary school setting serving an economically disadvantaged community. Since the ontological underpinnings of this work are relativist in nature, the study does not assume internal alignment with external findings. Instead, it examines views from teachers and administrators to construct a collective reality built on their combined perceptual framework. In addition to informing instructional decisions in one specific district, this research may be useful for all school districts struggling to meet the needs of the increasingly digital student population. Since it will use surveys and focus groups to summarize perceptions and develop a perceptual consensus regarding GBL from the viewpoints of teachers and administrators in one district; the research will ultimately provide insight for

schools, especially secondary schools, seeking to understand and impact the trend toward GBL integration. In particular, teachers and instructional leaders seeking to incorporate GBL into their formal learning programs will be able to build on the perceptual foundation developed through this research to inform their initial steps.

In the continued effort to explore various views on the use of games for learning, this research study seeks to expand upon prior findings and themes in order to better understand the perceptual reactions to the potential strategy. Despite the targeted focus of this study, its findings should be meaningful to the overall field nonetheless. With this focused examination of perceived GBL value to these educational stakeholders, future researchers as well as educational policymakers and practitioners might be able to build on this work to facilitate GBL efforts in their own areas. Primarily, this work aims to provide points of comparison for the several European studies and single American study dominating the current research in this field. The resulting themes and suggestions may help to either corroborate pedagogical theories or generate further questions on perceived value. Finally, in doing so, this work could aid educational planners, regardless of their current position, in their efforts to more effectively study or implement GBL in their respective arenas. Even without seeking, and therefore suggesting, definitive results on effectiveness or value, the exploration of perceptions is critical to future work. Without addressing perceptions in this, or any, educational forum, a strategy's potential cannot be maximized as it would not build on the perceived benefits or address perceived concerns.

Research Questions

It is imperative to examine the perceptions of stakeholders to identify trends and contradictions, as well as support for and challenges to GBL implementation. Only with that

specific insight will the organization be able to begin planning an informed and productive

implementation process. Therefore, in order to explore the use of and perceptions regarding GBL

in education, the following research questions will guide and drive this study:

1) How do teachers and administrators perceive game-based learning as a tool for teaching
   and learning at the secondary level?

2) How do teachers utilize game-based learning as a tool for teaching and learning at the
   secondary level?

3) What do administrators observe regarding teachers' use of game-based learning as a tool
   for teaching and learning at the secondary level?

Conceptual Framework

Games have a long tradition, not just personally, but for society dating as far back as

ancient Greece (McGonigal, 2010, February). When immersed in game play, people are capable

of enduring and persevering through seemingly impossible situations to achieve what McGonigal

(2010) refers to as the *epic win.* If society could harness the addictive properties that gamers feel

as they seek out this epic win and transfer it to the goals of life and learning, the opportunities

could be limitless. It is this curiosity and potential that interests gamers in GBL research. If

learning organizations could achieve the transference of game-related motivation to support

educational endeavors, it would be the ultimate *epic win* for all involved parties.

Rather than assume there is one universal truth about GBL, that it is either valuable or

not, the interpretive/constructivist paradigm guiding this research reflects that reality is

individually constructed and may change over time (Scotland, 2012). Having watched the

'reality of education' change with the tides of political and public pressure and opinion in 19

years in education, I realize that the perceived value of GBL today is not that same as it was a

decade or two ago and that, even today, it may be different overseas, in a wealthy neighborhood, or in an impoverished community. That is due to the fact that peoples' experiences vary and result in different perceived realities. Personal and professional experiences suggest that GBL is a valuable instructional tool—I have witnessed success using games to teach students and lead professional development for adults. Research from studies and insight from experts corroborate my perceived value of GBL. Regardless, rather than using that to support a GBL value inherent to all, this work, which is based on the philosophical assumptions of relativism and subjectivism, assumes no definitive value that will apply globally regardless of the amount of personal experience, research data, or expert opinion (Guba, 1990). Therefore, the literature review serves to pull from a wide array of comparative studies to inform researchers of many possible ideologies and perceptions regarding GBL before creating survey tools and conducting data collection processes to examine local perception of this instructional strategy. Then, from that solid background, the study seeks to explore perceptions collaboratively in order to develop a
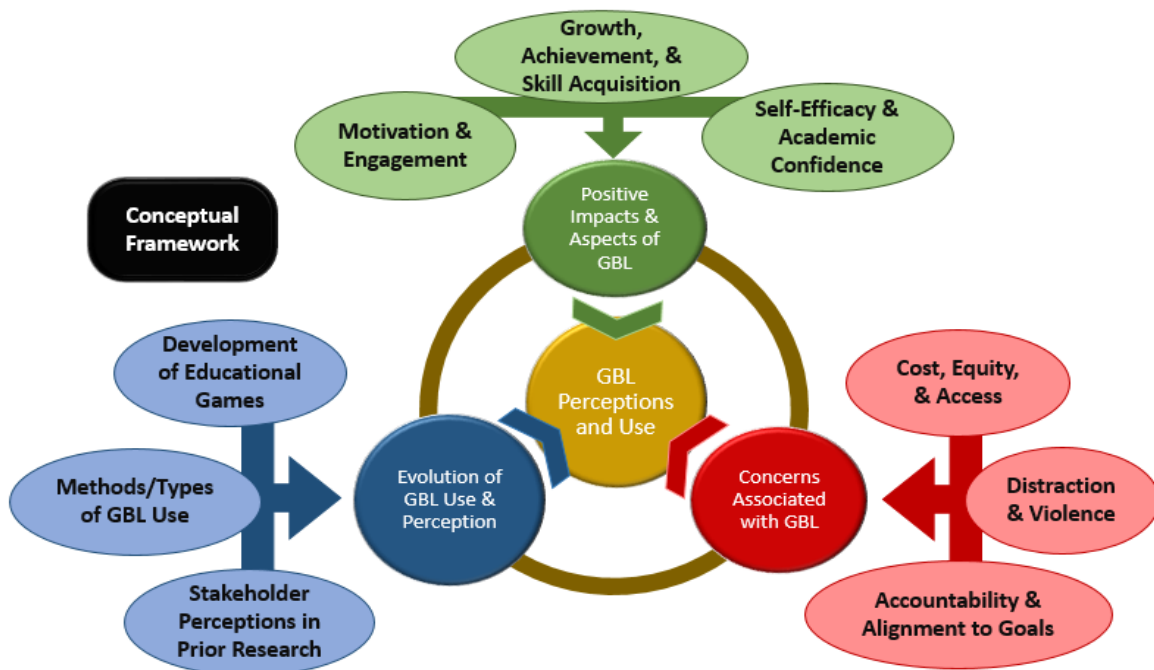
Figure 1.1: Conceptual Framework of the Research

collective perspective consensus within and across teacher and administrator stakeholder groups upon which the school community can build a plan to move forward.

In exploring available literature on the perceived value of GBL, three core streams converge to provide a foundation for this research (as illustrated in Figure 1). First, a review of literature on GBL provides an overview of the evolution of the GBL movement to integrate games into the classroom, delineating the various methods and types of GBL use, and highlighting the perceptions of educational professionals regarding GBL as documented in prior research. While there are numerous studies examining various viewpoints, the multiple works of research teams led by Jeroen Bourgonjon (Bourgonjon et al., 2013; Bourgonjon et al., 2011; Bourgonjon et al., 2010), Charles Mifsud (Mifsud et al., 2013), and Thomas Hainey (Hainey, Boyle, Connolly, & Stansfield, 2011; Hainey et al., 2013) explore subgroups separately or in conjunction. From there, the second stream represents a thorough analysis of GBL studies and identifies the various positive impacts and aspects of GBL that are supported by theory and research, including Squire's (2013) and Sharp's (2012) work showing increased motivation and engagement, notable student growth, achievement, and skill acquisition results. In addition to those benefits, findings emerging from Gee's (2012) and Dreubel's (2006) work support improved self-efficacy and academic confidence as a result of GBL usage. Then, the third stream fairly represents the other side of the debate—concerns associated with GBL. Specifically, it encompasses pitfalls, concerns, and obstacles reported regarding GBL as summarized through Whitton's (2012) work on cost and equity issues. Also, Van Eck's (2006) findings on the distracting or violent aspects of games and noted worries about educational accountability or alignment to learning goals support possible concerns with GBL. These streams will be critical in predicting a strong foundation for the possible reactions to GBL of study participants in order

to develop initial data collection instruments, as well as inform those participants of the current research surrounding the potential educational tool.

Definition of Terms

Commercial Off-the-Shelf (COTS) Games   These games, the opposite of serious games, are commercially developed games created initially for entertainment purposes, but teachers can modify or use them for learning purposes. Some examples include: *Scrabble*, *RISK*, *Battleship*, *MineCraft*, *SimCity,* and *Civilization*

Digital Natives   A term coined by Marc Prensky (2011), refers to the children in the current and next generation raised in an environment where they were so immersed in technology and digital media that they have come to expect a certain level of it in their daily life.

Game-Based Learning (GBL)   GBL is a pedagogical approach where students explore relevant aspects of games within a learning context designed by teachers. Teachers and students collaborate to add depth, perspective, and meaning to the experience of playing the game.

Gamification   This is a strategy that uses game elements (such as points, badges, leaderboards, competition, achievements, etc.) to motivate students. Games inherently do it, but the term is generally used to describe when the strategy is applied in a non-game setting.

Serious Games   Serious games are created specifically for another purpose besides entertainment, usually education, military training, business, etc. such as:

- educational sites or software including games within the practice, such as Study Island, BrainPop, CoolMath, Reflex Math, or PBSKids
- video games created specifically to support student learning like *Oregon Trail*, *Math Blaster*, or *Where in the World is Carmen Sandiego?*

- non-video games created specifically to support learning, including Equate or simple board or card games that come with a curriculum or textbook

Zone of Proximal Development (ZPD)   This is a term used by Lev Vygotsky (1978) to explain the difference between what a learner can do without help and what they can do with support. Cognitive theory and research suggests this "zone" is where tasks should be targeted to maximize learning and drives the thinking behind the challenge in games.

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Assumptions, Limitations, and Delimitations

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Assumptions

There are several underlying assumptions that should be considered in planning for, and reviewing, this study:

1. Game-based learning (GBL) is naturally engaging to all students who enjoy gaming for entertainment purposes.

2. GBL is more engaging than traditional learning methods.

3. A positive approach to GBL is necessary in order for effective facilitation.

4. Good teachers and administrators will want to try strategies that may have a positive effect on student efficacy, perseverance, and achievement.

5. Participants in the study range naturally in their perceptions of, and experience with, both gaming and GBL as an instructional tool.

Limitations

In addition, it is critical to acknowledge the potential limitations of the study to provide full context for its findings and implications:

1. Since discussion will occur between new and veteran teaching staff, some participants may not feel fully comfortable sharing all details of use and perception.

2. Even though efforts to separate administration from teachers will occur, there may be some concern on the part of teaching staff about sharing too much professional information that could be indirectly considered when evaluating their teaching style and effectiveness.

Delimitations

Finally, it is critical to acknowledge the potential delimitations of the study that arise as a result of some of the choices made in site, population, and methodology:

1. The study only explores teaching staff working with students grades 7 through 12, which does not take into account any varying perceptions of educational professionals working with elementary students or adult learners.

2. Since the study explores perceptions in a single high school serving grades 7 through 12, it is not certain that the results and findings will be transferable to other schools due to differing populations.

3. In order to explore perceptions deeply, it is necessary to limit the number of participants from the teaching staff, which could potentially affect the validity of the constructed staff perception.

4. Whereas there is a wide pool of teaching staff to draw from in order to develop a broad range of experience and discipline (subject area), there are only a limited number of administrators assigned to this specific site. Therefore, it will be more difficult to guide a balance of experience and demographics purposefully to the same degree as will occur in the teacher population.

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Summary

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Pedagogical theory dating back to the works of educational forefathers Piaget (1962) and Vygotsky (1978) supports the use of games as a constructivist tool with a myriad of learning benefits. Clearly, in reviewing the possible merits of GBL as a learning tool to engage disinterested (and all) learners alike, it is a topic meriting further examination. This is especially critical now, as a large percentage of the student population represents a new generation of digital learners who rely on the use of information and communications technology (ICT) to socialize, learn, and live (Brown, 1999). When this new type of learner is not highly engaged by traditional instruction, GBL may provide the necessary solution. Therefore, in order to better plan future implementation of GBL, this research aims to explore the perceptions surrounding it, namely the thoughts of teachers and administrators who form most of the educational decisions in a district. By doing so, it will inform future practitioners and researchers of the perceptual support and concerns regarding GBL, so that initiatives can be adequately planned and implemented.

While this research will collect data from two critical stakeholder groups in one small secondary school in a disadvantaged community, preliminary research into existing studies will explore findings universally. A thorough review of existing literature will provide a solid foundation for exploring the currently perceived value of GBL based on three contributing streams: the evolution of GBL use and perception; the positive impacts and aspects of GBL; and the concerns associated with GBL. The extensive research and theory addressing this important topic can act as a valuable starting point for data collection in this study as it builds a framework of understanding that can inform and direct research activities moving forward.

Chapter 2: Literature Review

Introduction

The purpose of chapter two is to provide a comprehensive background and review of the available literature regarding game-based learning (GBL), specifically the perceived benefits and concerns associated with this instructional tool for teachers and the educational community. In an effort to develop a solid foundation for future research, this chapter will aim to synthesize the relevant historical factors and perceptions, dominant advantages, and noted concerns with respect to GBL as a formal component of teaching and learning in schools.

Research promisingly views games as a natural learning tool that positively affects student motivation, collaboration, skill development, and attitudes toward learning and regarding self-efficacy (Bloom, 2009; Dreubel, 2006; Sharp, 2012). However, schools still seem hesitant to implement GBL as a substantial component of their program. Therefore, it is imperative to examine the clear disconnect between theoretical value and actual use. While there may be other reasons widening this divide between belief and practice, this research will focus on the notion that, when designing learning activities and tools, perception can have as much impact on implementation and decision-making as findings and data. As a result, a literature review will explore existing research studies in this field in order to build a solid foundation for this work. In order to examine the topic fully, a first stream will critically examine literature tracking the theory behind and evolution of GBL as a viable learning avenue. Then, a second stream will examine positive impacts and aspects of GBL, and how those perceptions and findings may influence its formal use for instructional reasons. Finally, the third stream will explore research evidence regarding concerns associated with GBL, as those potentially negative aspects could affect formal use of the strategy in schools.

Evolution of Game-Based Learning Use and Perception

The notion of play has long been accepted as the original method of learning for young children and recognized as a constructivist tool through which students can frame and test ideas, develop and master skills, and experience new social roles (Crawford, 1984; Games & Squire, 2011; Piaget, 1962; Vygotsky, 1978). Today, the use of games for learning purposes occurs frequently outside of school settings and in early elementary levels, but is less commonplace in intermediate or secondary learning institutions. In addition, GBL has failed to evolve with the growth of advanced gaming in today's digital world.

Developing educational games. Educational video games date back as early as the 1960s, with the popularity of one of the pioneers of educational games, *Oregon Trail*, but despite erratic pushes over the years for greater GBL integration, the initiative has only slowly strengthened. A disconnect between the gaming industry's business goals to maximize profit and education's learning goals, among other issues, has impeded the efforts of many to incorporate GBL into more traditional learning environments (Lee et al., 2004, April). However, much has changed recently as a trifecta including continued interest in GBL research, unique learning needs presented by today's *digital natives*, and the popularity of video games has created a turning point in society where games no longer suffer the stigma of being only for fun (Van Eck, 2006). In addition, with the current transition to Common Core Standards and Next Generation Science Standards both stressing the use of digital tools to apply learning (Takeuchi & Vaala, 2014) and with the recent influx of tablets and 1-1 computer initiatives, games are increasingly viewed as a viable option to meet the curricular demands using available modern technology. As a result, games are slowly finding their way into classrooms around the globe, used in a variety of ways to meet multiple purposes.

Methods/types of game-based learning implementation. GBL research has demonstrated a myriad of goals and means through which games can facilitate learning. Studies support three general methods of integrating games into the classroom environment: (a) student development of games as a learning activity, (b) facilitation through a game that is designed by a teacher, and (c) using a commercial off-the shelf (COTS) game as is or in some modified format (Van Eck, 2006). All three methods can provide success with both digital and non-digital games, depending on the level of skill and the desired learning outcome. Having students or teachers create games is the easiest way to ensure alignment between instructional goals and gaming outcomes, but proves more difficult with digital games because it requires some level of web design skills or coding capability in order to actually develop digital games. Also, it is unlikely that those games created by students and teachers can ever fully mirror the "top-end aesthetic quality and game fidelity,…which some argue is important for acceptance by learners" (Whitton, 2012, p. 250).

Within the literature, studies report modified versions of *Tomb Raider* teaching math and chemistry to high school students (Kearney & Pivec, 2007), yet making or finding those options can be difficult. However, the development of more "serious games" that integrate high-end commercial qualities but focus on education over entertainment will likely change GBL utilization. Therefore, while it is still somewhat difficult to find appropriate games to meet all possible curricular needs, serious game development is on the rise. In fact, the fastest growing component of the gaming industry is the educational games department (Tack, 2013).

In addition to the various methods of acquiring games for use, analysis of data from organizations doing GBL work has identified themes about how games are used (despite their origin or type). While this list is not exhaustive, it is strongly indicative of the major functions of

17

GBL. First, students may use games as "experiential learning spaces, spaces where learners have rich, embodied, collaborative, and cooperative interactions" (Squire, 2013, p. 102). Experiential learning through games lets students interact in ways that would be otherwise impossible within the classroom environment and without the cost or possible risk of real-world experiences (Echeverri & Sadler, 2011). Second, games can provide a context for discussion that circumvents concerns regarding factual accuracy. One strong learning activity could have students compare the virtual reality presented in the game with the factual reality of the intended content and develop a stronger understanding of the topic through that analysis. Finally, games provide students a tool with which to think (Squire, 2013), which was the case in one study where disadvantaged students used *Minecraft* as their brainstorming and prototyping process in responding to curriculum related tasks (Elliott, 2014).

Perceptions. While research on the benefits of GBL can present a strong argument for game use in the classroom, perceptions can be equally effective in either reinforcing or undermining efforts to move forward in this arena. In fact, several research studies examined teacher beliefs and how they value certain practices, and discovered that those thought processes possess a profound influence on their educational choices (Yero, 2010). Therefore, it is critical to examine the opinions of those involved in, or impacted by, GBL efforts in schools. While a comprehensive study might include the students who will use the tool and parents who will support it as part of the research, this work will focus on the teachers and administrators who will implement it. Although research shows that perceptions might vary based on location, culture, achievement levels, and a myriad of other factors, a thorough review of the available literature revealed certain trends in and across each stakeholder group.

Despite a vast array of perception-based research completed in the area of GBL, there are three bands of literature that provide the most comprehensive findings regarding stakeholder perceptions. First, as part of a series of three studies performed in Flanders, Belgium, each focusing on one key stakeholder, researchers surveyed 505 teachers using a combination of paper and online questionnaires (Bourgonjon et al., 2013). In the study focusing specifically on staff perception, teachers were asked to provide information on demographics, teaching experience details, and constructs of the Technology Acceptance Model (TAM) for research before answering perceptual questions scored on a Likert scale (Bourgonjon et al., 2013). Secondly, one comprehensive study simultaneously examined all stakeholders' attitudes regarding GBL use. Researchers focused on four schools in Malta and a sample of 149 teachers (in addition to other stakeholders not examined here) (Mifsud et al., 2013). Using questionnaires, researchers presented conclusions on teachers' perceptions regarding educational potential as well as their actual use of GBL in lessons (Mifsud et al., 2013). Finally, to complement the foreign research completed in this area, Takeuchi and Vaala (2014) authored an extensive research report funded by the Bill and Melinda Gates Foundation, aiming to track the GBL movement and the reasons supporting and impeding its progress. To do so, they surveyed 700 American K-8 teachers that were proportional to the demographic and geographic makeup of American teachers using a 36-item survey that spanned all types of perceptual questions (Takeuchi & Vaala, 2014). Numerous categories of descriptive statistics were provided.

Trends in teacher perceptions and attitudes. GBL research and initiatives must address the impact of teachers as a critical stakeholder group, especially since research findings suggest there is a strong relationship between the beliefs of teachers and their planning efforts (Pajares, 1992). In reviewed research, teachers responded with a notable complexity when asked about

using games for learning. Overall, teachers supported GBL in theory but did not frequently use it in their classrooms (Mifsud et al., 2013). Most agreed that games could provide opportunities for student learning but were not convinced that GBL would improve their pedagogy (Bourgonjon et al., 2013). Essentially, teachers were not as highly worried about games limiting the learning potential of their students, but rather were concerned about teaching performance instead (Bourgonjon et al., 2013; Gerber & Price, 2013). Some teachers "feared reprisal from colleagues" (Gerber & Price, 2013, p. 59) and worried how they would be perceived for teaching through games as opposed to other methods. This performance evaluation component and the reservations associated with it may be difficult to alleviate, especially since it would require a certain change to school cultures and widespread acceptance of GBL. However, it is important to explore the pedagogy of GBL further in order to persuade teachers and school communities of its value.

Similar to these evaluation concerns, additional studies found educators pointing at external factors creating perceptual barriers for true implementation. First, teachers noted an apparent lack of formal GBL adoption policies in schools, along with a lack of materials, training, and administrative support as a major factor in their minimal implementation (Koh, Kin, Wadhwa, & Lim, 2011). Even with the possibility of external support and training, in one survey only 39% of teachers agreed that there are a sufficient quantity and variety of games that align with curricular standards and goals in order for the tool to be truly effective (Takeuchi & Vaala, 2014). Essentially, even though teachers are viewed as the gatekeepers of changing instructional methodologies (Takeuchi & Vaala, 2014), teacher perceptions point to a multitude of external issues affecting widespread GBL utilization. However, with respect to their controllable internal elements, extensive research studies have been conducted to investigate how their perceptions

vary depending on the type of game, subject covered, skills supported, and impact on various students.

Types of games for students. One interesting extension of teacher perception studies is whether educators regard all games as created equal and able to meet the needs of all learners equitably. Most teachers are relying on shorter games that students can complete within a single learning period as opposed to utilizing immersive digital games, not only due to a concern for time but also because it is easier to map these games to their curricular standards (Takeuchi & Vaala, 2014). Also, since teachers must rely on COTS for a majority of their GBL endeavors, some studies have examined teacher outlooks on these modified learning tools specifically. While only about 30% of teachers used COTS for motivational reasons, over 60% of teachers acknowledged that games improved motor and cognitive skills, higher order thinking skills, and content knowledge (Sandford, Ulicsak, Facer, & Rudd, 2006). Also notable in terms of equitable impact studies, teachers do not perceive games to be a tool similarly effective for all students. Instead, teacher survey responses imply a consensus that games benefit low performing students more than their higher performing peers and even more than other specific demographic subgroups (Takeuchi & Vaala, 2014).

Subject areas and skill development. Similar to the wavering perspectives of parents regarding game use for various subject areas, teachers perceive GBL effectiveness depending on the disciplines as well. When game-using teachers (GUTs) were asked how much games improved learning in different skill/subject areas, 42% felt they were effective in science instruction, 56% for reading/language arts learning, and 71% for math instruction (Takeuchi & Vaala, 2014). Teachers see more value and results in certain areas, however those results do not coincide across all studies.

Positive Impacts and Aspects of Game-Based Learning

Reports by the Federation of American Scientists (2006) tout games to be particularly well-suited to prepare students to thrive in today's knowledge economy and are effective in motivating, developing higher order thinking skills, and facilitating problem-solving and teamwork. While some aspects of GBL effectiveness may be difficult to prove concretely and are still debated, especially concerning its impact on certain subgroups or demographics, there are some general findings about the positive aspects associated with games and learning that are vastly undisputed. One aspect primarily agreed upon is the fact that this medium is able to reinvent and reinvigorate the formal curriculum (Larson & Gatto, 2004). Many concur that games provide a combination of structure, motivation, enjoyment, gratification, and intensity that traditional learning cannot match (Bloom, 2009; Kara-Soteriou, 2010; Sharp, 2012). As a result, GBL offers avenues to increase student growth potential, overall academic achievement, specific skill development, and self-efficacy.

Motivation and engagement. What could perhaps be the strongest positives associated with GBL are the natural correlations to student motivation and engagement. While the two are inherently connected, literature is available on each individually as well as in conjunction. Overall, research shows that increased motivation and engagement through game activities can make even the most uninterested student willing to face the challenges posed by the game to solve academic tasks (Kara-Soteriou, 2010).

Regarding the motivation factor of GBL, games can provide incentive within their construct and generate lasting motivation for learning beyond the game task. Perhaps the most motivating and compelling component of game design is the immediate feedback that the player receives in the process (Oblinger, 2004). Unlike traditional settings where feedback is presented

after a summative assessment, games rely on a formative assessment loop, immediate feedback, and a 'hang-in there' mentality that drives the student's intrinsic motivation to improve (Bloom, 2009). Contrary to some perceptions that games only generate interest in continued GBL tasks, it seems as if the combination of challenge, reward, and achievement encountered in games contribute to a sense of student enthusiasm and motivation that can endure into extended classroom activities (Robertson & Howells, 2008). Also, despite a general impression that games could shorten attention span and endurance, games have actually shown success in motivating students to persist where other strategies were ineffective (Dreubel, 2006). Finally, in addition to promoting endurance and interest, games are excellent mechanisms for motivating academic risk-taking that is necessary in strong learning environments because they allow students to try their hands at things without feeling the need to succeed in their first attempt (Whitton, 2012).

Along with motivation, engagement through immersive experiences is one of the driving forces substantiating a shift to GBL (Squire, 2013). Games, despite wrongful association with instant satisfaction, have perfected the art of delayed gratification that fosters stronger, more enduring engagement (S. Johnson, 2005). Between that game quality and the ability to facilitate multi-sensory, active tasks (Oblinger, 2004), GBL may be able to combat the increased disengagement of the *Net Generation* who experienced a highly digital, technologically-pervasive upbringing and now expect a more multi-faceted or multi-dimensional learning experience (Sharp, 2012). According to the literature, people do not only commit to completing games, but then they create instructional texts or virtual learning centers where they can openly share their mastery with others (Squire, 2005). Clearly, engagement ties not only to play, but to learning and mastery as well. This is partially because, unlike traditional learning, games use "emotionally compelling context" (Squire, 2013) that invoke intellectual and affective

engagement. In addition, games can reach a broad audience because of the wide variety of mechanics they pull from, including puzzles, social interaction, competition, stories, and the human need to complete sets (Whitton, 2012). Essentially, they create learning experiences accessible to a wider array of students by employing the pedagogical theory of differentiation through varied modalities, interests, and motivators.

Personal growth, achievement, and skill acquisition (social and academic). The ability of games to differentiate, in terms of process and level, as well as through motivational technique, is one of their biggest assets. GBL allows for high levels of personalization with regard to pacing, learning style, and ability (Sharp, 2012) which increases its effectiveness in fostering individual growth. Unlike traditional learning, failure in games is a critical component of the learning process that forces students to confront errors or gaps in their understanding through a cyclical learning process. This continual self-assessment aspect of gameplay, in conjunction with the ability to provide immediate feedback, allows students the opportunity to develop and test hypotheses and learn from their efforts (Oblinger, 2004). As a result, student thought processes become increasingly complex and they are better able to develop causal connections, brainstorm and implement possible solutions, and examine data (Squire, 2005).

In addition to these overarching gains, various games have demonstrated the ability to bolster specific skills through guided play, including the development of decision-making skills (Sharp, 2012), increased memory (Salies, 2002), and even enhanced levels of content-rich vocabulary and deeper understanding of historical concepts (Squire, 2005). These isolated cases of skill development are corroborated by the large-scale research completed by Haystead and Marzano (2009) reporting 20% improvements in achievement scores across 14 different K-12 school districts that implemented GBL in their regular program. Finally, along with academic

skill advancement, GBL also encourages interaction and promotes collaboration because players

must often work together to reach common goals (Whitton, 2012). While games can promote

student cooperation even with a virtual team, reports show that students who participate in GBL

in small groups show even greater social skill growth (Takeuchi & Vaala, 2014).

      Self-efficacy and academic confidence. Finally, it is critical to note that games not only

boost academic skills, but impact the learner affectively as well. Specifically, games enhance a

student's self-efficacy and academic confidence because they help the learner envision that they

are mastering the content involved (Barab, Gresafi, & Arici, 2009; Gee, 2005). This visualization

of mastery is often achieved through game *badges*, gold stars or bars, level achievements, and

other gamification tools as well as through the intelligently designed cycles that support students

as they learn the material and practice sufficiently before testing their skills. While a traditional

learning construct often relates failure as an end result, games creatively reinvent failure to be

merely a stepping stone or building block on the path to better understanding. They provide safer

learning environments where students' confidence can blossom as they reflect positively on

experimental mistakes and build upon them (Whitton, 2012). In doing this, games increase

success and provide an ego boost to students that promotes self-worth (Dreubel, 2006). These

affective impacts permeate across demographics, even for disadvantaged and disengaged

students who use GBL, as case studies have recorded positive attitude shifts, improved

attendance, and an increase in the valuable contribution to classroom experiences and

discussions from these generally under-represented learners (Elliott, 2014).

      It is clear that research provides significant affective and cognitive advantages to GBL—

noting benefits regarding motivation, engagement, skill development, personalized growth, and

feelings of self-efficacy. Ultimately, however, while literature largely supports the pedagogical

concept of GBL with theory and preliminary research results, real-world initiatives to use games as regularly as their traditional counterparts are still limited. Even with the extensive literature available on theoretical benefits and values of this learning tool, there might not be enough information on how to effectively integrate GBL into formal learning institutions (Watson, Yang, & Ruggiero, 2012) in order to fully reap these advantages.

Concerns Associated with Game-Based Learning

Despite the various motivational, affective, and academic advantages associated with GBL, there are complications and concerns as well. These varied concerns can be categorized to first-order barriers such as access, time, and technology that are extrinsic to teachers as opposed to second-order barriers like teaching beliefs, established practices, and fear of change that are intrinsic to teachers (Brickner, 1995; Ertmer, 1999). First, literature points to extrinsic issues with cost, equity, and access factors for both schools and students. The most debated of the core concerns voiced is that games may create more distraction for students, possibly instigate behavioral issues, and potentially have violent undertones (Kearney & Pivec, 2007). Finally, in the era of accountability, there are intrinsic barriers based on fear that games might not provide enough alignment with instructional goals to meet the needs of students and teachers. Although, all of these are valid reservations, they could be alleviated with increased information and experience.

Cost, equity, and access concerns. As is often the case with the evolution of instructional technology, one concern focuses on cost, equity, and access. Studies on use, perceptions, and barriers note limited budgets and technical resources to be a prime concern when considering GBL as a formal learning tool (Baek, 2008; Rice, 2007). Since efforts place the onus of responsibility on the schools to provide learning tools, including games, a major

cost/access issue arises in terms of securing games, supporting them with hardware, and training staff to implement them appropriately (Whitton, 2012). While cost may be higher in reference to digital games, the embedded need to budget for training on GBL strategies in general should be addressed. Depending on the type of game use, costs can be high—developing a digital game can range in cost from $5,000 to $250,000 (Ballanc, 2013), significantly holding schools back from that option.

Although cost impairs a school's ability to secure access to valuable games for learning, there are impediments that are more serious as well. Since GBL is not widely accepted by education, finding appropriate and valuable games for very specific learning situations can still be difficult (Whitton, 2012)—a problem that continued support can solve on its own. Beyond school access concerns, available studies corroborate the potential limitation to GBL as an in-class activity. Some students, and families, do not have access to the technology or connections necessary to interact with a gaming environment at home. This could potentially cause equity issues between the different socio-economic levels within a school community and undermine the extent to which games can otherwise level the playing field for students (Elliott, 2014).

Distraction and violence. In addition to more substantial concerns, two common reservations about GBL persist with minimal proof or supporting data. One fear, of an unintended distraction factor, looms over the efforts to integrate GBL into mainstream practices. Educational professionals surveyed on the topic of GBL use admitted that they viewed games as a distraction in the classroom (Pastore & Falvo, 2010) and noted concerns about classroom management as a result of game use (Can & Cagiltay, 2006). However, studies show that GBL activities focus students more and actually maximize instructional time across many ages and disciplines (Van Eck, 2006). In reality, the primary data discovered in this area came from the

fact that students were inexperienced with GBL, unsure how it would help them learn, or found the game too difficult or complicated at first (Squire, 2005). This implies that a more skilled and guided facilitation of GBL could eliminate or minimize those distracting elements.

Another myth that plays on the protective nature of parents and teachers is the fear that games are highly associated with violence and will have a negative impact on children as a result (Dreubel, 2006). While some COTS games are incredibly violent, many GBL staples succeed without violence as a central component of gameplay, and the current "Serious Games" Movement aims to create even more non-violent educational games (Wilson, 2007). With regard to the concern that digital games could incite student violence or other behavioral problems, evidence from multiple research studies has found that students often become so immersed in learning the game that their behavior improved (Elliott, 2014; Giannakos, 2013).

Accountability and alignment to core goals. Regardless of a theoretical interest in utilizing games as a teaching tool, some teachers are concerned that they focus more on the experience and motivational aspects than the learning objectives driving the lesson (Koidl, Mehm, Hampson, Conlan, & Göbel, 2010). People question if COTS games remain true to the intended learning goals or if they detract from the curriculum of the institution (Dreubel, 2006). Teacher survey responses mirror these concerns, fearing games will not meet intended learning goals or will develop only shallow skill sets (Allsop et al., 2013). Overall, some doubt the extent to which GBL is deemed 'acceptable' for instruction and learning (Becker, 2007). However, it is a misnomer that total accuracy is necessary for games to be valuable learning tools. In fact, teachers can use these "teachable moments to create cognitive disequilibrium (through instructional strategies and activities) by presenting or designing activities by which *students* discover information that conflicts with the game and the student's knowledge" (Van Eck, 2006,

p. 10). While one optimistic goal of this research is to change negative perceptions, the fact that they still permeate the educational community acts as an obstacle for implementation (Becker, 2007).

Summary

Despite the slow evolution of GBL as a common tool for teaching and learning, there are several methods and types of GBL and a variety of perceptions in reaction to those strategies. However, in the final analysis of GBL research, it seems that the benefits outweigh the pitfalls, at least theoretically. It is difficult to argue against increased motivation, engagement, and the cognitive learning theory that supports GBL based on concerns with cost, possible distraction, and accountability. However, fear and hesitance, mostly about GBL components that have little to do with learning value, are still holding back advancement. Therefore, educational professionals must address perceptions even more than the research-supported conclusions. Also, a sufficient level of experience with modern learning standards and instructional games is necessary to evaluate GBL value in the classroom accurately. While research documents the observed concerns, it is critical to note that some teacher reservations may be due to inexperience and to some extent the barriers may be imagined as meaningful GBL use may depend more on mastery of the curriculum than game use (Sandford et al., 2006). Therefore, in preparation for any future research or GBL efforts, addressing and minimizing any perceived inexperience factor will be critical to success.

Chapter 3: Research Methodology
Introduction

Perceptions can affect implementation efforts as much as other factors, which is why this study examined the views of stakeholders concerning the use of game-based learning (GBL). Specifically, it delved into the perceptions of a select group of high school teachers and administrators from an economically disadvantaged community and then built on those perspectives to construct a collective framework on which future GBL efforts can expand. In today's era of accountability in education, and in order to be efficient and effective, school districts are facing increasing pressures to implement initiatives that are research-based (Coburn & Talbert, 2006). However, since this research study was based on a constructivist platform, it sought to explore prior studies through a literature review as a precursor to the more important information—the thoughts and perspectives of the community examined. This work used prior findings as starting points in developing a consensus through participant input.

Stakeholder perception is critical in identifying the trends and contradictions, as well as examining support and challenges to GBL implementation. With that insight, an organization could begin planning an informed and productive implementation process. Therefore, for this mixed methods study, the central research questions examined how teachers and administrators in a specific 7-12 high school have shared perceptions and experiences regarding GBL as a teaching and learning tool. To achieve that goal, teachers and administrators at a single 7-12 high school were surveyed to develop a general baseline consensus regarding their use of and perspectives on GBL in the context of the school. Then, perceptions regarding GBL were examined in greater depth through three focus group discussions (one with five new teachers, one with five experienced teachers, and a third with eight administrators) in order to develop a collective consensus on the use of and value of the learning tool. Finally, an examination of

teacher practices through historical data via observations and lesson plan reviews provided

substance to what types of GBL use was observed by the administrative team. Essentially, the

mixed methods explanatory study focused on teaching and administrative experiences and

perceptions in order to discover how those perceptions might impact GBL use throughout the

school (Merriam, 2009). While the three data collection methodologies were distinct and

separate, they were highly interactive with one another and offered strong support to the

triangulation of the research data. Ultimately, the following research questions guided and drove

this study in its efforts to examine the use of and perceptions regarding GBL in education:

1) How do teachers and administrators perceive game-based learning as a tool for teaching and learning at the secondary level?

2) How do teachers utilize game-based learning as a tool for teaching and learning at the secondary level?

3) What do administrators observe regarding teachers' use of game-based learning as a tool for teaching and learning at the secondary level?

This chapter reviews various aspects of the research methods utilized to explore these

critical stakeholder perceptions about GBL. To begin, a rationale for the overarching research

design will be provided. Then, specific details about the research will be discussed, including

location, population, target participants, site, and the steps taken to obtain access. Research

methods will be explored through descriptions of the various tools utilized, data analysis

processes employed, and the stages through which data collection occurred. Finally, the chapter

will explain the various ways in which participants' rights were protected throughout these

various data collection, analysis, and reporting phases and examine the possible ethical

considerations involved in this study.

Research Design and Rationale

The perceptual nature of the research suggested a qualitative component, however certain aspects regarding participants' game usage and experience compelled the use of quantitative data as well. Therefore, this mixed methods study began by using surveys with scales, rankings, and choices to establish background for teachers and administrators regarding the use of and perceptions concerning GBL. Then, follow-up focus group questions, occasionally requiring some additions based on the findings from survey data, aimed to confirm and more fully explain the early emerging patterns. Whereas the survey provided a baseline of perspective and use, the focus group discussions delved further into the input of new and experienced teachers, as well as administrators. Topics discussed in those groups were tailored around the findings and emerging trends from the survey phase, but specifically sought out detailed explanations regarding feelings about game use in the classroom, perceived benefits and concerns, and input on steps for integration. In conjunction with those methods, the researcher worked with administrators to gather observational data about planned and implemented use of GBL through a review of historical data, including lesson plans and walkthrough observations. Ultimately, a mixed methods approach was necessary in order to gather, organize, and explore a multitude of information and perceptions from two separate stakeholder groups in a systematic manner.

Essentially, the mixed design was "needed to extend, elaborate on, or explain" (Creswell, 2012, p. 537) the intricacies of the varied perceptions. Electronic survey data established experience, overall interest, and satisfaction levels with GBL in a more expedited format while also collecting formative input that was used to develop relevant categories of benefits, perceptions, and usage. With that foundational data in place for the focus groups, qualitative measures were able to further examine early trends, determine if they represented a true

consensus or were just frequently noted, and expand upon questions uncovered regarding experience, interest, and perception. Then, building on that firsthand collective experience and perspective, a review of lesson plans and observational data allowed a wider scope of collected evidence in terms of school-wide GBL use.

Specifically, a cycle of explanatory sequential design was the most valuable means of addressing the research's intended purpose (Creswell, 2012). In the first round of data collection through electronic surveys, primarily quantitative data was collected. These quantitative measures noted experience, GBL interest, satisfaction, and comfort level and ultimately provided areas for further explanation and exploration through the focus groups. However, the mixed methods explanatory sequential design then used this quantitative data along with a handful of open-ended questions that broadly explored stakeholder perceptions in order to refine "what questions to ask, [and] what variables to measure" (Creswell, 2012, p. 546). To add to the scope of the school staff incorporated into the data collection without adding to the participant population, administrators also assisted in collecting observational data based on a review of teacher practices through available historical data. Essentially, data collection through surveys and focus group discussions adhered to a minimally "cross-sectional design" (Creswell, 2012, p. 380) in order to measure the input and perspectives of different educational subgroups, develop a baseline of participant consensus, refine the focus of explanatory questions, and then delve deeper into perceptual data. While this process may have seemed more obtrusive or exhaustive to the participants than a single point of data collection, it was necessary nonetheless. It was through this multi-pronged approach of teacher input, administrative input, and document review that the research was able to triangulate findings across individuals, data types, and methods as well as construct a collective consensus on GBL without presuming experience levels or

predetermining a specific trend or area to explore within this specific site and population (Creswell, 2012).

<center>**Site and Population**</center>

Research supports that teachers are the single most impactful factor in predicting learning (Tucker & Stronge, 2005), so teachers should be the driving force behind any successful GBL initiative. Therefore, rather than targeting a particular grade level, demographic, or subject area within the school as the lens for this study, defining teacher characteristics were used to focus and select the participants instead. Specifically, the study population aimed initially to target new teachers within their first five years of entering the profession for two main reasons: 1) supporting long-term future implementation goals and 2) following up on interesting perceptual findings from prior research discovered in a review of the available literature. From there, the teacher participants assigned to focus group discussions were balanced with an equal number of experienced teachers to offer an array of individual characteristics for comparisons and breadth. Then, that comprehensive teacher sample was matched in numbers from the existing administrative team responsible for observations and evaluations in the secondary school. This allowed for a robust and representative blend of teachers and administrators across various levels of experiences, backgrounds, and subject specialties.

Population Description

Fullan's (2011) tenets of effective change leadership advocate the use of data to impel and mark progress by focusing on the system and how to improve it. Therefore, since this research aimed to construct the organization's foundation for future GBL initiatives by examining perceptual trends regarding GBL, it was important to choose participants purposefully in order to ensure meaningful data collection. In this case, since public schools can exert sizable

influence regarding GBL implementation through their teaching core, it was critical to choose teacher participants that would inform those future efforts clearly. As a leader, one transformational change approach is to realize that not all teachers can change quickly, as many are either late adopters (Rogers, 2003) or blockers (Glickman, Gordon, & Ross-Gordon, 2010) when it comes to incorporating new ideas or initiatives. Therefore, schools may find it more productive to begin working with a concentrated group of enthusiastic new teachers and then slowly work to diffuse ideas based on their successful modeling (Rogers, 2003). However, the theory that teachers have clear cut GBL perceptions and levels of use based on their years of teaching experience is debatable based on conflicting findings from experience and prior research review (Bourgonjon et al., 2013; Gerber & Price, 2013). As a result, exploring any possible differential between new and experienced teachers in their responses and perspectives regarding GBL was a secondary goal of this work. Regardless of any possible experience bias regarding GBL perception and use, however, integrating a mix of teacher and administrative perspectives into the study population only improved the resulting data and findings. Ultimately, the richer data provided by the varied population offered a more comprehensive systems view upon which leadership can now see both the balcony and dance floor views of their organization and use those perspectives to affect change (Heifitz, Grashow, & Linsky, 2009).

Even though this research explored teacher perceptions openly without bias or assumed outcomes, certain aspects of prior research sparked specific areas of interest. In particular, research on pre-service or novice teacher perceptions of GBL use in the formal school curriculum showed that those teachers supported the pedagogy but were concerned about using the tool because of how they would be perceived or evaluated for *playing games* in their classrooms (Gerber & Price, 2013). With increases in the areas of teacher evaluation and

accountability in the arena of public education causing elevated apprehension in the teaching ranks, the reality of these potential fears regarding GBL use is critical. Ultimately, the study not only explored theoretical perceptions, but realities (including this possible fear) as well, and searched for ways to mitigate any conflicts between the two moving forward. By choosing a blend of new and experienced teachers and administrators for the participant group, the results provided stimulating perceptions and realities that will be valuable in future implementation efforts.

Teacher participants. Therefore, for this study, an invitation to participate was extended to all teaching staff. When interested teachers consented to take part in the survey process, they were asked to note if they were willing to participate in the follow-up focus group discussion component as well. Teachers who accepted the focus group invitation were separated into two categories. The first teacher group was characterized as having 0-5 years of teaching experience. The second teacher group was characterized as having 6-30 years of teaching experience. Each group consisted of five teachers, spanning five distinct disciplines/subject areas—Math, English Language Arts, Science, Social Studies, and Arts/Electives. Both teacher groups were chosen on a first-come, first-served basis. Although all teacher participants were secondary school teachers, they differed in other demographics. Based on a purposeful sampling approach, the focus groups comprised a balance of male and female teachers with varying years of experience in this school district. Subject specializations ranged from core academic areas to arts and STEM electives, offering a wide array of perspectives. To facilitate this, as interested participants notified the researcher by returning their informed consent form (Appendix A), their name, new/veteran teacher status, gender, subject area, and willingness to participate in a focus group (if applicable) were recorded on a confidential "Interested Participants" form (Appendix B). This allowed the

researcher to track the order in which an 'intent to participate' notification was received, but also select interested focus group teachers purposefully so that they spanned desired demographics.

Administrator participants. Finally, the school administrators that interact directly with these teachers were also invited to participate in the full range of data collection, including the survey questions, focus group discussion, and historical data review. In this school, the available personnel that comprise the administrative population of the participant group included one principal, two vice principals, three instructional supervisors, and two departmental directors (athletics and school counseling). They similarly received an invitation where they noted their willingness to take part in the survey, focus group, and historical data review components. Even with only eight potential administrators, this group also offered diverse demographics for research purpose as their backgrounds varied in terms of specialties (prior teaching subject areas), years of experience, gender, and current responsibility. Once willingness to participate was obtained from all administrators, the full group was welcomed to take part in both the survey and focus group components of data collection due to their smaller overall numbers. With this process, the study included roughly eight administrators in the survey, focus group, and historical data review components of the research. By utilizing these methods, the research drew on a broad range of input to develop a comprehensive consensus regarding the utilization of GBL within this school district.

Site Description

Working specifically with the two critical stakeholder groups responsible for a bulk of the instructional decision-making in public education, this study explored the perceptions of teachers and administrators in an urban secondary school setting serving approximately 800 students grades 7 through 12. In addition to focusing on this grade range to see how games were

perceived at the secondary level, this research specifically examined views of teachers and administrators serving a community largely comprised of economically disadvantaged families (over 60% of the school population is eligible for free/reduced lunch programs) but also housing a small section of more affluent families. The setting was unique in that regard. In fact, because of the urban community's low socio-economic status, this city was one of the 31 districts designated as an Abbott district (during the time when the designation was still formally used in the state) based on the NJ Supreme Court's Abbott rulings of 1990 and 1997 (Abbott Districts, 2009). These rulings developed a mandate for supplemental services to ensure that students in low socio-economic areas, including this one, receive a constitutionally equitable education. Furthermore, when the state categorized schools into *District Factor Groups* based on socio-economic levels in the community, this district again found itself situated in the second lowest tier (NJDOE, n.d.).

Unlike other districts with firmly established patterns of success and achievement, which are fortunate to serve communities with a natural passion and prioritization for learning and educational accomplishment, this city has been fighting for small academic victories for years. Therefore, while this district's successes may not seem as lofty as more affluent and high performing schools, they are hard fought and well-earned. Perhaps due to the economically disadvantaged status of the community, the school has struggled for several years to combat the increased disengagement of the students, as documented in local data reports including teacher evaluations and state reviews. In response, the teachers and administrators have proactively sought out new methods of reaching disinterested learners, trying new ideas and using alternate methods in order to affect greater growth for years, which is part of why this notion of GBL is so intriguing for its potential impact.

Over the past decade, the district worked through continuous cycles of self-evaluation, reflection, and improvement to address concerns regarding student learning and growth. In that time, it worked closely with private and state agencies including the Collaborative Assessment and Planning for Achievement (CAPA) initiative and Middle States Commission on Elementary and Secondary Schools to audit curriculum, program, and instructional tools and identify areas for improvement. Through these efforts, the district improved its curriculum writing process to infuse more connections and rigorous activities into the written template, increased evaluative but informal walkthrough observations, and added instructional supervisors to target and expand additional professional growth and coaching opportunities for all teachers. In the ongoing efforts to improve teaching and learning, GBL may be the next major initiative to support student growth and achievement.

Site Access

To work closely with the population of this school, it was necessary to speak with all levels of administration and participants in order to facilitate true understanding of the research goals and acquire permission. The first step was to meet preliminarily with the superintendent of schools and discuss the overarching purpose of the research planned. Having already discussed the plan cooperatively with the superintendent to begin planning the research study in an acceptable manner, the superintendent reviewed the official full research proposal and provided formal approval. From there, all administrators and teachers were briefed on the plan for research in order to acquire their individual consent to participate. The researcher provided a concise overview of the plan to help potential participants understand the purpose and what was required of them, but also to reassure them that their input would be confidential and would respect their personal and professional opinions. Once teachers committed to one (survey only) or both

(survey and focus group) teacher components of the multi-pronged approach to data collection and analysis, administrative participation was secured as well.

Overall, the school community was supportive. However, the reality of education in today's era of increased evaluations and accountability could have potentially affected research participation rates. Still, with a broad base of participants to draw from, there was no difficulty securing sufficient valuable involvement to avoid bias in the population.

<p style="text-align:center">Research Methods</p>

Methods utilized to facilitate this research centered largely on the use of electronic surveys in conjunction with focus groups in a cycle of explanatory sequential design. That information was then corroborated and supported with lesson plan and observation documentation provided through a review of historical data. For the most part, a similar process of data collection took place concurrently for both teachers and administrators. Data collection for all consenting participants started withed a largely quantitative survey, *Overall Use and Perceptions of Game-Based Learning*, which gathered baseline perceptual, use, and background information regarding GBL. The survey also included several open-ended qualitative questions to provide additional unrestrained data. Following the survey, qualitative focus group discussions including a selected sample of the population explored the early findings from survey data analysis and expanded upon the trends presented with details, examples, and explanations. The primary differential in data collection between the stakeholder types was the added component for the administrative team who helped the researcher utilize historical data (lesson plans and walkthrough observations) to review teaching practice. Informed consent letters described this methodology to ensure that all participants were aware of the multi-phase approach to data collection and analysis in advance (Appendix A). By agreeing to cooperate with the full study,

participants were aware that they would be called upon more than once, each time using methods that continuously protected the privacy of their responses. Some participants only agreed to, or were selected to, take part in the survey round of data collection. For teaching participants who took part in all relevant components of the study, data collection consisted of a single electronic survey followed by a single focus group invitation. Administrators who consented to full participation completed that same survey-focus group cycle, but also helped review historical lesson plan and walkthrough observation data that included an expanded scope of evidence. Overall, cycles of data collection through surveys and focus group discussions utilized a "cross-sectional design" (Creswell, 2012, p. 380) that measured the perspectives of educational subgroups, uncovered trends, and delved further in order to construct collective consensus on GBL without presumptions or pre-planned starting points.

Surveys

In the initial round of data collection, electronic surveys were sent to all teachers and administrators who agreed to participate (Appendix C). On those surveys, some qualitative but mostly quantitative questions collected basic background information (for subgroup development) and sought perceptual input specific to their educational perspective and role. Other quantitative elements asked participants to note experience, GBL interest, satisfaction, and comfort level. Finally, using multiple answer options and the occasional qualitative, open-ended question, the survey broadly explored stakeholder perceptions in order to refine "what questions to ask, [and] what variables to measure" (Creswell, 2012, p. 546) in the focus group phase of data collection.

Survey description. The primarily quantitative survey was implemented using Survey Monkey technology and provided additional questions on top of those originally designed for the

later qualitative data collection phase. This online tool facilitated the development, dissemination, and collection of online surveys using a variety of question types either built from their bank of question stems or created individually. It allowed the researcher to collect survey data in real time while helping protect anonymity of participants. Using this tool, survey questions explored perceptions about the value of GBL as a tool for teaching and learning with respect to classroom instruction in all secondary grades and subject areas. In addition, the survey requested that participants provide details about actual use (if any, firsthand or observed) of GBL as a teaching and learning tool. While this line of questioning was geared more toward collecting firsthand experience about teacher use and administrator observation of GBL, it also allowed for teacher input based on what they noted from peer discussions, collegial observations, and professional sharing. More importantly, it afforded some level of corroboration between responses that supported data triangulation, as well as offered supplemental data and discussion of use outside the small group of participants.

In addition to these core questions about perception and use, the initial surveys were also the primary method of collecting background and demographic data that identified subgroups and facilitated an examination of trends. For example, participants provided information about age range, gender, subject area specialty, years of teaching experience, prior experience with gaming in school as well as for personal use, and other characteristics. This allowed the research to examine possible statistical correlation of perceptual patterns by any or all of these demographics.

Participant selection, identification, and invitation. For the survey round, teacher and administrator participation included all consenting teachers and administrators. After facilitating a presentation to all possible participants about the intent and process of the proposed study,

invitations were sent to all teaching and administrative staff members. The email invitation

included a detailed overview of the data collection process, research goals, and expectations for

participation. It also included a reminder that staff could refuse participation or withdraw at any

time, a copy of the informed consent form, and a plan for how findings would be shared upon the

conclusion of the study. From the received consent forms, the researcher sent out an email

invitation to complete the survey portion of the study and noted the names of those also willing

to take part in the focus groups on the confidential "Interested Participants" form (Appendix B).

Data collection. Throughout this first cycle of data collection, the primary tool utilized

was the electronic survey. However, even before formal data collection began, administrators

were informed of the focus on GBL perceptions, use, and observations so that they could be

cognizant of informal examples in teaching practice, evidence, and details on the topic within

their daily activities (circulating throughout the building and interacting with teachers).

Specifically, since administrators complete informal walkthrough observations as part of their

daily responsibilities, if they were participating in the study, these observations could serve as a

great source of informal data on GBL. In addition, since administrators review lesson plans, they

were encouraged to take notice during their weekly review of instructional plans for documented

uses of GBL that could impact responses in both surveys and focus group discussions.

All survey questions and data were disseminated and submitted using Survey Monkey, a

web-based survey tool that electronically administered, collected, and assisted in the analysis of

surveys. Within this tool, participants were only identifiable to the single researcher through their

personalized participant number, or study code (Creswell, 2012). Participants, once consent was

received, were sent a link to address the survey questions within a week's time as well as

reminders in the final days to ensure completion by those teachers and administrators who agreed

to participate. Using individual participant numbers, this survey technology allowed the researcher to sort responses into stakeholder subgroups and ensure full participation without sacrificing survey anonymity. In addition to facilitating the collection process and assisting with anonymity measures, Survey Monkey also assisted in the qualitative data analysis by scanning individual responses for each question and noting common phrases and themes.

Data analysis. The Survey Monkey tool alleviated some of the logistical work of the researcher by combing through the various responses to determine early trends for further examination and providing a solid starting point for analysis. While Survey Monkey could not complete the full analysis itself, it has coding and categorization tools built into its premium account access that were used to assist the researcher in examining survey data. The built-in scale, multiple choice, and ranking analysis tools of the Survey Monkey software highly aided the researcher's efforts to apply descriptive statistics to the various quantitative components by providing simple charts, tables, and graphs for informal review of data at a glance. This made it easier for the researcher to explore data as it was collected and begin to hypothesize early trends. From there, the researcher primarily relied on Excel spreadsheets exported from the Survey Monkey software and the corresponding Microsoft Excel Data Analysis Add-on tools to calculate various statistical figures. Of particular interest were the average and standard deviation calculations regarding perceptual consensuses for each question or topic, as well as the statistic measures of central tendency for teacher and administrator use. In addition, the Excel tools were used to examine various ANOVA measures and determine if there were significant differences between any of the subgroups based on role, years' experience, and gaming background. Then, for the small number of qualitative components on the survey, the research relied on the text analysis tools available within the Survey Monkey software to identify and extract frequently

used terms and phrases, which helped facilitate the coding and analysis process. Emerging data

themes from each set of responses discovered using these tools were essential in helping the

researcher refine specific areas for further examination in the following round of qualitative

exploration and discussion. While focus group discussion questions and protocol were pre-

determined, there were also some emerging questions that were added based on what information

was discovered through survey analysis.

Focus Groups

Focus groups enhanced the understanding of emerging themes by expanding upon the

initial patterns and trends uncovered in early survey data analysis. Whereas the electronic

surveys automatically collected the same exact data from all participants, qualitative data

collection varied somewhat. Even though pre-determined baseline questions were similar for all

focus groups, data analysis yielded patterns that fluctuated based on the different participant

subgroups (new teachers, experienced teachers, administrators) and a small number of additional

emerging questions affected the foci of the various group discussions.

Focus group protocol description. Since privacy and anonymity were a concern, for

teachers in particular, it was crucial that focus groups not cross teacher/administrator lines.

Therefore, groups were identified as group 1, teachers with 0-5 years of experience, group 2,

teachers with 6-30 years of experience, and the administrator group. Each focus group's

discussion protocol started from the same core question bank exploring general themes about

GBL use and perceptions (Appendix D). However, even with that pre-developed protocol,

survey data analysis created additional emerging questions for all three subgroups that sought

further connections and expanded on contradictions between individual perspectives.

Participant selection, identification, and invitation. For the focus group discussion

element of data collection, teacher and administrator participation was limited to only 10

teachers and 8 administrators. As noted, teacher participants were split across new (0-5 years)

and experienced (6-30 years) staff with an intentional spread across various demographic

components, including gender and subject area specialization. To do so, from the received

consent forms, the researcher utilized a purposeful sampling strategy known as maximal

variation sampling to choose 10 teachers and 8 administrators who spanned the various

categories of potential demographic interest (Creswell, 2015). Using this purposeful sampling

approach, the willing participants were reviewed and screened to maximize diversity based on

years of experience, subject area specialties, age, and gender (with the first two characteristics

receiving much higher priority in the selection process). Specifically, through careful utilization

of the confidential "Interested Participants" form (Appendix B), efforts were taken to choose five

new teachers and five experienced teachers that span the five categories of discipline/subject

areas—Math, English Language Arts, Science, Social Studies, and Arts/Electives; offering a

wide variety of subject area specialty across all participants.

      With only 8 administrators and 10 teachers involved in a timeframe that reached slightly

into early summer months, it was not too difficult to secure involvement of all 18 individuals.

After reviewing and analyzing perceptual trends from surveys to develop a collective consensus

across all three subgroups (new teachers, experienced teachers, administrators) as well as each

subgroup separately, three focus group discussions were scheduled. Five new teachers reported

for a new teacher focus group reviewing patterns and expanding on trends specific to their group

and common across all three. Similarly, five experienced teachers met in a second focus group

that examined their emerging consensus, contradictions, and questions. Finally, the eight

members of the administrative team met in one focus group discussion to explore and expand on

the emerging trends and patterns from their responses.

Data collection. During these focus group discussions, the researcher sought to comprehend why certain perceptions dominated the collective responses while others emerged in one or more subgroups, and aimed to more deeply realize the patterns and perceptions uncovered. To do so, the researcher presented the subgroups of participants with an array of strong and moderate patterns emerging from the early analysis procedures and asked them to react, respond, confirm, or negate those trends. These discussions allowed participants to expand on consensus findings and better inform the research on the "why" and "how" of the current collective perceptions. Teacher participants drew on personal experience either using or observing GBL instruction. Administrator participants also drew on personal observational data, even recollecting experiences from informal walkthroughs or lesson plan reviews. In this round of data collection through focus groups, the researcher used handwritten notes and obtained permission from the participants to record the discussion using available technology to guarantee accuracy. Notes were recorded on a focus group protocol form documenting both the specific questions pre-developed as well as those refined or added to because of survey data analysis.

Data analysis. Similar qualitative coding and analysis processes were applied to focus group data. Due to the fact that input was accumulated primarily verbally with this strategy, there was no automatic written document to code and examine directly using the Survey Monkey or other similar software. However, with participant permission, the researcher audio recorded the focus group discussions to aid documentation and transcription. Then, the researcher employed the use of Dragon NaturallySpeaking, the leading speech recognition software (Nuance, 2015), to assist in the transcription of focus group data into writing. From there, the researcher used Microsoft Office software to examine the collective responses from each subgroup to identify

emerging themes and patterns in perception.

Administrator Review of Teacher Practice through Historical Data

This component did not occur as a specific round of data collection, but rather ran throughout the first several weeks of the study in conjunction with the other data collection activities. In this element of data collection, administrators supported the research by collecting observational information about GBL use through a review of historical data from the third marking period—namely lesson plans and informal observation (walkthrough) forms for all staff.

As part of their weekly and monthly responsibilities, all administrators are assigned one or more departments within the building for which they must review weekly lesson plans and provide specific feedback. In addition to this task, administrators are also required to meet a monthly quota of informal observations, or walkthroughs, to provide targeted feedback on instructional practices. Although they do not become a permanent part of teachers' cumulative evaluation file or summative evaluation scores, these walkthroughs document activity as observed in 5-10 minute glimpses and provide feedback and suggestions to teachers as part of the overall professional growth program for the district. Therefore, since this data was already being captured as part of the existing administrative process in the district, it was both feasible and valuable to review this historical data and seek out additional evidence of GBL use around the school without having to expand the participant numbers.

Administrative review of teacher practice protocol description. As communicated in the consent to participate and overview of the research study for interested administrators, a third component of the comprehensive methodology, to review historical teacher practice data, occurred within the study. To facilitate a review of historical data that uncovered evidence of GBL use, administrators were provided a 'Lesson Plan Review Template' (Appendix F) that

expedited the process of reviewing third marking period lesson plans for those departments/ teachers to which they are assigned. On the template, administrators noted the subject area under review and then organized notes by month based on frequency of documented GBL use, type/method of GBL use(s) noted most often, and any bias in the occurrence suggesting more utilization by new teachers (with 0-5 years' experience) or experienced teachers (with 6–30 years in the field). Similarly, administrators provided access to their walkthrough (informal) observation forms from the third marking period so that the researcher could review those as well. The researcher utilized a monthly observation review template to facilitate the process of examining the forms used by district administration for informal observations, or walkthroughs, on all staff. On the 'Walkthrough Review Template' (Appendix G), the researcher documented GBL elements from the walkthroughs completed for each month of the third marking period and collected notes on GBL frequency per department, per new versus experienced teaching staff, and type of GBL observed.

This methodology served three primary purposes in building upon the early work from surveys and focus groups. First, it collected informal data (no teacher names were documented at any point on any of the forms used) that could substantiate administrative comments about observed use as well as support those comments with specific information. Second, it expanded the scope of the study to explore and seek out incidents of GBL use in the school beyond the teaching participants, as the documentation recorded use (frequency and type) whether the associated teacher was a study participant or not. Third, it provided a critical and tangible element upon which strong data triangulation could occur. Comparing teacher discussions of use with administrative recollection was strengthened by the support of formal historical data and documentation.

Participant selection, identification, and invitation. All administrators who participated in the study were included in the review of historical teacher practice data through third marking period lesson plans. After facilitating a presentation about the intent and process of the proposed study, invitations were sent to all administrators. In addition to this dissemination of information about the research study in general, administrators were informed about this third methodology that affected them but not teaching participants. Specifically, they were provided access to the documentation resource available as it would expedite their review of historical data found in third marking period lesson plans.

Data collection. Throughout the ongoing process of historical data collection, the primary tools were the templates provided for departmental lesson plan review and monthly walkthrough review. Even before data collection began, administrators were made aware of the focus on GBL use as the only item included in this documentation. Teacher names, comments, suggestions, or evaluative components were irrelevant to the study and were not to be noted. Since all administrators must complete informal walkthrough observations and review lesson plans as part of their responsibilities, this data already existed and was accessible. Also, since administrators already reviewed these lesson plans in their normal work responsibilities prior to the start of the study and since the researcher personally examined the informal walkthrough observation data, this third element did not pose a severe burden on the administrative participants. All administrators were provided with the necessary template at the beginning of the study and assistance was available to support their use of the research form. While using the historical lesson plan review tool, administrators were reminded to document only frequency of GBL use, type or method of GBL use, and preponderance toward new or experienced teachers (if any).

Data analysis. The templates for historical lesson plan review and informal walkthrough observations provided insight and detail that were valuable for the administrative focus group discussion, but were also collected for formal analysis.

The third marking period lesson plan review forms for the various departments were gathered from the appropriate administrators to accumulate historical data. Specifically, a comparison of these forms allowed the researcher to note and analyze trends in frequency of GBL use in the various departments (and overall), types of GBL use in the various departments (and in general), and whether or not new teachers were more or less likely to document GBL use in their weekly lesson plans. Since the suggested choices and categories in the lesson plan review template mirrored those in the initial survey, this provided a solid comparison point for corroboration of evidence across sources and methodologies.

Similarly, the monthly walkthrough review forms, completed by the researcher for only third marking period walkthrough observations, were examined to compare and combine data and analyze possible patterns. First, the percentage of total walkthrough observations resulting in identification of GBL use allowed some firsthand quantitative data on frequency that offered a critical comparison point for survey and focus group questions about GBL use in the classroom. Then, an analysis broke down the data by how many observances of GBL were attributed to various subject areas as well as the percentage for new versus experienced teachers to help to validate or raise questions about the other data collection methods. Finally, qualitative notes provided on types or methods of GBL use was helpful in balancing and confirming the qualitative data collected in both surveys and focus group discussions. Since this data encompassed a wider range of teachers (as all teachers submit lesson plans and are subject to informal walkthrough observations), it was not expected that data would match perfectly.

However, the stronger the triangulation between the various data collection methodologies, the more valid and reliable the overall results. Ultimately, the patterns and themes that emerged from this historical data collection helped the researcher (and the administrators) quantify observed GBL use more clearly and accurately, corroborating the verbalized experiences in the two other methods.

Stages of Data Collection

Based on the various rounds of data collection for all participants, research needed to spread over several weeks. A timeline of the data collection and analysis process, starting in the spring of 2016, is as follows:

Timeline:

Week of	Teacher Data Collection	Administrator Data Collection
5/23/16	Facilitated information sessions and communication of project purpose and process.	
6/1/16 (pending IRB approval)	Distributed voluntary consent forms to determine stakeholder participant populations. Sent initial surveys to all willing teacher and administrator participants (due 6/8/16). Provided direction and documentation resource(s) to administrators for their review of teacher practice through historical data (lesson plans) and secured access to walkthrough observations for researcher review.	
6/13/16	Analyzed teacher surveys to determine themes and refine focus groups' questions, framework, and protocol (6/9-6/16).	Analyzed administrative surveys to determine themes and refine focus groups' questions, framework, and protocol (6/9-6/16).
6/20/16	Facilitated teacher focus groups to delve deeper into emerging themes (6/17-6/24).	Facilitated administrator focus groups to delve deeper into emerging themes (6/17-6/24).
6/26/16	Collected final documentation for administrator review of teacher practice through historical data (lesson plans). Completed final documentation for review of teacher practice through historical data (walkthrough observations). Began final analysis of data for teachers and administrators. (Estimated two or three weeks for final analysis.)	

Figure 3.1: Timeline of Data Collection and Analysis

Ethical Considerations

This section outlines and addresses the ethical considerations necessary to facilitate research responsibly, especially in one's own backyard. First, it is important to note that the researcher has been employed within the school district wherein this research study was conducted for almost two decades. Starting out as a student teacher in the intermediate school, then a high school teacher, high school department chairperson, and then high school instructional supervisor, the researcher now works centrally in the district administration building as the district-level Supervisor of Curriculum and Instruction. This offered many benefits to the research, including firsthand experience with many of the district's personnel, a strong knowledge of its history, and pulse on its instructional happenings. However, since the position is a district-level supervisor, none of the teachers or administrators in the high school building report directly to the researcher, so no pressure or intimidation was associated with participation in the study.

Regardless, ongoing efforts to proactively determine and prevent ethical concerns were critical for effective research procedures. Therefore, ethical considerations were a central focus throughout all stages of research. These considerations started with early discussions among the research committee members prior to study implementation. From there, the researcher procured Institutional Review Board (IRB) approval prior to beginning research efforts. The IRB reviewed and approved the study's goals, purpose, data collection procedures, and intended population before any research work began. Once work began, it was crucial to protect new teachers specifically, since they did not have tenure in their teaching position, and was necessary to make wise decisions regarding participant selection. With those safety protocols in place, attention shifted to securing the anonymity and confidentiality of all participants.

Research included new teachers in their first few years (the most formative years of their career); therefore, it was imperative to be careful that the researcher was not coercing these non-tenured teachers into participation. Far too often in education, non-tenured teachers are asked to volunteer for additional responsibilities. While it is an unspoken and often unintentional tradition, it happens nonetheless. The research interest in teachers, but specifically new teachers, was based on their various ranges of formative development level and not their willingness to please the school, so they were made fully aware that this was a voluntary, with the option to withdraw at any time, and anonymous activity in order to ensure valid data. In addition to this concern of coerced consent, there was a fear that input might tainted by concerns about administrative or community review of data, so again anonymity and the ability to withdraw without consequence was crucial. Teachers needed to be able to provide input and perceptions openly in order for the study to fulfill its constructivist goals effectively. Also, while identities were not released or connected to any specific responses and survey data was reported in the aggregate making it nearly impossible to separate any single person's response, there were still potential ethical considerations. Specifically, there were concerns about the perceptions of new teaching staff (collectively) based on the results from surveys and focus groups since they comprised half of the teacher participant focus group membership and their subgroup was examined specifically.

Finally, because the research was conducted locally, it was important to avoid the pitfalls of 'backyard research' including the selection of colleagues (Glesne, 2011). While it may have been tempting to select participants using a random sampling technique and take the bias of choosing members out of the equation, this research targeted meaningful and potentially relevant characteristics that minimized personal connections from the study by focusing rather on a

purposeful quota-based, or maximal variation, approach to sampling. Also, to avoid bias in responses based on personal or organizational connections or pressures, informed consent about the purpose of the study was crucial (B. Johnson & Christensen, 2010). Explaining the research goals, communicating how responses would be used, and defining who would have access to survey data seemed to dispel any potential fears of how input could negatively impact teachers.

Securing Anonymity and Confidentiality of Participants

With semi-vulnerable populations involved in the study who could potentially face negative consequences should their identities be compromised, namely new teachers, complete privacy was the goal (Baez, 2002). Therefore, since the site of research was obvious to internal contributors, it was vital to secure the anonymity and confidentiality of all participants within the study. For this particular research on the perceptions regarding GBL, that was not extremely difficult. Since the study was built on a constructivist paradigm and sought to develop a collective perspective, individual responses did not need to be distinct in the reporting of quantitative data collection. Detailed stakeholder data was not specifically communicated in reports based on demographic characteristics like age, income, grade level, or specific courses taught. Instead, the quantitative analysis applied sorted participants based on general subject area, new/experienced status, gender, teacher/administrator role, experience with gaming, and positive perception rating of GBL as a teaching and learning tool—all characteristics that were either too broad to track or largely unknown to the final reviewers. In fact, most of those typically used identifiable data characteristics were irrelevant and were not collected; so protecting anonymity and avoiding the detection of individuals by their responses was not overly problematic. Based on the design and safety protocol, it would be nearly impossible for any reviewers to discern identities. However, it was still critical to consider protective measures and

implement strategies that guaranteed the anonymity and confidentiality of all active participants.

Security protocols were important in all three phases of the research: data collection, data cleaning, and sharing of results and findings (Kaiser, 2009). The first phase, data collection, required the most preventative measures to ensure complete confidentiality and anonymity. First, to confirm that each participant completed the survey once, without attaching their names to their responses, each was provided a unique but random number, alias, or study code (Creswell, 2012) that they used to submit their answers. This code was also necessary to potentially correlate answers across various iterations of data collection as needed. Since teachers and administrators participated in the same data collection phases, responses were coded through their participant number and automatically categorized into those two groups. These codes were recorded in a single, separate document not included or shared with any of the other research findings or participants, and were removed from surveys once they were finalized. To increase confidentiality in the survey phase, questionnaires were completed using web-based technology, not only for ease of collection and analysis, but also to eliminate handwriting recognition of the individual participants. Similarly, focus groups utilized speech recognition/transcription software, such as *Dragon NaturallySpeaking* software, to assist in recording the discussion while minimizing any level of voice recognition by a fellow team member or peer reviewer (Virginia Tech, 2015).

Along with avoiding names, handwriting, and voiceprints, it was important to also mask the educational traits and trademarks that could unintentionally lead to 'deductive disclosure,' which could occur if certain details make participants identifiable internally within the organization to colleagues or supervisors (Sieber, 2013). Much like specific names or detailed demographic data, course-specific information was not pertinent to the study and was minimized

highly. Participants were not asked to reveal detailed course information in the data collection process, and the remnants of possible identifiable data were addressed in the data-cleaning phase. When data review began, details about the specific site, classes, and teacher were removed and/or replaced with more general ranges based on population breakdowns. With such small numbers involved, including course information could have inadvertently isolated individual responses and would have made it difficult to maintain confidentiality; but it was permissible to catalog them as Math/Science/Technology teachers, English/History/World Language teachers, and elective teachers. Regardless, since those differentiations of area were not pivotal to the core research questions or findings, it was not necessary to note those topics at all in most of the final research reporting.

Along with carefully collecting, cleaning, and presenting data, documentation was properly secured, stored, and will ultimately be destroyed throughout the research process. A personal survey tool account was utilized to facilitate data collection as opposed to a district level account to guarantee that no additional users could examine the gathered responses. Since participants gave permission to record the focus groups, discussions were audio recorded and transcribed for analysis. The tangible evidence, including the audio recordings and transcriptions of the focus group discussions were stored in a protected area outside of the district. Similarly, electronic data from all components of data collection were stored securely outside of the district on an encrypted and password protected computer. All data, reports, and summaries were stored safely and will be destroyed after three years.

Chapter 4: Findings, Results, and Interpretations

Findings

Research findings come from multiple means of data collection as previously delineated. Over the course of a month, 54 interested staff members participated in an anonymous online survey using questions with scales, rankings, and choices to establish background for teachers and administrators regarding the use of and perceptions concerning game-based learning (GBL). Then, from those research participants who expressed an interest in also contributing to focus group discussions, further data was collected, primarily detailed explanations from administrators, new, and veteran teachers regarding their feelings about game use in the classroom, perceived benefits and concerns, and input on steps for integration. Finally, the researcher worked in conjunction with the administrative team to gather and analyze observational data about planned and implemented use of GBL through a review of historical data, including third marking period lesson plans and walkthrough observations.

This chapter will explore the full scope of the collected data, first examining the separate components, and then comparing, corroborating, and connecting the various components with one another. Ultimately, the purpose of this data collection process was to address the following research questions:

1) How do teachers and administrators perceive game-based learning as a tool for teaching and learning at the secondary level?

2) How do teachers utilize game-based learning as a tool for teaching and learning at the secondary level?

3) What do administrators observe regarding teachers' use of game-based learning as a tool for teaching and learning at the secondary level?

After reviewing survey, focus group, and historical research data, some themes emerged throughout all three data collection methods. The recurring topics from data collection include comfort level possibly tied to a generational gap, the means and frequency of games use, benefits of proposed use versus reality of the system, and obstacles that could impede better use of the strategy. In order to explore these in detail, the findings will be examined separately through the three research methodologies (surveys, focus groups, and historical data). Then, connections across those three collection methods will be fleshed out with regard to these and other emerging themes.

Survey Data

Data collection for this study began by collecting survey data from 54 willing teacher and administrator participants in order to develop a baseline consensus regarding their use of and perspectives on GBL in the context of the school. A majority of the collected survey information provided descriptive quantitative or qualitative data based on their opinion or firsthand experiences with GBL, but first the survey asked for demographic data from each participant. Specifically, early survey questions gathered descriptive statistics on demographics such as gender, subject area, years of experience, and grade level taught in order to determine if a fair and equitable representation of the population had been included. Then, closed end questions collected quantitative data to identify emerging patterns regarding participants' overall comfort, value, and satisfaction regarding GBL as a tool for teaching and learning. Along with exploring these responses in their original state, this data was also organized and statistically analyzed to search for possible trends. In addition, and in an effort to add depth to the general perception data from the survey, open-ended GBL questions yielded qualitative responses about participants' perceived overall benefits and barriers. These qualitative survey elements sought to solicit input

from participants before they had the chance to review the multiple choices in the later survey questions, as those options could potentially distort or affect one's natural reaction about benefits and barriers. This honest and unbiased data suggested perceptual patterns and provided a baseline for future discussion in focus groups. From there, survey questions shifted their focus to explore data on first-hand GBL use or observation of GBL use. Specifically, surveys collected quantitative data on game use about frequency, purpose, and type as well as effectiveness. In particular, participants were asked to use rating scales about GBL effectiveness in specific situations and subject areas and then statistical analyses processes were applied to that quantitative data to determine if possible trends existed. Finally, the surveys solicited data about support from teachers, students, and administrators in efforts to utilize GBL as a teaching and learning tool using a rating system that yielded quantitative measures for easy comparison. Overall, the survey gathered a vast array of predominantly quantitative and occasionally qualitative data to begin the examination of perceptions regarding GBL as a classroom tool.

Quantitative demographic data from surveys. To build a baseline regarding the survey population, survey questions collected demographic data that aimed to determine if the participant group was well-balanced and facilitate potential subgroup comparisons based on characteristics. Data supports a fair spread or representation across subject areas, gender, grade levels taught, and years of experience (both in the district and in the field of education overall). Participants' responsibilities equitably spanned the three grade ranges in the 7-12 high school. In Figure 4.1, the breakdown and data shows that 32% of the survey participants

Grade Levels Taught

11th and 12th 32%
7th and 8th 29%
9th and 10th 39%
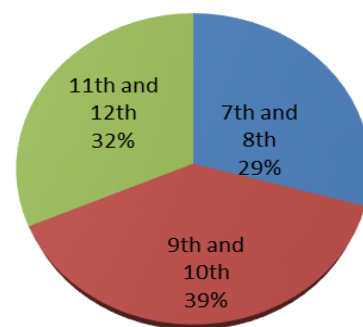
Figure 4.1: Survey Data- Grade Levels Taught by Participants

responsible for teaching 11th and 12th grade, 39% of the survey responses coming from staff who work directly with 9th and 10th grade students, and 29% coming from participants responsible for working with 7th and 8th grade students. This fair breakdown occurred in other demographics as well. Even without any form of intentional sampling methods, the different subjects taught by the participants also nicely spanned a variety of specialties. In Figure 4.2, a strong presence of the four core subject areas is noticeable among
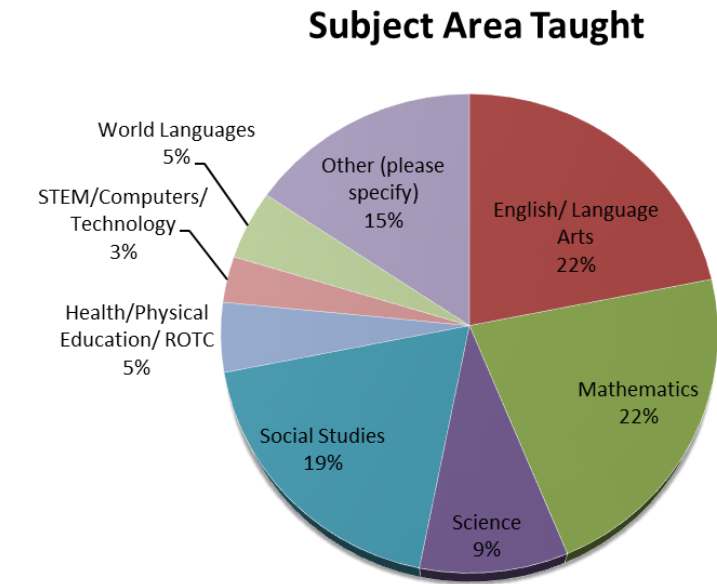
Figure 4.2: Survey Data – Subject Areas Taught by Participants

the survey participants: 22% teaching English/Language Arts, 22% teaching Mathematics, 19% teaching Social Studies, and 9 % teaching Science. The remaining 28% of the survey participants span over Health, Physical Education, and ROTC (5%), STEM courses, Computers and Technology (3%), World Languages (5%) and the combined elective coursework including all other subjects comprising Fine and Performing Arts, Graphic Design, and Family and Consumer Sciences (15%). Even the gender of the participants seemed to represent the school population legitimately. As seen in Figure 4.3, 61% of the survey participants were female and 39% were male. While the split is not even between the two genders, this is typical of the teaching
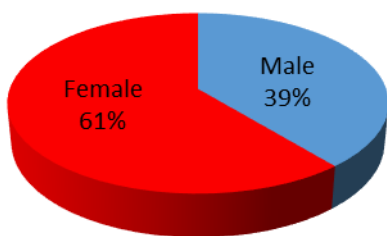
Figure 4.3: Survey Data- Gender of Participants

profession. There is a historical tendency to have more female teachers than males, a pattern that occurs in this school population as well, so the 61-39 divide seems to be a reasonable representation.

Finally, it is clear that the survey includes responses from staff members spanning all levels of experience represented in the staff population, which is important since one element of the survey is to explore any possible differences in responses based on novice or veteran level of experience. Figure 4.4 shows the years of experience of survey participants, both in terms of their experience in education (in general) and in this specific district position. While almost 40% of the survey participants have 0 to 5 years of experience in this district, only about half of them are new to the profession. With district experience used as the cut-off for new or veteran teacher groupings for the various components of data collection, this chart
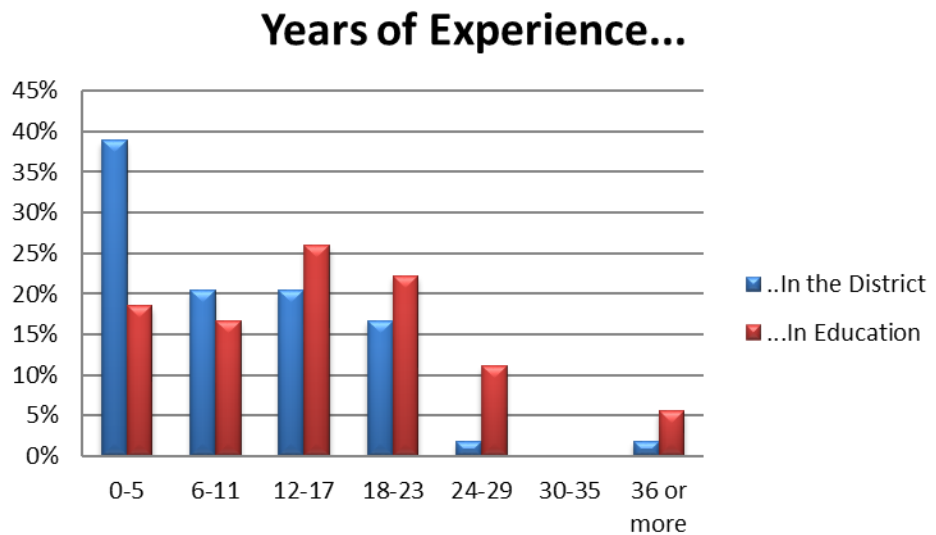
Figure 4.4: Survey Data- Participants' Years of Experience

shows that new teachers with 0 to 5 years of experience completed roughly 40% of the surveys. The remaining 60% of the survey responses came from veteran teachers with 6 or more years of experience in the district. The bulk of these veteran participants held between 6 and 23 years of experience with this school system and a few outliers held 24 or more. District historical data on overall years' experience of all staff members working in this building shows that the proportion

of teachers or administrators in each of the noted year spans steadily declines from the newest group (0 to 5 years) and down through the more experienced groups. The proportions in the survey data closely parallels that decline, thus suggesting a fair representation of staff.

Quantitative survey data on perceived comfort, satisfaction, and value. One of the core aims of this study is to explore how teachers and administrators perceive GBL as a tool for teaching and learning. With that purpose in mind, several questions asked for specific input regarding comfort levels, satisfaction with the tool, and apparent value. The subsequent data is illustrated in three separate bar graphs (Figure 4.5), and then one overlapping graph (Figure 4.6). They appear this way for two main reasons. First, since these three questions occurred consecutively on the survey with similar rating scales, it was important to ensure similar rankings were not given for all three questions. The appearance of variation across the three answers implies a greater validity within those responses. Secondly, since GBL comfort, value,
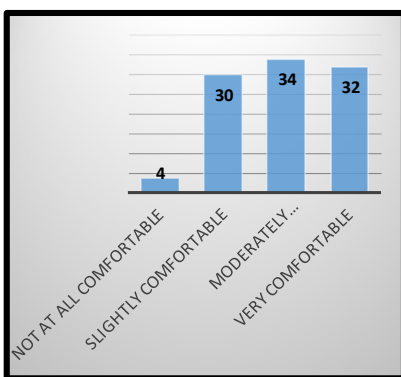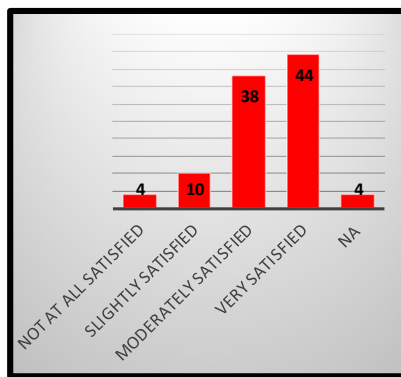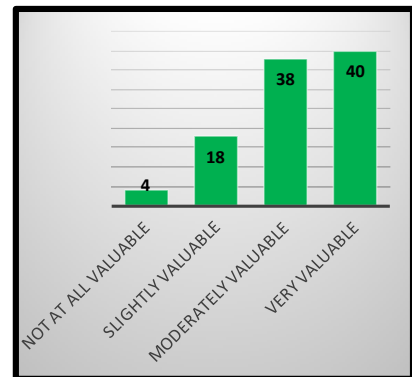
Figure 4.5: Survey Data – Comfort, Satisfaction, and Value

and satisfaction are closely related, it is interesting to see if similar trends or skew patterns occur.

Based on literature from prior research, comfort with the tool was clearly a potential concern. The data in the first graph (blue bars) of Figure 4.5 shows that only around a third of the

staff members surveyed feel very comfortable with the use of digital and non-digital games as a tool for teaching and learning. The remaining responses spread evenly between being only slightly and moderately comfortable. Very few people (4 %) noted that they are explicitly "not comfortable" with games as a teaching and learning tool. The data regarding satisfaction and perceived value, as noted in the second and third graphs of Figure 4.5 (red and green bars) also displayed more responses in the upper categories than the lower. While the comfort graph centers around moderate levels of comfort with a symmetric distribution, the satisfaction (red) and value (green) graphs in Figure 4.5 display distributions that are skewed left (as they have fewer responses on the lower end of the scale). Both questions solicited similar data, with 38% of the responses noting that staff were moderately satisfied with the outcomes after using GBL and found the tool to be moderately valuable. Satisfaction with GBL after using it provided numbers that are slightly more favorable with 44% being very satisfied and only 10% being slightly
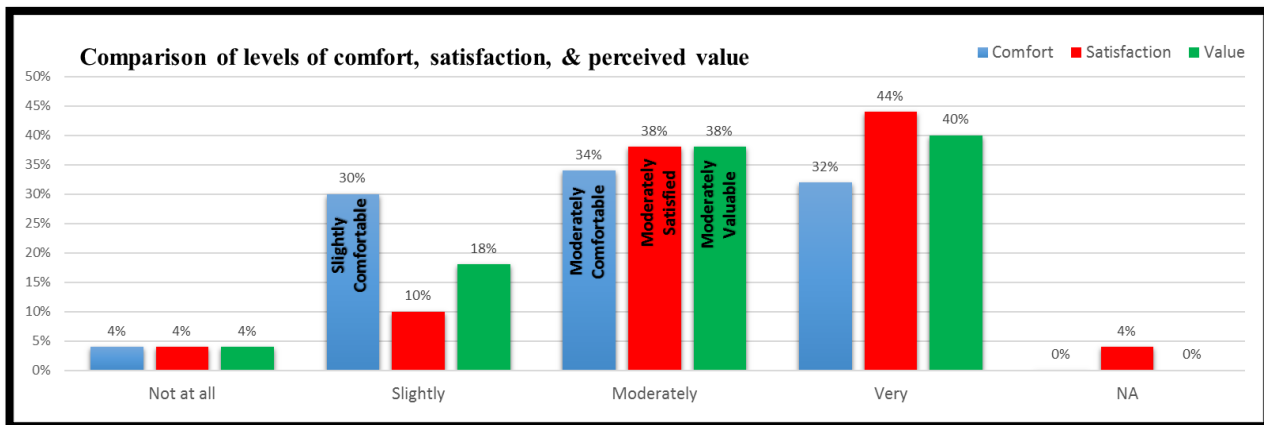
Figure 4.6: Comparison of Survey Data on Comfort, Satisfaction, and Value

satisfied with their GBL outcomes. In terms of perceived value, only 40% noted it was very valuable, while 18% said it was slightly valuable. Similar to the comfort level question, only 4% noted they were not at all satisfied with GBL outcomes or felt the tool was not at all valuable. The comparison of the three sets of response data is even more evident in Figure 4.6, which overlaps the three data sets onto a single graph. Survey responses to all three questions resulted

in a minimally similar spread in the big picture, with almost no responses noting "not at all" and most spread between "moderate" and "very" reactions. However, there still seemed to be minor skew suggesting higher rates of participant satisfaction and lower rates of participant comfort, with perceived value being only slightly less than satisfaction.

Quantitative data analysis on perceived value, satisfaction, and comfort. Since one portion of the survey asked all participants to rate perceived GBL value, satisfaction after having used games in the classroom (if applicable), and self-assessed comfort levels with GBL, it is possible to further examine if those perceived ratings vary with their role or years of experience. In order to do so, the Likert Scales on which participants responded to those questions were converted to numerical values (explained and displayed in each section) in order to provide quantitative data that allows for a statistical analysis of perceptual responses based on grouping as an administrator, a new teacher, or a veteran teacher. ANOVA tests were used initially, and then, where applicable, T-tests determined where statistical differences existed between the three groups. This section will first explore the data on perceived value of GBL before then looking into noted satisfaction and comfort levels.

Quantitative data analysis regarding perceived value. The first set of responses statistically studied from this section of rating-based survey questions pertains to the perceived value of GBL as a teaching and learning tool. While it is clear from survey responses that participants held different views on this topic, the purpose of the statistical analysis is to determine if those differing views align with categorizations as administrators, new teachers, and veteran teachers. Therefore, responses on the rating system for perceived value, which ranged from "Not at all valuable" (0) to "Very valuable" (3), were collected and grouped by role as an administrator, new teacher, or veteran teacher. This scale, as well as the summary and

breakdown data from the analysis completed, appears in Figure 4.7. The summary table notes specific data for each of the three groups: administrators (ADM), new teachers (NEW), and veteran teachers (VET). For each group, the summary table denotes how many responses (Count) fell into that grouping of participants, what the sum of those rating responses were, what the average rating was

LIKERT SCALE CONVERSION
0 = Not at all valuable
1 = Slightly valuable
2 = Moderately valuable
3 = Very valuable

SUMMARY				
Groups	Count	Sum	Average	Variance
ADM	8	18	2.25	1.071429
NEW	14	35	2.5	0.269231
VET	28	54	1.928571	0.809524

ANOVA-Perceived Value					
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.162857	2	1.581429	2.26213	0.115351	3.195056
Within Groups	32.85714	47	0.699088			
Total	36.02	49				

Figure 4.7: Perceived Value Rating Scale and ANOVA Data

for each group, and the variance of each grouping's data set. Looking first at the average response per group in the summary table of Figure 4.7, it seemed as if the veteran teachers found the strategy to be the least valuable as they noted an average response of 1.93. From there, administrators provided an average response of 2.25 and the new teachers seemed to find GBL as most valuable, with an average response of 2.5.

Still, this glancing comparison is not enough to substantiate any statistical difference, so a single factor ANOVA test was applied in order to confirm or reject the hypothesis that groups held statistically significant different views on GBL value. The results of that test on perceived value responses appear in the ANOVA table of Figure 4.7. While much of the data in this table is used to track and verify the calculations that occur, the primary point of concern regarding findings is the P-value, which appears in the second to last column, and the α value of 0.05 on which the statistical analysis was performed, which is not noted in the table. Despite the appearance of a notable difference between perceived value for the three groups, the ANOVA

test on value did not confirm a statistically significant difference. Comparing the three groups with $\alpha = 0.05$, since the P-value of 0.115351 is not less than alpha (α), it is safe to retain the null hypothesis that any association with one of the three groups (administrator, new teacher, veteran teacher) did not provide a statistical difference in perceived value.

Quantitative data analysis on satisfaction levels. While continuing to explore perceptual data, it is also important to explore the satisfaction levels for those participants who attempted to infuse GBL into their classroom. This topic was again surveyed using a rating-based question on satisfaction with GBL for any participant who had any experience with it and utilized a Likert Scale that was transferred to quantitative data using a numerical rating scale seen in Figure 4.8. This area was unique in that not all participants were able to respond on the Likert Scale. If they had never utilized GBL, they could not reflect on their satisfaction with the experience and were instructed to choose "N/A." Those "N/A" responses were removed from the numerical pool of data in order to look specifically at informed responses about satisfaction with the strategy. The remaining choices were similarly transferred to a numeric scale, ranging from "Not at all satisfied" (0) to "Very satisfied" (3), and that data was grouped by position and experience levels as seen in the conversion chart of Figure 4.8. The summary table for satisfaction ratings in Figure 4.8 provides the same specific data for each of the three groups: administrators (ADM), new teachers (NEW), and veteran teachers (VET). That data

LIKERT SCALE CONVERSION
0 = Not at all satisfied
1 = Slightly satisfied
2 = Moderately satisfied
3 = Very satisfied

SUMMARY				
Groups	Count	Sum	Average	Variance
ADMIN	7	18	2.571429	0.619048
NEW	15	37	2.466667	0.266667
VET	26	54	2.076923	0.873846

ANOVA-Satisfaction Level						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.185394	2	1.092697	1.67856	0.198117	3.204317
Within Groups	29.29377	45	0.650973			
Total	31.47917	47				

Figure 4.8: Satisfaction Rating Scale and ANOVA Data

includes the count of responses from each grouping of participants, the sum of those rating

responses, the average rating was for each group, and the variance of each grouping's data set.

Overall, the perceived satisfaction results are slightly higher than those reported for perceived

value (from the previous section), but a similar gap exists between the veteran teachers' average

rating and the other groups. Once again, the veteran teachers rated lowest, finding their

experiences with GBL to be the least satisfying (showing an average response of 2.076923). New

teachers ranked second in terms of satisfaction with strategy, with an average response of

2.466667, and administrators were the most satisfied with its use, reporting a slightly higher

average response of 2.571429.

With that summary data hypothesizing a notable difference between administrators, new

teachers, and veteran teachers, statistical testing was applied and the resulting data appears in the

ANOVA table for satisfaction levels in Figure 4.8. Specifically, to confirm or deny any group-

based statistical difference, the single factor ANOVA test with $\alpha = 0.05$ was applied to the

satisfaction ratings provided. Even though administrators and new teachers rated their

satisfaction levels as higher on average than the veteran teacher participants did, the ANOVA

test on satisfaction did not confirm a statistically significant difference. With a P-value of

0.198117 not less than the designated alpha (α) value, it is safe to retain the null hypothesis that

any association with one of the three groups (administrator, new teacher, veteran teacher) did not

yield a statistical difference in user satisfaction.

Quantitative data analysis on comfort levels. Of the three areas explored, the responses

regarding participant comfort level with GBL use are the only ones that demonstrated a

significant difference based on groupings as administrators, veteran teachers, and new teachers.

Just as with value and satisfaction components, survey participants confronted a single question

that asked them to rate their comfort in using GBL as a tool for teaching and learning. Similarly,

those rating-based responses were transferred into a numerical scale to allow for review,

averaging, and deeper quantitative analysis. The rating system for comfort level spanning "Not at

all comfortable" (0) to "Very comfortable" (3), which appear in Figure 4.9, again allowed for survey responses to be grouped into

LIKERT SCALE CONVERSION
0 = Not at all comfortable
1 = Slightly comfortable
2 = Moderately comfortable
3 = Very comfortable

SUMMARY				
Groups	Count	Sum	Average	Variance
ADM	8	19	2.375	0.839286
NEW	14	32	2.285714	0.21978
VET	28	46	1.642857	0.904762

ANOVA- Comfort Level						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	5.659286	2	2.829643	4.010565	0.024652	3.195056
Within Groups	33.16071	47	0.705547			
Total	38.82	49				

Figure 4.9: Comfort Rating Scale and ANOVA Data

administrator (ADM), new teachers (NEW), and veteran teachers (VET) who took the survey.

With that data recorded, the first step again is to summarize the collation into groupings. This is

visible in the summary table of Figure 4.9, where the number of responses for each group, rating

sum, average, and variance are available for review. Looking specifically at the average response

per group, it is clear that the veteran teachers were the least comfortable with the use of games

for learning (with an average response rating recorded as 1.64). New teachers were considerably

more comfortable (yielding an average response rating of 2.29) and administrators were the most

comfortable (resulting in an average response rating of 2.38).

While the notion that some groups are more or less comfortable with GBL as a teaching

and learning tool seems evident when comparing the averages, further statistical analysis using a

single factor ANOVA test is necessary to confirm the trend. Statistical analysis data appears in

the ANOVA table for comfort level in Figure 4.9. Unlike prior ANOVA tests for this study,

looking at the results for the comfort level ANOVA tests when comparing the three groups with

$\alpha = 0.05$, since the P-value of 0.024652 is notably less than alpha (α), it is safe to reject a null

hypothesis and claim that association with one of the three groups does, in fact, suggest a

statistical difference in comfort level. Diving deeper

into the possible relationship, however, requires the

application of further statistical analysis. Specifically,

in order to identify exactly where the statistical

difference does, and does not, exist, it is necessary to

run t-tests on the various pairing of groups, as seen in

the following figures (Figures 4.10, 4.11, 4.12).

In each of the three t-Test tables, a single

pairing across the three groups is compared in order to

determine if there is significant difference in the

average comfort rating based on association with the

specific participant grouping. The first table in Figure

4.10 displays data from the t-Test comparing

administrator (ADM) comfort ratings and new teacher

(NEW) comfort ratings. The data includes some of the

same information from the ANOVA summary,

including the mean, variance, and number of

observations (or response count). More importantly,

however, it provides the "t Stat" to the "Critical one-

tail" value for this specific t-Test, which is how one

t-Test: Two-Sample Assuming Unequal Variances		
	ADM	NEW
Mean	2.375	2.285714
Variance	0.839286	0.21978
Observations	8	14
Hypothesized Mean Difference	0	
df	9	
t Stat	0.257094	
P(T<=t) one-tail	0.401444	
t Critical one-tail	1.833113	
P(T<=t) two-tail	0.802888	
t Critical two-tail	2.262157	

Figure 4.10: Comfort Level T-Test, ADM/NEW

t-Test: Two-Sample Assuming Unequal Variances		
	ADM	VET
Mean	2.375	1.642857
Variance	0.839286	0.904762
Observations	8	28
Hypothesized Mean Difference	0	
df	12	
t Stat	1.97643	
P(T<=t) one-tail	0.035774	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.071549	
t Critical two-tail	2.178813	

Figure 4.11: Comfort Level T-Test, ADM/VET

t-Test: Two-Sample Assuming Unequal Variances		
	NEW	VET
Mean	2.285714	1.642857
Variance	0.21978	0.904762
Observations	14	28
Hypothesized Mean Difference	0	
df	40	
t Stat	2.933876	
P(T<=t) one-tail	0.00276	
t Critical one-tail	1.683851	
P(T<=t) two-tail	0.00552	
t Critical two-tail	2.021075	

Figure 4.12: Comfort Level T-Test, NEW/VET

can determine the outcome of the analysis. By statistical rules, if the t Stat exceeds the Critical

one-tail value, that marks the existence of a statistical difference between those two groups. Similar information is provided for the t-Test comparing the administrator (ADM) group with the veteran teachers (VET) in Figure 4.11, and for the t-Test comparing the new teachers (NEW) with the veteran teachers (VET) in Figure 4.12.

By comparing the "t Stat" to the "Critical one-tail" value for each test, it becomes evident that there is no statistical difference between the new teachers and administrators with regard to their comfort levels (as the t stat does not exceed the critical one-tail value as shown in Figure 4.10). However, examination of the same values for the other two grouping comparisons reveal the true crux of the statistical difference—the veteran teacher group. Among the survey participants who completed the questions on comfort ratings (N=50), there was a statistically significant difference between the administrator group (M=2.375, V=0.839286) and the veteran teacher group (M=1.642857, V=0.904762). The comparison of these two groups, documented in Figure 4.11, reports t Stat=1.97643 which is larger than the t Critical one-tail=1.782288. Similarly, there was a statistically significant difference between the new teacher group (M=2285714, V=0.21978) and the veteran teacher group (M=1.642857, V=0.904762). In fact, the greatest statistical significant difference occurs between these groups, as noted in Figure 4.12, with t Stat=2.933876 more drastically exceeding the Critical one-tail=1.683851.

Qualitative survey data on benefits and concerns. To finish the first section of the survey examining opinions about GBL in general, and to follow up on the choice-based perceptual questions with greater detail, the survey asked participants to explain the greatest perceived benefits to using digital and non-digital games for teaching and learning as well as the greatest perceived barriers/concerns. Rather than provide choices as with many of the other (later) survey questions, this section allowed for complete freedom of input using open-ended

text responses and offering no suggested options or answers. Once the myriad of responses for each question were collected, they were then sorted manually and coded using Survey Monkey technology until patterns emerged and themes developed.

In reviewing the qualitative responses regarding the greatest benefits of GBL, there were six overall themes that permeated the collected comments: increased engagement, relevance to students' learning mode, means of review/practice, reinforcing various social skills, use of competition, and integration of critical thinking skills. Increased engagement was, by far, the greatest benefit noted, with 68% of all replies referencing it in some way. Relevance to student learning as well as review/practice were each noted 14% of the time. Competition and the
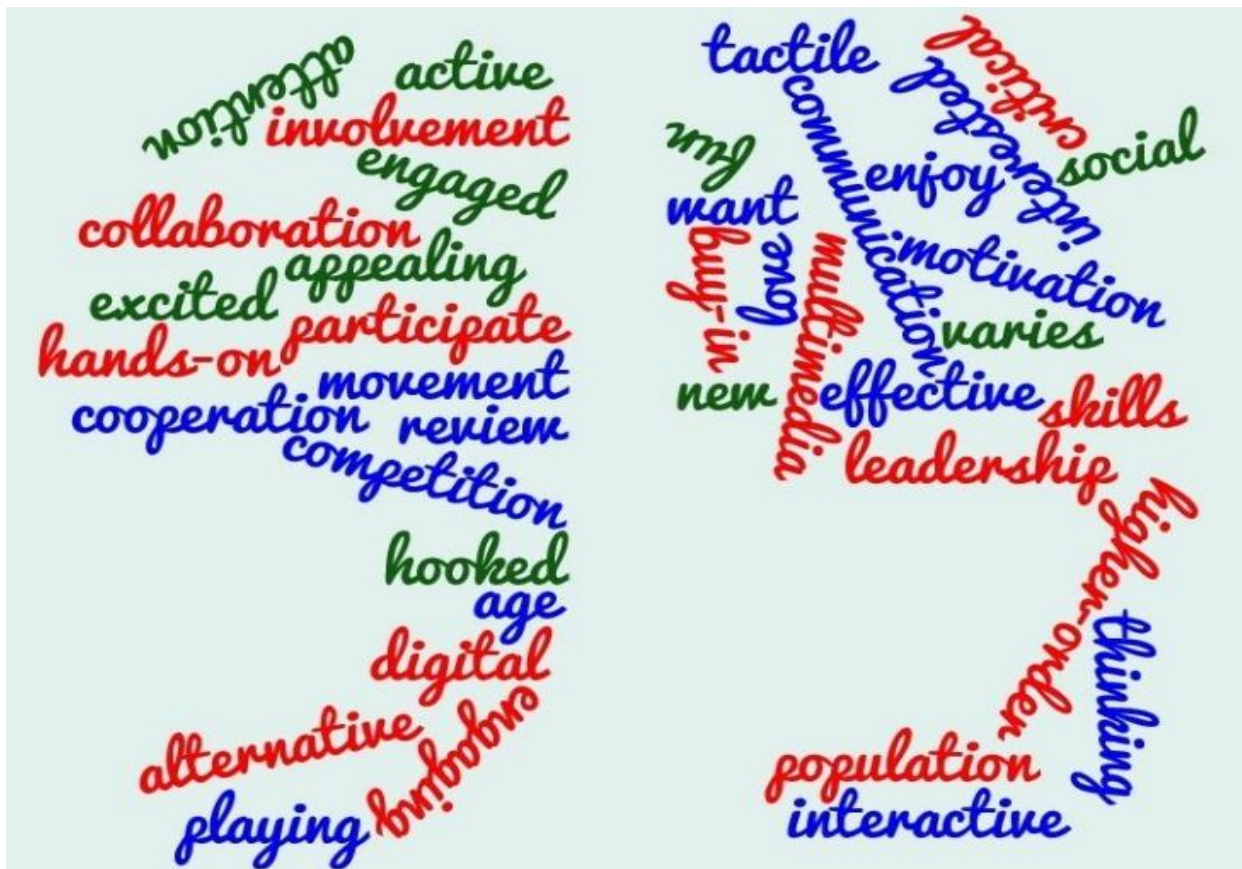
Figure 4.13: Wordle on Key Terms Regarding Benefits of GBL

reinforcement of social skills were each alluded to 10% of the time. Critical thinking only

appeared about 4% of the time. While the percentage breakdowns allow for insight into the

frequency of each pattern, they limit the details of the open-ended responses into their themes.

Therefore, the central terms noted throughout these responses shown in the Wordle in Figure

4.16 included such terms as hooked, appealing, excited, interested, social, effective, interactive,

and involvement. The coloring of the Wordle and the terms within it is simply an effect from the

tool used to create it and does not specifically imply a pattern or frequency associated with each

word. Reviewing the actual vivid terminology here builds on the themes noted above with more

descriptive and specific details.

The qualitative responses addressing the greatest perceived barriers/concerns instructors

face when using digital and non-digital games for teaching and learning also fell within six

themes, but with a less dominant one emerging. The most prominent theme, amount of time needed to conduct GBL, permeated 32% of responses. Concerns about technology access surfaced in 24% of the replies while the complication of alignment to curricular goals showed up in 22% of survey comments. Negative perceptions holding people back appeared in 16% of the comments

Figure 4.14: Wordle on Key Terms Regarding Barriers/ Concerns with GBL

and a need for training was mentioned 10% of the time. Finally, 4% of responses suggested financial limitations. Again, while the extent to which themes emerge and how often they display in the overall set of responses is helpful, that information does not offer insight into the specific fears and concerns communicated by survey participants. That level of detail is illustrated in the Wordle showing in Figure 4.14, where frequently used words from the coded qualitative data on perceived barriers and concerns come together, including comfort (lack thereof), resistance, rigor, set-up, time-consuming, and overwhelming.

  Quantitative survey data on game use and experience. With background and overall perceptual input as a foundation, the survey moved on to explore feedback on actual firsthand use of games in various manners. In fact, the bulk of the survey examined details on GBL use, experiences, and effectiveness. Throughout this topic of exploration, the survey provided either multiple choice or rating scale options from which the participants could choose. That information was then collected, categorized, and counted in order to create quantitative measures for analysis. Therefore, this section will examine quantitative data on GBL frequency and manner of use before specifically exploring input regarding perceived outcomes and effectiveness.

  Quantitative data on frequency of game use. To begin, the survey asked participants about their use of games in three manners—for entertainment reasons (outside of learning), digitally for teaching and learning purposes, and non-digitally for teaching and learning purposes. Essentially, three questions asked specifically about one of the three possible manners in which the participant might use games and provided them seven choices to describe their frequency of use. These frequency choices, seen along the bottom of the triple bar graph in Figure 4.15, range from "Every Day" to "Never." Details about the range of responses for each

type of game use also appear in Figure 4.15. To focus specifically on how often survey

participants used games for entertainment purposes, one should look specifically at the bright

blue bars. According to the data, more people used games for entertainment about once per week

than any other choice. In a similar manner, red bars show the frequency of GBL use with respect

to digital games according to survey responses and green bars note the use of non-digital games

for teaching and learning. The curves connecting the separate bar series' then show the

distribution for that type and make it easier to examine skew and peaks, noting which data sets

(entertainment, digital GBL, or non-digital GBL) climax further to the left (noting a higher

frequency) or the right (noting a lower frequency).

By graphing all three data sets on the same bar graph, it is possible to compare the peaks

and distributions of each manner of game use concerning their frequency. Digital GBL use
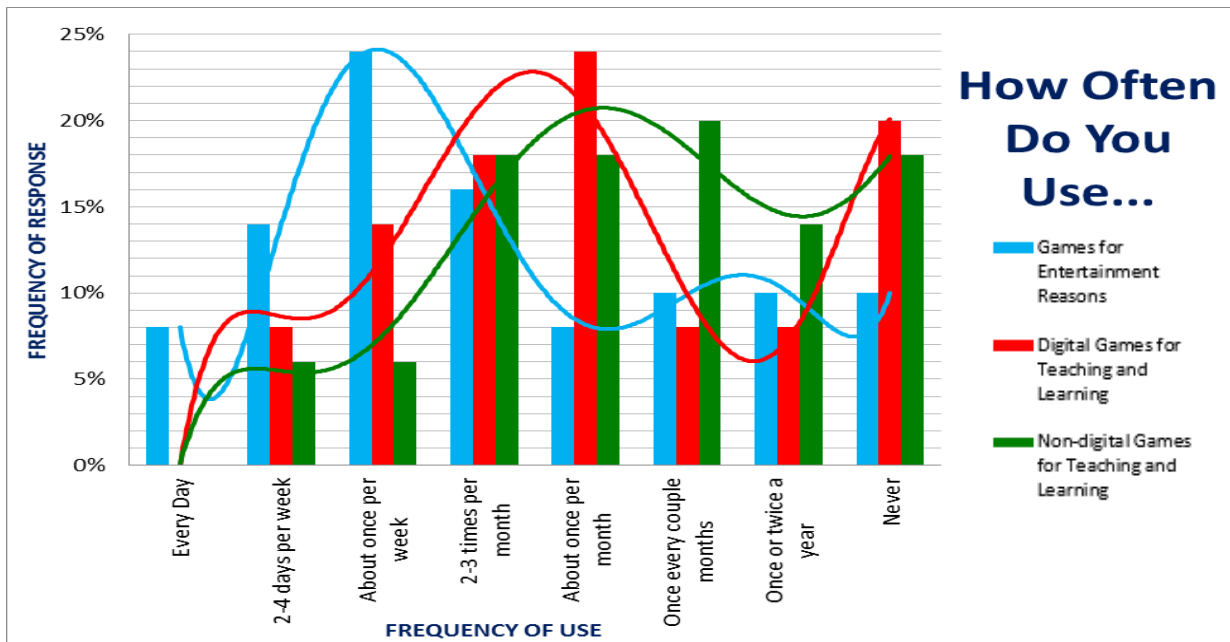
Figure 4.15: Frequency of Game Use for Entertainment and Learning

(noted by red bars in the graph) peaks at "about once per month" and then again at "never" with

lower frequency bars for the intervals between, while the frequency of non-digital GBL use is

more consistent and clustered. In general, non-digital GBL spans somewhat evenly between "2-3

times per month" and "never." While non-digital GBL is more clustered in its responses than digital GBL, the actual use (curve) peaks lower, meaning digital games may be used more frequently (by some participants) but not necessarily by as many of the participants. Finally, it is interesting to compare this pattern to the use of games for entertainment purposes. Since the bright blue curve peaks further to the left of the graph, it is clear that participants use games for entertainment purposes even if they do not use them in lessons and learning.

   Quantitative statistical data on frequency of GBL use for learning. To build upon the categorical data provided by the survey results and displayed in the previous triple bar graph, a simple statistical analysis of responses regarding frequency of use can offer additional insight and information. In order to do this, the scale of multiple choice responses to the three frequency questions about games for entertainment and learning were transferred to a numerical scale ranging from 0 (the participant never uses games) to 7 (the participant uses games every day) that can be seen in Figure 4.16. With these converted numerical ratings, various calculations can be applied to seek out possible statistical patterns.

   First, the three separate types of game use were compared. Since participants were asked to rate how frequently they utilize digital games for learning purposes, non-digital games for learning purposes, and any games for entertainment purposes and these responses were quantified using the conversion scale in Figure 4.16, that data could then be averaged for comparison purposes. Whereas the average overall score for entertainment-related game use equated to a scale score of 3.78 (multiple times per month), game use for learning purposes averaged much lower. Digital GBL occurred at a frequency scale rating of 2.86 and non-digital GBL only rated 2.46, meaning it occurred less than once a month.

   In addition to examining the differences in responses based on type or purpose of game

use, it is also helpful to examine whether or not grouping as an administrator, new teacher, or

veteran teacher impacts frequency. Using the transferred frequency responses on the 0 to 7 rating

scale, each participant's response rating for both digital and non-digital GBL use were averaged

in order to assign a
singular GBL use
rating to each
individual. Sorting
those ratings by
grouping
(administrator, new
teacher, or veteran

LIKERT SCALE CONVERSION	
0 =	Never
1 =	One or twice a year
2 =	Once every couple months
3 =	About once a month
4 =	2 to 3 times per month
5 =	About once per week
6 =	2 to 4 days per week
7 =	Every day

SUMMARY				
Groups	Count	Sum	Average	Variance
ADM	8	22	2.75	4.357143
NEW	15	42.5	2.833333	2.880952
VET	27	68.5	2.537037	1.960114

ANOVA- Average Frequency Rating (Digital and Non-digital GBL)						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.923704	2	0.461852	0.178224	0.837318	3.195056
Within Groups	121.7963	47	2.591411			
Total	122.72	49				

Figure 4.16: Frequency Rating Scale and ANOVA Data

teacher), it is possible to then determine if there is a significant difference between the extent to

which GBL it utilized by different participant groups. The quantitative data for the three groups,

reviewed in the summary table of Figure 4.16, shows the numbers of responses (count), sum, and

average for the administrators (ADM), new teachers (NEW), and veteran teachers (VET).

Looking first at group averages, the veteran teachers seem to use the strategy the least (average

frequency rating of 2.54), whereas new teachers used the strategy slightly more often (average

frequency rating of 2.83). However, in order to substantiate this difference with statistical

support, it is necessary to apply a single factor ANOVA with an alpha (α) of 0.05. The data

results of that application are detailed in the ANOVA table in Figure 4.16. In reviewing the data

provided, the potential of any statistical difference between new and veteran teachers is rejected.

The calculated P-value (0.84) is greater than the alpha (0.05), so the data does not support that

there is a significant statistical difference between the frequency ratings of new teachers, veteran

teachers, and administrators.

Quantitative data on game use, purpose, and type. With general information available

regarding the frequency of use for digital and non-digital GBL in comparison to game use for

entertainment purposes, the survey questions moved toward an exploration of game type, use,

and purpose to further examine GBL experiences. In order to do this, the survey put forth large

overarching questions with a multitude of optional answers. Participants were encouraged to

select one or more that applied to them and the data from those choices identified trends about

game utilization. The first question asked participants how they used games to deliver core

and/or supplemental curriculum content and then provided many ways teachers could select. A

second question asked
how games fit into the
learning program, seeking
to determine their GBL
use for practice,
assessment, as context for
discussion, or as a
thinking tool. Finally, the
survey asked which types
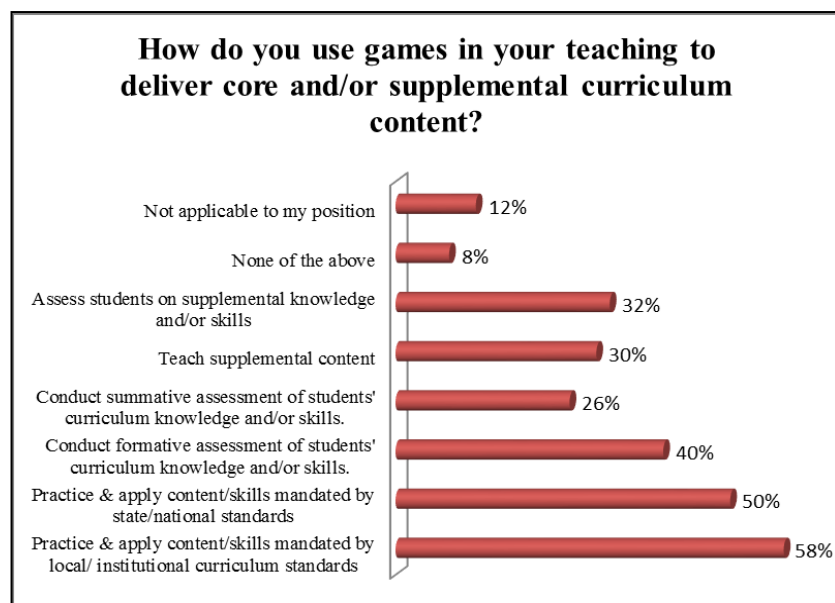
Figure 4.17: Reasons for Using Games in the Classroom

of games were used most often, with options that ranged in terms of how and by whom they may

have been developed. The data from those questions, and their responses, is explored in detail to

seek out patterns about game purpose, use, and type.

Responses from the first question, examining how games facilitate the delivery of

content, are broken down in Figure 4.17. The overarching question is clear and the various

choices are listed as labels down the vertical axis of the horizontal bar graph. With regard to game use for content delivery, it is evident that a majority of GBL facilitation focuses on practice and application of content and/or skills that some form of curriculum or standards mandates, as 50 - 58% of the participants selected those options. Several participants (roughly 40%) also noted that games are used to conduct formative assessment of curricular understanding, but notably fewer people (26%) mentioned using games for summative assessment of core

curriculum knowledge and skills. Roughly one-third of the participants (32%) admitted to using games to assess the supplemental knowledge and skills within their course and slightly
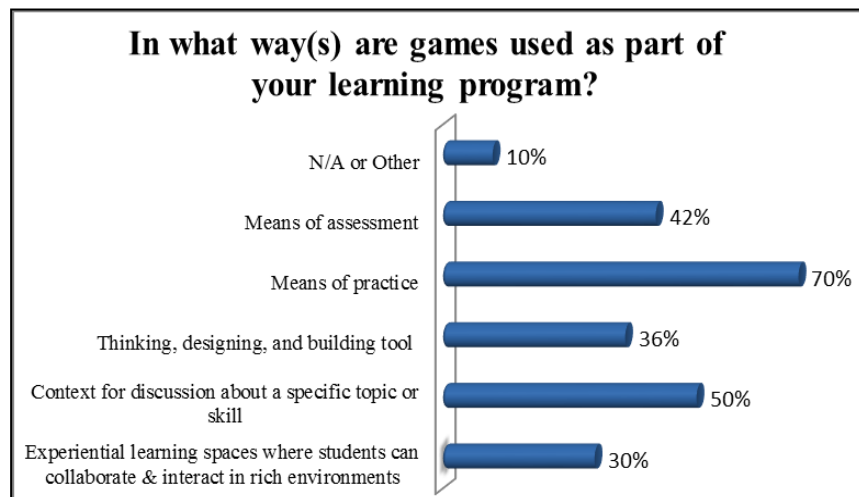
Figure 4.18: Purpose of Game Use in the Classroom

fewer (30%) even noted they use games to teach that supplemental content. The primary means of game use, or activity, for teaching and learning seems to fall in the areas of student practice, application, and formative assessment (whether to provide that formative feedback to the student directly, the teacher, or both).

The second overarching question from this section of the survey examines how games are used as a part of the participants' learning program. Figure 4.18 shares the resulting data. The different possible GBL purposes again label the vertical axis of the horizontal bar graph making it easy to see which options received the most support from survey participants. Again, the most common response from participants cited game use as a means of practice. From there, the

second most common purpose for using games was to provide context for discussion about a specific topic or skill (essentially acting as a jumping off point for class discussion to provide students a tangible hook into the material). Fifty percent of survey participants admitted using games for this reason. Similar to prior findings, only 42% of survey replies noted using games as a means of assessment. Even less commonly, however, games were only used as a thinking, building, or design tool according to 36% of the responses and were only used as experiential learning spaces based on 30% of the responses.

Finally, to create a more comprehensive understanding of the manner in which GBL is used by those teachers (and administrators) who completed the survey, it was also important to look into the types of games used. In order to do this, survey participants were asked to select which of the various types of games they had used in their classroom, with options based off prior literature research including games that were commercially created for education or for entertainment but modified for education,
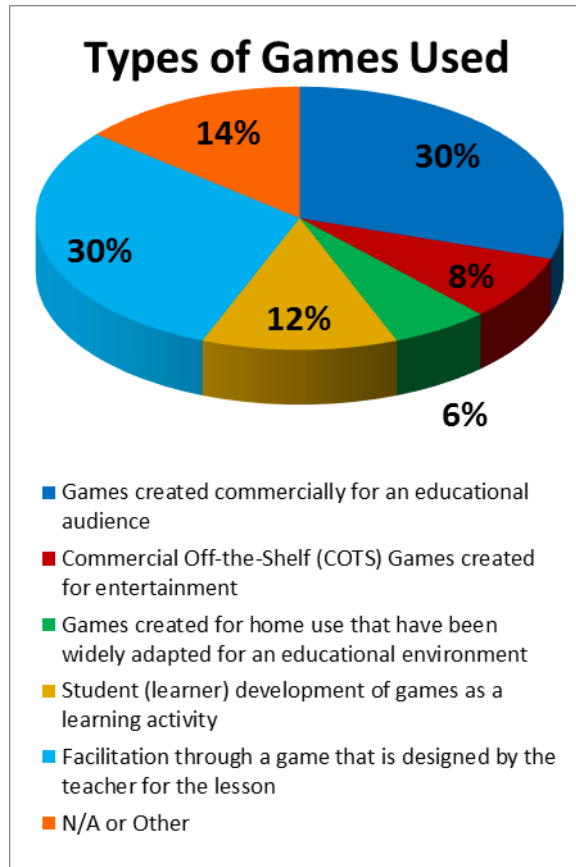
Figure 4.19: Types of Games Used in the Classroom

teacher-created games, or student-developed games. The pie chart in Figure 4.19 summarizes the responses from the survey participants. Examining this element of game type is critical in the research since both the (lack of) availability of pre-created games as well as the time it takes to develop games specifically for classroom learning surfaced when participants contemplated the

barriers and obstacles associated with GBL. Despite those concerns, the two types of games

noted as used most often were those already developed commercially for an educational purpose

(even with the noted availability issues) and those games designed by a teacher for a lesson

(regardless of the significant time and effort it takes to create them). As seen in Figure 4.19,

those two types of games (both shown in shades of blue) represented 30% of all responses

(each). In contrast, only 12% of responses noted GBL facilitation with students through the

development of their own games as the core learning activity, 8% modified commercial-off-the-

shelf (COTS) games from their original entertainment purposes to serve a learning goal, and 6%

found entertainment games that had already been widely adapted for educational purposes

through collaboration with peers and utilized those elements. This data provides a strong point of

comparison for exploration in later data collection rounds in order to see how the issue with

availability of existing games as well as the time and effort factor associated with making games

is holding people back from using the tool even more frequently than they already are.

      Quantitative survey data on effectiveness. Once data was collected regarding game

use, purposes, types, and practices, it was also critical to examine perceived effectiveness based

on those experiences. Therefore, the survey asked participants to rate how effective digital games

have been with regard to improving students' learning in a variety of academic content areas,

skill sets, and even affective elements. Participants noted if they felt games were highly

effective, effective, slightly effective, or not effective in improving students' learning. In the first

question of this type, the survey specifically asked participants to rate perceived effectiveness in

each of the different academic subject areas and non-academic skill sets (21st century, executive

function, and social skills). Participants were allowed the opportunity to rate any (and if

interested, all) of the subject/skill areas despite their primary background or teaching assignment

so as to examine general reactions to this question and not just those based on first-hand experience. Figure 4.20 displays the resulting data from these ratings. Each area is displayed on its own row with a segmented bar showing the breakdown in effectiveness levels. Examining the various content areas, teachers and administrators felt that digital games were effective (or highly effective) at improving learning in the areas of Social Studies/History (noted by 78% of the responses), Art or Culture (77%), and Computer/Technology (67%) than the other subjects. On the other hand, Math (45%), Science (50%), and Health/Physical Education (50%) received the lowest percentage of effective or highly effective responses. Whereas academic subject areas vary widely in their level of perceived impact on student learning, the responses regarding non-academic skill sets were more consistent and positive overall. Of the completed surveys, roughly 71% of responses rated digital games as effective or highly effective in influencing 21st Century Skills such as creative problem-solving, systems thinking, and perseverance as well as executive function skills such as memory, concentration, and focus. Collaboration, communication, and negotiation were noted as being effectively impacted by the use of digital games 82% of the time—the highest of all the potentially affected areas.
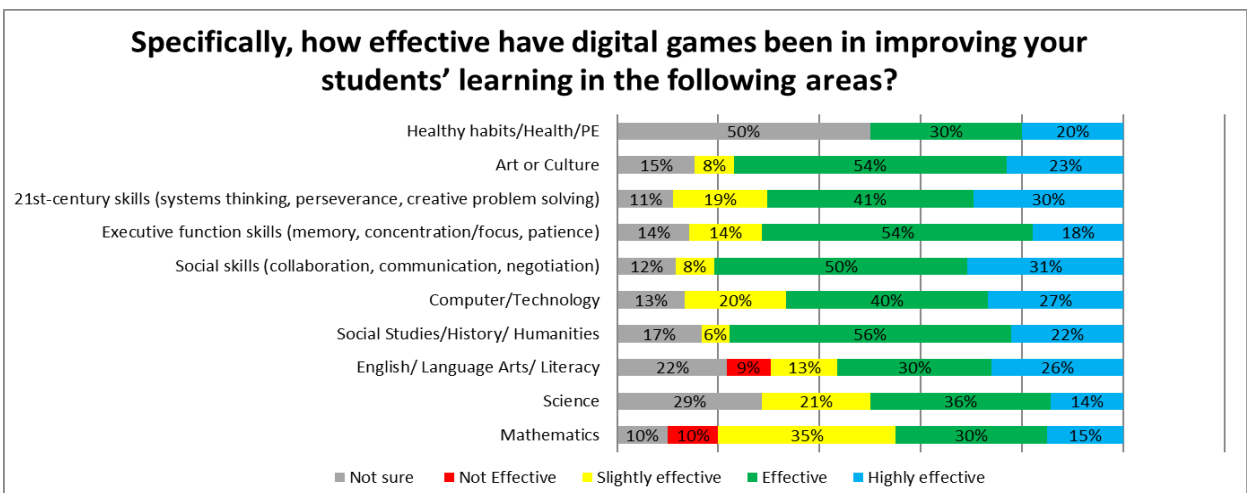
Figure 4.20: Effectiveness of GBL on Skills in Various Content Areas

Several of the key points of discussion that permeated the study of GBL and specifically the prior elements of this research study were included in a secondary separate set of survey questions. This process aimed to seek out how much teacher and administrator participants agreed with each specific comment about GBL, but also provided some internal triangulation for survey data through a mild repetition of perceptual questioning. For this part of the survey, participants reviewed ten separate statements paired with a Likert Scale for levels of agreement as seen in Figure 4.21 below. Some comments received strong agreement throughout the many returned responses while others were spread out more in terms of agreeing or disagreeing with the statement provided. In general, responses were helpful in offering some level of corroboration with other data collected. In addition, those statements and topics where participants agreed (or highly agreed) with the statements also offer interesting points for future
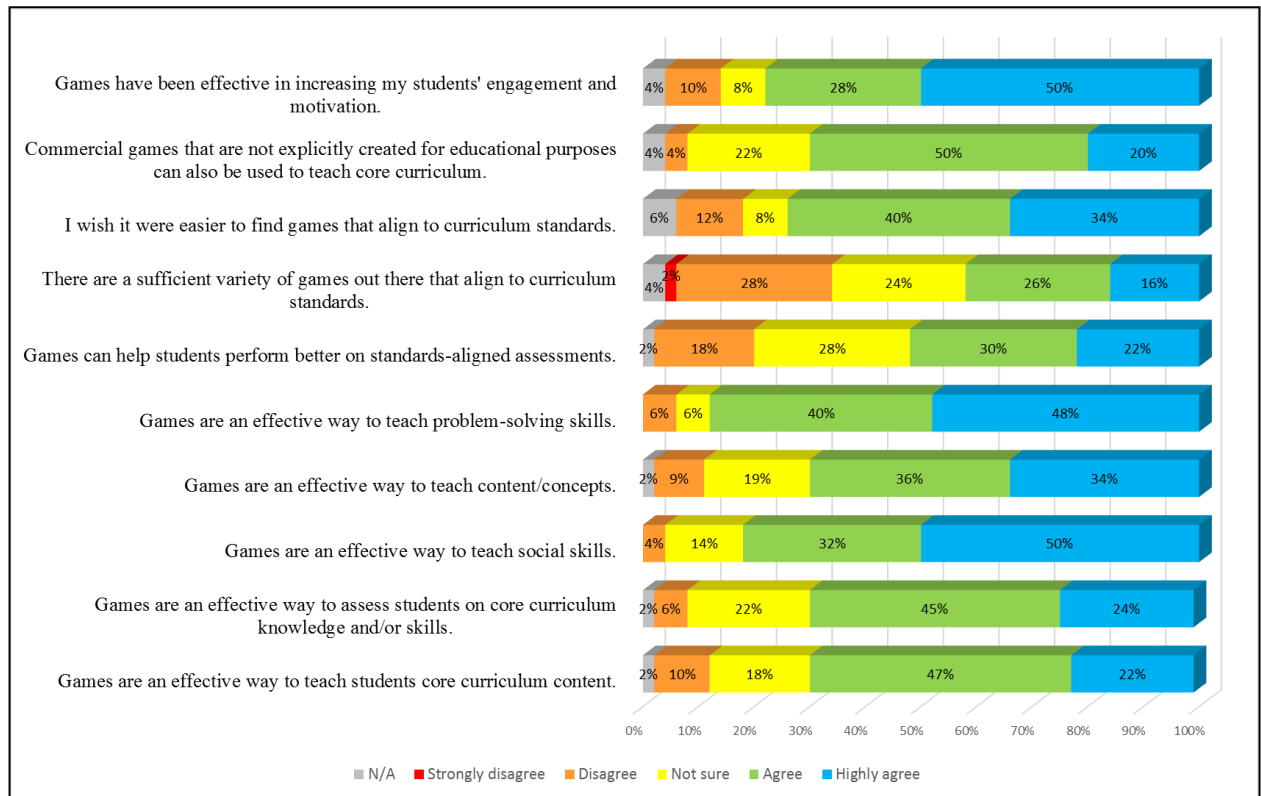
Figure 4.21: Participant Agreement with Various GBL Statements

exploration.

As noted earlier, the data shown in Figure 4.21 provides a point of triangulation with prior questions. For example, in this section, responses show that participants find games as an effective means of teaching problem-solving skills (88% of responses agreed or highly agreed) and social skills (82% of responses agreed or highly agreed). This corroborates data collected in prior questions on those same topics. The data collected in this portion of the survey also mirrored prior responses with regard to core curriculum content, knowledge, and academic skills as these areas reflected a slightly lower level of agreement than the aforementioned skills. Roughly 69-70% of responses agreed that games were an effective means of teaching or assessing core curriculum content, concepts, knowledge, or skills. These scale-rated responses also correlate to the open-ended question on benefits of GBL, where participants most frequently noted engagement as a benefit. According to responses, 78% of participants agreed that games have been effective in increasing engagement and motivation. Finally, data from this set of survey questions corroborates one of the major obstacles to be availability. As seen in the fourth statement of Figure 4.21, only 42% feel there are sufficient games available that align to curriculum standards while 74% wish it were easier to find games that align to those standards (as seen in the third statement).

To continue seeking out teacher and administrator experiences with GBL, one set of questions asked participants to comment on how the integration of GBL had facilitated any impact on various areas of classroom learning outcomes and behaviors. Specifically, teachers and administrators were asked if they had noted a change in students' opportunity to discuss constructive use of technology, improved engagement for lower performing students, positive collaboration between students, and sustained attention to specific tasks. The responses from

those questions appear in Figures 4.22 and 4.23.

Specifically, Figure 4.22 displays the responses where an increase yielded a positive impact on the classroom, including queries about student discussion, engagement, collaboration, and attention; whereas Figure 4.23 summarizes the responses for those questions where an increase would yield a negative impact on the classroom, such as delays in curriculum and conflict between students. Looking first at Figure 4.22, roughly 55% of responses noted improved opportunities to discuss constructive use of technology and only 48% reported sustained attention to tasks as result of integrating GBL into teaching and learning practices. The
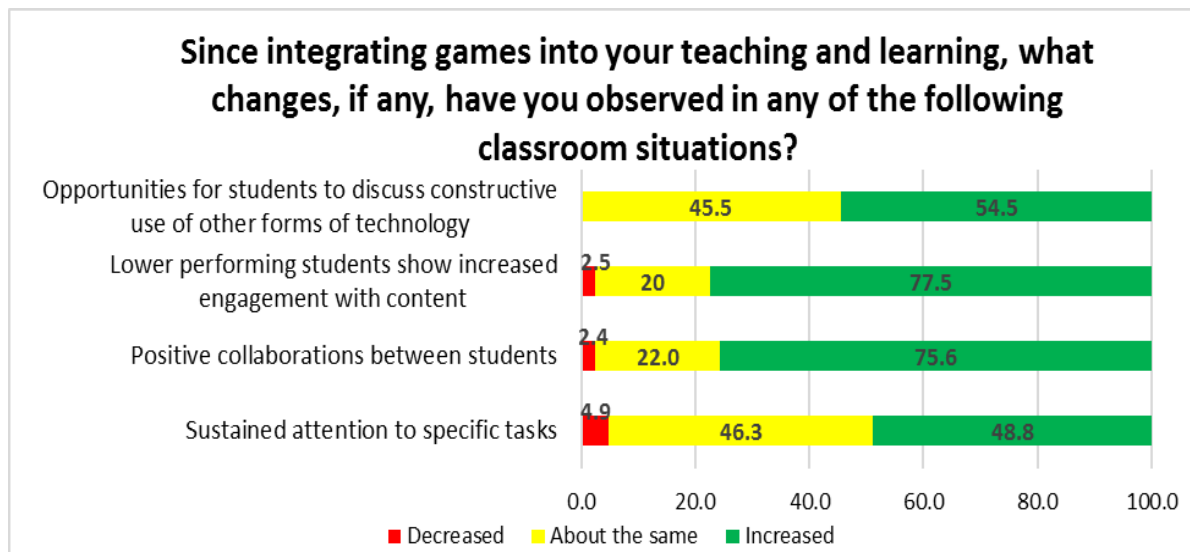
Figure 4.22: Noted Positive Impacts of GBL

remaining responses to those questions claimed that levels remained about the same regarding discussion and attention with very few answers suggesting a decrease because of GBL. In contrast, student engagement and collaboration questions elicited stronger positive reactions in these survey questions. Out of all the participant responses, between 75-78% of teachers and administrators reported that lower performing students showed increased engagement with content and that positive collaboration between students increased as a result of integrating games into teaching and learning.

Then, along with exploring those possible positive trends and outcomes of GBL experiences, the survey asked teachers and administrators to take notice of any potential negative effects as well. Specifically, they were asked to report any impact on student conflict and curriculum delivery pacing due to GBL utilization. The extent to which participants noted these elements increasing or decreasing with the use of GBL appear in the segmented bar graph in Figure 4.23. Teachers and administrators noted little overall impact on the delivery of content or curriculum. Of all respondents, 11% said there was actually less of a delay as a result of game use, while 19% reported there were more delays in delivering curriculum, and the majority (69%) said that pacing of curriculum was about the same. Finally, the survey examined the notion of student conflict in conjunction with game use, as this is a common question or concern.
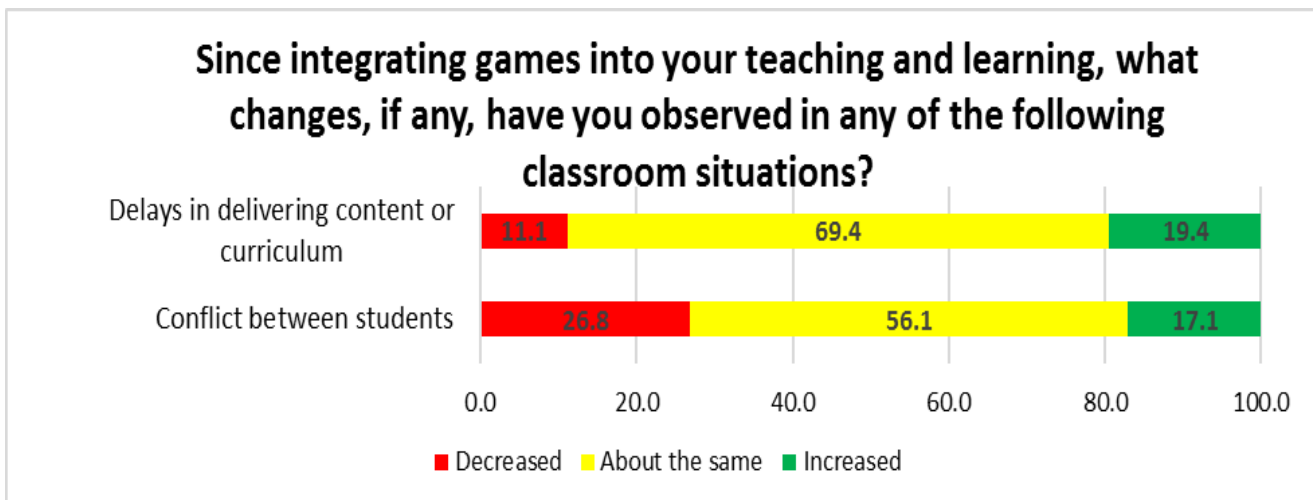
Figure 4.23: Possible Negative Outcomes of GBL

Some GBL literature suggests that the competition associated with games increases conflict while other research shows game competition will actually minimize the amount of conflict in a classroom setting. Survey data shows a mild divide in this response, with 17% of respondents claiming an increase in conflict, 27% noting a decrease in conflict, and 56% stating little notable difference because of game integration.

Quantitative data analysis of survey data on GBL effectiveness. With the data

collected on perceived effectiveness in a multitude of academic and social areas, it is possible to

analyze effectiveness ratings. Specifically, ANOVA testing can use ratings across the various

skill sets to determine if there is a statistically significant difference in the perceived

effectiveness for each type of skill, as well as if there is a significant difference in the perceived

effectiveness ratings from administrators, veteran teachers, and new teachers. In order for this to

occur, the Likert scale used for these survey questions underwent a conversion to numeric values

to facilitate statistical calculations. In this converted system, which can be seen in Figure 4.24,

those responses claiming GBL was not effective equate to a score of "0" for perceived

effectiveness and the numbers increase up through a score of "3" for those responses rating the

strategy as highly effective.

LIKERT SCALE CONVERSION

0 = Not effective
1 = Slightly effective
2 = Effective
3 = Highly effective

SUMMARY				
Groups	Count	Sum	Average	Variance
Math	21	34	1.619048	0.847619
Science	10	19	1.9	0.544444
English/ Language Arts	16	31	1.9375	0.995833
Social Studies	14	31	2.214286	0.335165
Computer/Technology	12	24	2	0.545455

ANOVA-Academic Subjects						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.1817433	4	0.795436	1.147255	0.341922	2.506621
Within Groups	47.147024	68	0.693339			
Total	50.328767	72				

Figure 4.24: Subject Area Effectiveness Rating Scale and ANOVA Data

Comparing effectiveness ratings in different settings, subjects, and skill sets. First, a

statistical analysis of response ratings examined effectiveness ratings across the different subject

areas, or academic skill sets, to determine if participants perceive GBL as more or less effective

for the different departments. The count, sum, average, and variance of the converted

effectiveness ratings can be seen in the summary table of Figure 4.24. Exploring average ratings

in that table reveals that participants felt that GBL was least effective for Math and most effective for Social Studies. There appears to be a noticeable difference in the average ratings: Math (1.62), Science (1.90), English/Language Arts (1.94), Computers/ Technology (2.0), and Social Studies (2.21). However, in order to determine if these varied values suggest a significant statistical difference, deeper analysis must occur. Therefore, a single factor ANOVA was applied to the average ratings for each subject area. The results, found in the ANOVA table of Figure 4.24, show that when the single factor ANOVA was applied, the resulting P-value is noticeably greater than the alpha utilized ($\alpha = 0.05$), suggesting that subject area had no significant impact on the provided effectiveness ratings. While there was some difference in the responses, they do not seem solely attributed to academic skill area.

In addition to evaluating academic subject area effectiveness, the survey and ensuing data analysis also sought to examine perceived effectiveness about various non-academic skill sets, namely social, executive functioning, and 21st century skills. Specific details about and examples of each of these non-academic skill sets appear in Figure 4.25. Although the extent to which participants deemed each category of non-academic skills as an effective avenue for GBL has already been discussed, it is also interesting to explore if the different types of non-academic skills had an impact on the participants' effectiveness ratings. Therefore, the effectiveness response ratings, once converted using the chart shown before and again referenced in Figure 4.26, were reviewed. The summary table of Figure 4.26 shows the counts, sums, and averages for each of the non-academic skills.
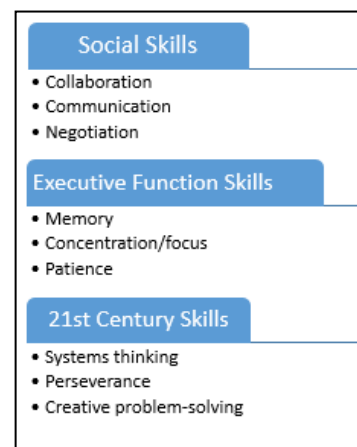
Figure 4.25: Non-Academic Skill Sets

At first glance, the scores for the three areas are noticeably higher than the academic group

(shown earlier in Figure 4.24) and slightly closer together. Teachers seem to perceive GBL as effective in developing social skills like strong collaboration, communication, and negotiation above all others. As noted in the summary table in Figure 4.26, these social skills received an average rating of 2.61, which is approaching the highly effective conversion value. However, survey participants also held positive effectiveness responses about the other two non-academic skill sets/areas as well (rating between an average of 2.17 and 2.39). Expanding upon this first glance of summary data, a single factor ANOVA was applied to the numerically coded effectiveness responses using $\alpha = 0.05$, but no statistical impact was justified. The data involved in this analysis is documented in the ANOVA table in Figure 4.26. Not surprisingly considering the averages were relatively close together, and since the P-value was significantly larger than α, data suggests that the different categories of non-academic skill sets did not have any impact on effectiveness ratings.

While there was not statistical significance within the academic subjects or within the

LIKERT SCALE CONVERSION	SUMMARY				
0 = Not effective	Groups	Count	Sum	Average	Variance
1 = Slightly effective	Social Skills	23	60	2.608696	1.158103
2 = Effective	Executive Function Skills	23	50	2.173913	0.87747
3 = Highly effective	21st Century Skills	23	55	2.391304	1.339921

ANOVA- Nonacademic Areas						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.1739	2	1.086957	0.966042	0.385902	3.135918
Within Groups	74.261	66	1.125165			
Total	76.435	68				

Figure 4.26: *Skill Set Effectiveness Rating Scale and ANOVA Data*

non-academic skill sets, this lack of finding did not occur when examining the two sets in relation to one another. By combining effectiveness rating data from all subject areas into an overarching *academic subjects* set and pooling corresponding rating data from the three skill sets

into *non-academic skills*, one can compare the two areas visually and statistically. Still using the same effectiveness conversion scale to create numerical measures from the selected effectiveness ratings (seen again in Figure 4.27), cumulative response data was collected for review. Early examination of the counts for each area, sum, average effectiveness rating, and variance appear in the summary table of Figure 4.27. When comparing academic areas with non-academic skill sets, it is quickly noticeable that average effectiveness ratings are higher for the non-academic areas (averaging at 2.42) than the academic subjects (averaging only 1.90). Of course, this does not prove there is a significant difference, so application of the single factor ANOVA explored the possibility of a statistical difference. The data from that test appears in the ANOVA table of Figure 4.27 and provides interesting findings. Applying a single factor ANOVA test with $\alpha = 0.05$ results in an incredibly low P-value of 0.000857, which confirms that the type of skills/content being addressed by the use of GBL affects how the teachers perceive the strategy's effectiveness. While there was no statistically significant difference or impact across various academic subjects or within different non-academic skill sets, there was a statistical impact or difference calculated between the two different components of overall learning. In evaluating the

LIKERT SCALE CONVERSION
0 = Not effective
1 = Slightly effective
2 = Effective
3 = Highly effective

SUMMARY				
Groups	Count	Sum	Average	Variance
ACADEMIC SUBJECTS	73	139	1.90411	0.699011
NON-ACADEMIC SKILLS	83	201	2.421687	1.076109

ANOVA- Academic / Non-academic Comparison						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	10.40463	1	10.40463	11.56322	0.000857	3.902553
Within Groups	138.5697	154	0.899803			
Total	148.9744	155				

Figure 4.27: Academic vs. Non-Academic Area Effectiveness Ratings and ANOVA Data

effectiveness of GBL to support skill development, there is a statistically significant difference between academic subjects (M=1.90411, V=0.699011) and non-academic skills (M=2.421687, V=1.076109), as evidenced by a P-value (p=0.000857) less than 0.05.

Comparing effectiveness ratings by participant subgroup. In addition to considering whether skill (academic or non-academic) type influenced effectiveness rating, it may also be enlightening to examine if categorization as an administrator, a new teacher, or a veteran teacher affects a participant's likelihood of rating GBL as slightly, highly, or not at all effective. To do this, the effectiveness ratings for each individual were first quantified and then averaged. For example, participant X's ratings for all areas, academic subjects and non-academic skills sets, were averaged to assign participant X a single GBL overall effectiveness rating. The individual average effectiveness ratings were then analyzed to search for significant differences across groups. A reminder of the conversion scale to transfer ratings into quantitative data, as well as the summary of count, sums, averages, and variances for each subgroup can be reviewed in the scale and summary tables of Figure 4.28. New teachers reported the highest average GBL overall effectiveness rating, 2.09, followed closely by administrators who recorded an average

LIKERT SCALE CONVERSION
0 = Not effective
1 = Slightly effective
2 = Effective
3 = Highly effective

SUMMARY				
Groups	Count	Sum	Average	Variance
ADM	6	12.2	2.033333	1.526667
NEW	13	27.23333	2.094872	0.133675
VET	20	29.6	1.48	0.776421

ANOVA-Average Academic Effectiveness Rating Per Participant						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.470108	2	1.735054	2.603727	0.087878	3.259446
Within Groups	23.98944	36	0.666373			
Total	27.45954	38				

Figure 4.28: Effectiveness Rating Scale and ANOVA Data by Participant Subgroup

effectiveness rating of 2.03. Veteran teachers, however, produced an average GBL effectiveness rating of only 1.48. To determine if the differences, specifically with regard to the lower average rating for veteran teachers, suggest a significant variation, single factor ANOVA testing procedures were applied, and the data output of that test can be seen in the ANOVA table of Figure 4.28 as well. While the P-value is relatively low and close to the necessary threshold, it is not lower than the alpha value ($\alpha = 0.05$). This means that the data collected and displayed in Figure 4.28 does not support any claim that participant subgroup designation impacts an individual's GBL effectiveness rating.

Quantitative survey data on stakeholder support of GBL. As the final component of survey data, teachers and administrators provided input on how much students, teachers, and administrators were perceived to be supportive of their use of games as tools for teaching and learning. Specifically, each participant was asked to rate their perceived level of GBL support from students, institution/administration, and colleagues/teachers regardless of whether they were a teacher or administrator themselves. Collected data appears in the 3-D column graph in Figure 4.29. The blue columns in the front represent the perceived GBL support level of the students, while the orange columns signify perceived support levels of administrators and the grey columns denote the perceived support levels of the teachers in the school. While actual percentage numbers do not appear in Figure 4.29, the visual allows for quick comparison of perceived support across the three stakeholder groups. Pulling from the actual data, 68% of the survey participants perceived students to be very supportive, while only 40% reported the institution and its administrators to be very supportive, and a mere 22% noted that teacher colleagues were very supportive. The patterns of perceived support are clear, with distinctly different curves of support developing for the three stakeholder groups. First, if one imagines the

blue bars connected with a curve to outline the distribution for student support, it peaks high in the very supportive range and could be described as skewed left. The distribution for the institutional (administrator) support curve is spread a little more over the somewhat and moderately supportive responses as well. This causes the (orange) distribution curve to peak less drastically near the very supportive area of the graph but still is skewed left to some extent. Finally, the data for colleagues and teachers (shown in grey) is spread very evenly across the three levels of supportive with the peak actually leaning more to the left (and lower range) of the graph in the somewhat supportive area. Unlike the other two distributions, the teacher data more closely approximates a symmetric distribution with a mild tendency to be skewed to the right.

Qualitative Focus Group Data

In accordance with the initial research design, the facilitation of three focus groups followed the collection of survey data. The first focus group included eight administrators who comprise essentially the entire administrative team for this building at the time of data collection. The second group included five veteran teachers with over 5 years of experience who, after

completing the survey round, volunteered to participate in a focus group and were selected. The third and final focus group similarly included five new teachers with up to 5 years of experience, who volunteered their continued research participation and were selected. Within these focus group discussions, perceptions regarding GBL were examined in greater depth to help develop a collective consensus on the use of and value of the learning tool. In reviewing the transcriptions from the three separate focus group discussions on the presented survey data to discuss possible emerging trends, three recurring themes were explored—concerns, questions, and potential obstacles regarding GBL; advantages and possible benefits of GBL; and a deeper description of game use and purpose. Different stakeholder subgroups (administrators, veteran teachers, new teachers) tended to focus more heavily on certain sub-themes across those three areas, but all three groups generally discussed the same overarching themes. In order to examine the extensive qualitative data that emerged from these groups, this section will explore responses to the focus groups question one group at a time. The first section will review the input provided by administrators across all three overarching themes noted above. When that is complete, the study will then consider veteran teacher insight regarding concerns, benefits, and game use. Finally, for the third part of the full subgroup comparison data, this section will examine new teacher perceptions on the recurring themes. Only then can similarities and differences be identified and analyzed.

      Administrator focus group. The administrator focus group was comprised of eight administrators/supervisors employed at the high school site. They provided a range of experience in terms of years in the profession, years in leadership, subject area specialization, and demographics. In reviewing the transcriptions from their focus group discussion on the presented survey data to discuss possible emerging trends, the administrator group explored the possible

concerns, questions, and obstacles regarding GBL in great detail, but also offered solid insight into the possible advantages/benefits as well as the overall observed use and purpose.

After facilitating the focus group and transcribing the conversation, administrator responses were coded to identify the major recurring themes and sub-topics. Organized details regarding these themes and the responses associated with them appear in the various figures in this section (Figures 4.30 through 4.33). For each figure, there is an overarching theme (noted in that section title as well as in the coding on each blue heading bar and in the caption) supported by two or three sub-themes. In those cases, where a specific recurring theme has a large amount of data spread over three or more sub-themes, those tables may spread over more than one figure to make the information more manageable for display and review. These coding and logistic elements of the data presentation will be discussed throughout the section.

Concerns, questions, and potential obstacles. For this section, all of the qualitative data collected pertains to the recurring theme of concerns, questions, and potential obstacles that administrators perceive about GBL. From there, sub-themes emerged and were organized based on their title as well. For example, in the first piece of Figure 4.30, information is provided on concerns, questions, and potential obstacles that administrators communicated regarding GBL and technology.

Administrators provided perhaps the strongest data to support the existence of concerns, questions, and obstacles regarding GBL, but were positive and proactive in their discussion, often seeking solutions to these areas. Among the various concerns associated with GBL, the administrators talked about technology, the generational gap, and concerns regarding training. In addition to those elements, they also discussed alignment with content, as well as issues with the cost of, and time needed for, GBL use.

Technology. Excerpts of qualitative data from the administrator focus group regarding concerns, questions, and potential obstacles with respect to GBL and technology can be reviewed in detail in Figure 4.30, under the first heading. Overall, there was a general administrative consensus that interest in digital gaming tools naturally brought with it problems regarding technology access and cooperation. There are currently only limited number of devices stationed in each classroom, a handful of iPad carts, and a few available computer labs serving the whole school. While this is usually a significant amount of technology to serve the school's needs, the increased access needed to integrate regular use of GBL may demand a greater number of available devices. As the school begins to utilize a web-based computer lab/cart sign up process, teachers may find the access to technology more easily managed as they can determine its availability at any time from any location. Even with this adequate access, there is still some hesitation due to the need to follow technology protocol through the district coordinator in order to install or utilize new software. Finally, there is an administrative perception that some teachers (possibly veterans) may not be or technologically confident enough to find GBL resources and use them without the fear of them breaking down or malfunctioning.

Generational gap. The second sub-theme included in concerns, questions, and potential obstacles with respect to GBL discussed by the administrator group was the notion of a generational gap. Specific statements from the focus group regarding this topic appear in the second section of Figure 4.30. However, in general, the administrative team perceives younger teachers to be comfortable with, and more likely to utilize, GBL as a teaching tool. They attribute this to the fact that teachers tend to teach the way they learned, with younger teachers having more access to this strategy in their preparation than their veteran counterparts. In addition, newer teachers seem likely to support other new teachers in these efforts but might be

96

uncomfortable approaching a veteran colleague to suggest a change in their pedagogy.

Conversely, veteran teachers may be less naturally comfortable with GBL and too proud to ask a

young teacher to show them 'new tricks.' Finally, the administrative team noted that there is a

generational gap that must be addressed. However, it is important to remember regarding

Technology - Concerns, Questions, & Potential Obstacles: Administrators

- Availability/access to iPad carts and computer labs sas well as limited number of devices (usually 5) in each room could pose problems.
- Access could improve with new online computer lab/iPad cart registration for upcoming year so teachers can make plans and reserve technology (as well as with students being able to use their phones as a device).
- Some teachers (especially veteran) may not be tech-savvy enought to know these games are out there or find them.
- Since all tech endeavors require a formal technology approval process through our Tech Coordinator, it is possible that some teachers think it will be difficult or not allowed.
- There seems to be a lot of fear of the technology breaking down mid-lesson or not being able to get it to work right.

Generational Gap - Concerns, Questions, & Potential Obstacles: Administrators

- Younger teachers are more famliar with games, both recreationally and as a learning tool. Teachers tend to teach the way they were taught and more of the veternan teachers learned by lecture, but "then there was a whole shift in learning a few years later, so our younger teachers were exposed to that as students."
- While younger teachers will support each other in GBL, it seems unlikely they will try to encourage a more veteran teacher to try it because they may feel intimidated.
- Veteran teachers may not feel as naturally comfortable with games and there is a fear/pride factor making them not want to ask a 22 year old to show them how to.
- There is a generational achievement gap for teachers as well that we need to close and get teachers to be more open and receptive.
- Regarding lesson plan review data, possiblity it shows up more in new teachers' plans because they are more likely to revise their plans when they decide to add it (in case someone comes in) whereas veteran teachers will just leave plans as is.

Training - Concerns, Questions, & Potential Obstacles: Administrators

- Administrators feel that even though this strategy has been modeled in PLCs and discussed in team meetings, it is still out of the habit of the teachers and they need more training and support.
- Some teachers might be more willing to do it if they had more training.
- During the training that has occurred, teachers found GBL activities very interesting and intriguing and noted they did not realize they could use it in their classroom.
- Administrators noted that some teachers would need some very direct training and coaching in order to feel comfortable doing it.
- Comfort can only come from exposure and training, especially since some teachers are not even familiar with playing these games, let alone teaching with them.

Figure 4.30: Administrator Themes Representing Concerns, Questions, and Potential Obstacles

historical lesson plan data, new teachers are more likely to include details about GBL use in their

weekly plans than a veteran counterpart even if they both use it equally often because new

teachers generally document greater detail and description. As a result, lesson plan data may be

skewed slightly.

     Training. Training was a recurring topic of discussion brought up in all three focus

groups, but with different focal points based on group needs and perceptions. Specific details

stemming from the administrator focus group regarding concerns, questions, and potential

obstacles with respect to GBL and training can be reviewed in detail in Figure 4.30, under the

third heading. In general, even though this topic had been modeled and discussed in multiple

professional learning communities (PLCs) and team meetings, administrators felt as if the

teachers still needed more training and support. In fact, the building leadership suggested that

teacher comfort with the tool might only come from exposure and training, and that the training

may need to be direct modeling and coaching in order for it to be effective. Feedback from prior

training sessions has suggested that some teachers found these strategies quite interesting but did

not realize how they could be used in the classroom.

     Alignment with content. Although the administrators do not stress content alignment

when observing GBL in the classroom, they do acknowledge that this perceived pressure may

limit its use. Therefore, this sub-theme was discussed in detail in the administrator focus group.

While excerpts of the qualitative data regarding these sub-themes appear under the first heading

in Figure 4.31, a summary of the information follows. There are mixed perceptions about

whether or not it is easier to use games in some content areas than others, but the group provided

differing opinions as to which subjects were more difficult based on their experiences. Other

questions posed included whether or not games might challenge advanced learners if the skills

integrated were aimed more toward the middle of the content spectrum. Still, some comments

suggested that the bigger concern was how teachers might be able to transition game 'work' into

some sort of score or grade. Finally, administrators commented that since standardized tests do

not work this way and teacher evaluation has put increased pressure on state test scores, teachers

feel they must focus on directly mastering the content and skills on the test.

Cost. Cost was a sub-theme within concerns, questions, and potential obstacles connected

to GBL discussed by several of the participants, but the specific input provided by administrators

appears under the second heading of Figure 4.31. Administrators admitted that despite the best

Alignment with Content - Concerns, Questions, & Potential Obstacles: Administrators

- Some feel it is easier to align to certain content areas over others, but do not necessarily agree on the areas.
- Some felt it was harder in the upper math and sciences, others delt it was harder in multi-level self-contained classrooms, some felt it lent itself to English and History.
- Some noted concerns that if you aimed for the middle level of skill, it would not challenge advanced students.
- Some noted that alignment to content goals was not as big a question as connection to "grades" and transition into some form of number or score.
- Some responses tied with time concerns as standardized tests do not work this way and they feel they have to focus on mastering the content and skills of the standardized test.

Cost - Concerns, Questions, & Potential Obstacles: Administrators

- The administrators noted part of any problem could be that the school does not have an endless supply of resources, such as games for the teachers to use or try.
- Perhaps one goal could be to develop an internal resource of games and game components that teachers could utilize but also share through to alleviate some of the cost (and time) concerns.
- There is also a lot of cost involved in creating games--materials, printing, laminating, etc.

Time - Concerns, Questions, & Potential Obstacles: Administrators

- One main time concern is that it takes a lot of time to create (or modify) a game, set it up, prepare, and show students how to play. With so much at stake with state tests and teacher accountability, teachers may be worried about using that much time on a game.
- There is also some concern that teachers are so busy during the day and then are pulled for coverages and lose time they could use to develop games.
- The administrative team is considering ways to find more time within the teaching staff's day to allow them the latitude to try to implement strategies such as this one that may take more time.
- The administrators also discussed working to foster teams that could collaborate on GBL to alleviate some of the individual pressure and time by having them work together.

Figure 4.31: Administrator Themes Representing Concerns, Questions, and Potential Obstacles (continued)

intentions, budgets and financial factors undoubtedly impact the use of GBL. Buying, modifying, or building games can be expensive for teachers and the district/building does not have an endless supply of resources for teachers to use or try. Administrators were proactive in their discussion of this real-world obstacle, however. The team mentioned setting a goal to develop a resource of games and game components in order to better support teacher efforts at integrating GBL by alleviating some of the time and cost concerns.

Time. The final sub-theme from the administrator focus group regarding concerns, questions, and potential obstacles with respect to GBL are located under the third heading in Figure 4.31 and explores the issues associated with time. Similar to the discussion on the financial factors, the administrators discussed the time needed to implement GBL successfully. It takes a lot of time to create, find, or modify games for learning, set them up, and guide students through them. With so much in terms of accountability to content standards and standardized state testing, it can be difficult to get teachers to sacrifice the necessary time to make GBL a reality. In this school, the teachers' day is hectic and they often cover classes so it would be difficult to find time to work on game development during the day. Again, the administrative team was proactive in their examination of this potential barrier, exploring possible means of finding/building time into the schedule for teacher collaboration where they could work together on GBL efforts.

Advantages and possible benefits. In this section, all of the qualitative data collected pertains to the recurring theme of advantages and possible benefits that administrators perceive concerning GBL. Within that collected data, three sub-themes emerged, the perceived potential gains involved novelty, engagement and fun, and social skills. Overall, the administrative focus group made it clear that they had witnessed several serious reasons to perceive GBL as a

valuable teaching and learning tool, most notably that games foster student engagement, allow greater levels of differentiation, and help build social skills. Of course, much of the success of GBL is contingent on the fact that games provide an element of novelty and work through non-traditional methods. Therefore, while the novelty of GBL (and the ensuing advantages) is

Novelty - Advantages & Possible Benefits: Administrators

- One reason games seem to be effective is because they are new, novel, and not the common predictable way of learning.
- Even with games, if you overuse it, it will get boring. However, right now it is not used as much so it is still quite novel for learning. If we push to have teachers do it more, it might be less exciting.

Engagement & Fun - Advantages & Possible Benefits: Administrators

- Clearly, games elicit greater student engagement. Students are learning and enthusiastic. The purpose of the class was met in the example(s) observed.
- Sometimes students may not be as interested in the topic, but they get engaged because they are excited about the game.
- By having students create games or play games that they may not be familiar with, because they are a little bit out of their comfort zone, they have to be more engaged to keep up and compete.
- Students look forward to playing, even though they are learning too.
- Examples:
  - When playing review games, students are so excited and can't wait for the next question so they can compete and figure it out.
  - With game-based review, "the whole aura and attitude of [the] kids changed, … you went from kids having their heads down to all the sudden their clapping, running around the room, giving each other high fives, the teacher was using rewards, whether it be like a pass or a coupon or a piece of candy and I've just never seen a class that engaged and enthusiastic about learning"
  - "So I'm walking down the hall and I hear a lot of chaos and a lot of commotion and I'm like let me go check this classroom out and see what's going on. They were playing a review game, they had teams set up the whole thing, and they were going bananas."

Social Skills - Advantages & Possible Benefits: Administrators

- Many students benefit from the kinesthetic nature of non-digital games and the visual nature of digital games, plus most benefit from the social aspect of all games.
- Several students on the special needs spectrum do not understand how their quirks/mannerisms affect others. In games, they can pick up on signals from their about proper social interaction behavior.
- Since games force collaboration, students get increased positive collaboration experience in a structured manner that teach social skills.
- During games, students work with peers they may not usually work with and teaches them to foster relationships with people of all different types like they will have to in the real world.

Figure 4.32: Administrator Themes Representing Advantages and Possible Benefits

positive, teachers must be careful not to overuse this tool or it, too, will get boring.

Engagement and fun. Specific excerpts from the administrator focus group that explain their perceptions on how games can provide advantages or benefits related to engagement and fun can be reviewed under the first heading in Figure 4.32. In general, administrators believed the primary advantage to utilizing GBL is that games elicit student engagement. When students are learning through games, they are enthusiastic, highly active, and participative even if they are not naturally interested in the content or skills involved. Administrators noted several examples of GBL use where students were so excited they could not wait to 'play' and learn more. Students look forward to playing learning games in class and, when doing so, the class atmosphere and attitude changes completely to one of energy and positive learning chaos.

Social skills. According to the data collected, the final major benefit of GBL is its ability to reach all types of students and support academic as well as affective skill growth. Therefore, the impact on social skills comprises the third sub-theme within the advantages and possible benefits discussion with the administrative team. Specific details and comments from this discussion appear under the third heading of Figure 4.32, but an overview is provided here as well.

With a focus on meeting different learning styles and needs, the administrators noted how many of the high school students benefit from the kinesthetic nature of the non-digital games, the visual nature of the digital games, and the social component of all group games used in classroom learning. These three learning styles (visual, kinesthetic, and social) can be powerful, especially in this district. Still, they are sometimes underrepresented when it comes to more traditional teaching strategies, which is why games can be such a strong addition to current pedagogy. In discussing the social impact of games, several students in the school who are on the

special needs spectrum struggle to understand how their mannerisms or quirks may affect others, but in observing them work within a game construct, they are more capable of picking up social signals from their peers and working on proper social interaction. Games force collaboration with friends as well as unknown peers, which leads students to foster relationships with new individuals and develop positive collaboration and social skills.

Game use and purpose. It is impossible to discuss GBL without examining the actual terms under which it is used. Details about game use, therefore, encompass the third recurring theme that emerged throughout the focus group data collection. This section will lay out the qualitative data collected from the administrator focus group that specifically pertains to game use and purpose. The focus group data collection table, seen in Figure 4.33, organizes the sub-themes within this overarching topic with coded headings and specific elements from the transcription of discussion. For the administrator group, there were only two sub themes, the

Practices Regarding Game Use/Purposes - Game Use & Purpose: Administrators

- Some people still feel that students need to see, hear, and write in order to learn content before they can apply it, so games are most often used for review and practice after learning. This also impacts frequency because teachers can't use it too often if its only used after teaching new material.
- Tying to comfort levels, many are more comfortable using it for review for now because it is easier to set up a game based upon skills and application, "this is what we've done, let's just throw these 20 questions in and we'll make it a game real quick, boom, boom, Jeopardy, I've got the 20 questions right here. I've already taught it, boom." It is much harder to build and use games in order to foster discussion or teach content.
- There have been some observed uses for true teaching, just not as often as review. MANIA is used by the history department to teach the causes of World War I. Another game taught students about the Salem Witch trials by simulating the paranoia surrounding the events.
- Some not only use games, like Kahoot or Quizzess, for practice/review, but also take advantage of it to formatively assess their students and allow their students to self-assess.
- One question keeping teachers from using it for formal assessment is the concerns about how to transfer the work to some sort of grade.

Common Language About Games - Game Use & Purpose: Administrators

- There is still some discussion among the administrative team as to what exactly "is" a game for learning.
- Some administrators have observed scavenger hunts or other fun, non-traditional strategies and would argue that they could be considered games (this leans more towards gamification of non-game tasks).

Figure 4.33: Administrator Themes Representing Game Use and Purpose

overall practices regarding game use/purpose observed and a discussion about common language needed to explain those practices better.

Practices regarding game use/purposes. In their focus group discussion, the administrators noted several observed uses of games while referencing the popular responses from the survey data on this topic. The specific qualitative data describing these observed practices appear under the first heading in Figure 4.33. In their experience, some of the teachers still believe students must see, hear, and write content in order to learn it before they can apply it in a game setting. As a result, the most often used manner of GBL is for practice and review after teachers have had a chance to 'teach' the content. According to the administrative team, teachers feel more comfortable using games in this manner because it allows them to maintain some of their regular strategies for critical content. Another reason provided for this finding is that it might be easier for a novice GBL teacher to develop and implement games as a review tool than to build and use a game to foster discussion or teach content. That being said, the administrators did mention some first-hand observations of GBL use to teach and simulate content—modeling the causes of World War I, recreating the paranoia surrounding the Salem Witch Trials and the Red Scare, and imitating the situations associated with trench warfare. The administrators noticed some teachers even use the game experience as an opportunity to formatively assess students, but they are not yet used as formal summative assessment pieces as it is difficult to transfer 'game work' into a fair grade or score.

Common language about games. Throughout the overarching discussion on game use and purpose, a frequent question arose about the need for common language. Excerpts of that qualitative data from the administrator focus group transcripts appear under the second heading in Figure 4.33. Specifically, the administrative team debated what exactly a game for learning is,

and what non-traditional activities that are fun and engaging should be defined as. Are puzzles games? When problem-solving is posed as a challenge to find the right, or the best, solution, is that a game? This clarity of what makes fun learning qualify as GBL is something that can only improve the current discussion and efforts.

Veteran teacher focus group. The veteran teacher focus group was comprised of five teachers employed at the high school site for over 5 years. They represented a strong variety in terms of years of experience in the profession, grade levels and subject area specializations, comfort levels with GBL, and demographics. In reviewing the transcriptions from their focus group discussion on the presented survey data to discuss possible emerging trends, the veteran teacher focus group provided the most detail regarding possible concerns, questions, and obstacles regarding GBL, but also offered strong points with respect to the possible advantages/benefits as well as the overall observed use and purpose.

After facilitating the veteran focus group and transcribing the conversation, the same coding and analysis process used with the administrator transcriptions helped organize the veteran teacher responses. The veteran teacher input collected primarily spanned the same major recurring themes and sub-topics with only minimal variation. Organized details regarding these themes and the responses associated with them appear in the various figures throughout this section (Figures 4.34 through 4.37). Each of these figures displays detailed qualitative data for one of the overarching themes broken down into two or three sub-themes. In order to determine the collective veteran teacher perceptions regarding GBL, each of the overarching themes will be explored individually, supported with specific qualitative data excerpts in the provided figures.

Concerns, questions, and potential obstacles. Veteran teachers also provided qualitative input on the first recurring theme of concerns, questions, and potential obstacles about GBL.

This section will detail the comments of the veteran teachers associated with that topic by discussing each of the sub-themes: technology, generational gap, training, cost, alignment with content, and time. Overall, either due to their increased experience in education or some possible generational gap regarding GBL, veteran teachers provided the most detailed and extensive responses in terms of the possible concerns, questions, and obstacles surrounding games as a teaching or learning tool. While they were not completely negative about the topic, they were not as proactive as the administrators were when examining potential barriers.

Technology. The first sub-theme regarding GBL concerns, question, and potential obstacles for the veteran teacher focus group was the topic of technology. Specific excerpts of qualitative data associated with this topic were pulled from the veteran focus group discussion transcripts and are organized under the first heading of Figure 4.34. Veteran teachers corroborated the concern that there are technology access issues with only four computers in each room and not all students having a cell phone or personal device on which they could access digital games. However, they also mentioned other concerns as well. First, the cell service in the building is not phenomenal, so at times it is not easy to use phones for web-based games or apps. Second, veteran teachers mentioned that there are often compatibility issues with the software needed and programs will not load in the classroom. Finally, veteran teachers explained that digital gaming and phone-based gaming might not be the novel idea it seems because students are on their phones all the time, so perhaps it would be better suited to move away from that medium in order to engage them better.

Generational gap. In addition to their technology comments, veteran teachers also discussed a generational gap first mentioned in the administrator focus group. Veteran teacher perceptions on this topic comprised the second sub-theme of GBL concerns, questions, and

potential obstacles and that qualitative data appears under the second heading of Figure 4.34. The

veteran teacher group honestly admitted that many experienced teachers have concerns about

Technology - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- Kids are on their phones all the time so why give them more digital time. It's almost different to not be on it. Especially for some of the younger grades going into the older, you know, they spend all of their time doing it anyway, so let's give them something else.
- In the classroom, there are only four computers and not everyone has a cell phone and we can't always get cell service, so. If people can work in the media center, they can utilize it more, though.
- Sometimes there are compatibility issues with software. Sometimes programs won't load in the classroom. You try it at home, it works great, and you come into school and it's like a brick wall.

Generational Gap - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- Veteran teachers noted concerns about comfort level with games and how to fit them in without students feeling like it was free time.
- User demographics may play a major role. People that use of games for entertainment are more inclined to use it for learning.
- Veteran teachers admitted that they may be more comfortable with ways they have taught for years and already know that it works whereas younger teachers probably are more willing because they don't know what has always worked. They are more likely to try new things and see what works.
- "Well, education is changing, so veteran teachers need to get on board or retire."

Training - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- Teachers had some training on GBL. Their PLC was one of the best workshops ever--so much fun and got a lot of information at the same time. They can see where it is beneficial.
- Little game bits could be added in instead of making it the whole day's lesson. Teachers could just put it in the first two minutes to spark interest but they would need more training on how to do that.
- Direct training seems to be effective. Teachers are comfortable using games that were directly modeled in professional development exactly as they were presented. However, then all classes are using that one modeled game for the next two weeks because everyone wants to try it. So it seems like a large variety of games need to be modeled for teachers but that would take a lot of training.
- Need more training on how to create an effective game and how to make sure it does not get too competitive and upset kids as they fight to win the game.
- Teachers may be more comfortable if they had more one-on-one support when they first tried to implement it, someone to coach them through making it and implementing it. Then they might be more prepared and willing to try it themselves.

Cost - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- There are great games that are out there already made, but they're $50 or $60 a box. If only five kids can play the game and you have a class of 20, you're talking major expense to do that.
- If you don't have the time to do it yourself, or the money to buy it pre-made, that aspect of GBL is not supported.

Figure 4.34: Veteran Teacher Themes Representing Concerns, Questions, and Potential Obstacles

their comfort level with games and how to fit them into a meaningful learning experience that students do not perceive as 'free time.' Many of the veteran teachers think it has less to do with the years' experience in teaching and more to do with demographics regarding use of games for entertainment purposes. Younger generations are more likely to be avid gamers than their older counterparts are and therefore are more comfortable transferring that into the classroom. Veteran teachers, on the other hand, are admittedly more comfortable with the means they have used to teach content and skills for years. For many of them, they feel like they know what works and want to keep using it; whereas new teachers may not have a stockpile of tried and true successful methods so they are more willing to experiment with their lessons. However, despite the honest self-assessment, many of the veteran teachers in the focus group admitted that education is changing and all teachers will need to adjust.

Training. As noted in the administrator focus group section, discussions about training as one element of the concerns, questions, and potential obstacles regarding GBL permeated all three participant groups. Specific statements from the veteran focus group regarding the topic of training appear in the third section of Figure 4.34, but a summary follows here. Even though not all of the veteran teachers attended the various voluntary PLCs and training sessions on GBL, they have all experienced some level of training or turn-keying of the strategy through team, building, or departmental meetings. The veteran focus group agreed the GBL workshops were incredibly fun and provided a lot of information and ideas, essentially modeling the effectiveness of the strategy. Several veterans suggested they needed more training and that direct modeling was the most effective means. Teachers have noted being comfortable using games as they were directly modeled but not as comfortable making their own games based on the idea in general. In order for the staff to be trained thoroughly and without all teachers then immediately trying to

use the same exact game in class, extensive training on a myriad of game options would be necessary. Then, teachers would need training on how to create an effective game, but in order for that to be highly successful, the veterans suggest a one-on-one coaching methodology. Essentially, the veterans feel teachers would be more comfortable trying to use games if they had a GBL mentor to walk them through the first round of development and implementation.

Cost. A fourth sub-theme of the concerns, questions, and potential obstacles discussed by the veteran teacher focus group was the issue of cost. Excerpts of qualitative data from their focus group transcript on this topic appear in detail in Figure 4.34 under the fourth heading. The veteran teachers mentioned the cost of GBL development and implementation, but only briefly. It seemed as if their primary concern was the cost to purchase pre-made games and the fact that the school budget does not support said cost. While there are some great games available, the veteran teachers noted how each one costs close to 50 or 60 dollars and that several would be needed in order for an entire class to play simultaneously. The veteran teachers did not mention any cost associated with making a game, for whatever reason, but that was mentioned by the other groups.

Alignment with content. The fifth sub-theme supporting the overarching theme of GBL concerns, questions, and potential obstacles was alignment with content. Excerpts of qualitative data from the veteran teacher group on this topic appear explicitly in the first section of Figure 4.35. The veteran teachers possessed strong feelings about the need to ensure that games aligned to curriculum content and the difficulty in making sure this happens. Some of the veteran teachers suggested it was difficult to find games that matched their content goals while others suggested they could find games, but only ones that matched the lower level skills within their curriculum rather than the higher order thinking skills and content. The veteran teachers were

adamant about how important it is to make sure the game fits into the learning, so they are not

just playing for fun, but for purpose. In their opinion, this is one of the biggest challenges with

using GBL. Others noted that since there is such a huge sense of responsibility when it comes to

Alignment with Content - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- I haven't really found a whole lot of digital games that I think are really helpful and useful for the purposes of what I'm trying to accomplish. I teach reading and writing and it just doesn't really work as well. "The only way to teach writing is through writing." Games could be valuable in terms of getting students engaged, but not actually to teach writing. So, that part of it is a challenge.
- It's important to make sure the game's going to fit the learning, that they're going to learn from it, so it's not just playing.
- Aligning the game with content is the biggest challenge for some teachers. Some feel that it's a good way to sneak in little bits of content but it is not necessarily easy to do.
- Teachers have used vocabulary games, but that's also for lower level thinking skills, that's not the higher level skills. Simulations seem more possible in history and maybe science but not as much in English.
- There is such a huge sense of responsibility when it comes to the testing that is involved in these kids' lives every year and just making sure that we've covered what we are required to cover and then like you said, now let's see if we can work with it, but to teach them through the game, I feel like you could lose kids in the process of not understanding, like what is the point if they don't have the objective to start with.
- It may depend on the subject, because there may be more games out there that teach history or science and it may be harder to develop them in some subjects.
- The core is very prescriptive in terms of curriculum, so if there were games aligned to that core content, teachers might be more likely to use them. Otherwise, teachers are too worried that they will end up just playing games and then the scores will suffer.
- What content are we aiming to align to? With games there is more genuine learning, but it may not yield the right answers on the PARCC. You can't deny that learning is happening, but the questions that we are required to answer on PARCC may not be covered in game-based learning.

Time - Concerns, Questions, & Potential Obstacles: Veteran Teachers

- Maybe if you have a large class, say you want to use Monopoly, there's a limit on the number of players you can have in a game, so maybe the teacher would feel they weren't including everybody or there wasn't enough time to play enough games to make sure everybody participated.
- Absolutely, almost all teachers would love to use games, but if you have to go buy a game at Toys R Us, make your own questions and pair it up with the game, it's a great idea, but it's so overwhelmingly time consuming.
- Time is definitely a factor, but we can still create great things. The way to overcome that is to have a great group to work with. For example, if you create something and share it and I create something and share it, we both have two ideas for the work of one. You know, like the EIRC, you can go there and there are things made, or you can make things, and the ideas already there for the games and things like that that I've used in the past.
- Games are time consuming. Maybe teachers can take something and try to rework it so that it is short enough so that you can play because you can't spend a week playing a game.
- Not only is the time spent making the games, but teachers spend a lot of time developing good activities and lessons and they may not want to give up that time to replace that work with a game.

Figure 4.35: Veteran Themes Representing Concerns, Questions, and Potential Obstacles (continued)

preparing students for the state assessments, some teachers might not be willing to risk their lessons using games. They noted that the core subject areas' curricula are highly prescriptive and if games were largely aligned to that, they would be more willing to use them, but without that prior alignment and assurance, they are worried student learning and achievement outcomes will suffer. Perceptions varied slightly based on experience and on subject area, with some feeling that certain subjects might be easier to align with than others.

Time. The final sub-theme in this section was the notion of time. Comments made by veteran teachers collected from the focus group transcripts regarding time as a concern in using GBL appear in detail under the last heading in Figure 4.35. Time was one of the main concerns for the veteran focus group, both in terms of the time taken to prepare the game and the time taken from class to play it. First, veteran teachers discussed at length the great amount of time it takes to find, make, modify, and tailor games to their curriculum in addition to the many other responsibilities in their daily routine. Some of the veteran teachers proposed ways to minimize the time-consuming factor of game development, suggesting teachers work in teams, share resources, and work smarter, not harder. Expert advice in this area would facilitate this work for new game-using teachers. Second, teachers are constantly maximizing each precious minute in the classroom to make them as meaningful as possible, so some consider it risky to use up a significant amount of time playing a game. Some games take a longer amount of time, students may need to cycle through that station, or time may be spent creating and then playing games. In all these regards, the veteran teachers believe games, while valuable, can be very time-consuming.

Advantages and possible benefits. This section details all of the qualitative data collected from the veteran teacher focus group that pertained to the second recurring theme, exploring

advantages and possible benefits of GBL. Within that overarching theme, two sub-themes

emerged, namely engagement and fun as well as social skills. The veteran teacher focus group

admitted definite reasons to perceive GBL as a valuable teaching and learning tool, despite their

numerous concerns and questions. Most prominently, the veteran group noted increased

Engagement & Fun - Advantages & Possible Benefits: Veteran Teachers

- They want to play the games, they love it, but, and they get excited about it, especially if it's something they can relate it to that they've already played and it's not that difficult to teach them.
- Reluctant kids get caught up into it. Even the reluctant teachers do. On the opening day of school, one teacher admitted not wanting to be there or play along but then after about 30 seconds, they got caught up in it and found themselves running around the building. Some students that are a little bit shy and don't want to talk or be a big person in this situation kind of sit back at first and then they start getting into it.
- Sometimes it brings out some kids' strengths that they don't get to exhibit in anything else, and it brings out their confidence because they're like "oh I'm good at that." Different people can have different roles and then more people can be engaged.
- Example: In one lesson on World War I, students simulated trench warfare. The classroom was divided into two halves and were throwing paper to simulate the bullets and everybody was engaged.
- Two different opinions about how engagement affects learning emerged.
- "I'm convinced it increases engagement and involvement and motivation, but I sometimes wonder if it is actually increasing learning."
- Kids feel may get a question right because they had fun when they were trying to remember that!" and some teachers believe having fun or being happy while the activity is taking place makes students more likely to learn and helps them remember things.

Social Skills - Advantages & Possible Benefits: Veteran Teachers

- There are some debatable concerns as to whether or not games are good for some special needs students who may not have the best coping and cooperation skills because there is a lot of competition, "beating" one another, taking turns, etc.
- Sometimes people worry it will cause more conflict within the group and other times people think it's good to teach them to play together. Students need social skills, they have to be able to win and lose gracefully, share, wait their turn, etc. For some students, this is their only guided practice at doing those things.
- Games are great for building social skills because students encounter genuine real-world interactions and feelings, including disappointment.
- Students also all need critical thinking and problem-solving skills aside from content-specific skills that games can teach and support.
- Games often use more conversation than a normal classroom. Students have to be interactive, they cannot avoid discussion with peers.
- Some students who never get to show their strengths in the typical classroom activity will get to in a game because it addresses so many different areas. Sometimes games will bring out competitive natures in kids that teachers may never see otherwise.
- Games are a good way to meet the kids where they are. "They're all different places developmentally, but playing is universal. We've all played from when we were babies to now, so it's a good way to bring out those experiences again."

Figure 4.36: Veteran Themes Representing Advantages and Possible Benefits

engagement in the learning process, the ability to provide a differentiated means through which students can demonstrate understanding, and a primarily positive impact on social skill development.

Engagement and fun. For specific excerpts of qualitative perceptual data from the veteran teacher focus group on engagement and fun as a possible benefit of GBL, one can review the first heading in Figure 4.36. Overall, veteran teachers agree that GBL is a fun way to learn, more fun than any traditional method. They admitted that even the reluctant and shy learners succumb to the excitement of the games and participate. In addition to engaging all types of students, games also seem to entice students into greater participation and ultimately bring out some of their strengths that they would not otherwise be able to demonstrate. The veteran group mentioned that GBL clearly increased engagement, involvement, and motivation, but were not completely convinced that it actually improved learning as well. Some were unsure about its impact on retention and learning, while others noted the element of fun helps students internalize information, make connections, and remember critical content.

Social skills. The impact on social skills is the second sub-theme in the overarching theme of advantages and possible benefits connected to GBL. Detailed comments pulled from the veteran teacher focus group transcripts regarding this topic appear under the second header of Figure 4.36. In general, veteran teachers were somewhat divided in their beliefs regarding GBL impact on students with special needs. At least one veteran teacher in the focus group voiced concerns as to whether or not games provided valuable experiences for some special needs students who do not possess strong coping and cooperation skills because of the focus games place on competition and winning. Some teachers worry that the games may provide conflict in this regard, however others believe games are the best means through which teachers (and peer

113

students) can help scaffold proper social interaction and behavior. While the lessons may be difficult, games help students encounter real-world conflict and feelings, including disappointment, in a safe and supportive environment with only minimal risk or loss. Games also help develop and strengthen problem-solving and critical thinking skills for all students, while fostering more active conversation between students than a traditional lesson offers.

Game use and purpose. It would be difficult to fully develop a perceptual foundation for the veteran teacher focus group without examining the actual terms under which they used (or did not use) the tool. Qualitative data about game use, the third recurring theme, within this section will specifically explore the means through which veteran teachers used GBL. The focus group data collection table examining game use and purpose for veteran teachers, seen in Figure 4.37, organizes the sub-themes within this overarching topic with headings and specific elements from the transcription of discussion. For the veteran group, there were only two sub themes, the overall practices regarding game use/purpose observed and a discussion about perceived administrative support of games in the classroom.

Practices regarding game use/purposes. The first sub-theme in terms of game use and purpose centered on the actual details about classroom practices, which the veteran teachers spoke quite a bit about in their focus group discussion. The specific qualitative data describing these practices appear under the first heading in Figure 4.37. In their focus group discussion, the veteran teachers reviewed the responses from the survey data on game use but focused on their personal experiences. The discussion among the veteran teachers primarily addressed the use of games for review above all other purposes. They mentioned that teachers could also use games for outside-the-box thinking, strategy, and as a point for discussion in class. Still, they admitted that games are used for review more than any other purpose because it is the easiest option for

most teachers to wrap their heads around. Teachers are more comfortable with games as review

because then they can still teach using the methods they typically do before switching to the

game. In addition, teachers can elicit involvement that is more active when they use game

strategies for review than their traditional methods and the GBL practices create a mental schema

that helps students remember the reviewed material. Finally, the veteran teachers discussed using

games to evaluate their students understanding informally but most veteran teachers seemed

hesitant to use them for formal assessment. The veteran teacher group agreed that tests still need

Practices Regarding Game Use/Purposes - Game Use & Purpose: Veteran Teachers

- Used for review/practice of vocabulary, basic grammar, and other lower level skills.
- Teachers could also think outside the box and include strategy games as a point for discussion and to foster higher order thinking in general.
- Teachers use it for review more often because it is the easiest way to use it and more teachers are able to wrap their head around that than other uses. Teachers may feel more comfortable with that method because they've already been able to teach the way they know how to and then can use the game for review, where it seems useful to most people.
- ("I've already taught it…now we're reviewing…I've covered what I'm supposed to cover, and I did it in a way that I know how to do it, so…")
- Review is a great use because game review elicits a lot more participation than traditional review methods and also creates a mental schema that helps students remember that reviewed material because of the novelty of the review process.
- Teachers see means of evaluating if kids are playing the game and using that to assume they get the material, but struggle to see how to use it as an assessment. Tests need to be more cut and dry and games seem too subjective to act as good assessment tools.
- Teacher noted that they used it but started small and that helped.

Administrative Support of Games - Game Use & Purpose: Veteran Teachers

- Teachers seek administrative support because they want to be told it's ok to use games especially now with all the accountability, evaluations, and walkthroughs. Teachers don't feel like they can just do what they think is important or the best way all the time. Sometimes it feels like their hands are tied without administrative support or blessing and you want to know it's ok because your reputation is on the line.
- It seems like administration loves it.
- I think all of our administrators would be supportive of coming to a class and seeing game-based learning going on. What I haven't really fully seen yet is supportive in terms of time, finance, and backing up the supplies. If you're willing to go out to the store and buy it and try it in your classroom, great, that's fantastic and you'll probably get an awesome review,
- When I first broke into education, support wasn't there for this kind of different ideas, if you were caught playing in the classroom, then you were seen as somebody who couldn't manage the classroom and it was, it looked different than the other five egg carton rows down the way.

Figure 4.37: Veteran Themes Representing Game Use and Purpose

to be more formal and objective whereas games are too subjective.

Administrative support of games. Along with discussing details about game use, veterans deliberated over the importance of administrative support in these (and all) non-traditional methodologies. These comments comprise the second sub-theme of the overarching discussion on game use and purpose for veteran teachers. Specific selections from the focus group transcripts appear under the second heading in Figure 4.37. According to the veteran focus group, teachers seek administrative support as a reassurance, or blessing, that their efforts are deemed acceptable, especially with the increased accountability of teacher evaluations. This group of veteran teachers, however, noted that the administrative team at the school seems to love and thoroughly support seeing its use in class. Still, the veterans commented that the administrative team has yet to support it in terms of providing the time, budget, and resources to implement it effectively.

New teacher focus group. The new teacher focus group was comprised of five teachers employed at the high school site for 5 years or less. While their years of experience in the profession obviously did not represent a wide range, the group did differ notably in terms of grade level and subject area specialization, as well as demographics. After transcribing the qualitative data from the new teacher focus group and applying the same process to sort perceptions into the same three overarching themes, sub-themes were developed and organized into tables mirroring those presented for administrators and veteran teachers. These tables, rich with specific qualitative data from the new teacher focus group appear throughout this section, in Figures 4.38 through 4.42. Each of these figures displays detailed qualitative data for one of the overarching themes broken down into two or three sub-themes. In order to understand GBL perceptions of the new teachers, each of the overarching themes will be explored individually

and supported with specific qualitative data excerpts in the provided figures. In reviewing the details from their focus group discussion on the presented survey data to discuss possible emerging trends, the new teacher focus group provided the least detail regarding possible concerns, questions, and obstacles regarding GBL. In contrast, the new teacher focus group offered the most information and insight about the possible advantages/benefits as well as the overall observed use and purpose.

Concerns, questions, and potential obstacles. New teachers provided some unique additional evidence to describe the existence of concerns, questions, and potential obstacles regarding GBL. This section will explain each of the sub-themes specifically associated with that topic that arose in the new teacher focus group: technology, generational gap, training, alignment with content, and time. Despite stronger overall support of the teaching tool, the new teachers offered important insight about concerns regarding technology, generational differences, training, content alignment, and time. While some of their responses corroborated the opinions of the other groups, some were unique in perspective.

Technology. Even the more technologically savvy new teachers provided valid concerns and questions about technology with respect to GBL. Extracts of the qualitative data from the new teacher focus group regarding concerns, questions, and potential obstacles with respect to GBL and technology appear in detail in Figure 4.38, under the first heading. Overall, new teachers concur with data collected from other groups that there are not enough technological devices to implement GBL effectively and easily. As noted before there are only 4 or 5 computers in each room and even when teachers can sign out the iPad cart, it does not have enough for a whole class to use individually. The new teachers brought up an interesting point about cell phones and personal devices as well. Not all students have them readily available, but

even more so, not all want to or are able to use them. The school does not provide open access to their Wi-Fi, so students are hesitant to use up their personal Wi-Fi data (or battery) for school learning. In addition, on school devices, the district web-filter blocks many sites, so if a teacher signs on to override the filter for student gaming, anything the student does online at that point associates with the teacher's credentials. New teachers also brought up concerns about how malfunctioning technology may trigger a loss of student focus and cause behavioral issues. The class could easily lose positive momentum while the teacher works to troubleshoot technology complications associated with GBL. Finally, they noted that when not all students can play simultaneously, or completely finish the game task, it minimizes the effectiveness of any potential student learning data collected in the process, which diminishes some of the value of the digital gaming strategy for assessment purposes.

Generational gap. The second sub-theme included in concerns, questions, and potential obstacles with respect to GBL discussed by all three groups was the notion of a generational gap. Specific statements from the new teacher focus group regarding this topic appear in the second section of Figure 4.38. Interestingly, the new teachers actually spoke less about the generational gap than either of the other focus groups, perhaps out of respect and professionalism or perhaps because they do not yet see a possible divide as strongly as the veterans and administrators. They did note perceptions that their veteran counterparts may not see a major reason or need to change, since their current strategies seem to be meeting the students' learning needs well already. When asked about the disparity in the survey regarding frequency and the implication that it was tied to a generational gap between teachers, the new teacher group agreed it may tie to that grouping but for less direct reasons. The veteran teachers are more likely to use it for review, which only happens occasionally. In addition, the new teachers contended that the variation in

Technology - Concerns, Questions, & Potential Obstacles: New Teachers

- There are not enough devices to always implement it effectively and easily. The iPad cart does not have enough iPads for a whole class. There are only 4 or 5 computers in the back of each room. Not all kids have personal technology devices they can, or want to, use for games/learning because it saps their battery and/or data.
- There is also not enough open access. The school does not have open wifi so students are hesitant to use their own phone data to connect. Also, the school's filter (barracuda) cuts back on ease of access because it blocks so much. If the teacher needs to sign in to override the filter, they are responsible for anything the students access at that point.
- Technology issues (even seemingly minor ones) can then cause attention and behavioral issues because students lose focus and momentum as the teacher is troubleshooting the technology. Also, the teacher/class can lose valuable learning time as they work on technology issues. If the activity cannot be completed fully, it may be a waste of time to do it at all.
- Since the technology may keep it from working completely, or for all students, it becomes difficult or impossible to use the game to collect data on student understanding.

Generational Gap - Concerns, Questions, & Potential Obstacles: New Teachers

- Some of the disparity noted in the survey regarding frequency of use is likely tied to the perceived generation gap between younger teachers who use it very often and veteran teachers who use it only once in a while.
- The older generation seems to feel there is no major reason or need to change. They feel that their current strategies are meeting the students' learning needs well so why change?
- Not all teachers attest the variation in frequency/use to generation but rather to a difference in personality—some teachers find it interesting and want to put the effort in to make it happen while others do not find it as worth the work.

Training - Concerns, Questions, & Potential Obstacles: New Teachers

- Some teachers may also just need tech training to be able to troubleshoot the simple technology obstacles since technology can often be a barrier to effective game use. Most teachers receive training on using iPads, etc. through peers and word of mouth, no official training. It was more like "oh we figured it out, good."
- One new teacher noted that it doesn't feel necessary to be trained, "but maybe that's because of my age and being a recent, I mean four years, but a recent graduate, knowing all of these things that are available and out there for me, knowing all the resources, I have that, where an older teacher might need that training." Teachers can learn a lot at the PLCs, but they're not required so some veterans aren't going and are not getting that training.
- Perception that comfort and realized value comes with training. If teachers haven't been able to get to the training sessions on it then they're not learning that it works and is actually beneficial.

Figure 4.38: New Teacher Themes Representing Concerns, Questions, and Potential Obstacles

frequency might be less due to generational differences and more a result of personal interest—

those who find it interesting will put in the effort and use it often, while those who do not find it

as interesting personally will not.

  Training. As with the two prior groups, the new teacher focus group discussed training as

well, but unique perspectives arose. Specific details noted from the new teacher focus group

transcripts regarding concerns, questions, and potential obstacles with respect to GBL and training appear in detail in Figure 4.38 under the third heading. New teachers also agree that increased comfort with GBL and a heightened realization that it holds value comes with training on effective use of the strategy, however they do not agree to the same extent as the other groups about the type and depth of training needed. New teachers think more technology training to help teachers troubleshoot the simple glitches and obstacles would alleviate the fear of technology barriers with digital gaming and ultimately increase comfort with and effective use of games for teaching and learning. One new teacher mentioned they did not feel intense GBL training was necessary in order to use it well, but said that could possibly be due to their more recent enrollment in a teacher preparation program and therefore increased awareness of the resources and options available for GBL. It was also mentioned that while the available PLC sessions on games for teaching and learning are valuable, they are not required, so many of the veteran teachers may not attend and therefore not benefit from the added exposure to the pedagogical tool.

Alignment with content. Within the overarching theme of GBL concerns, questions, and potential obstacles, one sub-theme related to game alignment with content. New teachers talked less about content alignment issues than the administrators or veteran teachers, but excerpts of qualitative data from their focus group discussion on this topic appear explicitly in the first section of Figure 4.39. They did acknowledge that it can be challenging to find games that align with both the targeted content/skills as well as the appropriate grade level and confirmed a common perception that it may be easier to use games in the classroom of 'non-tested areas' because there is less strain to cover so much specific material. There was some debate between the new teachers about the amount of time and effort that must go into creating a valuable game

and then playing it in the classroom in contrast to the extent to which those activities will then align to curricular goals. The tool would probably be used more often if there were more pre-made games directly aligned to curricular goals or if they could find a way to lessen the time, cost, and work it takes to modify it to fit perfectly. One highly interesting point was made by a teacher in this group contrasting the often-mentioned perception that games are harder to implement and/or less valuable in the 'tested areas.' It was mentioned that, in some cases, digital math games can actually help prepare students for state-mandated Partnership for Assessment of Readiness for College and Careers (PARCC) testing because they have to practice doing math on a computer—manipulating figures with the mouse as well as problem-solving in their minds, on

Alignment with Content - Concerns, Questions, & Potential Obstacles: New Teachers

- It can be challenging to find games that align both with content (and skills) and (appropriate) grade level.
- There is a perception by some staff that it is easier to use in the "non-tested areas" because they do not feel the same "strain" to cover so much specific material.
- An interesting point was made regarding digital games and math learning. While many people think tested areas cannot afford the risk of games, one teacher noted that digital math game actually help students prepare for the PARCC because it gets them to think about and solve math problems on the computer and helps them practice manipulating math visuals and problems with the mouse.
- Debate and discussion ensued over the balance between time/effort needed to modify a game and the extent to which it aligns to desired learning goals. Pre-made games are not usually well-suited for class, but it can be a lot of work to change a game in order to meet curriculum needs.

Time - Concerns, Questions, & Potential Obstacles: New Teachers

- If you are making your own board game, that takes a great amount of time but seems to pay off the most. Modifying a game takes a little less time, but is probably the second most valuable. Digital pre-made games are good but not as directly correlated to content all the time. However, they take the least time.
- There are ways to build games smarter so they take less work in the future, however. Print out the board games and just swap out the cards for each question (using the board multiple times). Teachers Pay Teachers (TPT) is great for this. It has a lot of resources (not always free but still cheaper and faster than doing it on your own.
- It takes time to make a good game that engages students and prepare the answer key(s) in advance.
- It's not necessarily that it takes too long to be able to do it, but "you find yourself so caught up in everything else that needs to be done, between lesson plans and contacting parents and making sure your grades are up to date that sometimes creating those games isn't as easy as it seems."
- In addition to taking a lot of time to make games, there is also a concern about managing valuable learning time. Class time is critical because teachers are so focused on getting through certain material before the PARCC.

Figure 4.39: New Teacher Themes Representing Concerns, Questions, and Potential Obstacles (continued)

scratch paper, or using computer tools.

   Time. The final sub-theme relating to concerns, questions, and potential obstacles facing

GBL effort was the concept of time. Specific qualitative data selections from the new teacher

focus groups regarding time appear under the second heading in Figure 4.39. The new teachers

seemed the most conflicted about the time element, perhaps because they had the most first-hand

experience to know the extent to which it can be a major factor. They know that when making a

board game personally, teachers must invest a great amount of time, but also realize that making

or modifying a game to specific learning needs pays off the most in terms of learning value.

While they are not unwilling to spend the time on these efforts, the reality is that they find

themselves caught up in everything else that needs to be done—lesson plans, contacting parents,

updating grades; that they often lose time needed to make strong GBL experiences. In order to

combat the time factor, they discussed ways to build games smarter so they take less time in the

future, such as using standardized boards with interchangeable cards for different content. New

teachers suggested 'Teachers Pay Teachers' (TPT) as a valuable online reference (at a minimal

cost) to help speed up the game development process as well.

   Advantages and possible benefits. This section details all of the qualitative data

pertaining to the recurring theme of advantages and possible benefits gathered from the new

teacher focus group discussions. Each subheading throughout this section will focus on one of

the sub-themes tied to that overarching concept, including novelty, engagement and fun,

memory/connections, and social skills. Overall, the new teacher focus group demonstrated strong

support of GBL as a valuable teaching and learning tool through their extensive discussion of the

various advantages and benefits associated with the strategy. In addition to exploring how the

novelty aspect of games makes them a more engaging learning tool, the new teachers also

examined the impact on memory and connections in the learning process, as well as the ability to reach different types of students on both academic and social levels. As other participants noted before, the new teachers warned that this tool's novelty could wear off if they did not maintain a fine line between effective use and overuse. In supporting this hypothesis, the new teachers commented how the pre-packaged games within the Study Island program used by many English and Math teachers were once enticing to the students but are now less interesting each year. Specific new teacher focus group comments describing how novelty connects to GBL are

Novelty - Advantages & Possible Benefits: New Teachers

- The novelty factor will/can wear off on some games too if they are used too often. Some of the standard package games purchased (Study Island was mentioned) has been used regularly for several years and the students are less interested in each year.
- There is a fine line between using games as an effective tool and overusing it to the point that the novelty wears out.
- Once, the use of cell phones was novel and it hooked students, but they are less interested in that now.

Engagement & Fun - Advantages & Possible Benefits: New Teachers

- Kids learn more "because they're directly engaged in it. They're moving things, they're actually manipulating it."
- Games are usually "a great way to get them over that hurdle" of not wanting to talk, work, or learn. Students always want to talk about them. They're more interested in talking about the content than if the teacher lectured and then asked them to talk about it.
- Some concerns about a lack of skill hindering engagement. If they cannot advance in the game "because they don't know the skill, then engagement goes down."
- One new teacher suggested that "not everybody understands about game-based learning either. They walk in and see that the kids are huddled around one desk because they're excited about it. They see that as chaos going on in the room, but really they're just so engaged with what's going on and they're yelling because they're excited about what they're learning. It looks like I can't handle my kids, when really they're probably more engaged than they've been all week."
- One teacher noted that the games used would even help engage the ELL learners because they were able to grasp the simple game concept and it was easy for them to do, so they found it interesting and were able to participate pretty well.
- Games change the mood of the classroom even before they begin. Sometimes the later periods come in already excited because they hear from their peers what they are going to be doing, as opposed to when they come in like "ugh, I heard we're doing a really hard packet today."
- Teachers can sometimes use it as a bartering tool, "well if you can get through this, we can play the game, if you can't get through it, then we'll have to do it another time."
- During an end of year feedback survey, one teacher asked one thing they found interesting this year and why. Most of them mentioned when they played the Salem Witch Trials game. It's what they can remember it's more exciting.

Figure 4.40: New Teacher Themes Representing Advantages and Possible Benefits

documented under the first heading in Figure 4.40.

Engagement and fun. The element of fun and engagement is the first major sub-theme in the overarching theme of advantages and possible benefits connected to GBL. Detailed comments pulled from the new teacher focus group transcripts regarding this topic appear under the second header of Figure 4.40. First, the new teachers admitted that students seem to learn more in GBL activities because they are directly engaged, moving, interacting with, and manipulating material. Games are a great way to get students past the barrier of not wanting to talk, work, or learn and quickly change the mood of the classroom. Some new teachers have even noted that students entered class more positive simply because they heard from their friends that the class would be using GBL that day. One commented that the games offered teachers a possible bartering tool, offering that strategy as a reward for completion of work or good behavior as opposed to a more traditional method. Another new teacher noted that games help engage the English Language Learners (ELL) in the class since they were able to follow the game process through social mirroring and peer cooperation. The primary anxiety regarding the increased engagement is that perhaps not all teachers, supervisors, and/or administrators truly understand what they are seeing when they observe GBL, so classes using it might appear chaotic, loud, or even off-task. One teacher admitted a fear that a lack of skill on the part of the students could hinder game play and therefore disrupt the engagement factor, but none had experienced that personally. Overall, the experiences of the new teachers corroborated the perception that games increased active participation because they engage students, not only into game play but also into related discussions about the activity and the content included.

Memory and connections. This concept of fostering greater participation in game play as well as connected discussions about learning and skill development uncovered an additional

benefit not strongly mentioned in the other focus groups—increased retention and mental

connections to the material. Specific statements from the focus group regarding this topic appear

in the first section of Figure 4.41. In general, however, the new teachers who used GBL more

often throughout the year noted that students remembered the activity and material better when

paired with game use. Furthermore, those new teachers who had used GBL mentioned that class

discussions were livelier and more meaningful when tied to games or simulations because those

tasks allowed the students a stronger and deeper connection to the learning. One commented

Memory & Connections - Advantages & Possible Benefits: New Teachers

- It's a good trigger. It helps them remember things. Like "Oh, we played the Salem Witch Trials," or I did a game like Go Fish for the Columbian Exchange and they're like "oh yeah, that's when we played Exchange, that was about the Columbian Exchange," and if they're playing a game they don't really realize they're learning anything and then after the fact they're like "oh, ok, oh yeah the Salem Witch Trials, that happened." They tend to remember that material more.
- It's great because now on their final when I had a question that was similar, a lot of them said it was a lot easier to remember what was going on in trench warfare and technology because we talked about it and over and over again in conjunction with the game, so it was easier for them to put it together. After the game, the class watched a documentary on trench warfare, and students could make meaningful connections to what they had done in the game.

Social Skills - Advantages & Possible Benefits: New Teachers

- Games appeal to a lot of learners. They can tie in visual learning, kinesthetic learning, which is big, and a lot of our kids need to be able to do, being able to just get up and move around and see pictures all incorporated into one game, it definitely helps them learn.
- The whole point of games is to work as a team for some objective, so you have to solve or work for it. So, it's perfect for problem solving and participating within a group. Regarding the social skills aspect of it, students are like "I have to work with this person, I don't necessarily get along, how do we make that work for this game? I can't always be the winner, oh I have to go back to start" it's even accepting those things that you don't necessarily want to happen or agree with and how to cope with those things that are happening.

Figure 4.41: New Teacher Themes Representing Advantages and Possible Benefits (continued)

specifically that the topics learned through GBL were those the students remembered most.

Social skills. The final sub-theme of advantages and possible benefits of GBL emerging

from the new teacher focus group is the impact on social skills. Excerpts of qualitative perceptual

data about this topic from transcripts of the new teacher focus group appear under the second

heading of Figure 4.41. It seems that with recent training in Howard Gardner's multiple learning

styles or intelligences, the new teachers recognize the value of games in that they appeal to a large range of students. Games can tie in visual and kinesthetic learning, integrate social and verbal interaction, and potentially work in a digital or multimedia manner. In addition to reaching various styles and interests, games encourage and often require that students work and collaborate as part of a team to problem-solve in different situations. Therefore, students are guided through content and skills tied to the curriculum, but also immersed in critical 21st century skills like problem-solving, critical thinking, collaboration, and communication. In addition, games help incorporate character education into an otherwise busy schedule, teaching students to cope with loss and handle winning over others gracefully.

Game use and purpose. In order to develop a perceptual foundation for the new teacher focus group for comparison against their peers, data must also address the actual terms under which they used (or did not use) GBL as a tool for teaching and learning. Qualitative data about game use, which comprises the third recurring theme of the focus groups, explored within this section will focus on the means through which new teachers used GBL. The data collection table examining game use and purpose for new teachers, seen in Figure 4.42, organizes the sub-themes within this overarching topic with headings and specific elements from the transcription of discussion. For the new teacher focus group, the same two sub themes existed that were seen in the veteran teacher focus group, the overall practices regarding game use/purpose observed and a discussion about perceived administrative support of games in the classroom.

Practices regarding game use/purposes. The first, and most obvious, sub-theme in this overarching area is a discussion of game use and practices. This topic permeated a large portion of the new teacher focus group discussion and specific comments regarding it appear under first heading in Figure 4.42. During their focus group discussion, the new teachers detailed their

Practices Regarding Game Use/Purposes - Game Use & Purpose: New Teachers

- New teachers were surprised by the survey responses on frequency of use because they use it more often and more ways and perhaps anticipated more similarity in the overall results. They also questioned if perhaps they had a more broad and flexible definition of what is in included in GBL whereas veteran teachers may only consider board games and video games in their consideration.

  Examples:

  - One of the new teachers had students make board games to review the different units from the year. "I've never seen them so engaged in creating board games and the questions and the answer keys and I think people go to technology because it's easy, but really the board games I think the kids learn even more because they're directly engaged in it. They're moving things, they're actually manipulating it."
  - One teacher discussed a Communist game/simulation during which students noted "oh my God, they're making me swear on my mom" or "no one will let me into their group and I'm not even Communist" and the teacher explained blacklisting during the Red Scare. The game was used prior to teaching the unit on McCarthyism and the Red Scare and then it was easier to explain the content.

- Most teachers struggle to find/create games that can help teach content in this manner. The majority of teachers feel students have to master the skill before they can play the game so they primarily use games for practice and review. Those teachers who use it the most, actually use it less for review and "more of a starting point so that they can form their own knowledge on it."

- New teachers who are skilled game-using teachers (GUT) were able to integrate valuable learning and assessment strategies into their games by having students play and then write about what they were doing and make connections to the content.

- Some teachers use game-connected writing to assess. Several new teachers also mentioned that they assess by observation on student participation, more for formative purposes than grades. "It's almost easier to make games a formative assessment just to see where they're at, and much more difficult as a summative assessment." Other comments suggested having students make games based on the content can be a good assessment tool. Overall, they seemed more informed and active in the use of games for assessment. One did however express concern about using non-digital to collect assessment data, as the hands-on collection of data could be cumbersome.

- Games are a great tool for review because they make it easier to get through a lot of content than just saying "here's a packet" with all the material and most of the students do not do it. When it's a game they all do it together, which helps them.

Administrative Support of Games - Game Use & Purpose: New Teachers

- In this building it applies heavily because we've had several PLCs and our opening day activity was all about gamification and game-based learning and in this building they push for it and they strive for it, and they want to see it going on in the classroom.

- It is also emphasized in the observation rubric. For the high school, last year's school goal for Professional Growth Plans was student engagement and games are one way to really get students engaged. It seemed like the administrators wanted to see classes doing game-based learning, they wanted to see the kids having fun while learning. To some extent there was a "if you can't beat 'em, join 'em" impression overall as staff members, as in like "this is what is expected of you" in this district, so more staff would try it because it was expected and is definitely supported here.

- It seems like there is still some balance in the support because they want to see effective game use but if an administrator walks by and sees chaos in the room, teachers will still feel like they have to justify what they are doing.

Figure 4.42: New Teacher Themes Representing Game Use and Purpose

increased use of game for teaching and learning by communicating evidence of various uses and

purposes. The new teachers were surprised to see a lower frequency and predominantly review-style use according to the survey responses because they personally use it more often and in more varied manners. They agree that games are a valuable review tool, as they make it easier to cover a lot of material in a method that students will enjoy. One teacher even mentioned having students create their own board games to review the different units throughout the year as a cumulative review. Students were highly engaged as they interacted in the material. New teachers noted that review might be the most often used method across all teachers because it allows them to teach content the way they prefer and assist students in mastering the necessary skills before they play the game. In fact, the new teachers suggested that those individuals who actually use GBL the most probably use it less for review than others. Instead, some use it in conjunction with writing to first foster interaction and connections with the material and then ask students to communicate their understanding in writing. Others use games for formative and informal assessment through observation of student participation. Some even use it to model or simulate situations allowing students to experience it first-hand through the game.

Administrative support of games. Along with discussing the details of their personal experiences with game use, new teachers also added to the conversation about administrative support of the strategy. These comments, which appear under the second heading in Figure 4.42, comprise the second sub-theme in the overarching discussion on game use and purpose. Overall, the new teachers felt that administrators were highly supportive of their various means of using games for teaching and learning. They recounted several PLC sessions and prior opening day activities all modeling or using GBL. This group of new teachers also pointed out that the high school's professional development goal was to improve student engagement, so the use of learning games could even positively affect observations and evaluations. However, even with

this level of encouragement and support, the new teachers still feel some need to justify what they are doing when using GBL in case an administrator thinks there is chaos in the classroom on a game day and presumes that the new teacher cannot control their class.

Quantitative Historical Data

To attempt to provide a third, and less biased, component to the comprehensive data collection process, the administrative team and the researcher reviewed the lesson plans and walkthrough observations for all staff for one marking period of the year. The intention was that this examination of teacher practices through historical data would provide substance to what types of GBL use is observed by the administrative team. Data collected was quantitative and categorical in nature, with the review focusing on frequency of use, purpose, and demographic information on the GBL-using teacher to corroborate or contradict any new/veteran teacher or subject area trends implied in earlier data collection methods. Specifically, by including this data, the study may confirm the type of and frequency of GBL use by teachers further by adding observational information to the teacher-provided input through surveys and focus groups.

Lesson plan review. First, lesson plans were reviewed from the third marking period of the school year, from the end of January through April. Specifically, administrators read over previously collected lesson plans again to search for noted instances of GBL and document details about its use. While a single marking period snapshot is not comprehensive, it should be sufficient to determine if lesson plans can corroborate perceptual data collected through surveys and focus groups.

In order to collect quantitative frequency data that could be compared to survey responses, the same Likert Scale and numerical conversion figures (which appear in Figure 4.43) were utilized by all administrators involved in the lesson plan review process. Administrators

were asked to read over departmental plans for the four months in question and rate each month's frequency of use on the scale provided. Those four scale scores (one for each month) were then averaged to calculate an average frequency per department. The findings for average frequency per department appear in the table in Figure 4.43. Based on those calculations, the Social Studies and World Language departments documented GBL use in their plans the most often (once a week or more). The Mathematics department and Special Education department noted GBL use the

LIKERT SCALE CONVERSION	
0 =	Never
1 =	One or twice a year
2 =	Once every couple months
3 =	About once a month
4 =	2 to 3 times per month
5 =	About once per week
6 =	2 to 4 days per week
7 =	Every day

DEPARTMENT	AVE. FREQUENCY
Language Arts	3
Math	4.75
Social Studies	5.5
Science	3.75
Physical Education	1.5
Music	0
Fine Arts	2.25
World Languages	5.25
Business/Computers	3.5
Special Education	4.5

Figure 4.43: Frequency Rating Scale and Department Average Frequencies

second most frequently (multiple times each month). Language Arts, Science, and Business/Computer teachers documented GBL use roughly once a month or more. Fine Arts, Physical Education, and Music lessons reported the least, using GBL once every couple of months at most.

To draw comparative quantitative categorical data on how GBL was used, administrators also noted details on how teachers used games based on lesson plan documentation. Essentially, they kept a record of how each department used games for practice, review, assessment, or instruction. Since there were no documented incidents of GBL in the Music lesson plans (as noted in the table in Figure 4.43), the examination of GBL uses or purposes spans nine departments. To compare the various ways in which games are actually used in classroom lessons, each departmental supervisor used the provided Lesson Plan Review Template

(Appendix F) to document which purposes were demonstrated by the plans reviewed for the third marking period. Frequency over time within each department was not calculated, but rather a general overall listing of uses was. For example, the Math Supervisor may have noted

PURPOSE	COUNT
Practice	6
Review	9
Formative	4
Supplemental	4

Figure 4.44: GBL Use/Purpose as Noted in Lesson Plans During the Third Marking Period

that the math lesson plans documented use for practice, review, and formative assessment. Then, each purpose received a count based on how many departments had noted GBL use in that manner in their plans for the third marking period. The resulting tally appears in Figure 4.44. Review was used throughout all nine departments who noted GBL utilization. Practice was the second most common reason for teachers to implement GBL in their department, documented in the lesson plans of 6 (out of 9) departments. In contrast, only 4 of the 9 departments mentioned using GBL for formative assessment or to teach supplemental content.

Finally, the plans allowed the researcher to collect data on any potential bias regarding GBL use by new or veteran teachers. As administrators used the Lesson Plan Review Template to review GBL use in lesson plans, they documented any noted bias toward use by new teachers, veteran teachers, or not at all. Ultimately, 42.4% of the documentation noted no significant bias based on new or veteran teacher status. Some bias was noted, however. Administrators noticed new teachers documenting GBL in their plans more than veteran teachers 39.4% of the time, but only commented that veterans used it more than their new teaching counterparts 18.1% of the time.

Walkthrough review. To complete the historical data component, the researcher also reviewed all of the previously filed walkthrough observation forms completed during the third marking period. Specifically, the paper documentation from each walkthrough that took place

during the third marking period offered data needed to determine 1) if GBL occurred, 2) how it was used, 3) who it was used by, and 4) any comments or influence on the scoring of the informal evaluative tool. There were 200 documented walkthroughs filed at the high school for the period in question, with 121 attributed to veteran teachers with 6 or more years of experience and the other 79 associated with new teachers with 5 or fewer years in the profession. The quantitative measures collected in this review of walkthrough data, broken down in Figure 4.45, show the number of walkthroughs reviewed for new and veteran teachers, how many incidents of GBL were noted, and what the final percentages were for each group. From that documentation, only 10 of the 79 new teacher walkthroughs (12.7%) and only 8 of the 121 veteran teacher walkthroughs (6.61%) noted GBL use. While these numbers may seem lower than expected based on some of the other data provided, a closer comparison to both survey and focus group

	Walkthroughs Reviewed	Incidents of GBL Noted	Percentage
New Teachers	79	10	12.7%
Veteran Teachers	121	8	6.61%
TOTAL	200	18	9%

Figure 4.45: Documented GBL Use in Walkthrough Observations in the Third Marking Period

data will follow in future sections.

In addition to the quantitative data on documented GBL incidents, reviewing walkthrough observation forms provided other information valuable to the research study as well. First, it was noted that almost all of the eight veteran uses of GBL were for review purposes, whereas some of the new teacher GBL incidents included uses for new learning as well. Secondly, it was noticed that on those 18 walkthrough observations documenting cases of GBL, the ratings for student engagement were always in the highest level (actively engaged). Similarly, the 18 walkthrough observations all included learning environment sections that were

highly rated, often noting positive climate, student-centered focus, and differentiation. Finally, classroom management ratings noted effective behavior and a well-managed environment. While it is not implied that these high, positive ratings did not exist on non-GBL walkthroughs, it is interesting to note how universally these ratings occurred on all the GBL-cited forms.

Summary

The three-pronged approach to data collection seemed to provide a fair demographic variety as well as allow for corroboration across data sources. Surveys were able to capture a wider lens of overall perceptual patterns while focus group discussions offered the chance to develop the details surrounding emerging trends and persistent questions more deeply. These two data points, both first-person in nature and therefore somewhat subjective, were then balanced with largely objective historical data from walkthrough and lesson plan forms. Overall, the comprehensive data collected provides some valuable insight through its corroborations, contradictions, and those questions that remain unanswered.

Results and Interpretations

After reviewing the findings individually by data source (surveys, focus groups, and historical data), it is important to step back and explore how those separate pieces interact, overlap, and support one another. To do this effectively and efficiently, a thematic process will successfully facilitate a triangulation of various data components as they corroborate the major themes developed over the course of this research. Therefore, this section will review, examine, and discuss the results that have emerged from these findings as they apply to the major themes that exist. Specifically, four overarching themes permeated data findings: comfort levels and the generational gap; game use, type, and frequency; perceived benefits of GBL in the face of reality; and potential obstacles with GBL and reactions to them. Once these four themes are

dissected and substantiated with triangulated data, research questions can be fully addressed and answered.

Overarching Themes Permeating Data Findings

In order to clearly synthesize and then discuss the data thematically, this section will gather any relevant information across all three data collection methods (surveys, focus groups, and historical data) into a data synthesis table (such as those seen in Figures 4.46, 4.47, 4.48, and 4.49 in the upcoming pages) for each of the four overarching themes. The table splits into a maximum of three horizontal rows/sections, one for each applicable data collection method as a source of relevant data. The topmost section will always provide highlights from the survey data findings that pertain to the theme under examination. Data in this section will be predominantly quantitative in nature, either statistical or descriptive measures, but may include some qualitative elements as well. The second row, often viewed as the middle section(s) of the table, splits into three columns, each providing key qualitative data from one of the three focus groups. This will allow a visual comparison of similar or dissonant focus group data across the three participant groupings. Within those columns, any comments that tie to similar topics or points of discussion across the three groups will be set apart with a unique and matching color. Any items relevant to the overall theme, but singular in topic remain in neutral black font. The color choices, themselves, have no specific meaning except to focus attention on connected data points across participant groups. For example, the coloration of a specific topic as either red instead of blue holds no meaning, but simply acts as a notification that it ties to another similarly color-coded comment from another focus group. Finally, if applicable, a third (bottom) row/section will incorporate any historical data from lesson plan and observational walkthrough reviews that can corroborate or contrast the aforementioned data. This single glance at relevant data serves as a

recap of critical pieces of information from the comprehensive review of data in this chapter.

Comfort levels and the generational gap. One of the main underlying themes that continually surfaced in various data collection components is the concept of a generational gap concerning GBL use and comfort level. Looking back over the various findings of the study, there have been several key pieces of data regarding this theme that have been collected in the data synthesis table in Figure 4.46. The table includes critical survey data (top row/section) with descriptive and inferential statistics as well as important qualitative data from the three focus groups (bottom section split into three columns). Some comments from the administrative and veteran teacher focus group data, coded in either light blue or red writing to facilitate easier data

Comfort Levels and the Generational Gap: Data Across the Various Collection Methods		

SURVEY DATA:
• There seemed to be minor skew suggesting higher rates of participant satisfaction and lower rates of participant comfort, with perceived value being slightly less than satisfaction.
• Looking at the average comfort rating response per group, veteran teachers were the least comfortable (average response = 1.64) with the use of games for learning. New teachers were considerably more comfortable (average response = 2.29) and administrators were the most comfortable (average response = 2.38).
• ANOVA and t-Tests on comfort ratings confirms that association with the veteran teacher group statistically impacts comfort level.
   ○ The ANOVA test shows a significant difference exists within the three participant groups.
   ○ T-tests between each pairing shows that the difference exists between administrators and veteran teachers, as well as between new and veteran teachers, but not between administrators and new teachers.		

FOCUS GROUP: ADMIN	**FOCUS GROUP: NEW**	**FOCUS GROUP: VET**
Younger teachers are more familiar with games. Teachers tend to teach the way they were taught and more of the veteran teachers learned by lecture, but...younger teachers were exposed to [GBL]. Veteran teachers may not feel as naturally comfortable with games and there is a fear/pride factor making them not want to ask a 22-year-old to show them how to. There is a generational achievement gap for teachers as well that we need to close and get teachers to be more open and receptive.	Some of the disparity noted in the survey regarding frequency of use is likely tied to the perceived generation gap between younger teachers who use it very often and veteran teachers who use it only once in a while. The older generation seems to feel there is no major reason or need to change. They feel that their current strategies are meeting the students' learning needs well so why change? Not all teachers attest the variation in frequency/use to generation but rather to a difference in personality, interest, and effort.	People that use games for entertainment are more inclined to use it for learning. Noted concerns about comfort level with games and how to fit them in without students feeling like it was free time. User demographics may play a major role. Admitted that they may be more comfortable with ways they have taught for years and already know that it works whereas younger teachers probably are more willing because they don't know what has always worked. They are more likely to try new things and see what works.

Figure 4.46: Data Synthesis on Theme 1- Comfort Levels and the Generational Gap
(Note: Similar colors denote similar topic/theme.)

connections, hit upon the same topic. There is also a fair amount of disconnected commentary that provides unique group-based perceptual input in standard black text. There is no third row in this table as none of the collected historical data tied specifically to this theme.

Both survey and focus group data corroborated that there is a lack of comfort, knowledge, and savvy that may impede the use of GBL, especially for the veteran teachers. In collecting survey responses on perceived comfort, value, and satisfaction regarding GBL, comfort ratings by all participants were noticeably lower than ratings for value and satisfaction. Evidently, even if educational personnel find GBL to be beneficial, they are still somewhat uncomfortable with using it. Furthermore, a statistical analysis of the survey data suggests that comfort level differs significantly based on grouping as an administrator, new teacher, or veteran teacher. Specifically, the veteran group's responses revealed a statistically significant decrease in terms of comfort in comparison to the other two groups.

Focus group discussions to expand on this theme provide some possible reasons for the generational gap in comfort levels. Both administrators and veterans agree that younger teachers might be more comfortable with GBL because they are more likely to use games for entertainment purposes and are therefore more familiar and inclined to use them in the classroom. Administrators speculated that the discomfort veteran teachers feel toward GBL is exacerbated by fear and pride issues that keep them from reaching out to younger colleagues for assistance. Veteran teachers confirmed this, admitting they might be more comfortable with teaching methods they have used for years as opposed to newer techniques like GBL that might seem like free time in class. Perhaps, in a nod to respect and professionalism, the new teachers were the least verbal about the potential generation gap, suggesting the difference between the two groups might be less about comfort and more about the veteran teachers not seeing a need to

change what they perceive to be effective (albeit more traditional) methods.

While historical data shows that new teachers are documented using GBL in walkthroughs more frequently than veteran teachers, there is no substantial proof or reason to believe that frequency is directly connected to a generational gap with regard to comfort level. However, similar generational differences permeate many of the findings, results, and themes that emerge throughout the study. It is constantly explored as a potential statistical difference between collected data sets. In addition to this notable divide about GBL comfort levels and savvy, the generation gap with respect to actual use and various other perceptions will continue to resurface throughout the other themes explored and discussed in greater detail in future sections.

Game use, type, and frequency. Another major topic to explore is the varied results concerning how (and how often) games are used as a tool for learning. All three data sources (surveys, focus groups, and historical) collected information in the effort to corroborate game use in relation to frequency and purpose, and the key elements of that data appear in the data synthesis table in Figure 4.47. The table includes critical survey data (top row/section) with mostly descriptive statistics as well as important qualitative data from the three focus groups (middle section split into three columns). Unlike the focus group data for the first theme explored, where a fair amount of disconnected commentary in each group was coded in standard black text, all critical pieces of focus group information tie together with the input from their colleagues across focus group lines. For that reason, there is significantly more color- coding across the three focus group columns. Finally, a third (bottom) section of the table with historical data from lesson plan and walkthrough observations also discusses game use. This data will be synthesized throughout this section, looking first at the frequency of GBL use and then type or

Game Use, Type, and Frequency: Data Across the Various Collection Methods

SURVEY DATA:
- Games used for learning roughly once per month. Digital GBL used slightly more often than non-digital GBL. Veteran teachers used GBL the least (average response = 2.57). New teachers used GBL the most (average response = 2.83). No statistic difference could be noted using ANOVA testing.
- Over half used for practice/application/review, roughly 40% for formative assessment, and 50% as context for discussion. The most often types of games used were COTS for education and games made by the teacher.

FOCUS GROUP: ADMIN	FOCUS GROUP: NEW	FOCUS GROUP: VET
Students need to learn content before they can apply it, so games are often used for review and practice after learning. More comfortable with review because easier to set up a game based upon skills and application. Harder to use games to foster discussion or teach content. Some observed uses for true teaching, just not as often as review (simulations in history). Some also use GBL to formatively assess their students and allow their students to self-assess. The concerns about how to transfer GBL work to a grade keeps some from using it for formal assessment.	A majority of teachers feel students must master skills before they can play games so they are primarily used for practice and review. Great for review. They make it easier to get through a lot of content in a fun way that students can do together, which helps them. Communist game/simulation: Students experienced and then the teacher explained blacklisting during the Red Scare—made it easier to learn the content. Most teachers struggle to find/create games that can help teach content in this manner. Use "more of a starting point so that they can form their own knowledge on it." Some were able to integrate valuable learning and assessment strategies into their games by having students play and then write about what they were doing and make connections to the content. Use game-connected writing to assess. Assess by observation of student participation, more for formative purposes than grades.	Use for review more often. It is the easiest way and more teachers are able to wrap their head around that. Feel more comfortable with review because they've already taught the way they know how to and then use the game for review, where it seems useful to most people. Review is a great use-elicits a lot more participation than traditional methods and creates a mental schema that helps students remember that reviewed material because of the novelty of the review process. If kids are playing the game one can assume they get the material, but hard to use it as an assessment. Tests need to be more cut and dry. Games seem too subjective to act as good assessment tools.

HISTORICAL DATA:
- Lesson plan data reported varied levels of average frequency by department. The overall average for all departments equated to 3.4 (between once per month and 2-3 times per month).
- Lesson plan review data corroborates that practice and review are the most common use of GBL with formative assessment a second-level common use.
- All of the veteran teacher walkthroughs and several new teacher walkthroughs noted GBL use for review. Some new teachers also were observed using GBL to teach new material.

Figure 4.47: Data Synthesis on Theme 2- Game Use, Type, and Frequency
(Note: Similar colors denote similar topic/theme.)

means of use.

Frequency of GBL use. Frequency was examined primarily through survey and historical data, but focus groups were asked to comment as well. Survey responses suggested that games were used for learning purposes roughly once per month (average frequency approximately 2.7) with digital GBL being used slightly more often than non-digital GBL. While examining lesson plans for a snapshot of the full year is not an exact measurement, lesson plan review data seemed to align with the frequency reported through survey responses. While the lesson plan review data noted varied levels of average frequency by department, the comprehensive average for all

departments equated to roughly 3.4 on the Likert Scale Conversion chart (suggesting games are used between "once per month" and "2-3 times per month"). It is interesting to note that the rough estimation formula utilized by the administrative team in reviewing lesson plans implied more frequent use than actual first-hand survey results. However, the fact that each administrator averaged his or her individual departments, and then the comprehensive group was averaged again at the end, could account for a slightly higher calculation. Finally, examining the average frequency of GBL as it was broken down by years of experience in survey data, veteran teachers used GBL the least (average response = 2.57) while new teachers yielded an average response = 2.83. While higher numbers were reported in new teacher responses than veteran counterparts, no statistical difference could be noted using ANOVA testing. Historical data collected from third marking period walkthrough observations complements the hypothesis that new teachers may utilize GBL more since 12.7% of new teacher walkthrough forms documented cases of GBL while only 6.61% of veteran teacher walkthrough forms did the same.

   Type of GBL use. In terms of use, some clear trends emerge from all components of the data collection. The most obvious pattern is that teachers use games for practice and review more than any other reason. Surveys suggest there were three primary purposes motivating most game use, but focus groups and historical data point to practice and review singularly above all others. Survey responses showed that over half of the participants used GBL for practice, application, and/or review, while roughly 40% used it for formative assessment, and almost 50% used it as a context for discussion. Lesson plan review data corroborated that practice and review is the most common use of documented GBL with formative assessment appearing to be the second most common reason to use the strategy. Finally, when reviewing details on all walkthroughs that documented observed GBL use, all of the veteran teachers and several new teachers used GBL

specifically for practice and review purposes.

When asked to corroborate or contrast emerging survey patterns in their focus group discussions, all three sets of participants provided extensive details on why practice and review is likely the most common purpose. Administrators and new teachers both suggested that teachers might believe students need to learn content first before they can use it in games (hence limiting use to practice and review). Both teacher groups pointed out that games might be used more often for this purpose because they are so valuable for review. Games not only make it easier to practice and review large amounts of content in a condensed period, but also do so in a way that engages students, elicits more participation and collaboration than traditional methods, and creates a novelty-based mental schema that helps students retain material and understanding. Finally, administrators and veterans both admitted that comfort with the strategy is a factor as well. Some teachers are more comfortable using games for review because it is relatively easy to do and still allows them to teach through their preferred methods before switching to game play.

While GBL practice and review is considered easier, it may be more difficult for teachers to use games to foster discussion, teach new content, or assess learning summatively, which is likely why the three data sources do not yield as much evidence in these areas. However, these advanced GBL uses do occur in all three data forms, albeit less intensely. Survey responses and/or lesson plan data suggest that a percent of participants use games for discussion, assessment, and learning new content. Unlike the dominance of game-based review for all veteran and most of the new teachers, some new teachers also were observed using GBL to teach new material. However, once again, the greatest source of information for non-review uses of GBL came from the focus group data. Administrators and new teachers recounted ways that some use GBL to teach content, usually through game simulations. One new teacher used a game

to simulate Communist paranoia during the Red Scare. The new teacher group commented there is great value in using games as a starting point so students can form their own knowledge, but admitted that many teachers find it difficult to find or make games that can teach content in that manner. All three groups discussed the pros and cons of using games for assessment as well. All participants noted the value of games for formative assessment, but many found it difficult to use the tool for summative or graded assessment pieces. Veteran teachers noted that tests need to be more cut and dry to guarantee objectivity in grading while new teachers discussed ways to use game-based writing prompts to communicate and assess understanding. Ultimately, new teachers were considerably better informed about ways to use GBL for teaching and assessment purposes.

Perceived benefits of GBL in the face of reality. Third, all three various data sources provide solid details regarding the perceived value and benefits of GBL as a teaching and learning tool, in conjunction with the realities that support and stymie that value. For specific details broken down by data collection method, a data synthesis table appears in Figure 4.48. The table combines relevant survey data (in the top section) with qualitative data from the three focus groups (middle section split into three columns) and observational data from walkthrough documentation. Within the three focus group columns, there are several topics connecting the input from administrators, new teachers, and veteran teachers coded similarly with red, blue, green, or purple font. The various data components are synthesized and discussed throughout this section, looking first at the overall patterns, then specifically at engagement, and finally how GBL addresses the acquisition and retention of specific needs and skills.

Every aspect of data collection confirmed that increased student engagement was, by far, the greatest benefit from using this tool for teaching and learning, but other valuable effects were noted as well. All three participant groups discussed specific benefits in both their surveys and

focus groups, but again there were notable differences in their perceptions. Looking back at simple survey data on value shows that 78% of all participants feel that GBL is moderately or very valuable, with the average new teacher rating (2.5) slightly higher than the administrator rating (2.25) and the veteran teacher rating (1.93). While not statistically significant in their numerical difference, the implication of a generational gap based on these numbers definitely seems to continue with regard to perceived benefits and how they match up against the reality of classroom teaching. Overall, it seems as if the new teachers find more value and benefit in GBL than their more experienced counterparts and were able to communicate far greater justification of the strategy's value. In addition to the survey data statistics, this conjecture is also supported

Perceived Benefits of GBL in the Face of Reality: Data Across the Various Collection Methods		
SURVEY DATA: • Greatest benefits include: increased engagement (68% of replies), relevance to students' learning modes, means of practice/review, reinforce social skills, use of competition, integration of critical thinking skills.		
FOCUS GROUP: ADMIN	**FOCUS GROUP: NEW**	**FOCUS GROUP: VET**
Games are still quite novel for learning, not the common predictable way. Games elicit greater student engagement. Students are highly enthusiastic, active, and participative even if they are not interested in the content. They could not wait to play and learn more, looking forward to class. Games change the class atmosphere and attitude to one of energy and positive learning chaos. Students benefit from the kinesthetic, visual, and/or social element of games. They can also help students on the spectrum learn social interaction skills while working within the game construct.	The novelty of games makes them an engaging and effective tool so teachers must be careful not to overuse them. Allow students to be directly engaged, moving, interacting with, and manipulating material. Gets kids past the barrier of not wanting to talk, work, or learn. Changes the mood of the classroom to positive. Also increased activity in related discussions occur. Helps ELL students because they can learn social and academic skills through peer modeling and cooperation. Games tie in visual, kinesthetic, social, and multimedia elements while immersing students in 21st century skills. They also incorporate character education at all levels. GBL helped students remember activities and material better, made more lively and meaningful discussions, and facilitated a stronger mental connection to the learning.	Admitted that GBL clearly increased engagement, involvement, and motivation. It is a fun way to learn that pulls even reluctant/shy kids into participating. Games bring out some strengths students couldn't otherwise demonstrate. Some felt games are the best way to model and scaffold proper social interaction and behavior. Students encounter real-world conflict, feelings, & disappointment. Games develop and strengthen problem-solving and critical-thinking skills while fostering more conversation between students. Games help student internalize information, make connections, and remember critical content.
HISTORICAL DATA: • In all walkthrough observations noting GBL use, student engagement was rated at its highest level (actively engaged) and learning environment sections were highly rated, noting effective behavior and management.		

Figure 4.48: Data Synthesis on Theme 3-Perceived Benefits of GBL in the Face of Reality
(Note that similar colors across focus group columns denote a similar topic or theme for comparison).

directly by focus group data as well. Focus group findings from each group offered ways in

which GBL could be, or was, beneficial to teaching and learning. However, even with less

experience in the profession, new teachers had more insight to add to the discussion on GBL

benefits than the other two groups. Having communicated more experience actually using GBL

in the classroom, they were the most overwhelmingly positive in their responses, providing a

great deal of specifics on how games are beneficial to students, schools, and teachers.

      Engagement. Clearly, increased student engagement was the primary benefit that all

participants and data could agree upon throughout the process. At least 68% of all open-ended

survey responses about the greatest benefit of GBL directly referenced engagement levels in the

lesson. When asked to respond to certain statements directly, 78% of survey participants agreed

that games have been effective in increasing engagement and motivation. Roughly this same

percentage also agreed that lower performing students showed increased engagement with

content and positive collaboration between students increased as a result of GBL integration. All

three focus groups concurred that games allow students to be directly engaged in the material,

making students more active, enthusiastic, motivated, and participative because they may be

moving around and physically manipulating the material in some manner. They also all agreed

that games can draw students into learning even if they are not interested in the content or if they

are reluctant and shy. They break through the social and academic barriers of not wanting to talk

or work, minimize the fear of being wrong, and bring out some strengths that students would

otherwise struggle to demonstrate. Administrators and new teachers also mentioned that they had

witnessed games changing the whole mood or atmosphere of the classroom. Finally, new

teachers noted this positive energy transferred into other work as well, with game association

facilitating more active and meaningful discussions about content and heightened participation in

follow-up activities.

Addressing needs and skills. In addition, games were also noted as beneficial because they help satisfy special learning needs through differentiated modalities, build positive social skills, and even facilitate greater connections and retention. New teachers observed games helping ELL students learn proper social and academic skills by seeing what their peers were doing and working with them. Administrators and new teachers mentioned that games scaffold learning and differentiated approach for all students through kinesthetic, visual, social, or multimedia elements that tie to students' varied learning styles. All three groups observed the benefit of games to aid struggling and special education students by guiding collaborative activities that help children see, practice, and learn appropriate social interaction skills. Games are a good way for students to encounter real-world conflict, feelings, and disappointment, and provide an avenue for teachers and peers to infuse the character education lessons on how to deal with those feelings. Additionally, both teacher groups commented on the added value of games as a natural means of immersing kids in 21st century skills, problem-solving, and critical thinking while facilitating content mastery. Finally, the teachers agreed that GBL can help students internalize information, make connections, and cement understanding and retention of critical content. In addition to the fact that students are more involved in the novel activity to learn better, it also creates a stronger mental schema in the brain with more sturdy and varied connections that improve retention.

Overall, GBL's perception as a beneficial tool was steadily developed and justified across multiple data sources. Survey results and focus group discussions offered great support of the suggested benefit of the tool for teaching and learning. Historical data even corroborated this trend as all walkthroughs noting GBL use showed the highest possible marks in the student

144

engagement section (students are actively engaged) and also documented high ratings in learning

environment and effective behavior/management. Still, there were some interesting divides in the

findings. New teacher perceptions seemed to report directly from first-hand experiences unlike

other participants who spoke in more theoretical or second-hand terms. In addition, veteran

teachers tended to pair their discussion of perceived benefits with a comparison to the reality of

the situation and slight hesitation. Administrators focused mostly on the overwhelming spike in

student engagement, as that is the most immediately visible in walkthroughs, but offered other

insight as well; while teachers were more balanced in their responses and did not focus as highly

on engagement being the most important benefit of GBL use.

Potential obstacles with GBL and reactions to them. The final overarching theme that

permeated the data findings is the existence of obstacles, barriers, questions, and concerns that

hinder GBL utilization in some or all areas. A summary of pertinent descriptive statistics from

survey data and qualitative input from the three focus groups appears in the data synthesis table

in Figure 4.49. Data is organized in a similar fashion as in prior tables, with survey data across

the top and focus groups separated into three columns color-coded to direct attention to related

comments. Since lesson plans and walkthrough observation documentation provided no relevant

data on the topic of potential obstacles when using GBL, there is no bottom row for historical

data. The various data components seen in Figure 4.49 will be synthesized and discussed

throughout this section, looking first at how the generational gap can be considered an obstacle,

then specifically at technology and training concerns, and then finally issues with aligning to

content and invested time/cost.

The generational gap (as discussed in the first results theme) was originally brought up in

the discussion of obstacles, but then seemed to act as an underlying component of so many other

Potential Obstacles with GBL and Reactions to Them: Data Across the Various Collection Methods		

SURVEY DATA:
- Obstacles permeating the responses included: time needed (32%), technology access (24%), alignment to curricular goals (22%), negative perceptions holding people back (16%), need for training (10%) and financial limitations (4%).
- 42% feel enough games are available that align to curriculum. 74% wish it were easier to find games that align to standards.

FOCUS GROUP: ADMIN	FOCUS GROUP: NEW	FOCUS GROUP: VET
Technology access is somewhat limited but the school is working to improve that. Fear of tech failure and lack of tech savvy in finding resources holds people back.	Not enough technology for effective GBL implementation. No open wifi access is another issue—kids do not want to use their own. Concern that tech issues and delays could lead to behavior problems and wasting valuable learning time.	There are not enough computers in the classroom, easier if can sign up for library. There are software issues when using at school. Kids are already on their phones too much, why use them more?
There has been PD and those teachers found ideas they could use. More in-depth and direct training would help more staff. Only with exposure in training can comfort increase.	Some people may just need tech troubleshooting training to overcome glitches and minor use issues. Do not feel they need as intense training but acknowledge that older teachers may to increase comfort with the tool. Training offered was not mandatory and many veteran teachers did not attend.	Positive reaction from those that attended training but others noted needing direct training, more one-on-one coaching through the process.
Not stressing curricular alignment in observations but teachers still worry about it and pressure to prepare for state testing. Debate whether GBL aligns better with some subjects. Teachers unsure how to transfer to a grade.	Debate over ease of alignment to different subjects. Less worried about alignment because more skilled at modifying to content.	Strong comments about critical need to align to content and difficulty in doing that with GBL. Hard to find pre-made games that match their learning goals, especially their higher order skills. Many comments referenced the need to prepare for state assessments. Some argued it was easier to implement in certain subjects (non-tested), as the core areas are very prescriptive in terms of curriculum. Acknowledge that games support genuine learning but not necessarily capable of supporting PARCC skill preparation.
GBL can be costly. School does not have a large supply of finances or resources, but did brainstorm ideas on how to develop resource center and support.	Take a lot of time to modify games to meet goals but pays off the most in learning outcomes. Brainstormed ways to work smarter, share efforts, to minimize the time restraint.	Cost concerns about (expensive) price of commercial games.
It takes a lot of time to do GBL well and teachers are already busy teaching and helping cover. Maybe time for sharing ideas and work can be fit into schedule.	Acknowledged that with so many other professional responsibilities you have to do; it can be hard to find time to make GBL tools because you want to.	Major concerns about time to prepare and the time taken from class to play, described as overwhelmingly time consuming. One noted the way to overcome time challenge is to work with colleagues and share resources and efforts. Admitted hesitance in giving up the lessons they spent so much time building over the years to replace them with GBL.

Figure 4.49: Data Synthesis on Theme 4- Potential Obstacles with GBL and Reactions to Them
(Note that similar colors across focus group columns denote a similar topic or theme for comparison).

areas it was identified as its own emerging theme. Still, in terms of potential barriers for GBL, the core element of the generational gap is that veteran teachers may be too proud or embarrassed to ask a novice colleague for the assistance they would need in order to more easily try their hand at GBL. That generational gap alone may inhibit some veteran teachers from more actively implementing games for teaching and learning purposes. However, the gap in perception and experience between new and veteran teachers also reveals itself in the many other obstacles explored here as well, including technology, training, alignment with content, cost, and time.

Technology concerns. Technology concerns were communicated by 24% of the survey

participants as being one of the greatest barriers that instructors face in using digital and non-digital games for teaching and learning. Specifically, all three groups agreed upon the primary issue in that access to computers or other devices is somewhat limited for effective GBL use as there is only a pod of computers in each classroom, along with a handful of iPad carts and computer labs teachers can sign up for around the building. Beyond that common thread, the three groups brought unique perspectives regarding the technology issues that could hinder GBL use. New teachers noted that in addition to device access, wifi access is another issue making GBL more difficult. The school does not have open wifi access for classroom use on personal devices and students do not want to use their own personal wifi/data for classroom activities, including GBL. Administrators suggested that it is actually the fear of technology issues (as opposed to actual experiences with them) and a lack of technological savvy that holds people back from making better use of GBL. In addition, veteran teachers noted that software compatibility issues were another problem limiting GBL use and new teachers admitted concerns that technology delays could lead to behavior and classroom management problems.

> ***Training concerns***. Training was only noted in 10% of the survey participants' responses as one of the greatest barriers teachers face using GBL. Regardless, it was a major topic in focus groups discussions and interesting trends emerged that relate to all participants. First, it was evident that the administrators are highly supportive of providing training for teachers and even looking for ways to provide more time and resources with this training. However, there is still a clear divide regarding the need for training between the two teacher groups. New teachers are more interested in technology training and general support as needed while veteran teachers want direct training and even follow-up coaching to the extent that a well-versed GBL teacher would coach them start to finish through their GBL efforts. The type of general training previously

offered only provided a few examples and veteran teachers feel as if everyone then tries those similar strategies and they quickly saturate students. Therefore, veteran teachers prefer more direct coaching on how to create and/or implement their game ideas along with providing ideas on how to make sure the competition levels stay friendly and effective. It is generally agreed upon that most teachers would benefit from additional (and perhaps more intense) training/coaching in the use of GBL to boost comfort through guided exposure to the tool.

   Alignment to content. One point of contention, noted in 22% of survey responses, that developed interestingly throughout the focus groups is the importance of alignment to curriculum and goals. The administrators claimed that they are not critical of curricular alignment when they observe GBL in the classroom because they appreciate the engagement factor, but acknowledge that teachers still worry about this element regardless especially with state and public pressure to achieve on state assessments. All three focus groups debated to some extent whether GBL aligns better to certain subject areas—either because of the topics covered, games available, or decreased pressure to perform on state assessments (non-tested subjects). Veteran teachers were most concerned about alignment to content, noting how difficult it is to find games that match their learning goals, especially when higher order skills were involved, and questioning whether games were capable of preparing students for PARCC-like skills and tasks. Survey results corroborated the veteran concern, with only 42% of responses agreeing that there are enough games available to support the curriculum and an overwhelming 74% wishing it was easier to find games that align to the standards. In contrast to their more experienced counterparts, new teachers seemed less worried about alignment to learning goals, but that is likely because they had demonstrated greater skill in modifying or creating games to support content.

   Invested time and cost. Finally, the data across both survey and focus groups supported

the notion that one of the greatest obstacles to effective use of GBL is the high level of investment needed to implement it successfully. Survey data showed 32% of respondents noted time needed to be the greatest GBL obstacle with an additional 4% mentioning financial limitations. All three focus groups agreed that GBL can be costly and usually takes a significant amount of time. Administrators were empathetic and proactive about this obstacle. They admitted that the school did not have many GBL resources, but sought ways to provide budgetary support and free up time for teachers to work together on GBL efforts.

In some cases, what was not mentioned provided as much insight as the comments actually made. When analyzing the veteran focus group's commentary on cost as an obstacle for GBL, it became evident that most of these participants are limited in their understanding of the many games options available for classroom use. They primarily referenced the cost of a commercial game (roughly $50-$60) and how that would be pricey if several were needed for the full class. This only corroborates the administrative suggestion that veterans may not be technologically savvy enough to find economical resources and the implied trend that only the new teachers are really making or modifying games often enough to understand fully the investment (time and cost) that goes into them. The group did not acknowledge less expensive applications and seemed to be completely unaware of the cost a teacher might incur if they tried to make a game from scratch, suggesting they had not tried to use a myriad of GBL options in the past.

Even in their discussion of time needed for effective GBL implementation, new and veteran teachers' responses reinforced the generational gap between them. New teachers offered strong detail regarding the amount of time and effort it took them (first-hand) to develop or modify games to meet learning goals, but then also noted these methods paid off in supporting

learning outcomes. They admitted how difficult it can be to spend time developing GBL

activities when there are so many other professional responsibilities, but also provided proactive

methods for sharing efforts with colleagues and making smart (and reusable) decisions in their

game development. Veteran teachers, on the other hand, described the thought of GBL as

overwhelmingly time consuming and voiced major concerns about the time taken away from

class to play learning games. They also admitted they were a little hesitant to give up the lessons

that they had spent so much of their time developing over the years to replace them with GBL

alternatives. Finally, veteran teachers suggested that teachers might share the workload to

minimize the time cost. However, as mentioned earlier, some of them may be uncomfortable

asking a novice teacher to collaborate with them on such an endeavor.

Research Questions

With a deeper understanding of the four overarching themes, data findings and results can

address the initial goals, and specifically the research questions, that have guided the study from

start to finish. Essentially, the purpose of this data collection process was to address the

following research questions.

Research question one: How do teachers and administrators perceive game-based

learning as a tool for teaching and learning at the secondary level? Teachers and

administrators perceive GBL to be a highly valuable tool for teaching and learning, but feel there

are some serious concerns or barriers keeping the theoretical value from matching the reality of

daily education. Overall, survey responses suggested a strong value perception and a wide

variety of ways in which teachers claim to use GBL as a tool for teaching and learning.

However, when focus group discussions and historical data aimed to corroborate that value, there

was some minor discrepancy. It seems as if there is a high theoretical value for potential, but it

has not yet transferred into the same level of applied value as teachers do not seem to be implementing GBL as frequently or as widespread (in terms of purpose) as their hypothetical value would suggest.

Regardless, it is clear that the teachers and administrators in this study note GBL as a beneficial tool for learning. In terms of the perceived benefit, data from survey responses showed that over 78% of the participants appreciated the value in the tool for several reasons, even if that admittance of theoretical value did not always transfer into real-world use. When asking teachers and administrators why they perceived GBL to be a valuable tool, they noted that GBL is quite effective in reaching all types of learners, especially those who typically struggle in the classroom whether it is due to some special need, apathy toward learning, or ELL barriers. Games not only engage all type of learners, but they also help them to better understand and remember the content involved because students make a positive (emotional) connection to the learning as well as an academic one. Teachers and administrators also felt that games were a great way to model and guide students through learning and demonstrate appropriate social interactions and behaviors, a task that can be difficult especially in a secondary setting and with so many prioritized academic goals. Ultimately, teachers and administrators generally agreed that games can definitely benefit students and the classroom in many ways. However, like all good things, they caution that GBL should be used in moderation or else its novelty will wear off and with it, the effectiveness in meeting all these needs.

Teachers and administrators also perceived that GBL, while beneficial, can be quite difficult to implement because of the necessary time, cost, resources, required training, and potential risk. Many staff participants noted that GBL took too much time (and sometimes money) to be able to implement it well, and definitely to use it more often. Even with the

necessary time to plan and use GBL effectively, many participants felt a lack of resources prohibited GBL from becoming a more established and widely used tool for teaching and learning. These resources included the necessary technology (and supporting infrastructure) and greater availability of games aligned to school curriculum and state learning standards, but also included a training and support structure to coach teachers who wanted to try their hand at GBL. While new teachers were more willing to experiment individually, veteran teachers did not feel that GBL is something one could just try to figure out on their own. They felt as if the teaching tool needs to be modeled and supported more in depth if they are to utilize it well.

Although it might not be easy to find time, finances, and resources, the administration and school district exerts control over those factors, so those perceived obstacles could be overcome. Therefore, a more worrisome perception is that teachers view GBL as riskier than traditional activities because game-based lessons can falter for a number of reasons whereas more traditional activities (largely teacher-controlled) are less likely to go astray. This opinion is more difficult to influence or overcome. However, this is not just a concern with GBL. Any learning activity that is more student-centered or relies on technology possesses the heightened risk to derail at any moment. Games may be even more unpredictable because they do not often conform to time constraints and include elements of luck. Add to that the uncertainty that the activity could spark student confusion or suffer some level of technology glitch and the risky (in terms of academic planning) moniker associated with games is understandable. Teachers and administrators do admit that with this risk comes great reward, but also note that often this uncertainty will steer them away from the GBL option, fearing it will drain precious time from the required curriculum and its many goals especially in those areas with test accountability pressures (Math, English, and Science). It is possible that this is part of why data from Social

Studies teachers across all data collection elements seemed to note the most positive perceptions of GBL use, as well as the greatest frequency and variety of actual application.

        Research question two: How do teachers utilize game-based learning as a tool for teaching and learning at the secondary level? Overall, it seems that teachers use games for teaching and learning between one and three times a month. The actual frequency of game use varies slightly based on the data element reviewed (survey, focus group, or historical data), the type of game in question, and the specific teacher, or teachers, in question. Survey data collected from a larger number of teacher participants suggested games were used for teaching and learning a little more than once a month. Lesson plan data, which theoretically encompasses all teachers in the school equitably, implies a slightly higher frequency. Survey data also shows that digital GBL is used slightly more than non-digital by this staff, however that could be due to the greater availability of short digital game elements embedded into online curriculum resources tied to textbook series as well as the 'Study Island' online program used in many classes to support assessment, instruction, and test preparation. Data from all three collection methods confirm that veteran teachers use the overall strategy of GBL less often than their novice counterparts in the 'new teacher' subgroup, either because of a lower comfort level, reduced interest in the tool, or simply because they have not yet reached that point (as they are still waiting for more training, support, and resources). Ultimately, the range of 1-3 uses per month seems a solid estimate for this particular staff based on their comprehensive comfort with and interest in GBL, as well as their predominant use as a review tool, hence limiting the frequency to between learning units.

        In terms of how teachers use GBL as an activity, practice and review is the most commonly noted purpose for game use in the classroom. This seems to be true for several

reasons. Principally, all of the GBL users agreed that games are an incredible way to boost engagement and participation in practice and review, which can often be a less than exciting component of learning because it involves repetition and sometimes more tedious application. Games make the concept of practice and review more interesting to the students, but also make it easier to incorporate a large amount of content and skill in a condensed period. Therefore, students, who may otherwise get bored with the practice and review necessary to cement learning long-term, find the GBL version of this activity to be more enticing and are more likely to participate. Teachers wisely take advantage of that fact and use games in this manner for that reason. Furthermore, since the GBL approach to practice and review is novel to students, it helps them retain material and strengthen understanding. In addition, however, teachers seem to prefer using games for practice and review because it is easier and more manageable for them, whether they are skilled or not in GBL use. Data shows that teachers were most comfortable with this form of game use because it is easier to set up and facilitate and because it allows the teacher to teach the content and skills first in whatever method they prefer. After putting their pedagogical mastery into the lesson development for the actual learning process, teachers seem quite willing and comfortable with taking a GBL approach to reviewing the material. Even those participants who put less faith in GBL as a teaching tool and feel students must first learn content through their traditional methods seem at ease with then using games for practice and review.

Along with practice and review purposes, teachers noted using GBL for formative assessment and as a context for discussion; however, based on focus group information, lesson plan review, and walkthrough observation data, these uses were not as frequent or widespread across all teachers. Several responses from administrators and veteran teachers confirmed that these methods were more difficult to implement, which is why they occur less frequently. Still,

the decreased use seemed to hinge on reduced comfort levels needed to implement effectively

rather than on a lack of perceived value for these goals. Survey results show 40% of participants

noting they use GBL for formative assessment while 50% claimed to use games as a context for

discussion. While focus group discussions with subsets of the population and broad scans of

lesson plan and walkthrough observation data could not corroborate that frequency in reality, it is

clear the staff intends to use them for those reasons, albeit less often. All three groups

(administrators, new teachers, and veteran teachers) noted the valuable use of games for

formative assessment, simply in varied levels and extents. Administrators observed its use, but

noted a concern about how to transfer that assessment to a grade or score. Veteran teachers

mirrored that concern on how to use the tool formally. Both admitted the informal observation of

content mastery was valuable regardless. Only the new teacher group was able to convey first-

hand experiences using GBL for formative assessment or to spark and drive academic discussion

and debate. In those discussions, teachers explained using games to simulate content, facilitate a

starting point for knowledge construction, and in conjunction with writing tasks for more formal

GBL-based assessment.

Ultimately, it clear that GBL is being used semi-frequently and with some variety beyond

simple practice and review. There is undoubtedly variation of use (both means and frequency)

based on experience level in the profession, experience and comfort with GBL as a tool, and

possibly even the subject or content in question.

Research question three: What do administrators observe regarding teachers' use of

game-based learning as a tool for teaching and learning at the secondary level? While

administrators might not be able to provide first-hand details about using GBL for teaching and

learning, they provide invaluable insight into its use by various teachers from an unbiased

perspective. Through their informal interactions with teachers and students on a daily basis, as well as their review of weekly lesson plans and facilitation of regular walkthrough observations, administrators can provide objective data to corroborate or question the perceptual data provided by teachers. In this study, administrator input often solidified trends and patterns put forth by one or both teacher groups and occasionally introduced elements to the study that were then expanded upon by the teacher focus groups. Overall, the administrative observation of teacher GBL use resulted in three main trends that permeated many of the findings and results. First, GBL engages students in a way most other activities cannot. Second, the use of games in the classroom is largely limited to practice and review when looking at the school as a whole. Third, a generational gap greatly affects the use of GBL.

The most overwhelming response in terms of administrator observation of GBL use was the impact on engagement and classroom atmosphere. The administrative team recounted experiences where they observed students enthusiastically participating in GBL activities even when they were not inherently interested in that content. Students could not wait to play and were even heard commenting that they were looking forward to class. Administrators noticed that game use changed class atmosphere and attitude to be one of energy and positive learning chaos. While other benefits of the tool have been noted by the teachers and administrators alike, this one stood out the most as a drastic improvement factor for their overall school environment and student growth. This administrative team and this research study are based in a school that is not always characterized foremost by high student achievement and student-driven learning. Therefore, the administrators were so enthralled with GBL's ability to turn the more apathetic and struggling students into eager participants that the engagement factor was, by far, the

greatest benefit as they are constantly working to cultivate an atmosphere where students love to learn.

In terms of types of GBL use, administrators saw only a few examples of games use for teaching, simulation, assessment, or discussion purposes. Overall, GBL was used primarily for practice and review in their observational experiences. The few examples of non-practice/review GBL use was limited to a small set of new teachers and were implemented effectively, but did not necessarily warrant more noticeable benefits to the observer. The practice and review strategy permeated all of the examples of GBL documented in walkthrough observations and each time earned to the highest possible ratings for active student engagement and participation. While teachers communicated other benefits associated with teaching through GBL, the administrators did not actually observe any of those outcomes. In discussing why practice and review dominated GBL experience, the administrators hypothesized several reasons why this may be the prevailing mode based on their interactions and conversations with teachers. Administrators noted that some teachers still wish to maintain more control over the teaching and learning process, hence utilizing their preferred methods to teach content, but are willing to release that control and use GBL for practice and review. Apparently, based on administrative observations, many teachers believe they teach better than games, but perhaps cannot facilitate practice or review as effectively and engagingly.

The observation by administrators, that teachers tend to focus on GBL for practice and review, is especially true for veteran teachers. This generates the third major observation regarding GBL use—that it occurs with and around a 'generational gap' that hinders increased effectiveness with the teaching tool. Administrators made frequent reference to a generational gap between new and veteran teachers throughout much of their focus group discussion as it

seemed to affect many of the perceptual trends being explored. Based on informal interaction through daily discussions and observational conferencing, the administrator team noted that veteran teachers seem to be less comfortable with the tool, feel they are less prepared to use it, and seek out more extensive one-on-one training and coaching before trying to facilitate GBL in their classroom than their new teacher counterparts. In contrast, the administrators commented that younger teachers are more familiar with games, both through recreational experience and modern pedagogical training programs. Since most teachers tend to teach the way they learned, administrators notice new teachers more likely to try GBL activities, while veterans stick to their more traditional means. While these observations affect starting points for GBL use, the generation gap seems to suggest barriers moving forward as well. Administrators commented that while younger teachers have been observed working together and supporting one another in GBL (and other) efforts, the veteran teachers do not enjoy the same advantage. There are not enough experienced GBL users in the veteran teacher pool to be able to support one another effectively and administrators imply that new and veteran collaboration does not occur often enough. They feel that veteran teachers are too proud or not comfortable asking new teachers for help in this area and that those new teachers might feel too intimidated by their veteran counterparts to suggest and encourage this level of peer collaboration and support. This dividing line between staff may seriously inhibit the ability to increase GBL use and support staff in their efforts to use it.

Summary

The many findings of this study were first discussed, then narrowed down into overarching themes, and finally supported with information corroborated across one or more data sources. This comprehensive data aims to provide a solid foundation for the emerging results as

well as highlight avenues for further exploration. Ultimately, game use was explored in detail, as were perceived benefits and potential barriers. While some areas within these themes were highly agreed upon, other topics illuminated the differences across the generational gap of new and veteran teachers. Practice and review were the predominant means of GBL use, either because it was the easiest to manage or because it still allowed teachers more control over their teaching and learning procedures. In the end, all teachers and administrators agreed overwhelmingly that GBL is a novel tool that is highly effective in engaging students, even ELL, special needs, and struggling or reluctant ones. In contrast, time was the greatest obstacle—either the time it takes to make, find, or modify valuable learning games; the time 'taken away' from other learning activities; and the loss of time spent developing prior lessons only to replace them with games.

These highly corroborated elements are clearly critical in the study's final analysis, but it is also important to call attention to some of the more debated and contradictory points as well. First, the debate over whether game use can provide better teaching and assessment tools is one of great importance and interest. Second, the generational gap itself must be examined as it permeates comfort levels, interest, and the necessary knowledge base for effective implementation. This existing divide between new and veteran teachers may actually be holding back any possible growth in this area and could potentially provide insight into how to address the different training and support needs of the two groups.

Chapter 5: Conclusions and Recommendations

Introduction

Even though games have become an increasingly pervasive component of our society and culture, they have not yet matched that prevalence within the walls of most secondary school buildings. It is natural to ask oneself why this is the case. Prior research has examined a myriad of benefits as well as possible barriers across global studies. However, working from a constructivist paradigm, this research study only references past research as a foundation for developing effective data collection methods and then turns its focus on the site and population at hand. In particular, this study explores the perceptions of the teachers and administrators in one secondary school regarding the use of game-based learning (GBL) as a common instructional practice. It is the data collected from their responses and the following findings, results, and implications that are critical in the end. Specifically, this research centers on questions that examine teacher and administrator perceptions about, teacher use of, and administrative observations regarding GBL. In doing so, this study hopes to support the school and its staff by informing future GBL implementation initiatives. The study employed a mixed methods approach using surveys and focus group discussions in a cycle of explanatory sequential design seeking targeted input from 10 teachers and 8 administrators from a 7-12 high school, as well as administrative review of teacher practice through historical data, in order to construct and confirm a collective stakeholder perception about GBL. Data collected across all three methods were analyzed quite thoroughly, first individually in pieces and then in various groupings. Findings were explored and presented based on the method of data collection first, but then emerging patterns and trends were examined based on subgroup (administrator, new teacher, and veteran teacher) and theme. This multi-level approach to data analysis allowed individual points

to materialize, but also provided various means of triangulation, whether across methodology type, subgroup of participant, or thematic development.

Conclusions

The data collection and analysis within this research study uncovered a wealth of perceptual information spanning GBL use, benefits, and potential barriers. Much of the data gathered directly responded to predetermined questions on focused discussion topics, yet some highly interesting points also surfaced outside of those initially targeted areas. Having explored the results in Chapter 4, both the planned and unplanned findings and results were equally intriguing and insightful. However, to present the study's conclusions, one must return full circle to its origin and ensure that the ends satisfy the purpose and objective. Looking back, the purpose of this study was to explore and understand the perceptions of stakeholders regarding the use of GBL since perception, either positive or negative, can ultimately impact implementation efforts. It was imperative to examine the perceptions of stakeholders thoroughly, identify trends and contradictions, and seek out elements of both support and challenge with regard to GBL utilization. Only with that specific insight can educational organizations hope to plan and implement an informed and productive GBL process. Findings, results, and implications provided thorough responses to each research question. These responses, detailed in Chapter 4, are summarized here as a starting point for recommendations toward future action and/or research.

Research question one: How do teachers and administrators perceive game-based learning as a tool for teaching and learning at the secondary level?

In terms of teacher and administrator perceptions regarding GBL, there is a high theoretical value for potential, but (perhaps due to noted concerns) it has not yet transferred into

the same level of applied value. While over 78% of survey participants appreciated the value of GBL, data from focus group discussions and historical data did not necessarily confirm such high value or actual use. This implies that the value is theoretical for some. Specifically, GBL is advantageous because it can reach a wide range of the less engaged or struggling students (special needs, ELL, or apathetic learners). GBL also seems to enhance memory and connections because of positive interactions and experiences with the material, and is a great way to model and reinforce proper social behaviors and skills. However, despite the benefits, teachers and administrators contend that GBL can be challenging to implement due to issues with time, cost, required training and support, technology risks, and a limited availability of existing resources. Since time and funding can alleviate various these first-order resource issues, second-order barriers are more difficult to affect because they require "challenging one's belief systems and the institutionalized routines of one's practice" (Ertmer, 1999, p.48). Therefore, a more important concern is the perception that GBL is riskier than traditional activities because it might fail for a variety of reasons. GBL is more student-centered, often relies on technology, and does not always conform as clearly to time constraints, which increases unpredictability and the chance for disruption or confusion.

Research question two: How do teachers utilize game-based learning as a tool for teaching and learning at the secondary level?

Overall, the research suggests that GBL use occurs roughly 1 to 3 times a month, primarily for practice and review, and to differing degrees based on new/veteran teacher status. Triangulation of data from surveys, lesson plan review, and focus group discussions corroborate that teachers use games in the classroom more than once a month but less than weekly. In terms of how GBL use occurs, practice and review is the most commonly noted purpose because of the

increased engagement, impact on student participation and retention, success in condensing large

amounts of material into a relatively small amount of time, and the comparative ease with which

teachers can facilitate game review lessons. In addition, there is a moderately supported

hypothesis that many teachers prefer to continue using their own methods for teaching, learning,

and assessment, and are only willing to succumb to GBL for practice and review. Along with the

frequency and type-based details uncovered about GBL through this study, data also confirms

that veterans use the strategy less often than their novice colleagues do. Reasons behind this

differential might include lower comfort level or reduced interest in comparison to perceived

risk. Beyond these major trends in GBL use, there were several small but noteworthy patterns as

well. Game use for discussion context and for formative assessment is a strategy teachers want to

use, but seem to need more support to do so effectively. Training, in general, is a major reason

why some teachers do not use it more thoroughly, frequently, or effectively. However, while new

teachers request technology support training and collaboration time to facilitate GBL idea

generation, veteran teachers seek out direct, hands-on mentoring for early GBL efforts. Finally,

teachers seem to use digital games more than non-digital games, specifically those digital

components that accompany a textbook series since it is otherwise difficult to locate games that

easily align with curriculum and standards.

Research question three: What do administrators observe regarding teachers' use of game-based learning as a tool for teaching and learning at the secondary level?

Administrators provided objective data based on lesson plans and informal observations

or interactions that ultimately resulted in three main trends: GBL engages students, GBL use is

limited to practice and review, and there is a GBL generational gap between new and veteran

teachers. First, administrators were so enthralled with GBL's ability to turn the more apathetic

and struggling students into eager participants that the engagement factor was, by far, the critical benefit as they are constantly working to cultivate an atmosphere where students love to learn. Second, administrators witnessed only a few examples of effective non-practice/review GBL uses by a small set of new teachers; but these lessons did not appear to yield greater benefits to the teachers or students than the practice and review examples. Essentially, practice and review is the primary purpose; possibly, because many teachers believe they teach better than games, but maybe not facilitate practice or review as effectively and engagingly. Finally, administrators referenced a generational gap between new and veteran teachers in terms of comfort and willingness to experiment with the teaching and learning tool. Whereas new teachers seemed more familiar with games and willing to try new strategies, veteran teachers sought personal coaching, support, and resources in order to change their more traditional means. Moreover, while new teachers feel content to collaborate with other new teachers or ask them for assistance in GBL efforts, veteran teachers might not feel experienced colleagues can offer the necessary support and seem somewhat unwilling to ask a new teacher for help in this area.

<div align="center">**Recommendations**</div>

Ultimately, this research began because of a noted dissonance between perceived value of GBL and actual use. Even though prior research suggested it was a highly beneficial tool, GBL use was still minimal and/or inconsistent in most schools. To address this problem, it was not only necessary to understand the value of games in the classroom, but also stakeholder perceptions and experiences with GBL as they influence programming and implementation. After concluding the study, the insight gleaned from answering the three research questions offers suggestions for schools as they work to improve their use of GBL as a teaching and learning tool based on the perceptions of the teachers and administrators involved.

Recommendations, both for action and future research, comprise connected pieces of a possible answer to the problem statement, but do not necessarily provide a chronological and comprehensive solution. Therefore, implementation need not occur in any particular order, or at all, but offer support in light of the data collected and informed vision developed. Based on that information, it is recommended that school leaders review and consider implementing the recommendations for future action provided as a result of this research. In addition to those school-based recommendations, this timely topic could benefit from further follow up research highlighting various areas identified because of this study. In an effort to inform and inspire possible advancement of the GBL movement, an examination of these recommendations is the next step.

Recommendations for Action

Overall, the district should build on the team efforts that embodied the work done to complete this study. The amount of data and insight gathered from the participants in this district, regardless of their personal opinion about GBL, suggests a strong team effort to examine ideas and perspectives about education in order to uncover and develop best practices for learning for all students. Working together to complete the data collection process was the first step in the district's transformation toward an improved version of itself. The team was candid and receptive throughout their discussions and sharing of personal experiences, positive hopes, and serious concerns. This collaborative spirit will be critical in working to implement any future recommendations to improve GBL use in the district. Specifically, based on the outcomes and implications of this study, the researcher recommends the following actions:

- Results and findings must be shared with the school team in a manner that is both effective and empathetic.

- There may be minor blind spots for some people in terms of how they believe they are using GBL and by sharing results, the team might be able to minimize those blind spots and openly explore some of the trends that emerged.
- Since the goal is to build bridges across the potential generational gap, results noting that veteran teachers used GBL less and were less comfortable with the tool must be presented in a manner that supports forward movement.

- Embrace all instances of GBL utilization as a step in the right direction toward realized effectiveness and increased comfort with the tool (Fullan, 2011). Many teachers use games for practice and review while a few use them to teach, spark discussion, and facilitate simulations. All efforts are equally laudable.
  - Highlight teachers using more advanced levels of GBL and support teachers who are only starting to work toward those efforts.
  - Take advantage of GBL-minded teachers and organize peer observation opportunities where colleagues can witness advanced uses of the strategy first-hand to provide concrete support, help increase comfort level, encourage future experimentation, and comprise one of the core elements of the necessary training and support plan needed to improve overall GBL use.

- Develop and implement a thorough, personalized, and sustained GBL training plan that addresses a variety of skills, competencies, and knowledge.
  - Technology training to improve confidence is a necessary component.
  - Explicit training on how to use games as a context for discussion, simulation, or assessment, and then how to transfer that work into a grade must also be included.
  - Pair up new and veteran teachers and provide GBL collaboration time to bridge

the generational gap, provide direct and sustained support, help build internal

capacity, and even lessen some of the workload, cost, and time that makes GBL

challenging. New teachers could model game strategies while veteran teachers

could offer insight into classroom management with game use (and in general).

- Provide (at least some of) the necessary resources for effective GBL use.

   o Create a resource of physical game materials and embed time into the schedule to

   allow teachers opportunities to work on their efforts (preferably together).

   o Seek out a partnership between the field of education and the gaming industry in

   order to increase the availability of curriculum-appropriate games.

   o Search for grant funding to support collaboration between teachers and game

   companies to build appropriate educational games that meet the needs of the

   curriculum. This collaboration could also provide valuable hands-on learning

   experience for students who might be interested in a future in game development.

   Ultimately, students could participate in the process, acquire valuable career

   experience in the field of game design, and help build resources that will improve

   GBL options for all teachers and students.

Recommendations for Future Research

In addition to building on this study with targeted action, future research efforts could

also seek to build upon the work completed in a variety of manners. In general, research could

branch out from these findings, results, and implications in three overarching directions—further

research relating to school-based factors, exploring game industry components, and examining

game-based learning purposes in contrast to comparative benefits.

- School-based research could follow-up on or aim to parallel this study locally.

167

- o After implementing the recommendations for action over the course of 1-2 years, the team should conduct a follow-up study to determine if progress is being made.
- o Other schools might benefit from conducting similar research studies with their population since every district has a unique starting point and different needs.
- o Studies including students and/or parents could offer additional insight into GBL perceptions and experiences.
- o Further research might benefit from a closer examination of administrator input that specifically examines administrator perceptions and experiences across a greater number of participants to determine if the heightened levels of support noted in this team are indicative of the stakeholder group in general.
- Research may also seek to look outside the school population and explore the external factors of the gaming industry as it affects GBL efforts.
  - o Research gaming industry leaders to determine why they have only minimally expanded into the field of education even though it seems like it would offer a profitable market.
  - o Explore differences (besides current availability) between games created for entertainment and games developed for education since this could influence decisions and inform teacher efforts in attempting to create their own products for effective GBL implementation.
- Examine the comparative benefits of the different GBL uses (practice and review, thinking and learning tool, simulations, context for discussion). Find ways to quantify GBL impact on learning, specifically in terms of attitude, engagement, retention, mastery, and achievement and compare those measures based on which GBL use was

implemented.

Summary

Using surveys, focus groups, and a review of historical data from lesson plans and observational walkthroughs, this mixed methods study explored the perceptions and experiences of teachers and administrators regarding GBL in order to gain insight into why the strategy is used inconsistently for classroom teaching and learning. Since this research study works from a constructivist paradigm, a single universal answer to this question does not seem plausible. Instead, it is assumed that different schools and groups of people have different reasons for the varying levels of GBL utilization. Specifically, however, the teachers and administrators in this school provided evidence that helped explain why game use varies in their building. Overall, the inconsistency in GBL use seems to hinge largely on comfort level with the tool and willingness to work around the perceived challenges. Some teachers are deterred by concerns with technology complications, others are too worried about meeting curriculum goals to take what they perceive is a risk. Several teachers are discouraged by the associated time and cost needed to use GBL well or simply require greater training to use it. Recommendations provided address some of these concerns and utilize the data and results of the study to facilitate a resolution to the inconsistency issue.

Ultimately, a combination of shared information and vision, reinforcement of existing efforts, and the training and support needed to build upon that existing foundation might be the answer. By working through those recommended actions, the school and its staff should be able to collaborate in order to improve their use of GBL for teaching and learning in a more consistent manner. Of course, what comprises 'improved' use is not universally accepted and therefore must be defined and agreed upon by the team before they can effectively aim toward it.

Improved GBL use might equate to increased frequency or more incidents of non-practice/review GBL efforts, but that is not necessarily the case. Just because games are used more often, or in more sophisticated ways, to facilitate learning does not mean the learning outcomes are inherently better. Essentially, having a clearer picture of what leads to noted GBL inconsistencies helps pave the way to the next hurdle. Overall, the value of the tool is largely uncontested. Seventy-eight percent of survey responses marked it as moderately or very valuable. Therefore, the focus moving forward is not on whether it should be used, but how can the school maximize its potential value without overusing it and undermining its effectiveness. If teachers are skilled in facilitating learning, perhaps games should be used primarily for practice and review. Another possibility is that some populations (teacher or student) may benefit more from its use than others. These answers are still uncertain, but the facilitation of the provided recommendations can guide the school team toward discovering those answers through purposeful and deliberate practice and reflection (Fullan, 2011).

Essentially, a new tool has appeared on the horizon of teaching and learning—educational gaming activities. Much like the initial advent of the map in history or the calculator in mathematics, the tool is novel, enticing, and mildly controversial. Also like these tools, one instrument or strategy cannot answer all of education's problems. Imagine the social and cultural elements lost within the learning if all history lessons focused on geography simply because the map was such a 'neat tool.' Envision a class with no ability to do mental math, no estimation skills, no way of checking on the reasonableness of one's work because the appearance of a calculator demanded constant use and reliance on its capabilities. Games are not the answer to the question of how should students learn. Rather, the question may reside in what ways can GBL enhance effective teaching and learning?

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Invitation to Participate

Dear Educator,

Hello! My name is John Russell and I am a doctoral candidate in the Educational Leadership and Management program at Drexel University. My research dissertation examines game-based learning (GBL) in the classroom, which may include the use of commercial games such as *RISK, Minecraft*, or *Jenga*; software-integrated games like in *Study Island* or *BrainPop*; and teacher or student-created games. Entitled "Exploring Teacher and Administrator Perception Regarding Game-Based Learning," the purpose of the study is to understand the perceptions of high school teachers and administrators in regards to GBL as an instructional tool. Specifically, it will explore benefits and concerns associated with the strategy from the perspectives of both teachers and administrators as well as examine actual use within the existing setting and infrastructure.

In order to study perceptions and use, data will be collected using various phases and methods. In the first phase, all interested teachers and administrators will participate in an electronic survey that collects baseline perceptual and usage data to build a consensus regarding methods and frequency of use, benefits and concerns, and general perceptions. Then, 10 teachers and 8 administrators will be chosen to engage in three separate focus group discussions (one new teacher group, one veteran teacher group, and one administrator group). Participants will be chosen purposefully to span experience levels and subject areas in order to offer an array of input. Finally, to triangulate the communicated data regarding GBL use in the classroom, the administrative team will be asked to help review historical data and seek out evidence through (third marking period) lesson plan and walkthrough observation data. Data collected is for the sole purpose of exploring this topic and shall not be used or shared in any other fashion.

It is critical to note that surveys will be anonymous, confidential, and voluntary. The researcher will assign a code to each interested participant to track completion and those numbers will also be kept confidential and secure. Focus group discussions will occur voluntarily and outside the school day, allowing for greater privacy and security of responses. Transcripts and documentation noting GBL use in historical evidence (walkthrough observations and lesson plans) will not include any specific names and will be stored in a secure location.

All teachers and administrators are invited and encouraged to participate, regardless of their current use of, or familiarity with, GBL. No level of expertise is needed to provide valuable insight to the study. Instead, the research aims simply to seek out the opinion of all parties involved. If you choose to participate in the survey, you will receive an email with the link and your personalized study code to ensure anonymity. Furthermore, if you agree to be considered for the focus group discussions (and for administrators, historical data review), you will be contacted after the survey data has been collected with information about the time and place for future interactions. The survey is 25 questions and should take roughly 20 minutes. If consenting and chosen for the second phase of data collection, focus group discussion should last roughly 45-60 minutes. If you agree to participate, this informed consent form will need to be physically signed and returned via interoffice mail, and consent for all elements of data collection (surveys, focus groups, historical teacher practice data review) will be documented.

Please do not hesitate to ask questions about the process, purpose, or use of the data either before during or after the study. Results will be shared upon request, though the participants will of course remain anonymous. This is currently being completed as part of the dissertation process in a doctoral program and the results or findings could be published upon completion. There are no known risks or discomforts associated with this study. The benefit of the study is the information gained about the realistic use and possible value of this emerging learning strategy/tool and the chance for it to affect curriculum design in a positive manner.

Please sign this consent form if you are willing to participate in one or both phases of this formal research study. You are signing with full knowledge of the nature and purpose of the procedures and your involvement in such. You will receive a copy of this form for your records. If you have any questions or concerns regarding your decision to participate, please feel free to contact Dr. Ken Mawritz or myself.

Dr. Ken Mawritz   John Russell
Drexel University   Researcher
267-671-2267   609-387-5939
kjm97@drexel.edu   jr958@drexel.edu

This study has been reviewed and approved by Drexel University's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University polices.

Thank you for your consideration to participate in this study.

☐ I would be willing to participate in only the teacher/administrator survey phase of data collection.

☐ I would be willing to participate in both the survey and teacher focus group phase of data collection.

☐ I would be willing to participate in both the survey, administrator focus group, and historical lesson plan review.

_____   _____
Signature   Date

Respectfully yours,

John Russell, Doctoral Candidate, Drexel University, jr958@drexel.edu

Appendix B: Interested Participants

Document interested participants as they return their informed consent forms.

Potential Teacher Participant Pool				
Name (Note: T for teacher, A for administrator)	**Subject Area** (Math, ELA, Social Studies, Science, Arts/Electives)	**New** (0-5 years' experience) **Veteran** (6-30 years' experience)	**Gender** (M/F)	**Focus Group* Volunteer**

* Note: Administrators who volunteer for the focus group also consent to historical data review.

Appendix C: Survey for Teachers and Administrators

The first wave of data collection will be a largely quantitative survey, based on the National Survey of Teachers on Digital Games & Learning administered by the Joan Ganz Cooney Center. The survey has been adapted to be applied to this specific public secondary education learning environment.

Demographic Information

1. Which of the following best describes your position in this school district?
- Teacher
- Administrator/Supervisor
- Other (please specify) _____

2.   Teachers: What subject area do you currently teach? Select all that apply. (Administrators: What subject area did you teach? Select all that apply.)
- English/Language Arts
- Mathematics
- Science
- Social Studies
- Fine/Performing/Graphic Arts
- Health/PE/ROTC
- Computers/Technology/STEM
- World Languages
- Other (please specify) _____

3. What grade levels do you teach? (Administrators: What grade level did you teach?) Select all that apply.
- 7th and 8th
- 9th and 10th
- 11th and 12th
- Other (please specify)

4. How many years have you been in your current position in this district?   _____

5. How many years have you been in education?   _____

6. How old are you?

Under 30	31-40	41-50	51-60	61 and older

7. What is your gender?

Male	Female

Overall Use and Perceptions of Game-Based Learning

8. How often do you play video/digital games (game consoles, computer games, smart phone game apps, social media games, etc.) or non-video/digital games (cards, board games, dice games, etc.) for entertainment or other non-work/non-professional related reasons?

- Every day
- 2 to 4 days per week
- About once per week
- 2 to 3 times per month
- About once a month
- Once every couple of months
- Once or twice a year
- Never

9. How frequently do you use digital games for teaching and learning purposes? (i.e. *Study Island* games, *BrainPop*, *Oregon Trail*, *Math Blaster*, *Where in the World is Carmen Sandiego*, *Minecraft*, *SimCity*, etc.)

- Every day
- 2 to 4 days per week
- About once per week
- 2 to 3 times per month
- About once a month
- Once or twice during the course of the year
- Never
- N/A

10. How frequently do you use non-digital games for teaching and learning purposes? (i.e. chess, *RISK*, *Equate*, *Scrabble*, card-based learning games, or other educational board games)

- Every day
- 2 to 4 days per week
- About once per week
- 2 to 3 times per month
- About once a month
- Once or twice during the course of the year
- Never
- N/A

11. How would you describe your comfort level using digital and non-digital games as a tool for teaching and learning?

Not at all comfortable	Slightly comfortable	Moderately comfortable	Very comfortable

12. In your opinion, how valuable is the use of games as tools for teaching and learning?

Not at all valuable	Slightly valuable	Moderately valuable	Very valuable

13. In those instances when you have used game-based learning, how satisfied were you with the outcomes?

Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied

14. In your opinion, what are the greatest benefits to using digital and non-digital games for teaching and learning? Please explain briefly.

15. In your opinion, what are the greatest barriers/concerns instructors face in using digital and non-digital games for teaching and learning? Please explain briefly.

16. What type(s) of games do your students play the most as part of your learning program?
- Games created commercially for an educational audience (example: PBS, Poptropica, Filament Games, games built into textbook/online resources)
- Commercial Off-the-Shelf (COTS) Games created for entertainment (example: SimCity, World of Warcraft, the Civilization series, Guess Who, Battleship, RISK, etc.) used as-is or modified by the teacher
- Games created for home use that have been widely adapted for an educational environment (MinecraftEDU, SimCityEDU, Portal 2)
- Student (learner) development of games as a learning activity
- Facilitation through a game that is designed by the teacher for the lesson
- N/A
- Other (please specify) _____

17. In what way(s) are games used as part of your learning program?
- As experiential learning spaces where students can collaborate and interact in rich environments
- As a context for discussion about a specific topic or skill
- As a thinking, designing, and building tool
- As a means of practice
- As a means of assessment
- N/A
- Other (please specify) _____

    Please explain briefly:

18. How do you use games in your teaching to deliver core and/or supplemental curriculum content? Select all that apply.
- To cover/practice/apply content and skills mandated by local/institutional curriculum standards.
- To cover/practice/apply content and skills mandated by state or national standards.
- To conduct formative assessment of students' standards-based curriculum knowledge and/or skills
- To conduct summative (end-of-unit, end-of-term, end-of-year) assessment of students' standards-based curriculum knowledge and/or skills
- To teach supplemental content (not mandated by curriculum standards).
- To assess students on supplemental knowledge and/or skills.

185

- None of the above.
- Not applicable to my position.
- Other (please specify) _____

Please explain briefly:

19. Specifically, how effective have digital games been in improving your students' learning in the following areas? (Rate only those areas that apply to your direct experience.)

	Highly effective	Effective	Slightly effective	Not effective	Not sure	N/A
Math						
Science						
English/ Language Arts/ Literacy						
Social Studies/ History/ Humanities						
Computer/Technology						
Social skills (collaboration, communication, negotiation)						
Executive function skills (memory, concentration/focus, patience)						
21st-century skills (systems thinking, perseverance, creative problem solving)						
Art or culture						
Healthy habits/Health/PE						
Other (specify)						

20. In what ways, if any, do you assess student performance with and around games?   Select all that apply.
- I use the built-in assessments or assessment systems that come with certain games.
- I look at students' scores on certain games to assess their knowledge/skills on topics we cover in other formats (e.g., textbook, lectures, discussions, other media).
- I create my own tests/quizzes (paper, online tools, essays, etc.) to assess what students have learned by playing a digital game(s).

- I am able to tell what students have learned through their game play in whole-class discussions.
- I do not assess student performance with or around digital games.
- Other (please specify) _____

21. Based on your actual experiences using games for teaching and learning, indicate your level of agreement with the following statements.

	Highly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Games are an effective way to teach students core curriculum content.					
Games are an effective way to assess students on core curriculum knowledge and/or skills.					
Games are an effective way to teach social skills.					
Games are an effective way to teach content/concepts.					
Games are an effective way to teach problem-solving skills.					
Games can help students perform better on standards-aligned assessments.					
There are a sufficient variety of games out there that align to curriculum standards.					
I wish it were easier to find games that align to curriculum standards.					
Commercial games that are not explicitly created for educational purposes can also be used to teach core curriculum.					
Games have been effective in increasing my students' engagement and motivation.					

22. How do you typically have your students use games for learning?   Select up to TWO of the most common formats you use.
- With another classmate

- As a full class
- As homework
- Alone / Individually
- In small groups of 3 to 5 students
- In-between lessons or assigned activities
- N/A

23. Using the scale below, please rate the extent to which each group supports you in using games as a teaching and learning tool.

	Not at all supportive	Somewhat supportive	Moderately supportive	Very supportive	N/A
Students					
Institution/ Administrators					
Colleagues					

24. Since integrating games into your teaching and learning, what changes, if any, have you observed in any of the following classroom situations?

	Increased	Decreased	About the same	N/A
Sustained attention to specific tasks				
Conflict between students				
Positive collaborations between students				
Delays in delivering content or curriculum				
Lower performing students show increased engagement with content				
Opportunities for students to discuss constructive use of other forms of technology (examples: social networks, virtual worlds, multi-player video games outside of the classroom)				

26. Explain how you, either as a formal evaluator/observer or informal peer observer, have witnessed the use of GBL as a tool for teaching and learning.

The second wave of data collection will be largely qualitative, using a combination of teacher and administrator focus group discussions, with questions based on the findings from the first round survey data. Baseline questions are noted below but may be modified or added to based on the trends that emerge in the survey phase of data collection.

Questions

1. Data collected from the surveys suggests that teachers use GBL (<u>insert frequency noted from questions 9 and 10)</u>. Can you expand on this frequency? Why do you think this is? Why do you think it is not used more/less?

2. Responses collected from the surveys suggests that teachers/administrators perceive GBL to be beneficial because it yields (<u>insert common responses from question 14)</u>. Can you expand on these reasons and provide examples?

3. Surveys responses suggest that teachers/administrators perceive major obstacles to GBL to include (<u>insert common responses from question 15)</u>. Can you expand on these reasons and provide examples? Is there anything that can be done to minimize these obstacles?

4. Data showed that one/some of the primary ways that games are used in the classroom include (<u>insert common responses from question 17</u>). Can you offer some examples? Why do you think these means are used more often than the others?

5. Data showed that one/some of the primary purposes for using games in the classroom include (<u>insert common responses from question 18</u>). Can you provide examples? Why do you think these GBL purposes are integrated more often than the others?

6. Some interesting trends about teacher/administrative perceptions that emerged from the surveys include that:

   a. Many teachers/administrators are in high agreement about the following statements (<u>in the table from question 21)</u>. Why do you think that is? Can you provide some specific details that support and expand on this consensus?

   b. Many teachers/administrators strongly disagree with the following statements (<u>in the table from question 21)</u>. Why do you think that is? Can you offer some details that explain why you strongly disagree with that statement?

   c. There is a wide variation in responses regarding the following statements (<u>in the table from question 21)</u>. Why do you think that is? Can you provide some specific details that will help to flesh out the varying perspectives?

7. Findings from the surveys suggest that teaching colleagues are (<u>insert level of</u>) supportive of your use of GBL. Can you expand on this? How so? Does this seem to be true for all colleagues or does that level of support vary?

8. Findings from the surveys suggest that administrators are (<u>insert level of</u>) supportive of the use of GBL. Can you expand on this? How so? Does this seem to be true for all administrators or does that level of support vary?

9. (Administrators Only) Based on your informal collection of observational data through walkthroughs, observations, and/or lesson plans, what are some examples of GBL use you have observed in the classroom?

10. (Administrators Only) Based on your informal collection of observational data through walkthroughs, observations, and/or lesson plans in the past month, how often/consistently is GBL used in the classroom?

11. (Administrators Only) Based on your informal collection of observational data through walkthroughs, observations, and/or lesson plans in the past month, do the patterns emerging in the first round data about type/frequency of use (provide this data from early analysis of survey responses) match with what is being observed in the classroom(s)?

Appendix E: Field Notes Log

To be used during focus group discussions in particular to document emerging perception trends outside of the scope of the pre-determined questions.

Focus Group Field Notes Observational Log	
Record any discussions or interactions that may affect collected data outside of the prescribed questions on the focus group protocol. Then reflect on them after the group meeting has concluded to determine if there is an effect on the data.	
Descriptive Notes	Reflective Notes

Appendix F: Lesson Plan Review Template

Document noted information in monthly review of this department's lesson plans.

Department: _____ Administrator: _____

Month	Average frequency of GBL documented in plans per teacher: - Every day 2 to 4 days per week - About once per week 2 to 3 times per month - About once a month	Type(s) of GBL documented in plans (such as): - To cover/practice/apply content and skills - To review content and skills - To conduct formative assessment - To conduct summative assessment - To teach supplemental content	Bias toward New/ Experienced? Do you notice more GBL use from the new teachers (0-5 years) or the experienced teachers (6-30 years)
January			
February			
March			
April			

<p style="text-align:center">Appendix G: Walkthrough Form Review Template</p>

Document noted information in monthly review of walkthrough observations completed.

Month: _____   Administrator: _____

Total # of Walkthroughs Completed this Month: _____

For each walkthrough where GBL was noted, please add an entry with the following information:

- Was it a new (0-5 years) or experienced (6-30 years) teacher?
- What department or subject area?
- Note minor details on type of GBL observed (from notes on form).