FACTORS INFLUENCING PARENTAL ATTITUDES

TOWARD DIGITAL GAME-BASED LEARNING

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The purpose of this non-positivistic mixed-methods study is to examine parental attitudes towards the use of computer and video games in their child's classroom and to investigate how the sociocultural contexts in which parents live affect those attitudes.

The research was conducted using a mixed-methods triangulation design, including both quantitative and qualitative techniques. First, the study tried to identify which groups of parents were better positioned to accept and support digital game-based learning and which groups were less likely to have a positive attitude toward integrating digital games into the classroom. This study tried to determine if socioeconomic status, age, education level, and/or cultural background could serve as a predictor of parental attitudes toward digital game-based learning. Second, the study tried to recognize how social and cultural contexts in which parents live affect their attitudes toward digital games in the classroom.

Many researchers agree that parents play an important role in students' and eventually, educators' attitudes toward gaming. It has been argued that if parents accept a certain non-traditional (digital) learning tool, then their children would most likely have a similar attitude toward it. Parents might be the support system that educators need in order to ensure that students are able to see the educational value of video games and are willing to think critically and draw connections between what they learn in a gaming environment and core subject areas.

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CHAPTER I

INTRODUCTION

The effect of video games on learning is an emergent area of research in the social

sciences and education (Bourgonjon, Valcke, Soetaert, de Wever, & Schellens, 2011; Clark,

Tanner-Smith, Killingsworth, & Bellamy, 2013; Oosting, IJsselsteijn, & de Kort, 2008). The

majority of research on digital game-based learning "links video games with contemporary

learning theories" (Bourgonjon et al., 2011, p. 1434) and focuses on teachers' and students'

attitudes toward the integration of video games into the classroom for learning. Despite the

fact that educators and researchers are increasingly willing to incorporate nontraditional

approaches to teaching (Center on Education Policy, 2012), schools have been slow to adopt

digital game-based learning as part of their curriculum (Bourgonjon et al., 2011). Research

demonstrates that one of the reasons educational institutions are hesitant to introduce video

games into the curriculum is the fear of negative parental reaction to such an endeavor

(Bourgonjon et al., 2011; Takeuchi & Vaala, 2014).

For example, a study conducted by Bourgonjon et al. (2011) presented empirical

evidence that "the fear of teachers concerning parental acceptance of DGBL [digital game-

based learning] is real" (p. 1440). Eight hundred fifty-eight parents participated in the study

conducted by Bourgonjon et al., (2011) and the majority of them demonstrated a very low level

of acceptance of digital game-based learning (Bourgonjon et al., 2011). Further, they expressed

negative beliefs about the effectiveness of video games in educational settings.

"In Fall 2013, the Joan Ganz Cooney Center, on behalf of the Games and Learning

Publishing Council, surveyed 694 K-8 teachers from across the United States on whether and

how they are using digital games with their students" (Takeuchi & Vaala, 2014, p. 5). The results of the study were presented in 2014 in *A National Survey on Teaching with Digital Games* and demonstrated that teachers believe that the lack of parental support is one of the greatest barriers educators face in using digital games in the classroom (Takeuchi & Vaala, 2014, p. 53).

Despite the fact that parental perception of video games in education might serve as a barrier to integrating video games into the classroom, relatively little research addresses the reasons behind parental attitudes toward learning with digital games, which leads to the purpose of the proposed study (Bourgonjon et al., 2008; Turkay, Hoffman, Kinzer, Chantes, & Vicari, 2014).

Purpose of the Study

According to Perrotta, Featherstone, Aston, and Houghton (2013), the cultural and social contexts in which people live affect their attitudes and the level of acceptance of certain innovations. When it comes to video games, Perrotta et al. (2013) suggested that certain groups of individuals might be better positioned to accept and support game-based learning in a classroom. While current research demonstrates that there is a lack of parental experience with digital game play, there is also an inadequate understanding of the complex nature of digital games, limited knowledge about the benefits of game play, and negative media messages about digital games that shape parental attitude and perceptions about digital game-based learning (DGBL) (Bourgonjon et al., 2010, 2011; Turkay et al., 2014). This research does not indicate which groups of individuals are more likely to have negative or positive feelings toward digital games in the classroom.

There are two reasons this non-positivistic mixed-methods study was conducted. First, the study will attempt to identify which groups of parents are less likely or more likely to support DGBL. Second, the study will try to identify how social, cultural, and economic factors might influence parental attitudes toward DGBL so researchers, administrators, and teachers will be better positioned to develop engagement strategies to help parents understand the purpose of using games in the classroom.

To understand how social, cultural, and economic factors might influence parental attitudes toward digital game-based learning, the following subtopics were explored:

- How does parental involvement in video game play affect parental perception of digital game-based learning?
- How do media messages affect parental attitudes toward game-based learning?
- How does cultural and/or ethnic background affect parental attitudes toward game-based learning?

Value and Relevance of the Study

Our schools are becoming "increasingly diverse and multicultural" (Perrotta et al., 2013) and, when it comes to children's education, parental beliefs are extremely influential on several levels (Bourgonjon et al., 2011; Skoien & Berthelsen, 1996; Whitebread, Basilio, Kuvalja, & Verma, 2012). In 2009, a British Educational Communications and Technology Agency (BECTA) published a report titled *Computer games, schools, and young people: A report for educators on using games for learning*. In this report, the authors stated that 49% of teachers reported that objections from parents is the fifth major barrier to the integration of games into the curriculum (Williamson, 2009). Williamson (2009) also noted,

Game-based learning in schools depends on institutional, personal and other social

factors above all else. It depends on schools making an institutional commitment to

gaming; on teachers making a personal investment in it; and on wider social implications

such as young people's feelings about gaming, their parents' perceptions of the value of

gaming, and even public opinion and press coverage of computer games. (p. 23)

Therefore, parents should be among the "key players" (Bourgonjon et al., 2004, p. 1434) when

it comes to the integration of digital games into the classroom.

According to Bourgonjon et al. (2011), parental acceptance of digital game-based

learning should be marked as "as an important domain for further educational research" (p.

1435). According to Scharrer and Leone (2008), childrens' attitudes toward games as

educational tools are highly influenced by their parents' attitudes as well as parental concerns

about digital game-based learning and parental mediation techniques practiced at home. It is

the so-called "third person effect" (Scharrer & Leone, 2008) that explains the idea that parental

attitudes and beliefs are instrumental to the perceptions and beliefs that their children form

about the potential effects of certain media. Skoien and Berthelsen (1996) contended, "An

exploration of parental thinking, behavior, and other contextual aspects of families in relation

to video games will provide insight into that impact" (p. 2). It is important for educators and

researchers to understand parental feelings toward gaming, as they likely contribute to the

decisions teachers and administrators make. These decisions include assigning homework,

creating projects, and integrating innovative technologies into the classroom. In order to

improve parental acceptance, parents' views may be shifted by what Buckingham and Burn

(2007) called an improvement in their *game literacy.* This approach teaches learners, including

parents, "about games as a cultural medium in their own right, just as we teach about film or television or literature" (Buckingham & Burn, 2007, p. 323). However, it is important to understand what parents know and think about video games and what factors affect their beliefs before any approach to improve parental acceptance levels could be adapted and implemented.

Conclusion

Many researchers agree that parents play an important role in students' and, indirectly, educators' attitudes toward gaming (Skoien & Berthelsen, 1996; Whitebread et al., 2012). Green, Ortiz, and Lim (2009) argued that if parents accept a certain non-traditional (digital) learning tool, then their children would most likely have a similar attitude toward it. Parents might be the support system that educators need in order to ensure that students are able to see the educational value of digital games and become willing to think critically and draw connections between what they learn in the gaming environment and core subject areas (Bourgonjon et al., 2011; Kenny & McDaniel, 2009; Williamson, 2009). The next chapter summarizes the most recent research on digital games, defines games and game-based learning, and examines how games are used in the classroom toward a goal of explaining the need for this study and its relation to past research. In addition, the chapter includes a description of a theoretical framework behind learning with video games, as well as a discussion of the theory that supports the methodology used in the current study.

CHAPTER II

REVIEW OF RELATED LITERATURE AND THEORY

This chapter will present several important pieces of information that support and guide

the proposed research. First, the definition of games in general and digital games in particular,

will be provided. Next, a review of the related literature on video game research will be

discussed. As a part of the literature review, game-based learning will be defined in the context

of current research. In addition, the current research on games in education, barriers to digital

game integration into the classroom, and parental views on digital game-based learning are

presented. Finally, the theoretical framework for the current research study will be explored.

What are games?

According to Salen and Zimmerman (2004), the English language provides us with a

unique opportunity to differentiate between two terms: game and play. Many other languages

(such as German, French, Russian, Spanish, etc.) use different variations of the same word to

define both "game" and "play." Historically, in many cultures those two terms have been used

interchangeably (Gordon, 2008). Unlike the English language, these languages provide us with

no clear distinction between the two terms (Salen & Zimmerman, 2004). However, as Salen and

Zimmerman (2004) proposed, one should "consider games and play as two separate ideas with

related but distinct meanings" (p. 77).

Gordon (2008) suggested that philosophers, physiologists, and biologists have been

trying to define "play" for centuries. Gordon (2008) mentioned the works of Spencer in 1855;

Groos in 1898 and 1901; Hall in 1906; and Freud in 1959, and suggested that all of those

scientists proposed "deterministic and utilitarian definitions of play. The explanation for this

phenomenon could be found in Caillois (1959/2011), where the authors implied that people

would be engaged in play "because it is advantageous for man" (p. 153). Historically, play was

often considered a nuisance of childhood and compared to animal behavior, defined by the

extra energy that had to be exerted if no more energy was required for survival (Brehony,

2008). Play has often been contrasted with work (Brehony, 2008); however, in 1938, Dutch

anthropologist John Huizinga "presented a radically new understanding of play as an activity

that exists only for its own sake" (Gordon, 2008, p. 2). According to Huizinga (1950), play is an

extremely engaging activity that is not serious and exists outside of regular life.

Roger Caillois (1962/2001) expanded on the works of Huizinga by supporting the idea of

play existing in a separate space and not being associated with material gains; Caillois further

developed the definition by adding that play is "free or voluntary…associating play with a sense

of make-believe" (as quoted in Salen & Zimmerman, 2004, p. 88). Caillois (1962/2001) also

suggested that play is governed by rules and that roughhousing and theater would constitute

play. Bernard Suites (1990) echoed Caillois' (1959/2001) thoughts and suggested that rules

might limit the efficiency of the play; however, they might help us overcome challenges and get

closer to the final goal. Rules and goals are one of the essential components of a game,

according to Abt (1987). Abt (1987) stated that a game "is an activity among two or more

independent decision-makers seeking to achieve their objectives in some limiting context. A

more conventional definition would say that a game is a context with rules among adversaries

trying to win objectives" (p. 7). Abt (1987) further suggested that rules and objectives of the

game create limited contexts by which the goal of the game is defined. Salen and Zimmerman

(2004) suggested that there is a very complicated relationship between *game* and *play*. Play is

both a larger and a smaller term than game, depending on the way it is framed. In one sense, play is a larger term that includes game as a subset. In another, the reverse is true: game is the bigger term and includes play within it. (Salen & Zimmerman, 2004, p. 72).

Salen and Zimmerman (2004) suggested that if one looked at games as a larger conceptual phenomenon, three major aspects would emerge: (a) games can be played, (b) games have rules, and (c) games not only influence and are influenced by culture but they can also create one. In this regard, play could be considered a subset of games (Salen & Zimmerman, 2004). On the other hand, there are many playful activities that people can engage in that are not necessarily games (i.e., kids chasing each other on the playground, pretend-play, etc.); therefore, games could be considered a subset of play (Salen & Zimmerman, 2004).

In search of a perfect definition of game, Salen and Zimmerman (2004) analyzed the works of such scholars as Clark and Abt from 1970, Huizinga from 1955, Caillois from 1962/2001, Suits from 1990, Crawford from 1982, Avedon and Sutton-Smith from 1971, and Costikyan from 1994 and created a table (Table 1) that summarizes all the different elements that constituted a game.

Salen and Zimmerman (2004) concluded

Cobbling together elements from the previous definitions and whittling away the unnecessary bits leave us with the following definition: A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome. (p. 93)

Table 1

Summary of game elements based on definitions by different scholars

Elements of Game Definition	Parlett	Abt	Huizinga	Caillois	Suits	Crawford	Costikyan	Avedon & Sutton-Smith
Proceeds according to the rules that limit players	✓	✓	✓	✓	✓	✓	✓	✓
Conflict or Contest	✓					✓		✓
Goal/Outcome-oriented	✓	✓			✓		✓	✓
Activity, process, or event		✓			✓			✓
Involves decision-making		✓				✓	✓	
Not serious or absorbing			✓					
Never associated with material gain			✓	✓				
Artificial/Safe/Outside ordinary life			✓	✓		✓		
Creates special social groups			✓					
Voluntary				✓		✓		✓
Uncertain				✓				
Make-believe/Representational				✓		✓		
Inefficient					✓			
System of parts/Resources and tokens						✓	✓	
A form of art							✓	

Note. Salen and Zimmerman, 2004, p. 91.

This rather narrow definition of games suggests that all puzzles are games, whereas role-playing games (RPG) might or might not be considered games (Salen & Zimmerman, 2004). However, if games are considered a subset of play, then RPG or sandbox games create environments that allow users to engage in ludic or play-like activities, which could include the actual game play depending on the user's preferences (Salen & Zimmerman, 2004). Salen and Zimmerman (2004) proposed that "Ludic activities are play activities that include not only games but all of the non-game behaviors we also think of as 'playing': a kitten batting a ball of yarn, two college students tossing a Frisbee back and forth, children playing on a jungle gym" (p. 299). Game play, on the other hand, "is a narrow category of activity that only applies to what we defined already as 'games'" (Salen & Zimmerman, 2004, p. 299). The definition of games was further explored by Mayer (2014), where the author proposed that "Games are interactive simulated systems that are rule-based, responsive, challenging, cumulative, and inviting…you are in a simplified world in which things happen for a reason" (p. 5).

Table 2 demonstrates how Mayer's (2014) definition echoes Salen and Zimmerman's (2004) description of what games are and, in a certain sense, presents a simplified version of it.

Table 2

Comparison of Mayer and Salen/Zimmerman definitions of a game

Mayer (2014)	Salen and Zimmerman (2004)
Game is a system.	Game is a system.
Simulated system presents challenge in a simplified world.	Artificial conflict exists.
Everything happens for a reason.	Quantifiable outcome exists.

Note. Mayer, 2014; Salen and Zimmerman, 2004.

By combining the two aforementioned definitions, this study will define a *game as an interactive, simulated system that is rule-based and in which players engage in artificial conflict to reach a certain goal*. This definition applies to both video/digital games and simulation games since, according to Mayer (2014), "the line between a computer game and simulation game is so fuzzy that I include simulations and games in the same category" (p. 6).

Research on Games in Informal Learning Environments

Video games have existed for the past 40 years; however, the research on video games as a medium and its implications in social and education contexts is still emerging (Perrotta et al., 2013; Pivec, Dziabenko, & Schinnerl, 2003; Wastiau, Kearney, & Van den Berghe, 2009; Williamson, 2009). Subrahmanyam, Kraut, Greenfield, and Gross (2000) reviewed all the available literature that had been published by the year 2000 on how childrens' social and academic development was impacted by digital games. They reviewed the potential effects of computer use and video games on a child's development. The authors presented findings from studies that included anywhere from 10 to 500 participants. However, most of those studies offered little empirical data on how video game play might be linked to obesity, inactivity, and

aggressive behavior. Subrahmanyam et al. (2000) concluded that no firm assertions could be made about either positive or negative effect of digital games on child development.

Research on games from 2002 to 2010

In 2002, Curtis and Lawson completed a study that tried to investigate whether or not the experience in playing adventure video games would lead to the development of general problem skills (p. 54). The researchers worked with a group of 44 students who were required to "think out loud" while playing a text-based adventure game, *The Ancient Abbey* (Curtis & Lawson, 2002). The results of this study were inconclusive. Wastiau et al. (2009) argued that the inconclusive results for the Curtis and Lawson study were due to the qualitative methodology employed by researchers to conduct the study. Wastiau et al. (2009) further referred to similar research conducted by Pillay in 2003 that used mixed method research techniques. Pillay concluded, that when it comes to problem solving skills, "the game players reasoned more effectively and employed anticipatory thinking" (as quoted in Wastiau et al., 2009, p. 126).

Another qualitative study was conducted by Wright, Boria, and Breidenbach (2002), aimed at investigating how playing First Person Shooter (FPS) games "can reproduce and challenge everyday rules of social interaction while also generating interesting and creative innovations in verbal dialogue and non-verbal expressions" (p. 103). Researchers played 70 hours of *Counter-Strike* on 50 different servers while examining players' actions such as map making, logo and avatar design, movement within the world, and nonverbal interactions. In addition, they logged all the discourse that happened during the game play. Wright et al. (2002) concluded that the in-game discourse and interaction presented important social significance since, "Through the playing of the game and negotiating conflicts one learns the meaning of the

game, the meaning of 'having fun.' And that 'having fun' is bound up with creative actions

taken to enhance the pleasure of the game" (p. 120).

In the last ten years, a number of studies have demonstrated that video game play

might improve hand-eye coordination and motor skills (de Freitas, 2006; Wastiau et al., 2009).

The primary goal of an exploratory study by Egenfeldt-Nielsen (2003) was to determine

whether the connection exists between reaching a high skill level in video game play and hand-

eye coordination. Seven participants were selected to participate in the research study and

asked to play an arcade game, *Super Monkey Ball* (Egenfeldt-Nielsen, 2003). The author

admitted that the procedure was "quite informal" (Egenfeldt-Nielsen, 2003, p. 368) and

consisted of "observation, test, and interviews running over approximately 3 hours" (Egenfeldt-

Nielsen, 2003, p. 368). The results of the study were inconclusive due to methodological issues;

therefore, the author suggested a list of problems that should be taken into consideration when

designing any future studies that analyze hand-eye coordination in video/digital gameplay.

(Egenfeldt-Nielsen, 2003). In a later study, Rosser et al. (2007) observed 33 surgical residents

from Beth Israel Medical Center practicing minimally invasive surgical procedures in a

Laparoscopic Skills and Suturing Program to assess their level of accuracy and performance. As

part of the research study, students were also asked to play a popular arcade game, *Super*

Monkey Ball, in a series of three gaming exercises and to complete surveys so the researchers

could assess participants' past experience with video games, number of years in medical

practice, and surgical experience (Rosser et al., 2007). The results of the study demonstrated

that there was a positive correlation ($p < .03$) between a participant's video game skill and the

speed with which students were able to complete the procedure; negative correlation ($p < .02$)

was found between the number of hours of video game played by the surgeon during the week and the number of procedural errors made by the surgeons during the surgery (Rosser et al., 2007). Rosser et al. (2007) demonstrated that "Current video game players made 32% fewer errors ($p < .04$), performed 24% faster ($p < .04$), and scored 26% better overall (time and errors, $p < .005$) than their nonplaying colleagues" (p. 181). Wastiau et al. (2009) later reviewed the study by Rosser et al. (2007) and concluded that playing *Super Monkey Ball* not only improved participant hand-eye coordination but also "transferred outside the context of computer game play" (Wastiau et al., 2009, p. 132).

Just like Wright et al. (2002), Kearney (2005) used a video game, *Counter-Strike*, in his research study. In his experimental research, Kearney (2005) demonstrated that playing an FPS game might increase a player's multitasking ability ($p < 0.05$). Kearney (2005) concluded,

> The participants were completely focused on the game and this concentration appeared to influence the results of the subsequent multitasking test. If, in fact, games such as *Counter-Strike* and *America's Army* do simulate the real world, the United States military is justified in using these games for recruitment and training. In a real-life combat situation, a soldier's ability to multitask, focus on multiple applications, and to increase these abilities throughout the exercise would be imperative. (para. 21)

Echoing Kearney's (2005) assumption, Wastiau et al. (2009) concluded that based on the works of MacMahan from 2003, Paras and Bizzocchi from 2005, and Gentile, Lynch, Linder, and Walsh from 2004, there is a general consensus in the literature that the immersive nature of video games promotes cognitive improvement, longer attention spans, and as a result, might increase "the uptake of knowledge" (p. 124).

One of the cognitive tasks that has been studied for the past 40 years is visuospatial ability or human mental rotation abilities (Feng, Spence, & Pratt, 2007; Parsons et al., 2004). Spatial skills are typically positively correlated with mathematical achievement in school (Halpern, 2007; Spelke, 2005). However, according to earlier research by Shepard and Metzler (1971,) on average, women perform significantly worse than men on spatial cognition testing. Since spatial cognition is one of the essential mental skills for math and engineering, Feng et al. (2007) conducted a study in which female participants were trained on action video games in order to improve their visuospatial ability. The results of the study demonstrated that after 10 hours of training in action video games, womens' scores improved substantially—from 55% to 72% (Feng et al., 2007, p. 853). Despite these positive results, whether or not playing action video games does indeed foster mathematical ability is still unknown and needs to be investigated further (Bavelier, Green, Schrater, & Pouget, 2012).

Korczyn, Peretz, Aharonson, and Giladi (2007) demonstrated that playing *Tetris*, a tile-matching puzzle video game, might assist with the treatment of the early inset of Alzheimer's disease. One hundred twenty-one elderly people were asked to play *Tetris* for 30 minutes, three times a week for three months. The participants demonstrated improved attention, spatial learning, and short-term-memory skills at the end of the three-month trial period. Research further suggested that improvement in cognitive abilities is a great benefit of playing certain video games and

can also be applied to offset learning disabilities from degenerative diseases like

Alzheimer's and learning impairments resulting from problems such as ADHD and late

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effects resulting from the treatment of cancer for teenage children. (Wastiau et al.,

2009, p. 140)

In 2010, researchers from the Centre for Vision Research at York University selected 26

young men in their twenties and placed them in a functional magnetic resonance imaging

machine to measure which areas of the brain were activated while these subjects completed a

series of complex visiomotor tasks (Granek, Gorbet, & Sergio, 2010). Thirteen men who had

played video games at least four hours a week demonstrated much better results in performing

increasingly difficult visiomotor tasks than the other 13 men who were non-players.

Specifically, the control group, as compared with the video gamer group, utilized greater

posterior parietal cortex (PPC) activity including greater bilateral parieto-occipital sulcus

(POS; BA [Brodmann area] 7, 19), precuneus (BA 7), intraparietal sulcus (IPS; BA 7), and

inferior parietal lobule (IPL; BA 7) activity. (Granek et al., 2010, p. 1173)

Researchers were also able to test how the skills learned during video game play can transfer

over to other tasks and "how long-term, heavy experience with video games can alter the brain

activity involved in controlling other types of visually guided movements" (Granek et al., 2010,

p. 1172). In reviewing the Granek et al. (2010) study, Trudeau (2010) noted,

The non-gamers had to think a lot more and use a lot more of the workhorse parts of

their brains for eye-hand coordination, whereas the gamers really didn't have to use

that much brain at all, and they just used these higher cognitive centers to do it (para.

11).

Research on games from 2011 to present

More recent studies by Bavelier et al. (2012); Green, Sugarman, Medford, Klobusicky,

and Bavelier (2012); and Green and Bavelier (2012) demonstrated that video gamers were

notably different from non-gamers in certain real-life skills such as speed, accuracy, attention,

and multitasking. Six years after Kearney's (2005) research on *Counter-Strike* and multitasking,

Green et al. (2012) came to a similar conclusion that action games allowed students to become

much better in multitasking. Their research demonstrated that, in lab tests, the cost of

switching between the tasks and the reaction time was significantly better (p = 0.011,

F(1, 22) = 7.67) in action-game players than in non-players. (Green & Bavelier, 2012, p. 993).

Several researchers suggested that video game play not only promoted cognitive

improvement but also improved behavior, increased motivation, supported cognitive health,

and emotional well-being (Allaire et al., 2013; Cole, Yoo, & Knutson, 2012; Streeb, 2012). Cole

et al. (2012) compared the results of the MRI brain scans of 57 different people who were

randomly assigned to either play a game called *Re-Mission* or simply watch the game being

played. *Re-Mission* is a digital game designed specifically for children and young adults battling

cancer (HopeLab, 2015).

Each game puts players inside the human body to fight cancer with an arsenal of

weapons and super-powers, like chemotherapy, antibiotics, and the body's natural

defenses. The game play parallels real-world strategies used to successfully destroy

cancer and win. (HopeLab, 2015, para. 2)

Research found that there was a direct connection between playing a game and positive

behavior (Pearson r = .47; at one month follow-up, Pearson r = .38); the areas of the brain

responsible for positive motivation exhibited increased activity in participants who actually

played the game whereas participants who simply observed the game did not show any activity

in their brain's positive motivation circuits (Cole et al., 2012; Streeb, 2012). According to Brian

Knutson, associate professor of psychology and neuroscience at Stanford University and co-

author of an article about the aforementioned study, "Identifying a direct connection between

the stimulation of neural circuits and game play is a key step in unlocking the potential for

game-based tools to inspire positive behavior and improve health" (Streeb, 2012, para. 3).

However, according to Perrotta et al. (2013), any motivational effect from video games

"remains largely untested" (p. 17); therefore, "motivation associated with digital gaming may

be short lived and due to a 'novelty effect'" (p. 17). According to a recent study by Allaire et al.

(2013), older adults who played video games on a regular basis tend to be happier than those

who were non-gamers. One hundred forty individuals over the age of 63 were surveyed on

their gaming habits; Allaire et al. (2013) reported that 60% of the participants turned out to be

either occasional or regular gamers. A series of tests were later performed to assess the

participants' emotional wellbeing, as well as depression levels and negative effect (Allaire et al.,

2013). Results showed that older adults who played video games at least occasionally had a

greater sense of well-being and were less susceptible to negative emotion and depression

($p < .01$ for general wellbeing; $p < 0.2$ for negative affect; and $p < 0.3$ for depression) (Allaire et

al., 2013, p. 1304).

Positive effects of playing digital games were also seen in children. Franceschini et al.

(2013) conducted another experiment in which 20 dyslexic children ages 7-13 were separated

into two groups. The first group played nine 80-minute sessions of the commercial action-

packed Wii game *Rayman Raving Rabbids*, while the second group played non-action mini

digital games selected by the group of researchers (Franceschini et al., 2013, p. 462). The results

of the experiment demonstrated that ten children who played an action video game performed

better on attention measuring tests and were able to read faster (F(1, 18) = 5.50, p = 0.03)

(Franceschini et al., 2013, p. 463) and more accurately than the other 10 children who were

assigned to the non-action video game group (Franceschini et al., 2013). The authors

concluded, "The improvements in spatial and temporal attention correlated with those in

general reading abilities (r = 0.52, p = 0.02 and r = 0.49, p = 0.03, respectively)" (Franceschini et

al., 2013, p. 465). A study by Franceschini et al. (2013) also presented evidence that

> Playing action video games improved childrens' reading speed, without any cost in
>
> accuracy - more so than one year of spontaneous reading development and more than
>
> or equal to highly demanding traditional reading treatments. Attention skills also
>
> improved during action video game training. (p. 462).

Ferguson and Olson (2013) suggested that video game play might help in improving

certain behaviors. Their study included 377 American children who had "scored in the clinically

significant range on the clinically significant scales related to depressive or attention deficit

symptoms" (p. 129). Children were asked to complete a survey that measured their responses

across seven subdimensions: depression/attention symptoms, parental involvement, support

from others, delinquency, stress, exposure to game violence, and bullying (Ferguson & Olson,

2013, pp. 129-131). The results demonstrated that not only was there no connection between

playing violent video games and increased aggression and bullying in children with elevated

attention deficit or depressive symptoms (R^2 = .36, R^2 = .22, respectively) but also in some

instances, digital game play helped reduce the aggressive and bullying tendencies in the mentally vulnerable children (Ferguson & Olson, 2013).

Kühn, Gleich, Lorenz, Lindenberger, and Gallinat (2014) argued that video game play is an all-encompassing activity that offers a variety of "complex cognitive and motor demands" (p. 266). The researchers instructed 23 participants to play *Super Mario 64* on a portable Nintendo DS XXL console for 30 minutes a day over a period of two months (Kühn et al., 2014). Structural brain images were collected before and after the training in both a control and a video game training group. The results indicated that

> Video game training augments GM [gray matter] in brain areas crucial for spatial
> navigation, strategic planning, working memory, and motor performance going along
> with evidence for behavioral changes of navigation strategy. The presented video game
> training could therefore be used to counteract known risk factors for mental disease
> such as smaller hippocampus and prefrontal cortex volume in, for example, post-
> traumatic stress disorder, schizophrenia and neurodegenerative disease. (Kühn et al.,
> 2014, p. 266)

Despite the fact that the literature suggests that video game play might improve certain cognitive functions, increase motivation, and support emotional well-being outside of formal educational environments, the effect of video games on learning, knowledge retention, and transfer remains largely untested (Mayer, 2014). The next part of the literature review will explore the definition of game-based learning and provide an overview of current research on digital game integration into the classroom, as well as discuss barriers to the incorporation of digital games into the formal school curricula.

Game-Based Learning

In the 2009 report for educators on using games for learning titled, *Computer Games, Schools,*

and Young People, Williamson stated,

> A great deal has been written and published in the last decade about how games can
>
> fundamentally transform learning, and, in fact, about how playing computer games may
>
> have already fundamentally altered the learning habits and aspirations of young people.
>
> (p. 6)

However, the term *Game-Based Learning* (GBL) is ambiguous (Cicchino, 2015). Some

researchers believe that the word combination of game-based learning is misleading and

should not be used at all, due to the fact that neither games nor technology promote learning

(Mitgutsch, 2007; Wainess, 2007). Wainess (2007) argued that games themselves have no

impact on cognition whatsoever; however, the context in which games are used might

stimulate and foster learning. Mitgutsch (2007) suggested that games, in general, do not

influence knowledge acquisition. It is the act of play that produces learning outcomes;

therefore, we should move away from the term GBL and replace it with a more suitable term.

Play-Based Learning

However, other researchers argued that games in general and digital games in

particular, could offer a participatory experience that facilitates and promotes learning (Gee,

2007, 2008). According to Mitgutsch (2007), digital games are tools that can be used for

creating environments that foster learning through nonlinear and often, immersive play. This

view of game-based learning resonates with Kozma's (1991) belief on media and learning.

According to Carter (1996), Kozma "preferred to regard method and media as integral and

connected, believing that learning consists of relationships among cognitive, social, and affective processes, as well as multiple aspects of the environment" (Carter, 1996, p. 32). In digital game-based learning, "the vehicle" for delivering instruction is as important as the instructional method itself.

The idea that the tools instructors use to deliver the information are as important as the instruction method itself might be traced back to Dewey's views on learning. Dewey believed that "to be educative, an experience has to be built on or connected to prior experience" (Noddings, 2012, p. 31). This scaffolding process is the essential part of Vygotsky's conception of learning, which also supports the idea of social interaction, and according to Cooperstein and Kocevar-Weidinger, (2004) "Not only is social interaction essential for knowledge construction but it also allows students to verify their understanding (Vygotsky, 1978/1997), group activity increases discussion, experimentation, enthusiasm, and participation" (p. 145). Continuing with this idea, Pivec et al. (2003) suggested that the digital game

> should be motivating so the learner repeats cycles within a game context. While repeating (e.g., playing a game), the learner is expected to elicit desirable behaviors based on emotional or cognitive reactions which result from interaction with and feedback from game play. (p. 217)

Some researchers further noted that the interactive aspect of gameplay supports a teacher's perception that games would offer an "inclusive, interactive way of engaging pupils on their own level" (Sandford, Ulicsak, Facer, & Rudd, 2006, p. 16) and, according to Resnick (2006) "many of children's best learning experiences come when they are engaged, not simply in

interacting with materials but in designing, creating, and inventing with them" (Resnick, 2002,

as quoted in Resnick, 2006, p. 196).

Defining DGBL

In 2009, Wastiau et al. produced a comprehensive report on how video games are used

in schools. The authors suggested that game-based learning is "instructional activity using video

games in…education for improving, accelerating, and high-motivating of [the] learning process"

(Wastiau et al., 2009, p. 153).

Bogost (2011) offered an interesting insight into the definition of game-based learning.

He suggested that in order to understand the implications of video games in education and

learning, one must accept that digital games are "first and foremost representations that

stimulate certain behaviors and experiences" (Perrotta et al., 2013, p. 6). Bogost (2011) implied

that just like computers or technology in general, video games should be regarded as a medium

that might or might not facilitate instruction. With proper instruction, digital gaming worlds can

become playgrounds for experimentation and analysis by reframing the world for students and

allowing them to experiment and test ideas and concepts. Bogost (2011) further stated that

since games are immersive, they require players to become "practitioners of their problems

rather than casual observers" (p. 141).

Perrotta et al. (2013) suggested that interactivity, engagement, "learning by doing," and

motivation were some of the foundational concepts of game-based learning. Another

interesting trend in the literature suggested that

> game-based learning encompasses technological developments that are blurring the
>
> lines between formats, spaces, languages, and practices associated with video games,

23

leading to 'blended' experiences, which are not just confined to the video game itself"

(Perrotta et al., 2013, p. 5-6).

Mayer (2014) offered a simpler definition of digital game-based learning and suggested

that it should "include video games, digital games, computer games, serious games, and

simulation games that are intended to promote a change in the learners knowledge or skill" (p.

8). However, Cicchino (2015) suggested that simulations should be omitted from the digital

game-based learning framework. Cicchino (2015) compiled a list of six principles of game-based

learning (Table 3) and argued that "while a simulation permits the exploration of a concept, it

does not necessarily hold to the principles of gameplay" (p. 58).

Even though "myriad efforts have been made to make the terms associated with games

and learning concrete" (Cicchino, 2015, p. 57), this study synthesized the definitions proposed

by both Mayer (2014) and Wastiau et al. (2009) and suggest that *digital game-based learning*

(DGBL) is an instructional activity that uses games (Wastiau et al., 2009, p. 153) in order to

improve performance on measures of learning outcomes (Mayer, 2014, p. 5).

Table 3

Six principles of game-based learning (GBL)

GBL Principles	Purpose/Outcomes
Inspires critical thinking	• All aspects of learning environment are set up to encourage active and critical learning • Encourages students to utilize the practice skills we are seeking to develop
Provides just enough challenge for players	• Ample opportunity for learner to operate at the outer edge of his/her resources • Create a surmountable challenge • Environment provides necessary scaffolds for overcoming challenge and/or learning task
Provides opportunities for players to discover/construct their own knowledge/understanding	• Learners have opportunities to engage in guided discovery • Congruent with constructive learning theories
Provides a fictional world	• Metaphor or fantasy-driven context for gameplay • Learner has choices in developing a virtual identity in this fictional world • Learners can take risks where real-world consequences are lowered
It is "social"	• Players must interact with one another to make progress in a game • Learners constitute a group that is bonded through shared endeavors, goals, and practices • Community of practice
It must be winnable and by various avenues	• Win-states provide challenge and competition via multiple routers • Maintains its allure as a game • Learners may make choices, rely on their strengths and learning preferences, and engage in problem solving

Note. Cicchino, 2015, p. 59.

In the next part of this chapter, digital game-based learning is presented through the

lens of different learning theories in order to understand its benefits and shortcomings, as well

as explore different pedagogical and instructional strategies that can set DGBL apart from

"existing educational practice" (Egenfeldt-Nielsen, 2006, p. 7).

Theoretical Framework

Research suggests that digital games might create learning environments that have

certain features allowing them to be situated within different learning theories (Felicia, 2009).

Both Felicia (2009) and Egenfeldt-Nielsen (2006) suggested that digital games "to some

extent…feature all approaches–behaviorist, cognitivist, and constructivist (Felicia, 2009, p. 10).

Most educational digital games feature either a behaviorist or cognitivist approach to learning

that might be effective in certain areas, such as memorization of facts, and nominal in other

areas, such as knowledge construction, problem solving, transfer, and application of skills in

real-life (Gee, Lieberman, Raybourn, & Rajeski, 2004; Lieberman, 2001; Egenfeldt-Nielsen,

2006). According to Egenfeldt-Nielsen (2006), "We need to gain a more inclusive understanding

of the different learning perspectives if we are to understand the full scope of the educational

use of computer games" (p. 206).

Behaviorism and Cognitivism

Most educational video games employ "drill and kill" strategies and require very little

involvement from teachers (Egenfeldt-Nielsen, 2006). These types of games rely on "automatic

repetition coupled with extrinsic motivation" (Egenfeldt-Nielsen, 2006, p. 193). This approach

might work in certain areas, such as elementary classrooms for spelling and multiplication

tables (Egenfeldt-Nielsen, 2006), as well as health organizations for building disease awareness

and health management skills (Lieberman, 2001).

A study by Lieberman (2001) investigated the effect of playing a video game on learning and self-efficacy, using the *Bronkie the Bronchiasaurus* video game to teach children asthma self-management skills. Lieberman's (2001) study was designed using a pretest/posttest/posttest model and involved 50 patients ages 6-16 who had been diagnosed with asthma. After the initial pretest, children played the game for 40 minutes, Lieberman (2001) reported,

> Immediately after playing the video game and one month later, participant [sic] experienced significant improvements in asthma knowledge, self-efficacy for asthma self-management, and self-efficacy for talking with friends about asthma. During the month after they played the video game, there was an increase in…childrens' communication with their parents about asthma, compared to the month preceding the study (p. 32).

There are several factors that make these findings interensting; first, 40 minutes of game time was not enough to progress very far in the game. However, the repetitive nature of the game itself and activities that the children had to complete within the game induced memorization of certain self-management technques that allowed patients to control their asthma symptoms and therefore increased the patient's self-efficacy (Lieberman, 2001; Egenfeldt-Nielsen, 2006). Another factor that makes this study interesting is that the control group in the same experiment was asked to watch a video on asthma management only once, where the same information in the game was presented all at once. Even though the children that watched the video learned the same amount of information, they expressed less enjoyment and no desire to watch it again whereas the research group of students were eager

to play the game again (Lieberman, 2001; Egenfeldt-Nielsen, 2006). Lieberman (2001) argued

that successful video games have a potential of being played over and over again, which

directly relates to Thorndike's Law of Exercise and sets video games apart from other media as

one of the tools with a behaviorist approach to learning. Even though education games that

employ "drill and kill" strategies might be effective in certain areas that require memorization

of facts or sequences of actions, the scope of learning might be very limited (Egenfeldt-Nielsen,

2006). Another view states,

> In contrast, games that are based strictly on behaviorist learning theories
>
> [do] not really teach the player about a certain area; rather, it focuses on training,
>
> letting the player perform mechanical operations. This leads to memorizing the
>
> practiced aspects but probably not to a deep understanding of the skill or content–the
>
> activity will be parrot-like and the intended goal and competency will not be fully
>
> grasped by the student. (Egenfeldt-Nielsen, 2006, p. 193)

The problem with transfer is not only applicable to video games that are based on behaviorist

approach to learning, it is also a valid concern when it comes to games that employ cognitivist

methodologies to achieve a certain success within a game (Egenfeldt-Nielsen, 2006). Egenfeldt-

Nielsen (2006) cited works of Ko (1999) and Klawe (1998), in which these authors argued that

games requiring players to solve puzzles that became more complicated as the game

progressed provided players with opportunities to problem solve and to become more

intrinsically motivated. However, according to Ko (1999), problem solving within the game that

is based solely on a cognitive approach to learning does not transfer to contexts outside of that

game; in addition, players who were better problem-solvers prior to the start of the game were

generally more successful within the game.

It is speculated that problem-solving skills, as well as critical thinking, teamwork, and creativity can be taught through the use of digital games—particularly RPGs (Klopfer, 2008; Williamson, 2009; Wastiau et al., 2009). Role playing games allow students to experience learning through immersion, interactivity, and the actual process of "doing"; therefore, it positions digital game-based learning within the constructivist arena (Klopfer, 2008)

Constructivism

Games might offer the opportunity for the learner to learn by not only watching and listening but also by engaging and participating, which are essential attributes of constructive learning since "education is not an affair of 'telling' and being told, but an active constructive process" (Dewey, 1916, p. 38). Menn (1993) suggested, "Only 50% of what is watched is learned but 90% of what is experienced is mastered" (as cited in Wastiau et al., 2009, p. 124). These claims were further supported by Gee (2008) when he argued that

> although verbal or general understandings may facilitate passing certain kinds of information-focused tests, they do not necessarily facilitate actual problem solving. Research in cognitive science has shown, for example, that it is perfectly possible to understand Newton's laws as formulas, realizing their deductive capacities in a general way but not be able to actually draw these deductions and apply them to a concrete case in actual practice to solve a real-world problem. (p. 202)

Learning environments that are possible within digital games offer fertile ground for "situated understanding of the concept" (Gee, 2008, p. 202). *Situated learning*, a concept developed by Lave and Wenger (1991), suggests that knowledge needs to be presented in authentic context

and that collaboration is essential for knowledge acquisition. Situated learning helps students to develop the "ability to use the word or understand the concept in ways that are customizable to different specific situations of use" (Gee, 2008, p. 202).

According to Lave and Wenger (1991), situated learning promotes problem-solving skills as it creates contexts in which students might develop approaches and find solutions that might be transferrable to other social circumstances outside of the classroom. Lave and Wenger also believed that games might foster social interaction within the situated learning environment (1991). As a result, learners would have opportunities to engage in "communities of practice"— a subculture with its own beliefs and rules for behavior. Digital games allow for the emergence of environments in which "students facilitate situated understandings in the context of activity and experience grounded in perception" (Gee, 2008, p. 203). In 2004, DeKanter stated the potential that digital games have is to create an "environment which weaves together the essential and interdependent ingredients for productive learning" (DeKanter, 2004, p. 27). DeKanter (2004) further posited that interactivity is one of the essential components that allow video games to aid players in knowledge construction and provide learners with engaging experiences and motivation. Interactivity is one of the aspects of multimedia design theory, and in the last 20 years, there has been an abundance of research on how interactivity affects and facilities learning (Mayer, 2001; Moreno & Valdez, 2005). When it comes to video games, interactivity happens not only between the player and the game but also within the game itself (Gee, 2007; DeKanter, 2004).

Egenfeldt-Nielsen (2006) supported the idea of digital games creating environments that facilitate and support learning; however, he wondered if "questions of collaboration,

debriefing, and discussion are crucial to understanding: How can we construct, mediate, and support the knowledge acquired in relation to video games?" (p. 206). Egenfeldt-Nielsen (2006) further stated that one needs to understand that learning from digital games is not a homogeneous process: different "teaching forms and [game] genres…will benefit different educational goals" (p. 206). Echoing Egenfeldt–Nielsen (2006), Petrullo (2008) argued that game-based learning is relevant in today's era of learning with multimedia as it provides opportunities for multifaceted pedagogy. According to Petrullo (2008), the paradox is that we live in the visually oriented world but teach curriculum that is mostly text-based.

Reed (2009) suggested that because players are able to manipulate the objects and characters within the game, and according to Engelkamp's multimodal theory, might allow for better recall of information and knowledge acquisition. Reed (2009) further argued that players "derive inferences by constructing a mental model of the situation described in the story" (Reed, 2009, p. 54), which is essential for learning from the constructivist perspetive.

Most of the literature that favors the constructivist approach to digital game-based learning gives prominence to the "learning by doing" aspect of learning from digital games (Egenfeldt-Nielsen, 2006; Garris, Ahlers, & Driskell, 2002, Hsiao, Chang, Lin, & Hu, 2014)— where knowledge is not just information but most importantly, it is activity and experience (Gee, 2008). From the constructivist perspective, digital games are not only tools; they are, first of all, the environments that can potentially foster learning (Gee, 2009). Despite the overwhelming theoretical support for the potential benefits of game-based learning, the empirical research is still in its infancy (Gee, 2009; Mayer, 2014; Perrotta, Featherstone, Aston,

and Houghton, 2013). A discussion of several studies and meta-analyses on game-based learning follows in the next section.

Research on Games in Formal Educational Settings

Studies on digital game-based learning tend to focus on impact, potential benefits, and barriers to DGBL integration into the classroom, as well as anecdotal observations, case studies, and teacher/student self-report studies (Perrotta et al., 2013; Takeuchi et al., 2014; Wastiau et al., 2009). The literature on this topic presented quite a few interesting examples of how digital games are used in the classroom; however, many of them were missing solid theoretical and research frameworks (Wastiau et al., 2009). Wastiau et al. (2009) reviewed 42 major articles on game-based learning and noted that up to the early 2000s, the research was mostly quantitative but various mixed method research approaches had started to be employed since 2003 (p. 132-133). However, as Egenfeldt-Nielsen (2007) noted, "many of the studies [on video games in education] have severe flaws related to researcher bias, short exposure time, no control group, and lack integration of previous research" (p. 268). This statement was echoed in the later report by Perrotta et al. (2013) where 31 studies on game-based learning were presented and analyzed. The authors concluded,

> evidence [found in those studies] tentatively suggests that video games are motivating and support a more positive attitude to learning and school. However, these findings are not conclusive and require most of all, a more sustained and longitudinal research effort" (p. 25).

Mayer (2014) supported the earlier claims, stating, "The research literature on educational

games is highly diverse, disorganized, and unfocused, with an unusually high number of

methodologically flawed studies (Mayer, 2014, p. 21).

In his 2014 book, *Computer Games for Learning*, Mayer presented a meta-analysis of

media-comparison game research that has been published from 1996 to 2012. Mayer (2014)

summarized all the available empirical "evidence on whether games are more effective than

conventional media" (p. 229) when it comes to learning academic material. Mayer (2014)

reviewed and analyzed research according to five academic domains: science, second-language

acquisition, social studies, mathematics, and language arts. Based on the results of Mayer's

(2014) research, two academic areas seemed to have better learning outcomes in students who

played video games as part of their content learning. Mayer (2014) suggested that "based on

the median effect size: science (d = 0.69, based on sixteen comparisons) and second-language

learning (d = 0.96, based on five comparisons)" (p. 226), video game play might improve

learning outcomes in these two areas. Mayer (2014) further stated that math was "an

unpromising domain (d = 0.03, based on five comparisons), and two not-yet promising domains

were language arts (d = 0.32, based on three comparisons) and social studies (d = 0.62, based

on three comparisons)" (p. 226). In conclusion, Mayer (2014) posited that there is no sufficient

"evidence base" (p. 244) for digital games' positive effect on learning outcomes and therefore it

is "premature to recommend the incorporation of games in school curricula or as stand-alone

training venues" (p. 244). Despite these inconclusive results, digital games are, indeed, being

integrated into the classrooms in various parts of the world (de Freitas, 2006).

How Digital Games are Integrated

Wastiau et al. (2009) discussed one of the earlier studies on the integration of DGBL that involved 70 students ages 7-14 and was conducted in 2000 by Stevens. A control group of 37 students took the same academic test as the research group of 30 students who were asked to play video games for one hour every morning for 30 days (Wastiau et al., 2009, p. 127). Wastiau et al. (2009) report that Stevens suggested that students who played games showed improvement in their schoolwork, attitudes, and sense of direction and also demonstrated increased interest in literature studies (Wastiau et al., 2009, p. 127).

Squire (2004) conducted three case studies in which he used the game, *Civilization III,* as a teaching tool to inspire and motivate students to study social studies in general and history in particular. The first group of students consisted of 18 children who attended one of the inner city schools in Boston, MA. *Civilization III* was integrated into their high school Humanties course. The second group of five students, who came from low socio-economic backgrounds, were selected from the first group of highschoolers; they attended a summer camp program to dig deeper into the game and learn more advanced techniques. The third group of 12 students consisted of a more diverse population of children and all of them volunteered to participate in a short 6-week program at the YWCA (Young Women's Christian Association) where they learned to play *Civilization III*.

For the majority of students in these cases, the basic terms and concepts employed in *Civilization III* were new. A few students simply learned to read or pronounce these terms; others learned their rudimentary definitions and could point to an example but could do little more than that. Still others started to draw connections between game systems and historical

systems, and still others developed genuinely robust understandings for what each game term

meant. In one somewhat unanticipated outcome, students reported learning many

geographical facts, such as where Egypt, Nova Scotia, or Greenland are on a global map (Squire,

2004, p. 356).

One of the most interesting observations Squire (2004) made was the overwhelming

number of questions students posed while playing the game.

In one twenty-to-thirty minute period in the Media summer case (case two), I was asked

about: theology, steam power, free artistry, coastal fortresses, mutual protection pacts,

wealth, the corporation, embargoes, astronomy, refining, espionage, and cavalry, as

well as if threatening other civilizations had an impact on diplomacy and what happened

when the game ran out of names for new cities. These questions ranged from simple

queries about terms (e.g., What is the Colossus?) or geographical facts (e.g., Is there oil

in Greenland?) to functional questions (e.g., What are the effects of democracy?) to

procedural questions (e.g., How do I improve trade?) to questions about the game as a

simulation (e.g., Does the game include World War I?). (Squire, 2004, p. 362).

Squire (2004) concluded that this type of behavior was highly unusual and presented "a stark

contrast to their [inner city youth] typical behavior in school" (p. 362).

Similar to *Civilization III*, *Europa Universalis II* is another complex strategy game used in

Dutch classrooms to teach history. Egenfeldt-Nielsen (2005) conducted a research study in

which 72 high school students from the Netherlands and their teachers used the game over a

period of 10 weeks to teach social studies units. Egenfeldt-Nielsen (2005) concluded that even

though students were engaged and did learn certain material, it was difficult to relate the

lessons learned within the game to the desired learning outcomes and match the required

learning objectives. Egenfeldt-Nielsen (2005) suggested that games should be used as

supplemental material to support the instruction and not to replace it.

Quest Atlantis (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005) and its later version,

Atlantis Remixed, is a three-dimensional virtual environment that can be adapted to various

contexts, from science to social studies. A teacher has the ability to create "quests," or in other

words, educational activities. By completing these educational tasks students save the mythical

Atlantis from a disaster (Barab et al., 2005). Barab et al. (2005) argued that the Quest Atlantis

environment and its 3-D virtual worlds fostered student learning and increased their motivation

through exploration and goal-oriented interactions.

Over the past 10 years, several classroom comparative studies that involved integrating

Quest Atlantis worlds into the science, language arts or social studies curriculum have been

conducted (Warren, Stein, Dondlinger, & Barab, 2009; Barab, Gresalfi, & Ingram-Goble, 2010;

Barab, Pettyjohn, Gresalfi, & Solomou, 2012). According to Jones and Warren (2008) research

on Quest Atlantis "has focused on different thematic units" (p. 915). The results of the studies

demonstrated that students who participated in the learning activities within the immersive

worlds of Quest Atlantis, such as "The Ander City" for a statistics unit in math (Barab et al.,

2010), "Taiga" for a water quality unit in science (Barab et al., 2005), and "Modern

Prometheus" for a 7th grade persuasive writing unit (Barab et al., 2012), showed significant

increases in students' motivation and understanding of complex science concepts. Research on

"Anytown"—one of the games in Quest Atlantis environment—demonstrated notable growth

in students' writing abilities according to standardized test results (Jones & Warren, 2008). In

the discussion of the results of the integration of "Anytown" into the classroom, Warren,

Dondlinger, and Barab (2008) concluded,

> Students were motivated by the narrative structures to engage in substantially more
>
> free-choice writing practice in the treatment class at a ratio of 26:0 over the comparison
>
> class. From a curricular design viewpoint, the teacher did not have to push the optional
>
> activities in the digital environment as they emerged as choices, yet they enhanced the
>
> learner's standing within the game function of Anytown and allowed students to earn
>
> rewards and open additional content (p. 134).

Aside from academic achievement, there is generally a consensus in research that video

games promote problem-solving skills (Chuang and Chen, 2009; Kolovou & Heuvel-Panhuizen,

2010; Liu, Cheng, & Huang, 2011; Ya-Ting, 2012) and knowledge acquisition (Chuang & Chen,

2009; Huizenga, Admiraal, Akkerman, & Dam, 2009; Papastergiou, 2009). According to Gunter,

Kenny, and Vick (2008) "While many agree that most games teach something, most of the

positive attributions about games used in instructional settings center on motivation, social

skill-building, simulations, and changes in attitudes" (p. 512).

Steinberg (2012) provided several examples of how video games were incorporated in

various learning environments. One of the examples was the integration of *Dance Dance*

Revolution (DDR) into West Virginia schools' physical education classes "in hopes of better

exciting and motivating pupils" (Steinberg, 2012, p. 2). Miller, Vaux-Bjerke, McDonnell, &

DiPietro (2013) suggested that at least 10 other states incorporated DDR into their Physical

education curriculum. Miller et al. (2013) recruited 104 students in grades 3-8 from one of the

school districts in the District of Columbia and assigned them to three random groups. One

group was asked to play three 20-minute sessions of DDR where students repeated highly energetic dance moves after their digital avatars.

A second group was asked to play three 20-minute sessions of *Winds of Orbis: An Active Adventure* (Orbis)—a digital game in which students act like superheroes and jump, climb, and perform other highly intensive moves. A third group completed regular physical education (PE) classroom activities. Even though, the researchers discovered that on average students expended more energy when they participated in regular PE activities, children in grades 3-5 were able to meet the exercise intensity criteria while playing both DDR and Orbis (Miller et al., 2013). Adoption of digital games into the classroom led some companies to produce educational versions of their commercial games to be used in the classroom (Steinberg, 2012).

One of the best examples is *MinecraftEdu* by TeacherGaming—a company started by three teachers from the US and Finland and bought by Microsoft in January of 2016—created a modified a version of *Minecraft* that is flexible and powerful enough to be adapted by teachers for various subjects. According to Bristow (2013), by the fall of 2013, 2,500 schools worldwide had been using *Minecraft EDU* in some capacity. In 2012, the Center on Education Policy issued their last paper in a series of six reports dealing with students' motivation to learn. The paper provided a short list of educational games developed to reinforce academic skills and to motivate disengaged students. *Lure of the Labyrinth*, developed by MIT were among them.

Schwartz and Arena (2013) used *Stats Invaders*—a variation of the classic video game *Space Invaders*—to teach statistical probability distribution. Eighty-three community college students participated in a study out of which 53 played the game where descending alien ships created special formations according to specific probability distribution curves, whereas others

just read a textbook passage about the probability and distribution (Schwartz & Arena, 2013). In

addition, 51% of the students who played the game were given a two-page document that

offered a more formal explanation of statistical distribution and its concepts after they

completed the game (Arena and Schwartz, 2014). A post-test was administered, where all 84

students took a 10-question quiz on statistical distribution. The 26 students who played the

game and read the passage outperformed the students who just played the game and the

students who just read the passage (Arena and Schwartz, 2014).

In their later work, Arena and Schwartz (2014) suggested,

> The research demonstrates that even without having instructional content that maps
>
> directly onto curricular standards, games can prepare students to learn in more formal
>
> environments, such as school. Game environments can provide experience, and formal
>
> environments can provide explanations. This clarification should be useful for creating
>
> learning games because it can help them focus on what games do well, rather than
>
> trying to make games into a standalone solution for learning (p. 547).

Echoing Mayer's (2014) conclusions about social studies being a "not-yet-promising domain" (p.

226), Sáez-López, Miller, Vázquez-Cano, and Domínguez-Garrido (2015) concluded that there

was no significant difference (Sig. 2-tailed = 0.32) in learning outcomes between middle school

students who studied the history of architecture using *MinecraftEdu* and those who used

Microsoft Power Point slides and "other expositional methods" (p. 114).

In 2015, Cuhadar and Kampf incorporated games into a political science unit and

facilitated an international study aimed to investigate how video games enhance learning about

conflicts. Forty Israeli-Jewish participants from Tel Aviv University, 30 Palestinian students from

Al-Quds University, and 30 Guatemalan students from the University of San Carlos of Guatemala in a three hour experiment during which participants answered survey questions before the game, played two different scenarios in the game, *Global Conflicts*, and filled out another short survey after the completion of the game (Cuhadar & Kampf, 2015). In *Global Conflicts* students were asked to play two different scenarios within the game—an "Israeli checkpoint scenario related to the Israeli-Palestinian conflict and the Guatemalan civil war scenario" (Cuhadar & Kampf, 2015, p. 4). "The questionnaire used before and after the game was almost identical in content with the exception of a few additional questions in the post-game questionnaire deliberating participants' experience with the game" (Cuhadar & Kampf, 2015, p. 5). Despite the fact that the results of study demonstrated that both groups gained knowledge about the conflicts they were asked to explore, Guatemalan students did not change attitudes toward the civil war in their country whereas Israeli and Palestinian students "shifted from ethnocentric attitudes towards a more impartial attitude" (Cuhadar & Kampf, 2015, p. 8)

Despite the fact that numerous studies, including the aforementioned research on the integration of digital games into the classroom, showed positive results, "the literature is split on the extent to which video games can impact overall learning outcomes" (de Freitas, 2006, p. 5). In addition, "There are still a number of barriers to overcome before video games will see widespread acceptance as educational tools. Violence, [game] addiction, gender, and socioeconomic differences are serious issues that need to be fully addressed before parent and teacher attitudes towards video games will improve" (Arias, 2014, p. 64).

Teachers' Attitudes Toward Game-Based Learning

      In 2006, a study by the video game development companies FutureLab and Electronic

Arts produced a report on how integrating *Sims 2*, *Knight of Honor*, and *Roller Coaster Tycoon 3*

in four different schools in the United Kingdom influenced teachers' and students' attitudes

toward DGBL, as well as the impact of those games on learning outcomes (Sandford et al.,

2006). In 2009, FutureLab produced a similar study on teachers' perceptions of the value of

gaming in school (Williamson, 2009). The results from both studies are outlined in Figure 1 and

suggest that teachers' attitudes toward game-based learning have changed somewhat. The

findings of these two studies were very consistent with each other and "the similarity of this

data, although impossible to cross-reference directly, suggest that the figures are reliable"

(Williamson, 2009, p. 23).
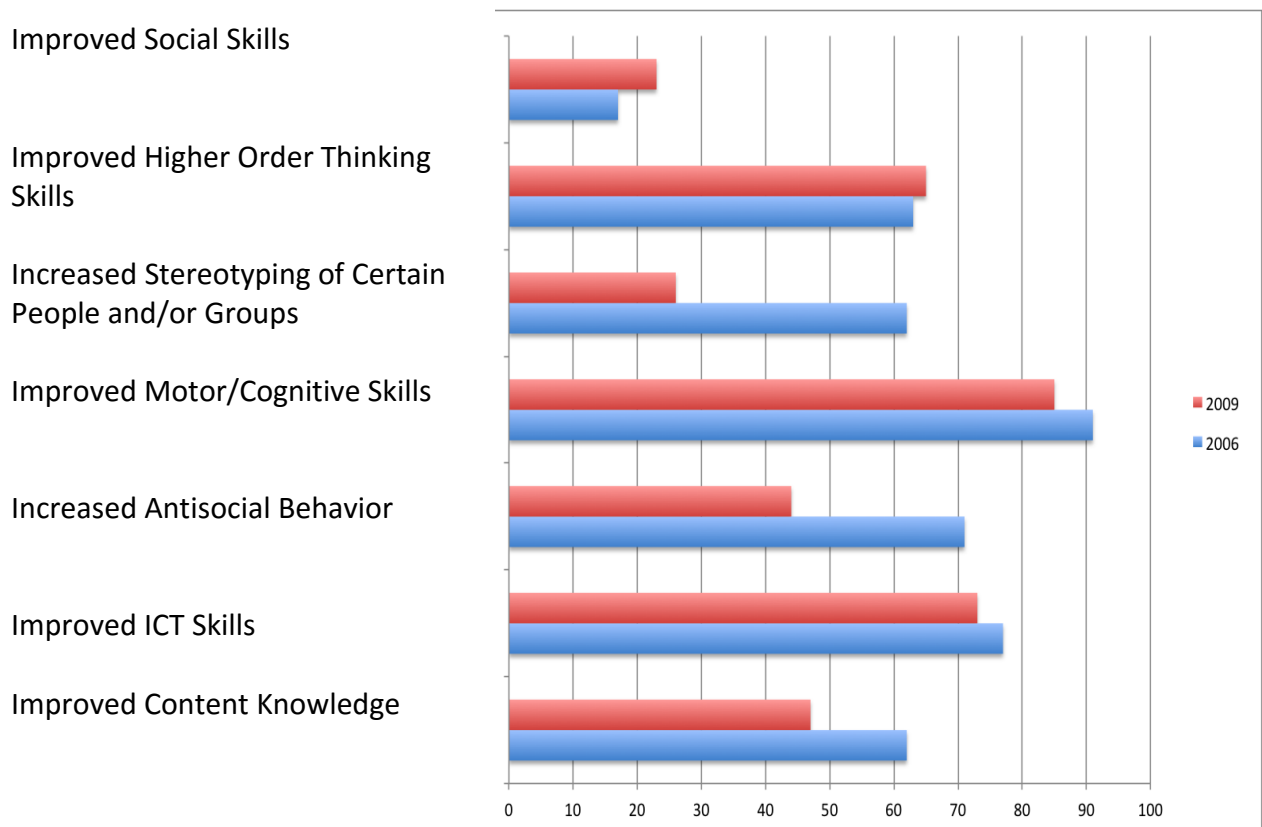
Figure 1. Comparison of Sanford et al. (2006) and Williamson (2009) survey results.

Further, in the same studies it was shown that teachers' perceptions of certain aspects of digital game-based learning have dramatically improved; for example in 2006, 71% of teachers believed that introducing videogames into the classroom might foster antisocial behavior in students, such as isolation and lack of empathy, whereas in 2009 only 44% of teachers supported that claim (Sandford et al., 2006; Williamson, 2009). In contrast, other areas studied showed significant declines for support of certain aspects of DGBL and increases in negative attitudes toward digital games in the classroom. For example, in 2006, 62% of teachers believed that introducing games into the classroom might improve knowledge in particular subject areas, whereas in 2009 this number dropped to 47% (Sandford et al., 2006; Williamson, 2009).

Pastore and Falvo (2010) surveyed 98 in-service and pre-service teachers and concluded that

> A majority of both in-service (85%) and pre-service (84%) teachers agreed that gaming was a good use of technology for learning. They also both agreed (in-85%, pre-86%) that gaming enhances students' learning. Accordingly, they both agreed (91%) that gaming motivates students (p. 51).

Pastore and Falvo (2010), therefore, suggested that teachers are becoming more open to the idea of games as potential learning and teaching tools. Millstone (2012) also presented a report by an independent, nonpartisan research center founded by Sesame Workshop to advance literacy in children, the Joan Ganz Cooney Center (Cooney), in collaboration with BrainPop, a group of educational websites. The report suggested that 70% of 500 US teachers surveyed

believed that digital games increase engagement and motivation, 62% believed that digital

games might help them become more effective teachers and 60% indicated that digital games

foster collaboration and teamwork among students. In addition, 95% of teachers admitted to

using educational games in their classrooms (Millstone, 2012). However, only 18% of the

participants in the Millstone (2012) survey were open to adapting commercial games into their

instruction. Despite the fact that many educators are slowly becoming more open to video

game integration into the classroom, not all the researchers are equally enthusiastic about

bringing digital games into the formal educational setting (Perrotta et al., 2013).

Barriers Toward Integration of Game-Based Learning

The 2012 report from Cooney and Brain Pop identified several issues that these teachers

believed served as barriers to digital game use in the classroom. Fifty percent of the teachers

indicated that cost was one of the major barriers to digital game integration, 46% reported that

access to technology resources was the substantial barrier, whereas 38% of teachers believed

that the emphasis on standardized testing did not allow for much flexibility and instructional

innovation (Millstone, 2012).

Unlike teachers, several game researchers are skeptical about the affordances of digital

game-based learning and believe that the major barrier to its integration might be the lack of

empirical evidence that it actually works (Mayer, 2014). Buckingham (2007) argued that the

recreational nature of video games might cause an undesirable effect on students' attitudes

toward school. Buckingham (2007) suggested

> we need to be wary of simply celebrating children's informal experiences of media and
>
> technology…there are good reasons to be cautious about the idea of simply extending

those experiences into the more 'formal' context of the school" (Buckingham, 2007, p. 101, as quoted in Perrotta et al., 2013, p. 25).

Buckingham (2007) further noted that the interest-driven nature of video games might undermine the distinctive role of schools and cannot "replicate the important forms of learning" that schools provide (Perrotta et al., 2013, p. 25). The more recent report by Perrotta et al. (2013) presented the results of the latest research on digital game-based learning, most of which showed that video games might positively impact students' attitudes toward certain subjects and even improve expected learning outcomes. Despite such promising results, Perrotta et al. (2013) suggested, "the current literature does not adequately evidence the presumed link between motivation, attitudes to learning, and learning outcomes" (p. ii). There is certainly a great need for longitudinal studies on the potential effects of game-based learning in order to determine whether any positive impact can be sustained (de Freitas, 2006; Perrotta et al., 2013; Wastiau et al., 2009).

Issues with Instructional Design

O'Neil, Wainess, and Baker (2005) suggested that for a digital game to become an effective teaching environment, it should be supplemented with additional curricula and employed within the framework of successful instructional practices. Many teachers feel pressured to introduce digital games into their classrooms (Gunter et al., 2008), and as a result, they choose to supplement their instructional activity with a game that might not necessarily be effective in a given context (O'Neil et al., 2005). Many teachers do not play the digital games as often or on the same scale as their students (Gunter et al., 2008); therefore, teachers' lack of understanding of complex storylines and how they affect gameplay contributes to poor choices

by educators when selecting a game as a teaching tool for their students (Squire, Barnett, Grant, & Higginbotham, 2004; Squire, Kurt, & Jenkins, 2011). According to Felicia (2009,) aside from so-called educational games, commercial video games were initially designed for entertainment; therefore, they were not "built on instructional design [rules; despite this fact] some of them intrinsically implement some well-known pedagogical principles" (p. 9).

Kearney and Pivec (2007a) suggested that persistent re-engagement is one of the characteristics of successful digital games. Some researchers, such as Colby R. S. and Colby R. (2008); Garris et al. (2002); Hirumi, Appelman, Rieber, and Van Eck (2010); Paras and Bizzocchi (2005); and Quinn (1997), all attributed this aspect of digital games to the concept of flow from Csikszentmihalyi (1990). According to Csikszentmihalyi's flow theory, the key to a successful learning activity is to create a flow, or in other words, to find the balance between the ability of the student and the challenge presented to them (1990). Digital games have all the attributes to create a successful flow—where players are having fun and are constantly engaged (Kearney & Pivec, 2007a). However, when digital games are used in the educational setting, the flow is sometimes lost (Gunter et al., 2008). One of the reasons is that the game chosen by the instructor does not teach anything new, and as a result, becomes boring; thus, students do not feel challenged and the flow is lost (Colby, R. S. & Colby, R., 2008). Koster (2013) noted, "Games grow boring when they fail to unfold new niceties in the puzzles they present" (as quoted in Colby, R. S. & Colby, R., 2008, p. 304). Some researchers argue that when designing for the digital game-based classroom, instructional designers should be capable of creating environments in which the flow is maintained while the learning objectives are met, and opportunities for knowledge application and transfer are presented (Colby, R. S. & Colby, R.,

2008; Garris et al., 2002; Gunter et al., 2008; Kearney & Pivec, 2007b).

In a more recent study by Admiraal, Huizenga, Akkerman, and Ten Dam (2011),
researchers aimed to establish a link between flow and learning outcomes in DGBL. Two
hundred and sixteen secondary school students in Amsterdam played *Frequency 1550*, a game
about medieval Amsterdam for one school day (Admiraal et al., 2011). Students' learning
outcomes were measured on a 30-question test that included both open-ended and multiple-
choice questions (Admiraal et al., 2011). The results indicated that flow had no effect on
students' performance on the test; 76% of the variance in the score of student learning
outcomes was due to the difference between the students—the older the students were, the
better they performed (Admiraal et al., 2011, pp. 1190-1192). The results of the study indicated
that flow definitely affected students' performance in the game since

> 43% of the variance in game performance has been explained by team flow and both
>
> types of distractive activities in a team. This means that the more flow in game play
>
> student teams showed, and the less distractive activities they carried out, the better
>
> they performed in *Frequency 1550* [italics added] (Admiraal et al., 2011, p. 1191).

Hamari et al. (2016) outlined and discussed the works by Akkerman et al., 2009; Brom et
al., 2014; Byun and Lob, 2014; Coller and Shernoff, 2009; Deater-Deckard et al., 2014; Eseryel
et al., 2013; Hou, 2015; Hou and Li, 2014; Huizenga et al., 2009; Hung et al., 2015; Liu et al.,
2011; Pellas, 2014; Proske et al., 2014; Ronimus et al., 2014; Sabourin and Lester, 2014; Tüzün
et al., 2009; van der Spek et al., 2013; and Wang and Chen, 2010. By reviewing the last six years
of empirical research on the effects of flow on learning and engagement, Hamari et al. (2016)

concluded that "there is reason to believe that flow (challenge and skills), engagement, and immersion have a positive impact on learning" (p. 176).

However, Hamari et al. (2016) further suggested that despite the fact that game-based learning has a positive effect on learning in general, it is still necessary to study whether or not game play might produce a concrete learning outcome. This argument can be traced back to Gunter et al. (2008) who suggested,

> W]hile most games appear to be effective in terms of creating an environment where students stay on task longer while engaged in the process of playing, little empirical evidence exists that demonstrates games provide any more positive, systematic outcomes for content learning than traditional teaching methods. (p. 512).

Research conducted by de Freitas (2006) suggested that the lack of empirical data that supported the fact that digital games work and produce desired learning outcomes serves as "One of the main obstructions to uptake of games in learning contexts" (p. 5).

Issues with Learning Outcomes

According to Garris et al. (2002), "unfortunately, there is little consensus on game features that support learning, the process by which games engage learners, or the types of learning outcomes that can be achieved through game play" (p. 442). Egenfeldt-Nielsen (2006) argued that in order for schools, teachers, students, administrators, researchers, and parents to accept digital games in the classroom it is not sufficient to demonstrate either positive or negative results of studies that deal with possible learning outcomes of digital game-based learning. The main question, according to Egenfeldt-Nielsen (2006) should be whether it is worth an effort to even introduce digital games into the regular classroom. One possible reason

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for this is the mismatch between what is expected as a measurable outcome in a traditional

classroom and the potential learning experience that games can provide (de Freitas, 2006;

Robinson, 2006; Garris et al., 2002).

In addition, as de Freitas (2006) pointed out,

Most studies were not conducted over substantial periods of time and it could therefore

be argued that learning gains were not advanced enough to be reflected in standardized

achievement tests. Outcome comparisons across studies may also be aided through

some level of agreement and consistency on how academic achievement should be

measured in relation to video games. (p. 5)

These statements find support in Egenfeldt-Nielsen (2006), where the author presented a short

synopsis of research from 1981 to 2005 on the effectiveness of game-based learning. Egenfeldt-

Nielsen (2006) suggested that even though research indicated that video games facilitate

learning and many results are promising, some skepticism is "warranted, however, because of

the lack of control groups, researcher bias, weak assessment tests, and short exposure time is

not addressed sufficiently" (p. 188).

O'Neil et al. (2005) implied that the lack of testing and the inability of current research

to establish a link between game-based learning and measurable learning outcomes should

suggest that the potential of video games for learning have to be "dismissed as motivational

fluff" (p. 456). On the other hand, de Freitas (2006) argued that this uncertain connection

between learning with games and specified measurable learning outcomes does not "mean

that learning is not taking place…it may indicate that learning through immersive worlds

involves a more complex understanding of learning, one that is not so easy to tie to specified

learning outcomes" (p. 18). Gunter et al. (2008) suggested that that "some researchers feel that a game's ineffectiveness as an academic learning tool is often the result of confusion over what it intends to teach: academic content or positive, intrinsic, and social attributions that are generally associated with the process of gameplay and interactivity" (p. 512).

Issues with Parental Attitudes

According to Oosting et al. (2008), parents are generally aware of "many potential developmental and educational benefits of digital games" (p. 5); however, many of them are still hesitant to accept digital games in the classroom (Bourgonjon et al., 2001; Colby R. S. & Colby, R., 2008; Oosting et al., 2008). Oosting et al. (2008) also suggested that despite the fact that "many of today's parents are avid gamers themselves" (p. 1), both the sophisticated levels of game technology and diversity of gaming content make it difficult for parents to fully "understand and guide their children's media choices and consumption patterns" (p. 1). Colby, R. S. and Colby, R. (2008) argued that parental attitude toward digital games in the classroom is influenced not only by the lack of parental understanding about the complex nature of video games but also by the overall notion of games being pastimes and play being a leisure activity. Additionally, Colby R. S. and Colby, R. (2008) suggested that in our post-industrialized society, games and play, in general, are often contrasted with work and considered unimportant. Williamson (2009) suggested that the problem stems from the public perception of "what actually constitutes valid and valuable educational activity, and is similarly related to popular perceptions of gaming as a purely pleasurable pastime rather than a challenging complex of social activities and skill" (p. 35). Whitebread et al. (2012) supported that claim and concluded that games as activity are considered "...trivial, and lacking in any serious purpose. As such, it is

seen as something that children do because they are immature, and as something they will

grow out of as they become adults" (p. 1).

Bourgonjon et al. (2011) suggested that it was not only important to know what parents

thought about games but also what factors influenced parental attitudes. These claims were

supported in Whitebread et al. (2012), where the authors noted that the area of parental

attitude toward games and play is under-researched and requires in-depth investigation.

The next part of the literature review will present the theoretical framework for

exploring parental attitudes toward digital game integration into the classroom.

<center>Parents and Video Games: Theoretical Perspective</center>

Colby R. S. and Colby, R. (2008) discussed the integration of digital games into the

college classroom and concluded,

> Students come to college with many expectations about academic rigor, and they often
>
> perceive games as outside these expectations…Years of children being told that
>
> homework must be finished before play perpetuates this distinction so that by the time
>
> the college-bound student arrives, games exist outside the seriousness of the classroom.
>
> (p. 302).

These observations were supported in Green et al. (2009), where the authors argued that

parental attitudes toward a certain activity influence how their children feel about it. Oosting et

al. (2008) suggested that even parents who are gamers might object to digital game integration

into their children's classrooms. This paradox is explained in the attitude model developed by

Schafer and Tait (1981), which states "there are factors that intervene between attitudes and

<center>50</center>

behavior which would cause a person's behavior to be inconsistent with his or her attitudes" (p.

3-4).

The Attitude Theory

Schafer and Tait (1981) suggested that the way one feels about a certain idea influences

one's behavior toward it. The authors proposed the following definitions: (a) Beliefs—

knowledge or information, which a person assumes to be true; (b) Values—general feelings

about what is desirable or undesirable; (c) Habits—automatic ways of behaving in appropriate

situations with a minimum of thinking; (d) Social Norm—expectations of behavior which the

members of the group, community, or society share; (e) Expected consequences—expectation

of the reward or cost (1981, p. 4).

However, according to Schafer and Tait (1981), even though it is possible to predict how

people will behave based on their attitude "it is not uncommon for people to have feelings one

way and to behave differently" (p. 3). Figure 2 demonstrates the possible intervening factors
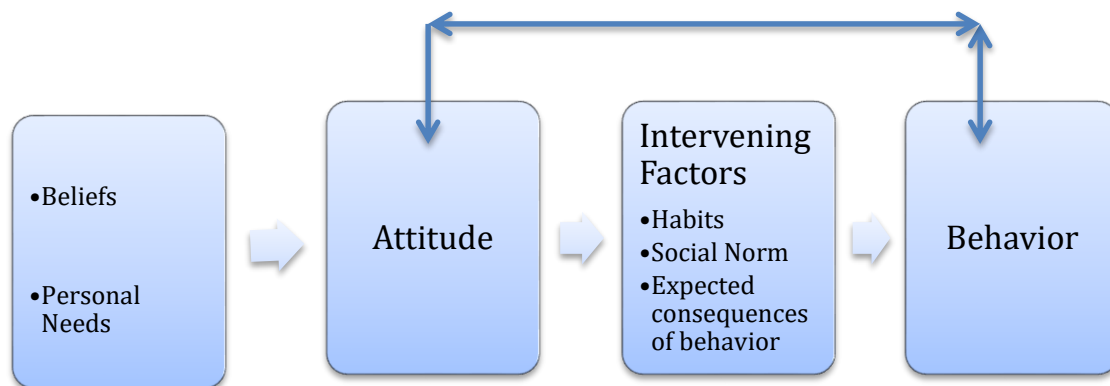
between attitudes and behaviors

Figure 2. The Attitude Theory Model presented by Schafer and Tait in *A guide for understanding attitudes and attitude change*, 1981, p. 5).

In addition, Schafer and Tait (1981) suggested that attitude might change as a result of a person's behavior. The authors argued,

> Once a person behaves a certain way, for whatever reason; there is a pressure on the individual to keep his/her attitudes consistent with that behavior. Therefore, behavior under certain circumstances will influence attitudes. (Schafer & Tait, 1981, p. 5)

When parental attitude toward digital games in a classroom is viewed in the framework of the attitude model, certain traits in the literature begin to emerge. The majority of research suggested that parental attitudes are biased and are influenced by factors that might be outside of parents' initial beliefs and values (Bourgonjon et al., 2010; Oosting et al., 2008; Rideout, 2014; Vitelli, 2014; Choo, Sim, Liau, Gentile, & Khoo, 2015)

Parental Bias and Social Norm

Schafer and Tait (1981) named social norm as one of the main factors that intervene between attitudes and behaviors. In the 1973 theory of reasoned action, Fishbein and Ajzen introduced the term *subjective norm*, which is defined as "a person's perception that most people who are important to him think he should or should not perform the behavior in question" (as cited in Bourgonjon et al., 2011, p. 1436).

Skoien and Berthelsen (1996) suggested that the sociocultural environment in which people exist affects their attitudes; therefore, people always strive to do what is considered to be socially acceptable. Kenny and McDaniel (2009) argued that if video games were not generally accepted as a valid tool for learning in certain sociocultural contexts, members of that society would most likely reject their integration into the classroom. Kenny and McDaniel (2009) referred to this behavior as *collective consciousness* and used the 1991 definition by Jary

and Jary to describe the phenomenon as "the shared beliefs and moral attitudes that operate as a unifying force within society that directly influence an individual's ideals, beliefs, and behaviors" (as cited in Kenny and McDaniel, 2009, p. 5). According to Hsu and Lu (2007), "Social norm significantly influences technology use" (p. 1658) and "is a significant driving force for acceptance of technology when the latter is perceived as innovative" (Bourgonjon et al., 2011, p. 1440).

In their research, Bourgonjon et al. (2011) found social norm to be one of the most important factors that influenced parental attitudes toward integration of digital games into the classroom. In addition, Bourgonjon et al. (2011) suggested that it might be difficult to examine the effect of subjective norm on people's behavior as people tend to "internalize a referents' beliefs and make it part of their own belief system" (p. 1436).

Parental Bias and Media Messages

Skoien and Berthelsen (1996) suggested that all the media attention about the potentially harmful effects of video games served as one of the main factors that influenced parental beliefs. The media blames video games for anything from childhood obesity to increased childhood aggression and violence (Bourgonjon et al., 2011, Skoien & Berthelsen, 1996); however, "there was also no significant relationship between the amount of time children spent on videogames and aggressive behavior. Furthermore, a positive relationship was found between time spent on videogames and a child's intelligence" (van Schie & Wiegman, 1997, p. 1175).

Oosting et al. (2008) suggested that public debates about the possible negative effects of video games on the young contributed to the overall perception that games have a

potentially damaging effect on children (Oosting et al., 2008). According to Bourgonjon et al.

(2011), media claims would have a "profound impact on [parental] acceptance of DGBL" (p.

1436.) These claims were further supported in a pilot study by Piller and Gong (2012), where

the authors named media coverage on game violence as one of the factors that influence

parental belief that video games might be harmful to their children. On this same subject, Vitelli

(2014) stated,

> Despite the potential value of video games, much of the media coverage up to now has
>
> been negative, particularly due to concerns about potential video game addiction and
>
> their violent content….Attaching labels such as "good," "bad," "violent," or "prosocial"
>
> largely overlooks the complex picture surrounding the new generation of video games
>
> now available. (para. 19).

Ferguson (2007) noted that the majority of media hype about video games happens after a

tragic event, such as a mass shooting. Ferguson (2007) further suggested that most of the polls

on people's attitudes toward video games took place right after a tragedy when the country

was still grieving. That inappropriate timing inadvertently produced biased results (Ferguson

2007).

Kümpel and Haas (2015) conducted a study in which 360 participants were exposed to a

news article about negative effects of a computer game, and presented both the journalistic

and expert points of view. The results of Kümpel and Haas (2015) experiment demonstrated

that by "framing gaming," media could influence people's attitudes; however, it was still

unclear how much impact it actually had and what role individual idiosyncrasies played in the

process. Ferguson (2015) suggested that certain personality traits might promote negative

beliefs about digital games. Ferguson (2015) also stated that by playing digital games with their

children, parents could offset the negative impact media has on parental attitudes

The Effect of Parental Involvement and Mediation of Gameplay

In 1983, Singer, J. and Singer, D., stated that being engaged in multimedia activities with

their children might be the key to successful parental mediation and educational outcomes of

multimedia experiences. Neuman (1995) argued that parental involvement in play promotes

parent-child interaction, which in turn, strengthens parental influence on their children's beliefs

and encourages children to form their own views about video games and their effect.

Henderson and Mapp (2002) compiled 51 studies that provided empirical evidence for a

positive correlation between parental engagement in their children's education and student

achievement. Research demonstrated that the more involved parents were in their childrens'

education, the better their children did at school (Skoien & Berthelsen, 1996; Henderson &

Mapp, 2002; Whitebread et al., 2012). By bringing parents on board and educating them about

the potential of video games, schools can create partnerships that will allow students to extend

their learning beyond the classroom (Henderson & Mapp, 2002).

The 2008 report titled *Teens, Video Games, and Civics* presented the results of a

national survey that, among other things, looked at parental mediation techniques and

involvement in video game play with their children (Lenhart et al., 2008). Lenhart et al. (2008)

reported that

> a very small number of parents say they regularly play games with their children. Only
>
> 2% of parents say they always play video games with their teenaged children, compared
>
> with 29% who say they sometimes play games with their children, 26% who say they

rarely play games with their children, and 43% who say they never play games with their

children. (p. 38).

Despite the fact that parents are not generally involved in their children's gameplay, "90% say

they always or sometimes know what game their child is playing; 72% say they always or

sometimes check the ratings before their children are allowed to play a game; 46% of parents

say they always or sometimes stop their kids from playing a game" (Lenhart et al., 2008, p. v).

There is a consensus in the literature that parents play an important role in students'

attitudes toward gaming (Skoien & Berthelsen, 1996; Whitebread et al., 2012). Therefore, when

parents "participate in a media form with their children, [they] are able to impart their values

and beliefs about the acts and messages within the media form" (Lenhart et al., 2008, p. 38).).

Several researchers agreed that parental involvement and mediation were significant factors in

contributing to the overall educational effect of multimedia in general, and video games in

particular (Neuman, 1995; Rideout, 2014; Singer & Singer, 1983; Skoien & Berthelsen, 1996;

Steinberg, 2012; Turkay et al., 2014; Whitebread et al., 2012; Williamson, 2009). However,

Lenhart et al. (2008) reported that 62% of parents do not discuss nor emphasize the effect of

digital games with their children. Providing parents with opportunities to learn about potential

benefits of digital game-based learning might increase parental involvement into the learning

process and motivate parents to be more engaged in their children's education (Williamson,

2009). Williamson (2009) reported that one of the secondary schools that incorporated game-

based learning into the curriculum created events specifically for parents: seminars, showcases,

and lectures. One of the last parent events had more than 250 parents in attendance, according

to Williamson (2009). This demonstrates how the use of games in schools galvanizes interest; a

more focused exploration of parents' attitudes towards educational gaming would provide useful evidence to understand this more fully (p. 35).

Piller and Woychesin (2015) concluded,

Parents might be the support system that educators need in order to ensure that students are able to see educational value of video games and are willing to think critically and draw connections between what they learn in the gaming environment and core subject areas. (p. 3)

Ferguson (2015) stated by playing digital games with their children, parents would not only reduce some of their fears about the nature and effect of certain games but also gain information and credibility with their children.

Conclusion

In this chapter, we identified the definitions of a game and game-based learning. We provided a review of current research on how digital games are used in formal and informal educational settings. We also examined the theoretical framework in which digital game-based learning could be situated, as well as discussed barriers to digital game integration into the classroom. In addition, we deliberated over the reasons why educators should take parental attitudes toward game-based learning into consideration when they decide to integrate digital games into the classroom.

CHAPTER III

RESEARCH METHODS

This chapter discusses the methodology used to collect and report the findings from the study. This chapter also addresses the sampling procedures, procedures for data collection and analysis, as well as credibility of the methods selected. The rigor, validity, dependability, and conformability of the research are described in order to allow readers to determine the transferability of this mixed-method study.

Approach to Methodology

This exploratory research was conducted using a non-positivistic method of Triangulation Design, utilizing both quantitative and qualitative techniques. The purpose of this research was not to draw conclusions and find definitive answers but to learn more about the problem by investigating the following question: What social, cultural, and economic factors influence parental attitudes toward digital game-based learning? Nargundkar (2003) suggested that despite the fact that exploratory studies might have smaller sample sizes, "it helps to do the exploratory study as methodically as possible, if it is going to be used for major decisions about the way we are going to conduct our next study" (p. 41). From the literature review, it was deduced that by utilizing mixed methods, the research study would be approached in a more holistic manner. "Mixed methodology offers pluralism as an alternative to philosophical dualism and allows for fruitful integration of both worlds, which frequently results in superior research" (Johnson & Onwuegbuzie, 2004, p. 14).

For the current study, a quantitative research process was used first. This part of the research was designed to identify what groups of parents were better positioned to accept and

support digital game-based learning and which groups were less likely to have positive attitudes toward integrating digital games in the classroom. The literature review demonstrated that certain aspects, such as social economic status, age, education level, and/or cultural background might influence people's behavior and their attitudes toward certain innovations. This portion of the study also explored if any of these factors could serve as a predictor of parental attitudes toward digital game-based learning. An initial survey was administered to collect data and determine if there were any commonalties among parents: those who supported digital game-based learning and those who were not in favor of such instructional methodology. This part of the research was conducted using previously developed instruments to collect the quantitative data needed.

Second, this study explored how social and cultural contexts in which parents live affect their attitudes toward game-based learning. The initial plan was to use a nonprobability sampling technique of purposive sampling. The hope was to explore a wide range of perspectives by utilizing maximum variation sampling; however, only a very small number of participants provided the researcher with their contact information. Therefore, the population for the second part of the study had to be selected through mixed purposeful sampling methods utilizing consent, purposive, and convenience sampling strategies (Patton, 1990). The second part of the study consisted of semi-structured interviews that allowed the researcher to explore the idiosyncrasies of three particular groups of parents. To ensure triangulation and minimize measurement, sampling, and procedural biases, the following types of data collection were employed during the research study: a demographical survey, a perception/attitude survey, combination sampling, and semi-structured interviews.

Participants

Participants in this study were parents whose children attend a college-preparatory

public charter middle school (Grades 5-8) in a major city in the state of Texas, USA. As of

September of 2015, the school had 426 students and 93.7% of the population came from

economically disadvantaged homes. Tables 4 and 5 present demographical data that was

reported by the Texas Education Agency (TEA) for 2013-2014 school year. At the time the

current study was conducted, an updated school report card was not available from TEA. School

demographic data demonstrates that the majority of Texas students are of Hispanic or Latino

origin. In addition, more than one-third of the student population is English language learners.

Table 4

School enrollment by race/ethnicity

Population	Percentage
African American	17.6%
Hispanic	79.4%
White	1.2%
American Indian	0.0%
Asian	1.6%
Pacific Islander	0.0%
Two or more races	0.2%

Table 5

School enrollment by student group

Population	Percentage
Economically disadvantaged	93.7%
English language learners	35.6%
Special education	3.7%

A data collection instrument, in the form of a survey, was created using Qualtrics and the link to the survey was emailed to the school's principal in late October of 2015. The principal sent out a mass email to all parents asking them to fill out the survey online. The text of the email (introductory letter), as well as the consent form were provided by the researcher and created in accordance with the University of North Texas Institutional Review Board (IRB) guidelines and approval process. One week after the email was sent out, 300 packets were sent home with the students in grades 5-8. Each packet consisted of a cover page, an introductory letter, a consent form, and the survey questionnaire. The cover page asked the parents to ignore the survey if they had already participated online. Participation in the research study was voluntary and anonymous; however, participants who were willing to be interviewed were asked to add their email addresses at the end of the survey.

Forty-one participants started an online survey, but only 26 ($n = 26$) were qualified to participate in the study. Ten online participants ($n = 10$) indicated that their children did not play video games; therefore, the system did not allow them to participate further. Five participants ($n = 5$) even though qualified, abandoned the survey before completion. Three hundred hard copies were distributed to the participants; however, only 112 ($n = 112$) people agreed to participate in the current research. Despite the fact that 112 people submitted their answers, only 73 ($n = 73$) qualified. Thirty-nine participants ($n = 39$) skipped one or more survey questions and were therefore disqualified. The total number of qualified participants in the first phase of the study consisted of 73 ($n = 73$) people who completed the paper survey and 26 ($n = 26$) online participants, a total sample size of 99 qualified subjects ($N = 99$).

The Survey

Prior to the main survey questions, participants were presented with the following information:

a. Why the study was being conducted and how it was to be administered

b. Participants' rights

c. Possible benefits and potential risks of the study

d. Procedures for maintaining confidentiality of research records

Part I of the survey was adapted from the questionnaire developed by Piller and Gong (2012) for their pilot study on differences in parental perception of video games between American-born and immigrant parents (Appendix A). It was necessary to find out whether a parent participant was American-born or an immigrant in order to understand if this fact affected their attitudes toward game-based learning and if so, how. (Kim & Hong, 2007; Moreno & Chuang, 2011; Oosting et al., 2008). The literature review demonstrated that ethnicity and cultural background played important roles in people's behavior and attitudes (Moreno & Chuang, 2011; Skoien & Berthelsen, 1996) since the ethnical subcultures in which people exist influence their family, academic, and social values (Dreby, 2009; Kao & Tienda, 1995; Lopez, Sanchez, & Hamilton, 2000).

Part II of the survey included the main questionnaire, consisting of questions adapted from several previously developed scales (Appendix B). The purpose of that questionnaire was to explore factors that might influence parental attitudes. The following scales were adapted and modified to fit the current research:

a. Parental involvement was measured across two sub dimensions (a) Rule Setting and

(b) Involvement in Gameplay. The questions (Appendix B) were adapted from a Piller

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& Gong (2012) questionnaire that was based on "a scale developed by van der Voot and Nikken's (1992) and published in their "Determinants of parental guidance of children's television viewing: A Dutch replication study." Skoien and Berthelsen (1996) adapted this scale to study parental beliefs about video games" (p 7). The scale has employed a four-point rating scale with response options of *Never*, *Occasionally*, *Often*, and *Always.* The first five questions measure Rule Setting when it comes to video game play and the last eight questions measure parental involvement in video game play.

b. To measure parental perception of digital game-based learning, an instrument developed by Wlodarczyk (2012), "Perceptions of Video Games in Education by PK-12 Public School Administrators in Connecticut " and modified by Piller and Gong (2012), was further adapted. The scale was designed to measure parental attitudes across two dimensions (a) Potential of DGBL and (b) Parental Concerns about DGBL. The scale consisted of 12 Likert-type questions with answers ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The first seven questions measure Potential of DGBL in the classroom whereas the last five questions measure Parental concerns about DGBL (Appendix B).

c. Negative media effect and Social Norm constructs were adapted from the instrument developed by Bourgonjon et al. (2011) for a proposed path model to "explain and predict parental acceptance of video games" (p. 1434). All the questions from Negative Media Effect instrument were transferred over to current survey with minor changes to the wording in order to make the questions more

applicable to the population selected for the current research. In addition to the

three original questions that were transferred to the Social Norm instrument from

the Subjective Norm scale, one more question—*People in my community think it is a*

good idea to use games in the classroom—was added (Appendix B).

The data was further analyzed using exploratory qualitative data analysis. Part III of the survey

was designed to collect demographic data such as sex, age, income, and level of education.

Semi-Structured Interviews

In order to explore further what social and cultural contexts influenced the parental

attitudes toward digital game-based learning, semi-structured interviews were conducted with

six participants. Initially, the goal was to select two participants from seven different

backgrounds that were identified during the initial data collection for a total number of 14

interviewees. The cultural backgrounds represented in the study were: USA, Central America,

former Soviet Union, Mexico, West Africa, India, and Southeast Asia. However, out of 99

participants, only 15 provided the researcher with contact information and agreed to

participate in the interviews. The 15 participants who agreed to participate in the second part

of the research represented three out of seven different cultural backgrounds. These conditions

dictated that purposeful sampling be mixed with convenience ; thus, two participants from

each represented group were selected for a total number of six interviewees.

The researcher contacted them by email to set a date and time for the interviews. The

interviews were conducted over the telephone during the last two weeks of December of 2015.

Each interview lasted approximately 30 minutes. Every interview was recorded, transcribed,

and presented to subjects for verification of content and accuracy. No personally identifiable information was collected. Each interviewee was assigned a pseudonym for identification.

Data was further analyzed using qualitative techniques of data coding and categorizing in order to understand emerging knowledge. To avoid bias, an independent researcher was invited to participate in data coding. Frequent debriefing sessions between the researchers were held to provide opportunities to "test researchers' developing ideas and interpretations" (Shenton, 2004, p. 67).

Initial coding employed in vivo codes where participants' own language/words was used as codes "to ground the analysis from the [participants'] perspectives] (Saldana, 2009, p. 48). For the second coding cycle, axial coding methodology was applied in which the researchers tried to "strategically reassemble data that were 'split' or 'fractured during the initial coding process' " (as quoted in Saldana, 2009, p. 159) It was followed by "theming the data" (Saldana, 2013, p. 175,) where the researchers attempted to cluster different emerging categories—"a word or phrase describing some segment of…data that is explicit," (Rossman & Rallis, 2003, p. 282) under several themes—" a phrase or sentence describing more subtle and tacit processes" (Rossman & Rallis, 2003, p. 282). To streamline the process of theming, the six phases outlined in Braun and Clarke (2006) guidelines for analysis (Table 6) were adapted.

Table 6

Phases of thematic analysis

Phase	Description of the Process
Familiarizing yourself with your data	Transcribing data (if necessary), reading, and rereading the data, noting down initial ideas.
Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
Reviewing themes	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic "map" of the analysis.
Defining and naming themes	Ongoing analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme.
Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Note. Braun and Clarke (2006), p. 35.

The phases of thematic analysis (Braun and Clarke, 2006) provided a solid framework for

theming the data.

Trustworthiness, Credibility, and Conformability

Specific steps were taken to ensure the trustworthiness of the current study. The survey

questions were adapted from previously developed and tested scales to warrant the reliability

of the instrument. To guarantee the conformability of the study, triangulation methods were

adapted and achieved by collecting data from various sources (surveys and semi-structured-

interviews) and by combining sampling methods.

According to Simon and Goes (2012), participants should have a chance to correct

factual and interpreted errors during, and after the interviews are completed; therefore,

member checking was implemented in order to ensure the validity of data interpretation.

During the interview, the researcher had to restate the information to ensure the accurate

understanding in order to avoid potential threats to credibility. According to Lincoln and Guba

(1985,) it might be necessary to provide participants with the report of analyzed data so the

participants can have a chance to agree or disagree that the report summarizes their views and

beliefs. The transcripts of the interviews were emailed to the participants for data validation.

Upon affirmation of the accuracy and "true and authentic representation" (Harper & Cole,

2012, p. 511) of the participant's beliefs and attitudes, the study was considered credible

(Harper & Cole, 2012) The results of the member checking process were noted and described in

great detail in order to understand how those corrections might have altered the data.

According to Shenton (2004), thick descriptions are instrumental for any qualitative

study. They help to ensure that both external and internal validity are not negatively affected.

Detailed descriptions of people, places, and settings in which interviews took place were taken

in order to "to determine the extent to which the overall findings 'ring true'" (Shenton, 2004, p.

69). Procedures were developed to ensure that the entire process of coding and categorizing

was documented. In order to ensure the dependability and transferability of the study,

researchers who participated in the coding process used an online document sharing

application to keep track of each other's work. In addition, every minor change in the coding

process was marked with a comment or a note, as well as saving every modified version of the

coding document under a different file name in order to track version edits.

Conclusion

In this chapter, I discussed the chosen methodology of qualitative and quantitative

techniques that were used during the research. Quantitative measures, the survey population,

and the setting were described in detail. The qualitative framework and sampling mechanism

were defined and the steps taken to ensure the trustworthiness of the study were presented.

The next chapter will be dedicated to data analysis and preliminary findings.

CHAPTER IV

ANALYSIS AND RESULTS

This chapter will explore the results of data collected using both qualitative and

quantitative instruments. The outcomes of the survey analysis will be presented and described

through the results of analysis of variance, Pearson product moment correlations, and

descriptive statistics. Further, themes that emerged during the analysis data collected during

semi-structured interviews will be described.

Survey Analysis

The main questionnaire consisted of four scales measuring parental attitudes across 6

different constructs: Rule Setting (*RuleSet*), Gameplay Involvement (*Involv*) , Parental Concern

about DGBL (*Concern*), Potential of DGBL (*Potential*), Negative Media Effect (*NegEff*) and Social

Norm (*SocNorm*)—all of which were adapted from various earlier studies (Bourgonjon et al.,

2011, Piller & Gong, 2012; Wlodarczyk, 2012).

Reliability Analysis

To examine the internal consistency of all the scales the reliability data analysis was

performed. The results indicated that the Cronbach's alphas for the *RuleSet*, *Involv*, *Potential*,

and *NegEff*, were .85, .84, .88, .86, respectively, which demonstrated that the scales were

highly reliable. The *Concern* (α = .70) and *SocNorm* (α = .79) scales exhibited acceptable

reliability.

Descriptive Statistics

Out of 99 participants, forty-four (*n* = 44) were American-born parents and fifty-five

(*n* = 55) were immigrant parents. Sixteen participants were male (*n* = 16) and 83 participants

were female (*n* = 83). Figures 3, 4, and 5 provide visual representation of the participants'

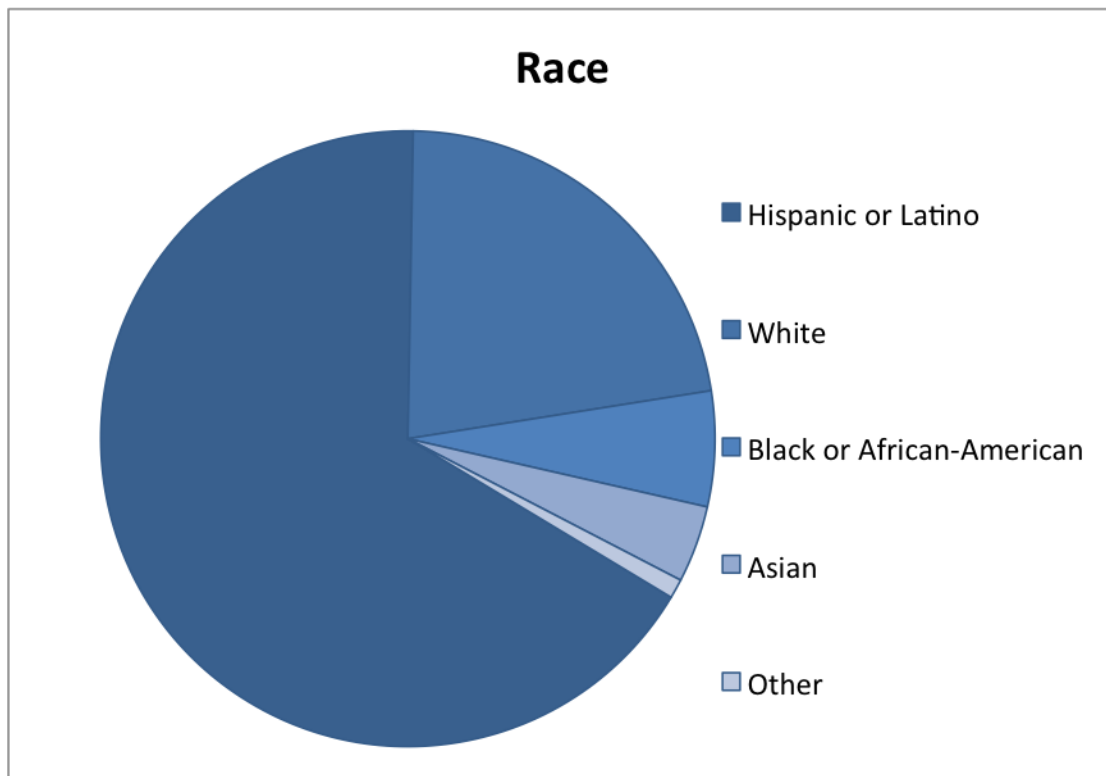demographic data collected during the first phase of the research.

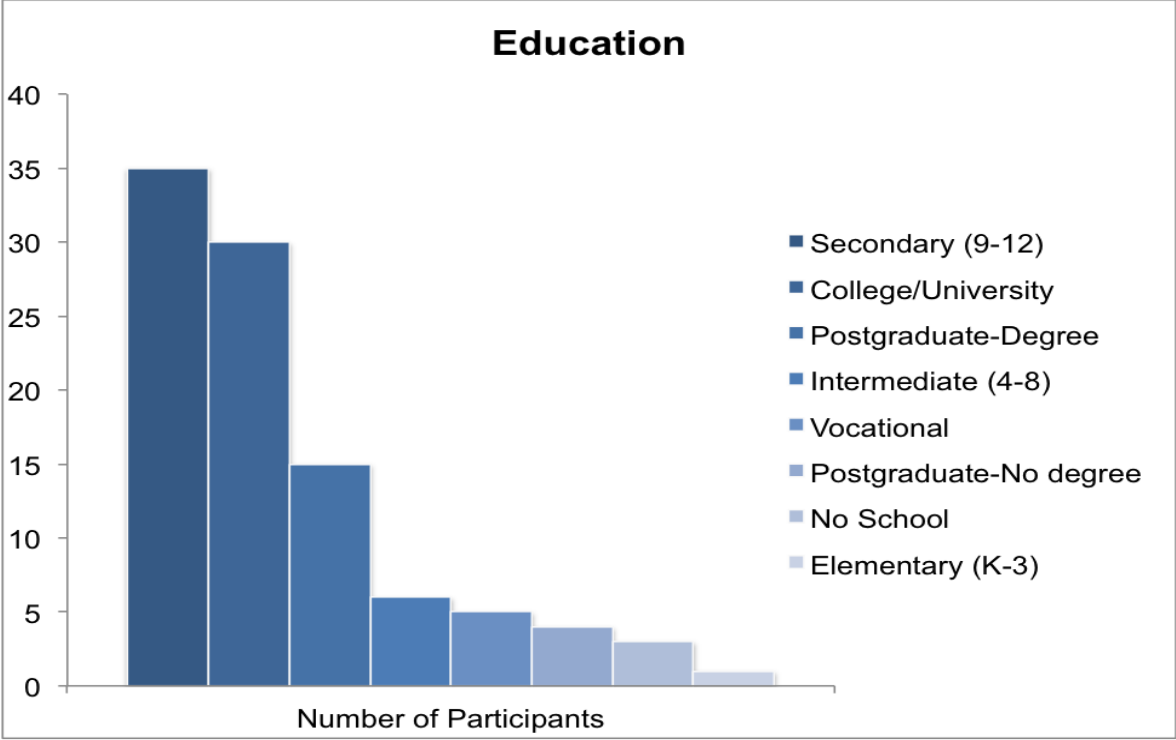*Figure 3*. Distribution of participants by race.

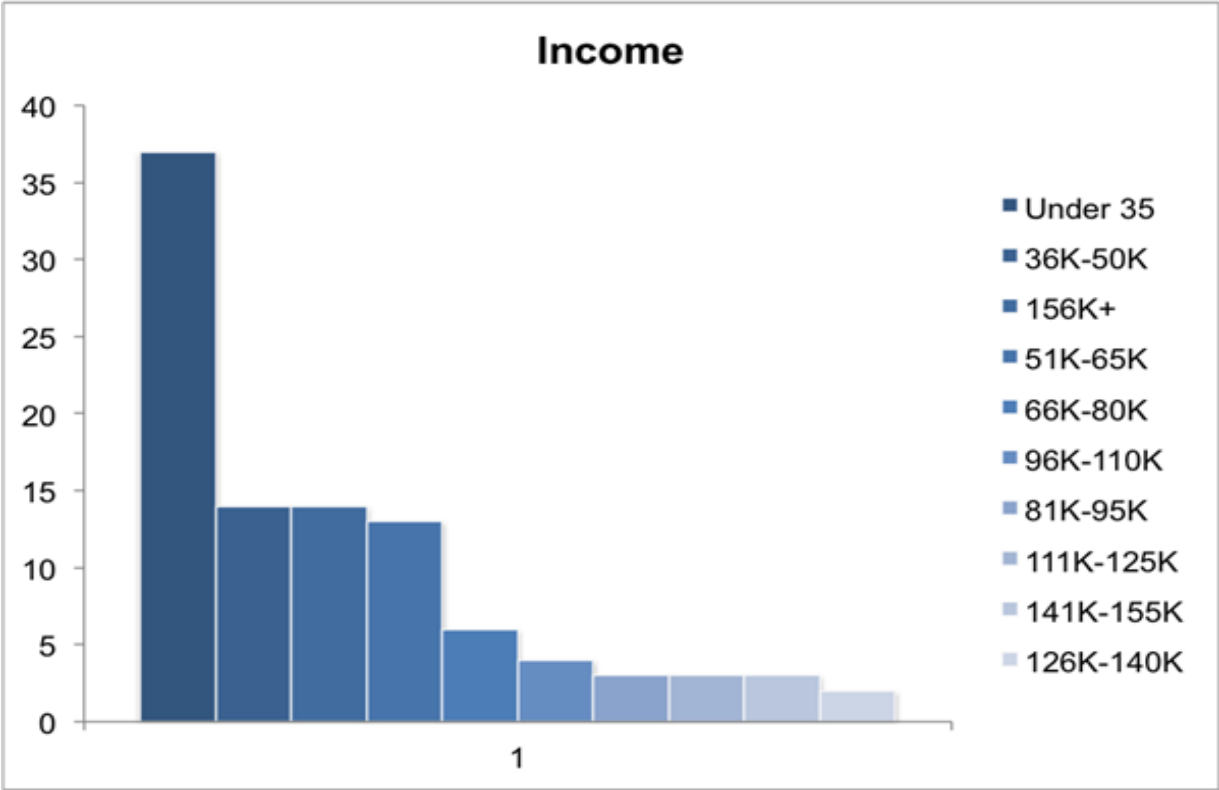*Figure 4*. Distribution of participants by level of education.

Figure 5. Distribution of participants by income.

Based on the descriptive statistics (Table 7), parents are not involved in playing video games with their children. In addition, parents rarely set specific rules or monitor children's gameplay. The mean score for each of the items measuring rule setting and involvement is between 1.9 and 2.3 on a 5-point Likert Scale. Out of 99 respondents, only 12 (12.1%) indicated that they *always* play with their child; nine people (9.1%) indicated they play *often* and 34 (34.1%) people reported that they *never* play video games with their children. In addition, 19 (19.1%) people stated that they never play with the child even if the child asks for it.

Table 7

Descriptive statistics

Constructs	Descriptives	
	M	*SD*
RuleSet	2.54	.60
Involv	2.20	.61
Concern	3.14	.78
Potential	3.14	.73
NegEff	3.6	.95
SocNorm	3.1	.78

The means for parental concern and parental perception of potential of video games in the classroom are the same (*M* = 3.14), which indicates that parents are torn between perceived negative aspects and educational potential of video games. However, based on the analysis of different items in both scales it appears that even though parents think that games should be explored for their education potential (Figure 6) there is a major concern that

children might become addicted to video games (Figure 7).

When it comes to digital games in the classroom and social norm, parents believe that their children will like the idea (*M* = 3.4); however, people in their community will have a low level of acceptance (*M* = 2.7) of video games in education. Figure 8 demonstrates the mean values of all items measuring *Social Norm*.
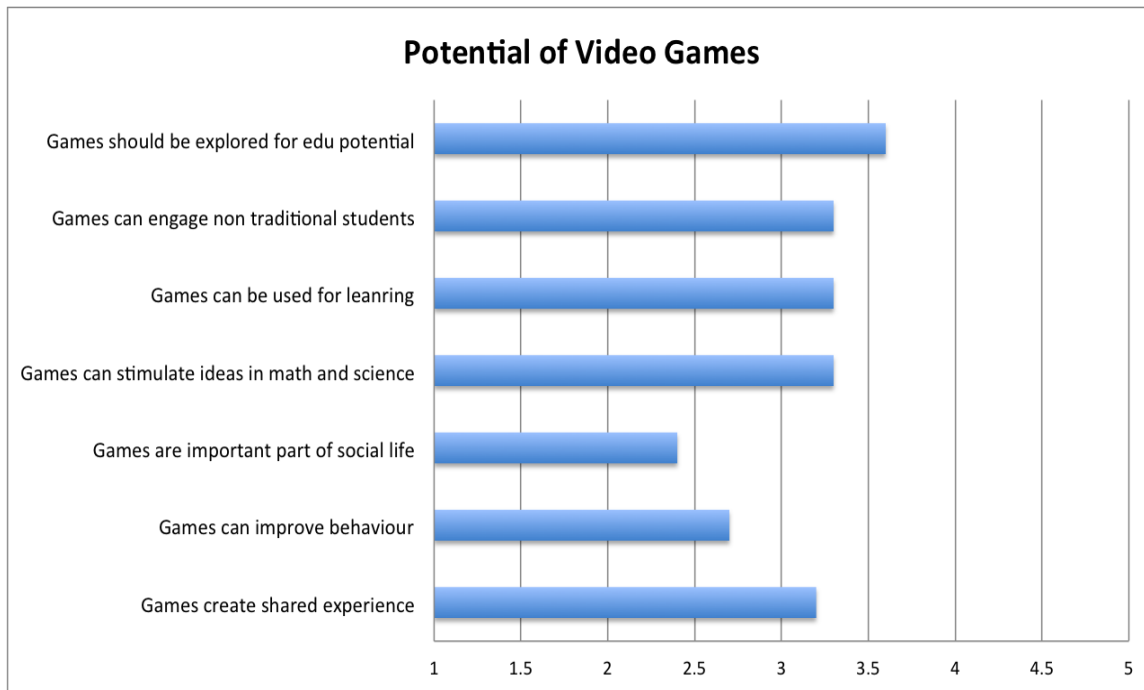

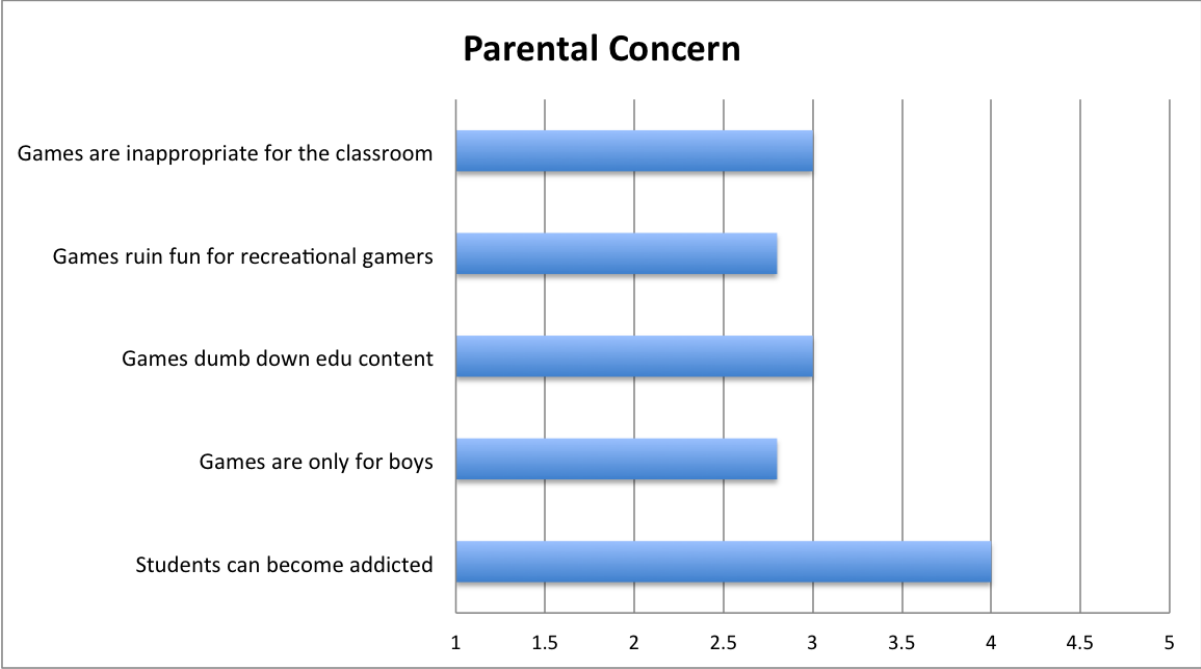*Figure 6.* Mean scores measuring Potential on a 5-point Likert Scale.

Figure 7. Mean scores measuring Concern on a 5-point Likert Scale.
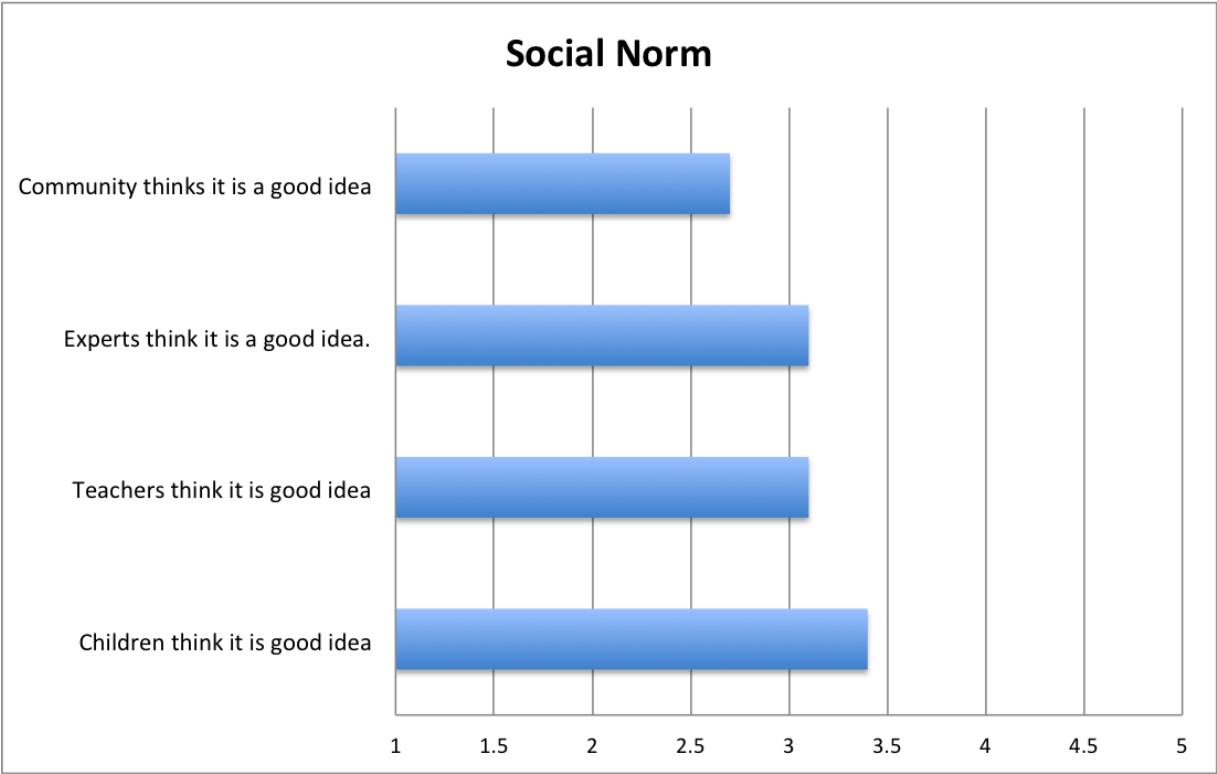

Figure 8. Mean scores measuring SocNorm on a 5-point Likert Scale.

Relationship analysis

To investigate the attributes that might affect parental attitudes toward video games in education, several possible relationships were tested. In addition to understanding what parental behaviors might correlate, the relationships between measured constructs were investigated.

Age

There was no correlation between any of the constructs and the age of the participants. Table 8 demonstrates that there is no relationship between a person's age and their behaviors and attitudes. Thus, age is not a factor in parental attitudes toward digital games.

Table 8

Correlation table for Age and other constructs

	Correlations					
	Potential	RuleSet	Involv	Concern	SocNorm	NegEff
Pearson Correlation	.000	.054	-.143	.009	-.161	.095
Sig. (2-tailed)	.999	.593	.158	.932	.111	.348

Sex

Table 9 demonstrates that there is no correlation between the sex of the participants and five out of six measurable constructs. There was a small positive correlation ($r = .216$, $p < .05$) between sex and negative media effect.

Table 9

Correlation table for Sex and other constructs

	Correlations					
	Potential	RuleSet	Involv	Concern	SocNorm	NegEff
Pearson Correlation	-.024	.029	.026	-.037	-.012	.216
Sig. (2-tailed)	.812	.775	.802	.718	.904	.032

By analyzing the differences in means, I found that female participants (3.69 ± .92) were statistically significantly more affected by the negative media messages than male participants (3.14 ± .98) and this difference is statistically meaningful (d = 0.58). Therefore, it might be speculated that women are more susceptible to negative media message about digital games.

Level of education

A positive correlation (r = .375, $p < .01$) between the level of education and the potential of video games in the classroom is shown in Table 10.

Table 10

Correlation table for Level of Education and other constructs

	Correlations					
	Potential	RuleSet	Involv	Concern	SocNorm	NegEff
Pearson Correlation	.375	.173	.030	-.164	.290	-.042
Sig. (2-tailed)	.000	.086	.771	.105	.004	.681

From these findings, it can be speculated that parents who are more educated will be more accepting of DGBL. There was also a positive correlation (r = .290, $p < .05$) between the level of

education and the social norm. It can argued that social norm or social acceptance of DGBL is more important for better-educated parents.

Constructs

By analyzing the relationships among various constructs, a weak negative correlation was found between the *Potential* and *NegEff* ($r = -.382$, $p < .01$), therefore it can be argued that parents who are more susceptible to negative media messages are less likely to see the potential of DGBL. There was also a weak negative correlation between *Concern* and *SocNorm* ($r = -.272$, $p < .01$), which indicates that parents who are concerned about digital games do not really worry about what others think. Moderate positive correlation between *Potential* and *SocNorm* ($r = .489$, $p < .01$) demonstrates that the more potential parents see in DGBL, the more interested they become in what others think. Even though the results indicated that parents who are more involved in digital game play with their children tend to set more rules ($r = .466$, $p < .01$), there was no correlation between *Involv* and *Potential* ($r = 0.12$, $p > .05$). Based on these results, it can be concluded that parents who are more involved in their children's digital game play might not necessarily be more open to DGBL.

Summary of survey analysis

Based on the results of the survey analysis, a few possible relationships between parental attitudes and attributes that affect those behaviors were discovered. This included that the level of education affects people's attitudes toward DGBL. The more educated the person is the more open they are to the idea of integrating DGBL into the classroom.

In addition, social norm—or what other people think about the subject—becomes more important as people begin to accept the idea of DGBL. I can speculate that this can be traced

back to the Attitude Theory (Schafer and Tait, 1981) where authors argued that, even though people have positive feelings toward something, social pressure might influence their behavior. In other words, even if a parent believes in potential of digital games as teaching and learning tools, they might still be against the idea of DGBL integration into the classroom because this idea is generally rejected by people in that parents' community.

By looking at the descriptive statistics, parents generally think that their community has rather negative feelings about DBGL integration into the classroom. Despite the fact that many parents believe that games should be explored for their educational potential, people worry that children might become addicted to digital games. In addition, I discovered that women are more affected by negative media messages than men are; however, I could not find any relationship between gender and parental attitudes toward DGBL. Parents are not involved in gameplay with their children and these findings are in line with previous studies (Bourgonjon et al, 2011); however, parental involvement seems have no effect on whether or not parents see potential in DGBL. One-way ANOVA and Linear Regressions analysis results indicated that the country of origin did not really impact parental attitudes and behaviors, however I selected six participants to be interviewed in order to explore what role if any cultural background plays in parental attitudes toward DGBL.

Semi-structured Interviews

To explore if and how cultural idiosyncrasies affect parental attitudes toward DGBL, six parents from three different cultural backgrounds were selected to be interviewed. Each interview was conducted over the phone and was recorded using Voice Recorder by TapMedia

Ltd., an app for the iPhone. The format of the interviews allowed for different types of

questions. A-priori and inductive a-priori questions were created prior to the interviews and

included the following:

a.   What is a game to you?

b.   What do you know about digital games?

c.   What kind of rules do you set for your children when it comes to digital gameplay?

d.   Do you think digital games have potential in the classroom and why?

e.   What do people in your community think about digital games?

f.   In your opinion, how does your background affect your attitudes toward digital

     games?

Inductive questions emerged during the interview process and were used to gain more insight

into a certain topic, solicit more details, or clarify statements made by the interviewees.

Participant descriptions

    Two interviewees were born and raised in the USA; another two emigrated from India

and the last two came to the United States from Russia.

Indian participants

    K is a 36-year-old female who works as a teaching assistant. She came to the United

States at the age of 22 from a major city in Northern India. *K* has a bachelor's degree in

Interdisciplinary Studies and resides in a middle class neighborhood with her husband and 8-

year-old son. *K* believes that digital games "absolutely" (sic) have potential in the classroom;

however, she is concerned that it would be difficult to adapt commercial games for education because of their "strong" (sic) violent content.

Researcher: So, why do you think games have potential in the classroom?

K: Given the age and time we live in. Kids are totally into it so yeah it is a way to get their attention for a longer span of time. Comparing to, say a worksheet.

Researcher: If I were to tell you that I have this wonderful game. And we will use to teach kids problem solving and critical thinking skills and there is data that proves that the game helps and work, but the game is the call of duty?

K: I say how are you going to make it educational and age appropriate?

Researcher: Well, here is all the research and data that says that it is educational

K: I do not care about the data. But it is not age appropriate, there is still violence and cursing, what do you do about that?

K admits that she does not play video games and has no interest in trying. She also believes that parents should micromanage what games their children play; however, she does not really know much about games herself so all she can do is watch the time limit. *K* thinks that her attitudes and beliefs stem from her cultural upbringing. She stated,

It [games] is a waste a time and spoils your eyes. Once again, it is not my view; it is what my community thinks. What is the purpose? What do you gain out of it? You are not getting any smarter; you are not getting any smarter. It is a waste of time. It is something for fun, so but it is the screen time… Because they compare to watching TV. In India, watching TV for too long is not good for the kids. That's the perception. That's how we grew up. Oh, you do not do it, because it spoils your eyes.

When asked what games are, *K* said that games are something you do for fun; games are not designed to teach you anything.

The second interviewee *S* is 43-year-old dental assistant who lives in a middle class neighborhood with her husband and 12-year-old son. *S* earned her degree in India and came to the United States at the age of 25 from a Southern Indian city. *S* is more skeptical about DGBL, as she believes that games should be kept outside of school. In her opinion, a game is a recreational activity that should not be brought into the classroom. *S* stated,

> In our culture education is the most important thing in a young persons 'life. Family and
> education. Games and learning should not overlap.

Just like *K, S* believes that people in Indian community have rather negative attitude toward DGBL.

She admitted this might be culturally transmitted: "They [people in Indian community] think it is not for the kids. Looking at the screen for too long can damage your eyes and stagnate your brain. Kids who play video games a lot are frowned upon." However, unlike *K, S* is willing to try playing games to see if there is anything educational about it. When asked how much she knew about digital games in general S answered, "I know enough to restrict certain games that I think are inappropriate. I do not like violence and sexual stuff in there. I think some kids can take it wrong way. "

Russian participants

O is a 43-year-old female who works part time at the real estate office. She lives with her husband, a 15-year-old son, and an 8-year-old daughter, as well as her elderly parents-in-

law. *O* graduated with the Bachelor's degree in business administration from a Russian university and came to the United States at the age of 28.

M is a 40-year-old female who works as a clerk at the lawyer's office. She came to the US at the age of 18 and has an associate's degree in business administration. *M* lives with her husband, two daughters (3 months old and 14 years old), as well as her 6-year-old stepson of whom she has a full custody.

Both, *O* and *M* have mixed feelings about games in the classroom.

> Researcher: Do you think digital games have potential in the classroom and why?
>
> *M*:   Ok, well, coming from a different country I am not used to it. So I do not think so. I think kids in the classroom should concentrate on learning, listening to the teacher and not playing video games
>
> *O*:   I do not know anymore. I just do not understand how games can teach kids anything. I understand educational games that can teach multiplication table, but games like Minecraft or Call of Duty. Hmmm. My husband thinks that those games develop certain skills, but I just think they [children] play too much.

M and *O* believe that their lack of understanding of how games can be beneficial stems from the fact that they were not exposed to the digital games in their younger years. They both admit that they associate games with the outside play; however, it is important to them to understand how the school and the teachers can rationalize and demonstrate that integrating digital games into the classroom is beneficial to their children. For example, O stated, "Can the teacher prove it? I think they need to explain to the parents what is going on and how they will

be using this game and why it is better than other methods. However, I do not always trust the teacher's judgment."

By contrast, *M* demonstrated more trust in teacher's decisions by saying, "I believe that teachers know exactly what they are doing and they come up with ways to teach our kids better. So if teachers come to me and say that this one video game will help my kid learn I will be ok with that." According to *O*, people in Russian community believe that "games are something you do when everything else is done." *M* echoed this statement, suggesting that games are viewed as a reward for a job well done. Both *O* and *M* admitted they do not know much about games; therefore, they are interested in what people around them think instead.

American participants

J is a 38-year-old white female who works as an art teacher at a public school. She is divorced and lives with her 10-year-old daughter. *C* is a 45-year-old African American female who has a degree in fashion merchandising. For the past 5 years, *C* was a stay- at-home mom for her two sons - 6 and 11 years old. At the time of the interview, *C* was looking for a job to help with family's financial struggles. *C*'s older son has a severe learning disability and at the time of the interview, her family was struggling with medical bills. Both *C* and *J* were keener on digital games in the classroom than previous interviewees were.

Researcher: Do you think video games have potential in the classroom and why?

J: Yes I do. Kids are interested in them. They can be more interesting than teachers and engage children in different ways or traditional ways that we teach kids if

they are used correctly or they are used in way that is fun. Not as long as you

have to do it so yeah

C: There is a great possibility. It depends on the classroom and the kids and the

teachers. Some teachers are not capable of using new things in a good

informative way. Some kids are not ready for it either, so I guess there might be

something in it, but there are way too many variables in there.

However, *C* was less enthusiastic than *J* about how people in their community view DGBL. C

stated, "I do not think that people in my community will accept it. Games have too much

violence and cussing. People want to shield their kids from it. They raise them in a bubble. I

would say, heck with it, use it [games in the classroom], but some kids might not be ready for it.

Some parents will not be ready for it. There will be a lot of drama."

At the same time both *C* and *J* admitted to relying on their community's feedback about

digital games, because as *J* put it "I do not know enough to make an informative decision."

When asked what games are, both *C* and *J* said that a game is a fun activity meant to entertain.

C added that games meant to keep children busy, whereas *J* added that games could be

educational if properly implemented.

Coding and thematic analysis

Braun and Clarke (2006) phases of thematic analysis served as guidelines for the

interview data analysis. Braun and Clarke (2006) suggested that thematic analysis could not

progress linearly; instead, it should be a recursive process that evolves over time. Two

researchers worked independently during the initial stages of coding and data analysis. Though

there was quite a lot of flexibility in how both researchers added notes, memos and organized

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initial codes, frequent debriefing sessions between the researchers allowed for more coherence during later stages of data theming.

Initial Coding

Both researchers generated initial reviews of data that were based on memos and notes added during the process of transcribing and re-reading the interviews. Braun and Clarke (2006) suggested that "writing should begin in phase one, with the jotting down of ideas" in order to create a structure for a more formal coding process.

Based on the initial review of the transcripts and notes taken during that time, we could speculate that overall *Indian parental perception* showed that they see no value in games in education overall. Culturally, they see that games are equivalent to watching television.

Russian parental perception showed that they see little to no value in games in education overall. Culturally they see that games are equivalent to playing or relaxation.

The *American parental perception* showed that they see more value in games in education overall than the other two cultures. Culturally, they saw games as mostly equivalent to play or relaxation, but if properly informed of teacher's reason to include the game in pedagogy, they are comfortable with their use in the learning environment.

Thirty-seven codes were developed between the two researchers; however many of them had the same meaning but different labels. For example, when *K* admitted, "I do not know whole lot about games," one researcher coded it as *Lack of Knowledge* whereas the second one coded it as *Not Informed.* After several debriefing sessions and multiple code reviews, 24 codes were synthesized and used to segment the data.

Searching for themes

When searching for themes I relied on different methods proposed by Ryan and Bernard

(2003). I noticed that the participants repeatedly admitted that they do not know much about

video games or are not sure about its effectiveness. "I do not know" in reference to digital

games in general and DGBL in particular appeared eighteen times in the interview transcripts.

For example, *K* admitted: "I really do not know how effective it is in teaching the kids and

getting the point across with video games."

S: Whether or not they [games] teach anything I do not know

J: I am probably a parent who does not know enough [about digital games] to

make informed decisions

S: I know very very little

C: I know nothing. I look at ratings sometimes

O: I do not know anymore. I just do not understand how games can teach kids

anything

Concerns about violent and sexual content appeared ten times whereas concerns about

negative impact on overall behavior, health issues, such as damage to the eyes and/or brain,

and possible addiction were noted in twelve different utterances.

S: Looking at the screen for too long can damage your eyes and stagnate your brain…

People think that games can become addictive and kids will lose themselves in that

unreal world. They might even want to do stupid things to imitate what they see

K: It is a waste a time and spoils your eyes. The other reason I do not like it is all the sex and violence in video games.

C: Games have too much violence and cussing. People want to shield their kids from it

It is worth noticing that both participants of Indian decent used what Ryan and Bernard (2003) called *Indigenous Typologies*—"terms that may sound unfamiliar or are used in unfamiliar ways" (p.89). When referring to the eye damage that can possibly be caused by spending too much time in front of the screen or a computer monitor, both participants used the term "to spoil eyes." Upon further clarification, both participants admitted that this is a commonly used term in Indian community.

Participants of both Russian and Indian decent used more "linguistic connectors" (Ryan and Bernard, 2006, p. 91) such as *because* and *since* to create casual connections between their backgrounds and/or childhood experiences and current attitudes.

S: I think people here [Americans] are more open to it, because they grew up with games

M: Just because I personally never played video games to me, they are just games. I am pretty sure that nowadays games are more educational than when I was growing up in Russia

K: That's the perception because that's how we grew up

O: Because we did not have video games. We had one silly game handheld device with one game where the wolf was catching eggs from the hens and that is it. I was too busy socializing and playing outside with my friends.

Researchers also noted that American participants never juxtaposed games to learning. Instead, they treated games as a separate entity, or technological innovation and described their thoughts and attitudes toward it. For example,

J: I think a lot of people are open to it to new technologies. It is part of our lives. I mean, most of us for work have to watch online things and take tests on it, training, and things. Video games can take the same role in the classroom.

C: I know my kid and I know what he can or cannot do. I do not know other kids. I am not sure how they will react to certain games.

At the same time, some immigrant parents constantly compared games to learning. Utterances about how games should not overlap with schoolwork and/or used as rewards appeared twelve times during the interviews.

S: Homework first – games last. For us education first-games last. Plus, games take time from studying.

K: What is the purpose? What do you gain out of it? You are not getting any smarter. Games are not created to teach you anything. Kids in the classroom should concentrate on learning.

M: …a game is reward. You get to do it once all the work is done. For kids, homework is number one; games are something you can earn.

O: We used to think that games are something you do when everything else is done. Chores, homework, afterschool activities should be done before you were

allowed to play. There was a big difference between educational activities and fun

activities. Games were meant to kill time.

Every participant admitted that they care about what people in their community think (or

would think). A participants' community social circle is where they would seek advice and

information.

> *M*: I do not know if I go online to do research, but I will probably talk to the other
>
> parents.

> *O*: There is just so much information on line. Some people say this others will say that. I
>
> do not know who to trust. I would much rather talk to the people I trust.

> *J*: I would probably talk to people around me, my network, my community; have you
>
> guys heard about this game do you think kids should play it?

The American participants seemed to believe that games are designed for entertainment

whereas immigrant participants stated that games are for recreation only and should be used

as rewards. Games were referred to as *a waste of time* three times, and as a *fun activity* far

more, recorded seven different times.

The initial thematic map (Figure 9) was developed to show nine early themes; and

possible theme-to-theme and code-to-theme relationships. Upon further analysis of

preliminary themes, it became "evident that some candidate themes are not really

themes…while others might collapse into each other…other themes might need to be broken

down into separate themes" (Ryan and Bernard, 2003, p. 20). There was not enough data to

support *Need for Mediation* theme; whereas *Rationale, Ignorance, and How* were combined to

form *Uninformed* theme. I followed Ryan and Bernard (2003) guidelines and created a chart

(Figure 10) to demonstrate the development of four intermediate themes.

Emergent Themes

Based on the analysis of the interviews and in line with Schafer and Tait (1981) theory, I

established a direct link between what was labeled as *Normative Beliefs* and *Concerns*,

Normative Beliefs and *Definition of Games* as well as *Concerns* and *Uninformed* (Figure 11).

Concerns stem from not being informed, which feeds into *Normative Beliefs,* which, in turn,

creates more concern and negativity. In addition, this negativity extended from *Normative*

Beliefs toward digital games in general and to DGBL in particular. It appears to stem from the

disconnect between what community believes about games and what games actually are.

This complex relationship can be traced back to Salen and Zimmerman's (2004)

argument that the term "game "is often confused with the term "play", which is seen as a

recreational activity and therefore makes it difficult for people to see how games can be used

for learning. During our final analysis stage, one major overarching theme was present — DGBL

Illiteracy — and that has one sub-theme, *Normative Beliefs*. Within *Normative Beliefs*, two

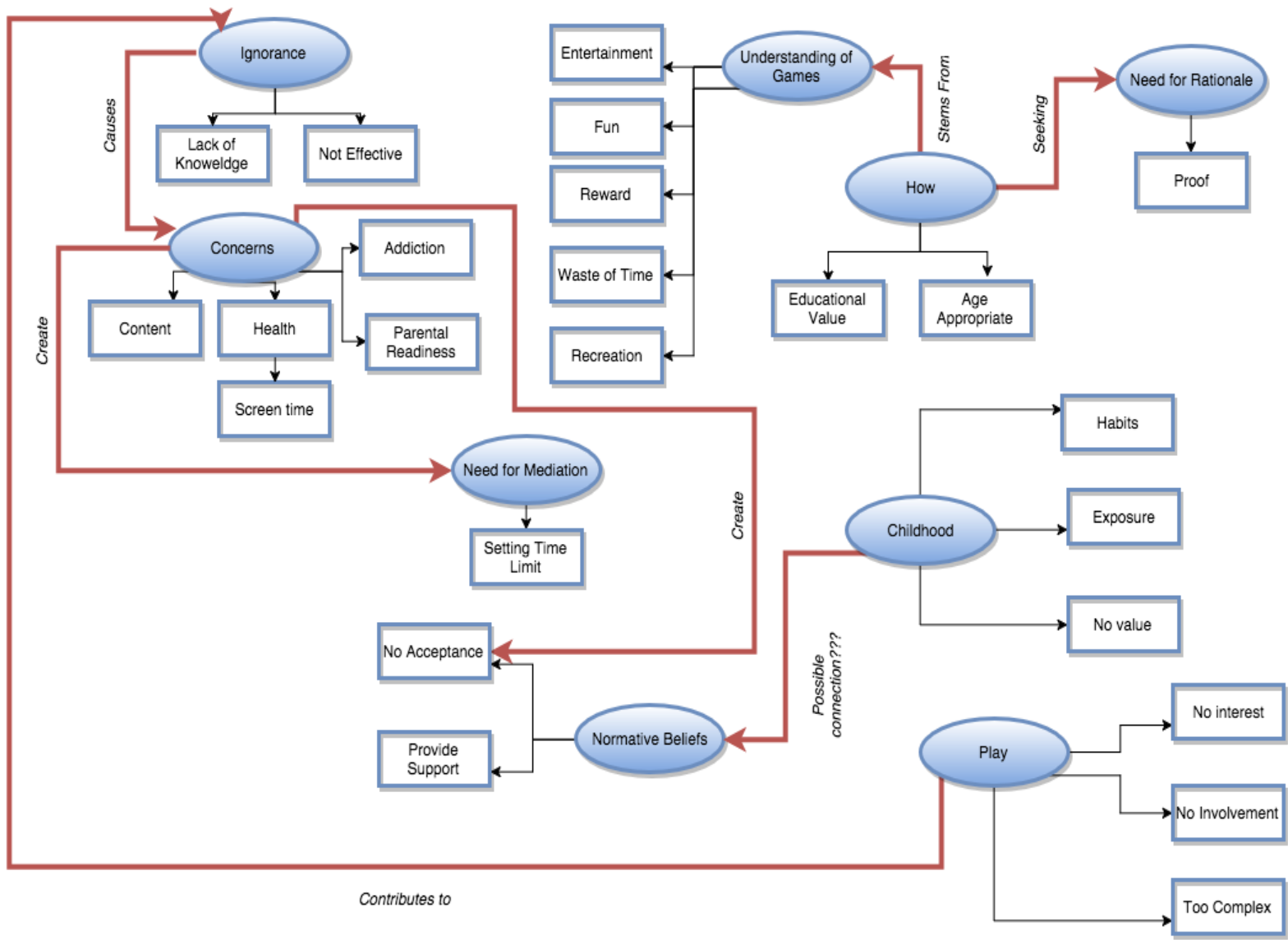separate categories emerged — *Semantics* and *False Assumptions* (Figure 12).

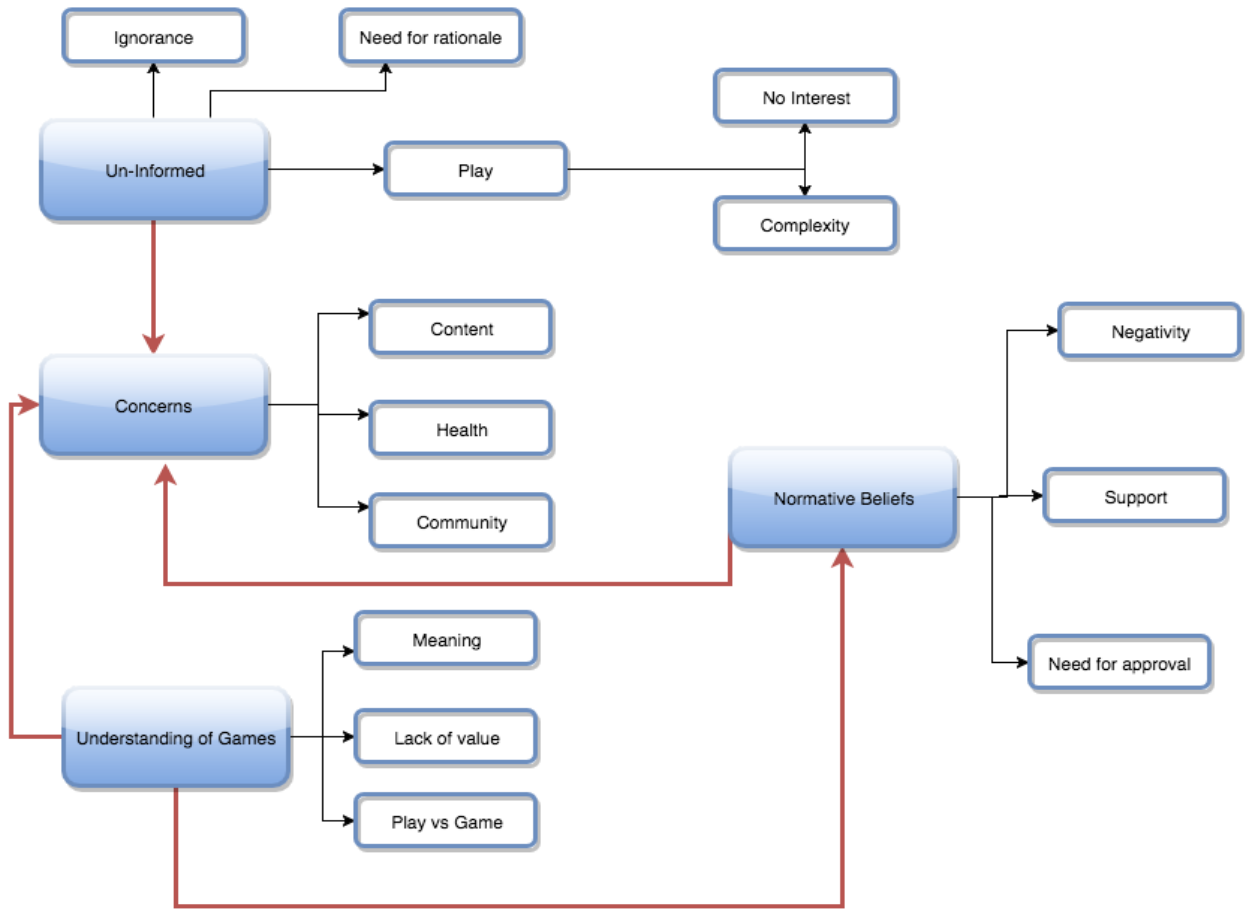*Figure 9.* Initial thematic map showing nine preliminary themes.

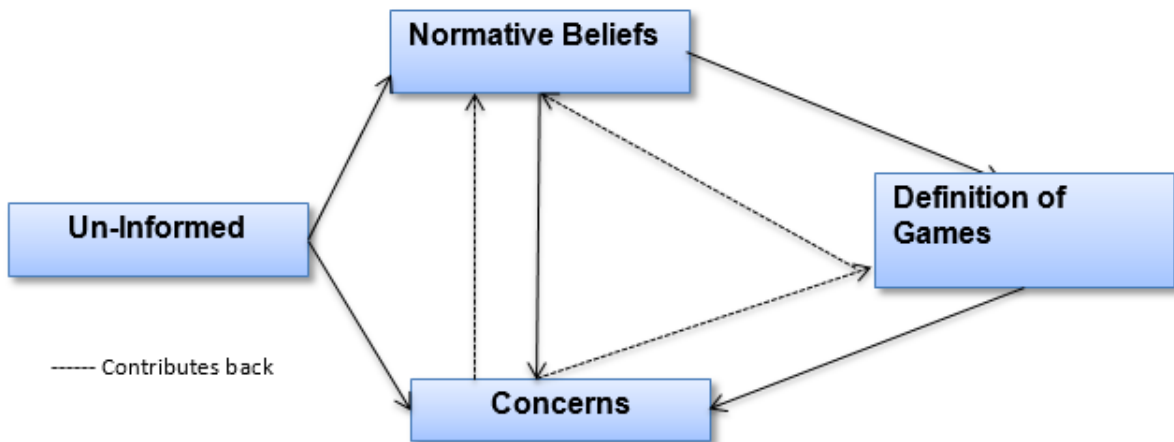*Figure 10.* Diagram showing developed thematic map with four intermediate themes.

Figure 11. Diagram showing possible relationships between intermediate themes.

Figure 12. Emergent themes.

Theme: DGBL Illiteracy

Parents are generally unaware of digital games and their effect on learning and behavior. Despite the fact that parents who are more educated tend to be more open toward the idea of DGBL integration into the classroom, they are still not sure how effective DGBL is and how children can benefit from it. Majority of parents are not involved in gameplay with their children citing lack of interest and complexity of game mechanics. These findings are in line with previous research by Kearney and Pivec (2007b) and Bourgonjon et al., (2011).

Subtheme: Normative Beliefs

It was evident that there is fundamental difference in what people believe the games are and the definition found in academic literature. Based on the interview analysis I found that different cultural groups vary in their definition of games. Even though every parent was able to provide their own meaning of games, normative beliefs heavily influenced their definitions. Misleading semantics reduce the value of games and its use in education. In addition, normative beliefs generate false assumptions and alter parental decision-making when it comes to DGBL acceptance. For example, Indian parents believe that playing games will "spoil eyes

93

[sic] and damage brains," as it is a commonly accepted belief in the Indian community. Such

scientifically baseless assumption creates barriers for parental acceptance of games in the

classroom.

Conclusion

This chapter presented analysis of both survey data and semi-structured interviews.

Relationships found during the statistical analysis were presented. The coding process was

described as well as stages of thematic analysis were presented. Finally, the two main themes

were introduced and summarized. The next chapter will discuss these results, demonstrate how

these findings can help in answering main dissertation question by drawing conclusions from

the evidence, examine study limitations, and deliberate on implications for further studies.

CHAPTER V

DISCUSSION AND CONCLUSION

This chapter presents a summary of findings and explain how the results of the study

help in answering questions proposed in Chapter 1. In addition, limitations of the study and

implications for further research will be discussed.

Summary of Findings

In order to understand better how social, cultural, and economic factors might influence

parental attitudes toward digital game-based learning, the following subtopics were explored:

- How does parental involvement in video game play affect parental perception of

  digital game-based learning?

- How do media messages affect parental attitudes toward game-based learning?

- How does cultural and/or ethnic background affect parental attitudes toward

  game-based learning?

These questions drove the methodology selected for the study. Creswell & Plano Clark (2007)

stated,

> Individuals tend to solve problems using both numbers and words, they combine
>
> inductive and deductive thinking, and they (e.g., therapists) employ skills in observing
>
> people as well as recording behavior. It is natural, then, for individuals to employ mixed
>
> methods research as the preferred mode of understanding the world (p.10).

Therefore, by choosing mixed methods research I was able to employ a more pragmatic and

practical approach to understanding the complex nature of parental attitudes toward DGBL.

Subtopic 1: How does parental involvement in video game play affect parental perception of

    digital game-based learning?

    As with previous studies by Bourgonjon et al. (2011), Lenhart et al. (2008), and

Williamson (2009), parents were generally found to not be involved in their children's' digital

gameplay. In addition, 19% of parents refused to play digital games even when their children

asked for it. Previous studies by Steinberg, 2012; Turkay et al., 2014; Whitebread et al., 2012;

and Williamson, 2009 suggested that parental attitudes toward games in education might be

positively affected by involving parents in digital gameplay with their children. However, I found

no relationships between parental involvement and attitudes toward DBGL potential.

Therefore, in light of this study it can be suggested that even if parents are involved in

gameplay with their children, they might not be open to the idea of using games in the

classroom.

Subtopic 2: How do media messages affect parental attitudes toward game-based learning?

    Negative media messages did not generally affect the attitude toward DGBL; however,

women were more susceptible to negative messages about games broadcasted by media

outlets. In addition, weak positive correlation between *Potential* and *NegEff* ($r = -.382$, $p < .01$)

could suggest that parents who are more affected by negativity from media might be less likely

to accept DGBL.

Subtopic 3: How does cultural and/or ethnic background affect parental attitudes toward game-

    based learning?

Based on the review of the literature, I suspected that certain groups of parents would be more open to DGBL integration into the classroom. The results of the survey analysis demonstrated that the more educated the parents are the more potential they see in DGBL. In addition, the more open parents are to the idea of DGBL, the more interested they became in what other people in their community think. Therefore, despite the fact that parents see potential benefits of DGBL, social norm might alter their behavior and therefore parents would still oppose the integration of digital games into the classroom. This conclusion is in line with Bourgonjon et al. (2011) findings that subjective norm is one of the most important factors that influenced parental attitudes toward integration of digital games into the classroom. It also echoes Schafer and Tait's (1981) attitude theory, where the authors named social norm as one of the main factors that intervenes between attitudes and behaviors. This conclusion can also be attributed to what Kenny and McDaniel (2009) classified as collective consciousness and demonstrates that many educated parents do not want to be radically different from the people in their community, especially when it comes to their acceptance of DGBL.

Main Research Question: What social, cultural, and economic factors might influence parental attitudes toward digital game-based learning?

By analyzing the data collected during the interviews, the emergence of one major theme—*Digital illiteracy*—as well as one subtheme—*Normative Beliefs*. The subtheme had two different emergent categories: Semantics and False Assumptions. These findings might serve as additional empirical evidence for Colby, R. S. and Colby, R. (2008), Whitebread et al. (2012), and

Williamson (2009) suggestions that parents see digital games as a leisure activity that lacks any educational value. Normative beliefs play very important role not only in perception of games but also in understanding what they are. There are fundamental differences in how people define games and what constitutes the definition of game according to academic literature. It can be speculated that normative beliefs heavily contribute to this disconnect. Interviewees of Indian descent defined games as a waste of time and suggested that playing digital games might be damaging to the eyes and brain. There was the possibility of perception change from evidence in the interview if the parent could play the game before the child and physically see the value in the game. Parents are not informed about games, are uninvolved in the playing of games, and do not understand why their children are attracted to them. Parents also show high concern about violence and sexual references being exhibited in video games, resulting in negative perceptions of using gaming in education. Interviewees of Russian descent defined games as recreational activity and contrasted playing games with work. The possibility of perception change was evidenced in the interview if the parent could qualify the relevance through their personal network of friends and associates. Culturally, they were not exposed to video games as children and had alternate forms of entertainment, suggesting their reasoning for not seeing the value of games in education. Americans defined games as entertainment. A possibility of perception change was evidenced in the interview if the parent could qualify the relevance through their spouse, personal network of friends, and associates. There was no indication of games being part of their childhood. The interview was indicative that American parents see games as primarily being a source of entertainment to keep kids occupied.

It is important, therefore, to think about how researchers and educators can help

parents understand the value of games and potential of DGBL. Education seems to be the best

predictor of parental acceptance of DGBL. By leveraging the power of education and parental

reliance on the opinions of others, it would be worth to explore effective ways of training

parents via different social media and cultural networks on game literacy in general and DGBL

in particular.

<p style="text-align:center">Limitations of the study</p>

The results of this study should be approached with several major considerations. First,

only 99 participants took part in the first part of the study. The gender distribution was heavily

skewed, as 83% of all participants were female. It would be beneficial to interview men, as well;

two of the interviewees mentioned that their husbands might have different opinions about

digital games. I would suggest that by including both women and men in the second part of the

study, it would have been possible to get more insight into the phenomena. In addition, all the

participants came from a very small geographical area in south Texas. Most of the participants

were of a lower socio-economic status and lacked higher education. Next, the survey

instrument of data collection is built on self-report and therefore the responses might be

biased. It is worth mentioning that some of the respondents left hand-written notes on the

hardcopy of the survey. There was a note that said, "[Name] is grounded from playing games

for two weeks;" and another said, "BTW [name] had not played for a week." These nuances

demonstrate that some parents felt the need to rationalize their answers and justify

themselves, therefore their responses might not have been completely truthful. In addition, we

<p style="text-align:center">99</p>

could also speculate that most of the parents think of digital games in terms of commercial

roleplaying games that have elements of violence and foul language and therefore

subconsciously react to the stigma associated with those games.

The interview participant selection was based on convenience sampling and was not

fully representative of the entire sample population that took the survey. Therefore, the results

of the second part of the research should not be generalized and used to describe the overall

attitudes of different cultural groups. In addition, the interviews were not in-depth and

provided only a glimpse into parental thinking and beliefs about games in general and DGBL in

particular. Furthermore, not only the interviews were conducted and analyzed by a practicing

educator with ten years of classroom experience (Appendix D), but also "It is hardly possible to

obtain complete objectivity when studying social phenomena" (Fog, 1999, p. 11). The results of

this exploratory study should be treated as informative, but require further investigation and

stem in part from the subjective perceptions of the researchers involved.

Implications for further research

The results of this study could create a basis for further research on parental attitudes

toward DGBL in different locations of the world, and as Bourgonjon et al. (2011) suggested, it

"might be worth exploring whether measurable differences in parental perceptions on the use

of games in education exist based on…society values as well (for example differences between

European, North American and Asian parents)" (p. 1441).

Moreover, looking into parental attitudes toward a certain digital game (i.e.,

Contraption Maker) or a specific type of digital game might allow for a deeper understanding of

it and how attitudes vary based on a game/game type and what factors contribute to those

changes. The results of present study demonstrated that parents are not indifferent to what other people think; therefore, it might be interesting to explore the effect of social media on parental attitudes toward digital games. It is recommended that educators and researchers create opportunities for parents to become "game literate;" however, more research is needed to investigate which methods of training and information distribution work most effectively.

Lastly, there is much research on play and its cultural value in different societies (Fog, 1999; Salen & Zimmerman, 2004; Walther, 2003); however, the research on cultural understanding of games is very limited. It is possible that by exploring the cultural idiosyncrasies and how they affect people's understanding of games the educators and researchers might create better learning opportunities on game literacy that cater to the needs of people from different cultural groups.

Conclusion

This study explored different factors that influence parental attitudes toward game-based learning. Different data collection methods, including surveys and interviews, allowed me to see how the level of education affects parental perception of DGBL. It is likely that education level plays a key role in parental attitudes toward DGBL and its potential in education. Despite the fact that some parents see education potential in digital games, they are cautions when it comes to accepting DGBL. Parents tend to listen to what community members think about the idea and form their opinions based on the normative beliefs of the socio-cultural community they come from. The theme of normative beliefs and their effect on parental attitudes was prevalent in this study. It demonstrated that parental misunderstanding of games stems from stigma associated with digital games within the sociocultural environments in which parents

exist. Normative beliefs tend to create false assumptions and reduce the educational value of digital games. Many parents still believe that games are simply a waste of time. When considering digital games in keeping with the "third person effect," as discussed by Scharrer and Leone (2008), such attitudes may inadvertently affect children's beliefs about DGBL. This, in turn, may also impede the successful integration of DGBL, making this an area for future study.

As games evolve as a medium and educators find effective ways to leverage educational potential of digital games, parental views cannot be ignored because they act as gatekeepers in terms of whether or not their children can play them. It is important to make parents the support system educators need in order to not only bring digital games into the classroom but also to help children accept games as a serious learning tool. Finding successful ways of educating parents about digital games and helping them understand the value of DGBL will promote cultural evolution and allow for DGBL to be seen in a different light.

APPENDIX A

PILLER AND GONG DEMOGRAPHICS SURVEY FROM 2012 PILOT STUDY

Part III of the Survey

Demographical Data Collection

10. Your gender:

O Male
O Female

11. How old are you?

O 24 and under
O 25-34
O 35-44
O 45-54
O 55-64
O 65 and Over

    12.   What is your marital status?

O Married
O Widowed
O Divorced
O Separated
O Never married

13. What is the highest degree or level of school you have completed? If currently

    enrolled, mark the previous grade or highest degree received.

O Did not attend school
O Primary grades (Grades K-3)
O Elementary (Grades 4-8)
O Secondary (Grades 9-12)
O Vocational/Trade School (Postsecondary)
O College/University
O Postgraduate/No Degree
O Postgraduate/Degree (Masters and/or PhD)

14. You are:

- O American Indian or Alaska Native
- O Asian
- O Black or African American
- O Hispanic or Latino
- O Native Hawaiian or Other Pacific Islander
- O White
- O Other

15. What is your combined household income?

- O Under 35K
- O 36K-50K
- O 51K-65K
- O 66K-80K
- O 91K-95K
- O 96K-110K
- O 111K-125K
- O 126K-140K
- O 141K-155K
- O Over 155K

16. What is your field of occupation?

- O Architecture and Engineering
- O Arts, Design, Entertainment, Sports and Media
- O Cleaning and Maintenance
- O Business and Financial Operations
- O Community and Social Services
- O Computer and Mathematical
- O Construction
- O Education, Training, Library
- O Food Prep and Serving
- O Farming, Fishing, Forestry
- O Healthcare Practitioner and Technical
- O Healthcare Support

O Legal
O Management
O Military
O Office and admin support
O Protective services
O Sales
O Transportation
O Other

17. Based on the results of this survey we might invite you for a telephone interview. If

    you would like to be considered for the interview, please enter your email address in

    the box below.

| |
| |

Thank you very much. We appreciate your help.

APPENDIX B

INVOLVEMENT AND MEDIATION SCALES; POTENTIAL,

CONCERN, AND SOCIAL NORM SCALES; AND

NEGATIVE EFFECT SCALE

Involvement and Mediation Scales

HOW OFTEN DO YOU:	Never	Occasionally	Often	Always
Not allow your child to play certain video games	O	O	O	O
Restrict the amount of child's video game playing	O	O	O	O
Set specific video game playing hours for the child	O	O	O	O
Specify video games that may be played	O	O	O	O
Not allow the purchase of an inappropriate video game	O	O	O	O
Play video games with your child	O	O	O	O
Play video games with your child for the benefit of the child	O	O	O	O
Play video games with your child at the request of the child	O	O	O	O
Discuss your child's interest in the video game	O	O	O	O
Discuss the video game played or about to be played	O	O	O	O
Talk about the differences between video games and real life	O	O	O	O
Watch while your child plays a video game	O	O	O	O
Encourage the child to play a video game you enjoy	O	O	O	O

Potential, Concern, and Social Norm Scales

PLEASE MARK HOW MUCH YOU AGREE OR DISAGREE WITH EACH OF THE FOLLOWING STATEMENTS:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Video games can create a shared experience which can be a good basis for instruction in the classroom	O	O	O	O	O
Video games can improve a student's overall behavior	O	O	O	O	O
Video games are an important part of social life	O	O	O	O	O
Video games can stimulate important ideas in math and science	O	O	O	O	O
Video games can be used for learning in the classroom	O	O	O	O	O
Video games can engage non-traditional learners	O	O	O	O	O
Video games should be explored for their educational potential	O	O	O	O	O
Students can become addicted to the video games	O	O	O	O	O
Video games created mostly for boys	O	O	O	O	O
Using video games will dumb down the academic content	O	O	O	O	O
Using video games at school will ruin the fun for recreational gamers	O	O	O	O	O
Video games are inappropriate for classrooms	O	O	O	O	O
My children think it is a good idea to use computer games in the classroom	O	O	O	O	O
Teachers think it is a good idea to use computer games in the classroom.	O	O	O	O	O
Experts think it is a good idea to use computer games in the classroom.	O	O	O	O	O
People in my community think it is a good idea to use games in the classroom	O	O	O	O	O

Negative Effect Scale

Incidents of gun violence in our country, as well as abroad, have started a debate about violence in video games. According to popular media, the offenders were influenced by video games. For example, the two boys that caused a massacre in Columbine by the games Doom and Counter-Strike. What do you think about these media messages?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I think there is truth in these messages.	O	O	O	O	O
These types of video games should be censured or banned.	O	O	O	O	O
I believe in the negative messages about computer games.	O	O	O	O	O
Playing computer games causes negative effects (violent behavior, laziness, dumbness, intolerance).	O	O	O	O	O
I am disturbed by the content of computer games (too violent, sexually loaded, stereotypes).	O	O	O	O	O

APPENDIX C

CONSENT FORMS

University of North Texas Institutional Review Board

Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: Factors influencing parental attitudes toward game-based learning

Student Investigator: Yulia Piller, University of North Texas (UNT) Department of Learning Technologies.
Supervising Investigator: Dr. Greg Jones

Purpose of the Study: You are being asked to participate in a research study that will investigate what factors influence parental attitudes toward video games and what aspects help parents form their opinions about video games in the classroom.

Study Procedures: You will be asked to (1) Answer 8 multiple choice questions to determine your eligibility (2) If eligible, you will be asked to take survey that will take about 5-7 minutes of your time. *Based on the results of the survey you might be contacted to participate in the second part of the research, telephone interviews. At the end of the survey you will be able to either agree or decline to participate in the second part of the research, informal telephone interviews. Should you agree to participate in the second phase of the research and the researcher selects you as a potential candidate, you will be contacted via email to set up a day and time that is convenient for you to speak on the phone with the researcher. The informal interview will not take longer than 10-15 minutes. No personal information will be collected. The researcher might seek some clarification on the answers you provided on the electronic survey.*

Foreseeable Risks: No foreseeable risks are involved in this study.

   Benefits to the Subjects or Others: This study is not expected to be of any direct benefit to you, but we hope to learn more about what social contexts influence parental beliefs about digital games. This knowledge might contribute to the decisions teachers and administrators make when designing effective instructional strategies and implementing new technologies into the classroom

   Compensation for Participants: None

   Procedures for Maintaining Confidentiality of Research Records: No personally identifiable information will be collected. Confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. Your participation in this online survey involves risks to confidentiality similar to a person's everyday use of the Internet. If you choose to participate in the second phase of the research –informal interviews – please note, that interviews will be conducted over the phone and recorded using electronic phone audio recorder. All recordings will later be transcribed, however every participant will be assigned a pseudonym and no personally identifiable

information will be used during transcription. The electronic recordings will be deleted as soon as the

transcription is over.

Questions about the Study: If you have any questions about the study, you may contact Yulia Piller at [email address] or Dr. Greg Jones at [email address].

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB).The UNT IRB can be contacted at (940) 565-4643 with any questions regarding the rights of research subjects.

Research Participants' Rights: Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- *Yulia Piller* has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study in general or any of its parts in particular, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You understand you may print a copy of this form for your records.

*******Survey Starts on the Next Page********

APPENDIX D

PERSON AS INSTRUMENT

I came to the US as a refugee when I was 17 years old from one of the republics of the former Soviet Union. I had already graduated from high school and was ready to pursue my studies at the university level. However, due to my lack of English language skills and my family's financial situation I had to delay my plans and work to help my family. These circumstances allowed me time to think and decide on my future career. I had always wanted to be an educator but I had to put this idea on hold since I was very conscious about my accent. To me, public speaking was a big issue. Furthermore, I knew nothing about the US public school system and was afraid that it would prevent me from being an effective teacher.

I received a Bachelor's degree in Business Computer Information Systems and worked as a systems analyst for one of the major retail chains in the US. Five years later, I decided to pursue my dream to be a teacher and went back to school to receive a Master's of Art in Teaching with a certification in Computer Science 8-12 and Technology Applications EC-12. I started teaching at one of the middle schools in Frisco Texas in 2006. I have taught 6th grade Computer Literacy, 7th grade Video Production, 8th grade Applied Multimedia, and 8th grade Broadcasting. As a computer literacy teacher, I was shocked and disappointed to find out how incompetent many elementary technology teachers were. The amount of misinformation that was presented to the students by these teachers was overwhelming. Students in 6th grade referred to the computer tower as a CPU; they thought Microsoft and Windows were the same thing, and did not know the difference between a file and a folder. Seventh and eighth grade students were so used to having very strict guidelines for every single paragraph they wrote that it would take me months of working with them before they started feeling comfortable expressing their ideas in a format that would best suit their digital story. As a video production

teacher, I pushed for the integration of professional-level software into my classroom and was very successful in creating project-based instruction for students to utilize such software tools as Adobe Photoshop and Final Cut.

As the result, I was invited by the Frisco ISD to write curriculum for 7th grade Video Production one year and 8th grade Applied Multimedia curriculum the next year. I was also invited to create student and teacher tutorials for the new software Frisco ISD was implementing in its digital media classes. Even though, the district always strived to be up to speed with technology, they could not find teachers who had a passion for technology and digital media subjects. Many teachers, especially at the middle school level were athletic coaches, would split their time between PE and multimedia classes.

As a part of a two-teacher team I was able to grow digital media program enrollment in my school from about 150 students in 2006 to about 225 students in 2011 However, many students were not able to participate in our classes due to parental objection. I received numerous emails and phone calls from parents telling me that they would not allow their child to be in our program simply because they did not see any value in multimedia or video production classes. In addition, some parents preferred their students to take Health for high school credit instead of a technology class. I was very passionate about project-based technology driven classes; I strongly believed that our instructional methods offer holistic approach to learning. However, it was difficult for me to convey these ideas to parents, as I did not have strong empirical support. This disconnect became a driving force behind my desire to go back to school and pursue my doctoral studies.

During my journey as a Ph.D. student, I realized that as a practicing educator it is difficult to separate data and research from my experiences as a teacher. In addition, I had a very hard time committing to research methodology based on a particular paradigm. I argued for pragmatism as a valid philosophical approach for social research, especially in education. As doctoral candidate, I had an opportunity to work with several different scholars and researchers. Furthermore, I was able to attend and speak at several international conferences, which allowed me to see and discuss issues surrounding technology integration that educators are facing globally. Research on technology and its place in education is constantly evolving and I am proud to be a part of it.

Since 2011, I have served as a Director of Arts and Technology Institute, a private technology-training center for children and adults. This job has allowed me the opportunity to experiment with the integration of the latest technology tools into the classroom and has given me the ability to observe, learn, and apply research to practice.

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