

EFFECTS OF PROBLEM-BASED LEARNING ON A FIFTH GRADE

LANGUAGE ARTS CLASSROOM

Deborah Blackwell, B.S., M.Ed., M.S.

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APPROVED:

Scott Warren, Committee Co-Chair
James G. Jones, Committee Co-Chair
Lin Lin Lipsmeyer, Committee Member
Michael Spector, Chair of the Department
of Learning Technologies
Herman Totten, Dean of the College of
Information
Mark Wardell, Dean of the Toulouse
Graduate School

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The main purpose of this qualitative research was to discover the effects of problem-based learning on a fifth grade language arts classroom. The secondary purpose was to examine how receptive fifth grade students were to a new way of learning. In this descriptive study, a group of nine students created an alternate reality game as part of a problem-based learning module. The instructional design of the study included three weeks for students to design and construct their games and one week to play, receive feedback and revise based on feedback. Through reflective blogs, semi-structured interviews, video recordings, and observations, data was collected to analyze. Over a period of five months, the data was coded and arranged into categories. The categories merged into themes. The results and findings revealed the impact collaborative groups have on design and enjoyment. Self-regulation skills were found to be lacking in most of the students, intrinsic motivation increased for some students while others developed positive outcomes beyond the scope of this study.

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By

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CHAPTER 1

INTRODUCTION

The learner of the future has drawn much attention. K-12 schools and International Baccalaureate have partnered with community members, educators, and learners to draw up profiles to identify traits needed to become well-rounded citizens of the world. Researchers have tried to identify the skills these students must utilize to find success as lifelong learners (P. Johnson, 2009). Politicians and policymakers have attempted to do the same; however, instead of promoting global collaboration, the No Child Left Behind Act (NCLB) of 2001 has mainly promoted standardized testing, which in turn promoted more resources for test preparation rather than learning that encourages critical thinking, creativity, and problem solving which have been identified as necessary for learners of today to be successful in the future.

1.1. Context of the Problem

School reform has been a concern for educators, community members, parents, and students for over 100 years. From being a *Nation at Risk* (National Commission on Excellence in Education, 1983) to the declaration NCLB, there has been much concern over the future of education and the learners of the future (Barell, 2010; Jenkins, Purushotma, Weigel, Clinton, & Robison, 2009; Kay, 2010). Local and national partnerships have been formed to address the way schools operate (Kay, 2010). However, even with an eye to the future, many agencies fall back on old methods of assessing the learner. The question is, “Are we looking for compliance or something else?”

1.2. Statement of the Problem

Problem-based learning (PBL) may be that “something else.” Some characteristics could become problematic in an elementary classroom. Roles are substantially reversed in PBL. Students become more responsible for constructing knowledge, and teachers become facilitators rather than dispensers of knowledge. This could be difficult if students are trained for “strategic compliance” (Ertmer & Simons, 2006; Schlechty, 2011), If the teacher does not fill the role, some students will look for someone else to do this rather than rely on their own capability. Problem-based learning also requires some level of self-regulation. Students are responsible for planning, monitoring, and self-reflection; however, developmentally, elementary students may not have these tools for self-regulation. Finally, the collaborative component could become a problem if students are not experienced in negotiation, tolerance of divergent ideas, and interdependence. With all these potential problems within PBL, the reported affordances (Azer, 2009; Belland & Glazewski, 2009; Ertmer & Simons, 2006; Hmelo-Silver, 2004; Savery & Duffy, 1995; Savery, 2006; Warren, Dondlinger, McLeod, & Bigenho, 2011) make it an attractive alternate way of teaching and learning to pursue.

1.3. Research Questions

The specific research questions addressed in this study are:

- What are the effects of problem-based learning on students in a fifth grade language arts classroom?
- How receptive are fifth grade students to new types of learning?

1.4. The Purpose of This Study

The purpose of this study was to determine the effects of problem-based learning (PBL). The use of problem-based learning has been one way of considering the educational needs of future learners (Barell, 2010). By adding a PBL component to an existing, teacher-created alternate-reality game (AltRG) novel study, the focus was expected to move from a “designed for” format to a (Dondlinger & Warren, 2009). How open are young learners to this paradigm shift? Recent research in both AltRGs and PBLs has largely been focused on secondary and post-secondary schools.

1.5. Overview of the Dissertation

The second chapter of this dissertation presents relevant literature in four distinct areas. The first focuses on the historic background of education in the 20th century. The second section reviews constructivism and PBL. The third area of focus concerns transmedia, primarily AltRGs. The fourth investigates literature on design-based learning, which concludes the literature review.

The third chapter explores the methods of design used to create the original alternate-reality game and the problem-based learning component that drove this study. It was after playing this AltRG, the learners created their own games, making it necessary context for the reader to understand the results and findings presented later in the dissertation. The fourth chapter delves into the research methods used to collect and analyze the data. The appropriateness and rationalization for the method used is also discussed, along with the descriptions of the participants and setting. The fifth chapter describes the results from the data collected. Included are excerpts from blogs,

interviews, and observations. The final chapter discusses implications that emerge from the results and also provides suggestions for future research in this final chapter.

1.6. Definition of Terms

- Alternate reality game - A specific genre of game that blend the lines of reality with elements of games (Montola & Waern, 2005). It is characterized by collaboration, problem solving, and interacting with the media that delivers the game. Frequently, participants interact with online characters in the game,

- make a decision based on that examination, and finally, critical thinking and problem solving includes solving problems (Skills, 2009).

- Collaboration - The ability to work with others regardless of the differences of background or opinions. According to the Partnership for 21st Century Skills (2009), collaboration “exercise[s] flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.” (page 4) It also operates with the understanding that all members are accountable for the work, and every member is appreciated for roles played (Skills, 2009).

- Communication - According to the Partnership for 21st Century Skills (2009), communication involves the ability to express ideas through a variety of methods, listen to understand context and “meaning,” use for a variety of reasons, take advantage of an assortment of media and technologies and discover which are most applicable to the situation, and “communicate effectively in diverse environments.” (page 4)

- Design-based learning - This is a style of learning in which the learner constructs knowledge by designing and building a model or prototype.

- Problem-based learning - Problem-based learning developed first in the medical community as a way to train doctors to think critically. The education community began to take notice and some have adapted it into k-12 schools. According to Hung, Jonassen, and Liu (2008), problem-based learning is:

[a]n instructional method that initiates students' learning by creating a need to solve an authentic problem. During the problem solving process, students construct content knowledge and develop problem-solving skills as well as self-directed learning skills while working toward a solution to the problem. (p. 486)

1.7. Limitations of This Study

This study does pose some limitations to the conclusions that may be drawn and applied in this study. First, both teachers in this study designed the AltRG and subsequent PBL related to it. I was one of the two teachers involved in this study. The decision to conduct a participatory case study was based on convenience and the opportunity for a keener understanding of the problem. While the goal of this study was not to find generalizability within the study, it sought to understand (Guba & Lincoln, 1994) a particular experience within two fifth grade classrooms. To that end, the study provides a snapshot for a certain period of time with a certain group of participants.

Also, participants were very familiar with the me and may have sometimes “faked good” in order to provide what they anticipated I wanted to see or hear. Many children in fifth grade still want to please adults in authority and may have sometimes answered accordingly.

CHAPTER 2

REVIEW OF THE LITERATURE

2.1. Introduction

The overarching purpose of this study was to analyze and describe the effect of a particular problem-based learning (PBL) implementation on fifth grade students in a language arts classroom. As addressed in Chapter 1, the purpose of this study was to observe and analyze the effect of adding a PBL module to an existing narrative-driven interactive multimedia novel unit. In this study, the students' narrative-driven, interactive multimedia PBL was expressed in the form of an AltRG.

2.2. Background

During the Industrial Age, schools were designed to produce citizens who could function well in a factory (Leland, Kasten, & Kent, 2002; Wallis, 2006). Since this goal required workers to do exactly as they were told (Leland et al., 2002), the stand and deliver strategies served the owners of the factories well. However, it is an open question as to whether it served the students well.

2.2.1. Factory Model Schools

During the Industrial Age, the education system's purpose was to provide a way for students to be ready to work in a factory and a way to socially assimilate the "waves of immigrants arriving at this time" (Leland et al., 2002, p. 7).

Eli Whitney's invention of interchangeable parts transformed manufacturing by making parts uniform. As the Industrial Revolution found a foothold in culture, Morgan

(2006) points to systems that began to equate “interchangeable parts” with “interchangeable workers” (p. 25). In fact, E. Cubberly compared the school system to a factory when he wrote, “Our schools are, in a sense, factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life” (Kliebard, 1971). When schools operate with the same mechanistic mindset, the focus seeks to create a product that that would meet quality control standards. Quality control of the product demands compliance to a standard and absolute deference by the workers to follow rules set by management. If a student did not meet the management’s standard of success, students and teachers felt the consequences. As Leland and Kasten (2002) state, “(Children) are treated as ‘rejects’ on the assembly line: they are pulled out and sent through again” (p. 9). Many times they were placed through the same classroom structure the exact same way they were cycled through in the first place. While Whitney’s invention was a radical innovation in the late 18th century, its application to education falls short in the Information Age.

This traditional schooling has been seen as a standard that would serve future generations equally well. Clichés revolving around the “good old days” of education predicted positive causal relationships with future generations. A common platitude posits, “if it worked for me, it will work for my kids” (Leland et al., 2002; Schoenfeld, 1999). Was this causal statement valid? Did the system really perform well? How did a system that rewarded uniformity, compliance, and “passivity” (Reigeluth, 1994) deal with those students that would not fit the mold of the perfect student? Orville Wright was just an average student who got in trouble. Walt Disney, Carl Sandburg, and Walt Whitman all dropped out (Kerry, 2002). Schools designed as job preparation institutions

essentially failed to engage students. Those innovators thrived in spite of the schools rather than helped by them. As automation continually replaced those who provided manual labor, schools needed to re-evaluate the system that had been around for over a century. World economies, policies, and actions have driven many people to look beyond superficial reforms. Stand and deliver methods neglected to provide students with an opportunity to succeed in this competitive environment (Kay, 2010).

Standardized testing, particularly high-stakes testing, may appear to be an economical, quick way to assess, but the overall cost in terms of knowledge, expertise, depth, and complexity is very expensive. The testing is too narrow in focus and often results in narrowing the focus of instruction as well (Au, 2007; D. Reeves, 2010)

The back-to-basics and standards movements are tied to the same standardization of the 19th and 20th centuries. Students are not interchangeable parts in an education assembly line and compliance does not equal engagement (Leland et al., 2002). In fact, this model dehumanizes the learning process and fails equip students with skills to thrive in the 21st century. According to Scot, Callahan, and Urquhart (2009), the emphasis on standardized testing, turns would-be innovators into “cookie-cutter students.” This attention to reaching the top score neglects the gifted student’s ability to go above and beyond the top. This attention to scripted curriculum, state standards, and standardized testing inadvertently built a ceiling that limits showing what gifted students know. If the system isn’t interested in discovering the potential of gifted students, it is highly possible that it is also not interested in developing any student beyond state standards (Au, 2007). Some believe that in order for learners to flourish in the future,

the public education curriculum must widen beyond the core content. Silva (2009) mentions the reverse has happened due to high-stakes testing.

In addition states, schools, and teachers are intentionally selecting strategies, learning experiences, and encourage activities that foster collaboration, critical thinking, communication, and increase the chance for students to become self-directed learners (Barell, 2010; Kay, 2010).

Factory model schools cannot prepare students for the future. If high-stakes testing limits curriculum and students, perhaps other learning theories should be examined. In the next section, constructivism is examined.

2.3. Learning Theory and Its Applications

2.3.1. Constructivism

As schools seek to move beyond the factory model, the shift from information processing and objectivism seems like a logical step. One such epistemological leap has been to social constructivism. Social constructivism seeks to explain the importance of the social negotiation to discovering what can be known. Savery and Duffy (1995) present three “propositions” of constructivism (see Table 2.1).

Table 2.1

Primary Propositions of Constructionism

Savery and Duffy’s Primary Propositions of Constructivism	
Interactions with Environment	The cognitive domain is interconnected with the learner’s affective domain as well as the physical domain.
Conflict	“Puzzlement” is the impetus for learning.
Social Negotiation	Learning does not occur in isolation. Social negotiation leaves room for individuals to examine own knowledge with other individuals to come to consensus.

Source. Savery & Duffy (1995), pp. 136-137.

Real-life knowledge does not occur in sixty-minute compartmental bits of time. The dispensing of information as known fact fits into the positivist epistemology and the time structure of most public schools. However, it misses the connection between learners and environment. According to Savery and Duffy (1995), understanding blends content with multiple actions occurring within and without the student. This convergence takes into account a student's cognitive, affective, behavioral, and academic experiences in order to build knowledge.

Combining a learner's natural curiosity, a problem that demands solving, an event that sparks the "puzzlement" serves to engage the individual to seek understanding (Savery & Duffy, 1995). For example, when a student reads a novel set in ancient societies, the student may seek out more information about the culture, mythology, and artifacts. The learning objective of that student is to become an expert in that culture; however, if that "puzzlement" reaches an impasse, peers or teachers can help the learner achieve that goal. Vygotsky's (1978) zone of proximal development (ZPD) is crucial for this. The support of a "more learned other" gives the learner a chance to take steps forward and achieve that goal and their schema is expanded.

Social interaction is at the core of knowledge construction. Vygotsky (1978) posits that a child experiences concepts on a "social level" before the child internalize the experience on a personal level. Collaboration brings together a multitude of ideas that are compared, sorted, and finally accepted to synthesize new knowledge (Savery & Duffy, 1995). It is in that collaboration that social negotiations develop the second aspect of the social component. Savery and Duffy (1995) proposed that "facts become facts because there is widespread agreement, not because there is some ultimate truth

to the fact” (p. 136). For example, during the fourteenth century, people thought the bubonic plague was caused by everything from comets to supernatural powers. It was accepted by many dominant cultures of the time that these were facts. It was not until the 20th century that science discovered the bacilli in the fleas that caused the plague (Gross, 1995). Now both the scientific community and culture agree with this cause, and therefore our larger society accepts this.

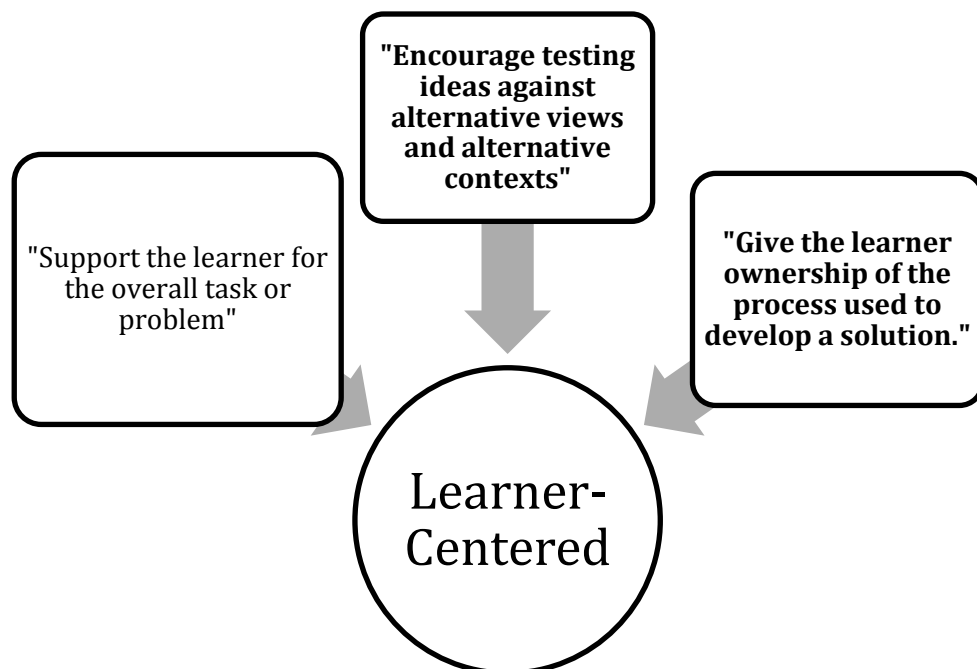


Figure 2.1. Savery and Duffy's (1995) Principles manifested in problem-based learning (Barrows, 2002).

Savery and Duffy (1995) developed instructional principles that could “guide the practice of teaching and the design of learning environments.” (p. 137) These, in turn, would be manifested in PBL. The man credited with originating problem-based learning in medical schools, Howard Barrows’ (2002), proposed that PBL activities should be learner-centered, self-directed, authentic, and their authenticity thus extends into the conditions by which the learner would encounter them. These four characteristics mesh

with the instructional principles developed by Savery and Duffy. Figure 2.1 presents this synthesis.

2.3.2. Problem-Based Learning and Constructivism

Problem-based learning (PBL) is a strategy that presents a complex problem for students to solve. These problems are ill-structured and lend themselves to diverse solutions, making them learners perceive them as authentic in nature (Barell, 2010). Multiple descriptions of what defines PBL have certain components in common (H. S. Barrows, 1996; Boud & Feletti, 1997; Brears, MacIntyre, & O'Sullivan, 2011; Hung, Jonassen, & Liu, 2008; J. Savery, 2006). To summarize these, they

- Are based around an ill-structured problem
- Institute an authentic problem to be solved
- Are collaborative among small groups
- Encourage self-directed learning
- Transform the instructor from a knowledge dispenser to a facilitator who provides scaffolding for the students.
- Are open-ended and diverse in their solutions

2.3.3. Foundations

While formally based in medical education (Barrows, 1996) problem-based learning has long been part of the human condition (Barell, 2010). In medical school, Barrow's instructional facilitator would present groups with a case or problem that represented authentic issues that the students would be expected to face as doctors.

Medical students would then build their knowledge about the problem, create hypotheses, test their treatments, and solve problems through their own self-directed study, often in small groups. Barrows (1996) noted, "During this self-directed learning, students work together, discussing, comparing, reviewing, and debating what they've learned" (p. 6).

Savery (2006) tracked the permeation of PBL into other learning institutions. Higher education in various disciplines, as well as K-12 schools, has experienced some success when implementing PBL activities into their respective curriculums; however, the efficacy of PBLs has been brought into question (Azer, 2009). Some failures represent ambiguous views of what PBL is (Boud & Felettti, 1997). Savery (2006) referenced and expanded on Barrows (nd) characteristics of PBL, and concluded that they

identify clearly 1.) the role of the tutor as a facilitator of learning, 2.) the responsibilities of the learners to be self-directed and self-regulated in their learning, and 3.) the essential elements in the design of ill-structured instructional problems as the driving force for inquiry. (p.15)

Since PBL activities appeared to be in sync with constructivist learning theory, it is important to understand what factors have kept it from widely being used in the classroom. Further, it is important to note what implementation suggestions have been made to address this reluctance as a result of past studies.

2.3.4. Hindrances to Implementation

Partially, the successful implementation of PBLs in K-12 relies on the flexibility, adaptability, and related skillsets present in a teacher's repertoire. Generally, teachers are not given appropriate training in this methodology that will support successful

implementation of PBL (Azer, 2009; Ertmer & Simons, 2006). In addition, high-stakes testing encourages many teachers and districts to focus on the test rather than deep learning, making PBL unattractive to administrators and instructors (Au, 2007). Overall challenges to the use of PBL are associated with three basic components. Ertmer and Simons (2006) list them as “1.) creating a culture of collaboration and interdependence, 2.), adjusting to changing roles, and 3.) scaffolding student learning and performance” (p. 42). The facilitator must also monitor the groups and be aware of lags in self-directed learning, and recognize when to step in and provide support in the form of verbal and resource-based soft-scaffolds (Hmelo-Silver & Barrows, 2006).

Brush and Saye (2001) attributed the term, *scaffolds*, to Vygotsky (1978) and his ZPD mentioned earlier in this chapter. They go on to say that while Vygotsky’s scaffolding suggests the necessity of adults or other students with a larger knowledge base, Brush and Saye refer to scaffolds as anything that would aid students in reaching a more complex understanding, this includes “multimedia embedded scaffolds” (p. 335).

Brush and Saye (2002) further elaborated on scaffolding by identifying soft and hard scaffolding. Soft scaffolding can be considered that *just in time* teaching point. This could be provided for a whole group to individuals. It might include working with a small group that is having difficulty with a website application; whereas, hard scaffolding would be anticipated in advanced. If students typically have a difficult time using a certain software, the teacher would provide hard scaffolding, direct instruction to the entire class.

Students exposed to PBL also face difficulties. Some students are not adept at directing their own learning (Azer, 2009). In other words, they prefer getting what they

view as the correct answer, rather than live with perceived ambiguity. Also, they may have a rudimentary understanding of PBL in general and what it means to engage in self-directed learning. Therefore, a student's well-developed learning practices will clash with new styles of learning (Little, 1997).

2.3.5. Implementation Plans

Ertmer and Simons (2006) offered suggestions for overcoming the challenges that K-12 teachers and students face while engaged in PBL activities. In regards to collaboration challenges, they propose that, after students have worked in "mini PBLs" in small groups, the entire class should then reflect on the experience. They recommend a strategy suggested by Steipen and Gallagher (1993) called "postholes." These postholes, or mini-lessons, present a short problem that introduces and builds schema into the way PBLs work. Requiring that students maintain detailed records and facilitators keeping in regular contact with students could also address the issue of keeping students engaged in the problem (Ertmer & Simons, 2006).

2.4. Alternate Reality Games (AltRG)

Sometimes known as pervasive or immersive games, AltRG are narrative-driven interactive multimedia events. In these games reality and the narrative merge to the point that the line between them is quite blurred (Montola & Waern, 2005). They use various technologies, old and new, to deliver narrative, keep the game moving, and the player engaged (O'Hara, Grian, & Williams, 2008).

2.4.1. History of Alternate Reality Games

Many have pointed to the A.I. Game, also known as The Beast, as the beginning of AltRG. Its roots are firmly planted in viral marketing as The Beast was created to advertise the film *A.I.* Clues were left at the end of a trailer about a sentient machine therapist. This lead people to search for the therapist online, and this lead to a website that stated the year was 2142. An engaging blend of problem solving, critical thinking, and collaboration followed (Zulborski, 2005). Another example of this type of marketing can be found in I-L-0-V-E-B-E-E-S, a viral campaign to introduce a new version of a Microsoft video game, Halo 2 (McGonigal, 2008). Not all AltRGs have remained commercial in theme or narrative. AltRGs can have serious subjects as well as in Jane McGonigal's World Without Oil. This AltRG brought participants into a world with a severe fuel crisis. In this case, this AltRG moved away from entertainment and into reality. This real world issue illustrates the serious potential for AltRGs (Olsen, 2007) and makes it an excellent venue for education through at levels.

MIT and the Smithsonian partnered to develop an AltRG for students 11 to 14 years old. In April of 2011, they launched the game. Players were to assume the role of scientists to help save the planet. They solved puzzles, played games (see Figure 2.2), and interacted with scientists by collecting and reporting on data, and collaborated with other students across the United States. As the students solved problems, more clues were released. For example, parts of a journal were "unlocked" when players came to a solution of some mystery (Calhoun, 2011).



Figure 2.2. *Time Rover game from Vanished*

2.4.2. Alternate Reality Games in Education

AltRGs are attractive to education for many reasons. According to Warren and Jones (2008), they have a low cost and ubiquitous nature. They also state that AltRGs encourage “...creative problem solving and collaborative play towards achieving the learning and playing goals of the design” (p. 36). AltRGs inspire authentic research as participants delve into solving the problem presented. Moseley (2008) writes, “Here were people gulping in information and setting forth on week-long collaborative research projects, just to solve a minor clue in an online game” (p. 2). Dominick (2008) observed that AltRGs follow constructivist thought as the participants build meaning from seemingly minor clues. According to Kim, Allen and Lee (2008), the creators adapt narratives as the players construct meaning. Finally, AltRGs support collaboration (M Dominik, 2008; Moseley, 2008; O’Hara, Grian, & Williams, 2008; Scott J. Warren &

Jones, 2008). As participants leave the gaming world, they encounter situations at work or school that will require them to work with other people. Not only are AltRGs consistent with PBL, they also mesh with 21st century skills(M Dominik, 2008).

2.5. Design-Based Learning

The design by students has been a well documented strategy for learning (Bhat & Kolodner, 2009; Ellefson, Brinker, Vernacchio, & Schunn, 2008; Hmelo, Holton, & Kolodner, 2000; Kafai, 2006; Lee & Kolodner, 2011; Puntambekar & Kolodner, 2005). According to Ellefson, Brinker, Vernaccio, and Shunn (2008), this strategy allows students to “learn content while designing an object or prototype.” (p. 292) Learning by Design TM and design-based learning (DBL) are grounded in science instruction. Doppelt (2007) compares the design process with problem solving (see Figure 3). Though generally connected to project-based learning (PjBL), its affordances for learning would evident in PBL. Project-based learning is based on a driving question whose end result is a project, and while PBL can result in a project, its focus is on an ill-structured problem. See chapter 2 for its definition.

CHAPTER 3

DESIGN METHODOLOGY

3.1. Introduction

The initial alternate reality game (AltRG), titled *The Truth* (see Figure 4) was initially designed in 2008, development completed in the summer of 2009, and it was implemented in the fall of 2009. Its original design intention was to create to address a specific issue with 5th grade students in a medium-sized intermediate school in North Texas. During the summer of 2010, the AltRG evolved to add in preparation for the students to design their own AltRG. The design was adjusted to meet the needs of students in the area of engagement. The first iteration was created *for students* rather than *by students*, as was the first iteration of the design of *The Door*, which was an educational alternate reality game developed to immerse undergraduate students in computer literacy skills (Warren et al., 2011). While *The Door* and a later version, *Broken Window* (Warren & Najmi, 2013), provided initial design models, the teacher-created AltRG used in this study was designed using language arts goals for intermediate grade students rather than basic technology skills.

3.2. Design for Students

During the summer of 2010, the designers began to emphasize student group work from the beginning of class instead of waiting for first contact by the characters in the game. It was also predicted that students would be more engaged if they created their own AltRG in groups. During the fall, the project was delayed and not begun until the spring of 2011. Due to this delay, one of the original designers dropped out of the

project after the initial AltRG was completed. However, a new participant with problem-based learning (PBL) experience joined the project in the spring of 2011. During the second half of the unit, these designers revised and implemented the student designed AltRG experience in order to increase engagement and have the students identify with characters from several different novels rather than a single one. These designers continued to meet during the summer of 2011 in order to adjust the design. For example, they learned that groups of 4 or 5 worked better than groups of 6 or 7. The designers also dropped the cooperative-like group structure of the initial project to allow more collaboration between students rather than focus on individual roles that would evolve in the second iteration. In cooperative groups, the teacher gives each member a role to perform. For example, one might serve as the scribe of the group. That member would be responsible for all of the writing in the learning task (D. Johnson & Johnson, 1999). It was believed that this would stimulate the collaborative process throughout the entire project. The *designed for* students AltRG experience (Figure 3.1) was implemented in the fall of 2011, but the *designed by* experience component did not begin until the spring semester of 2012.

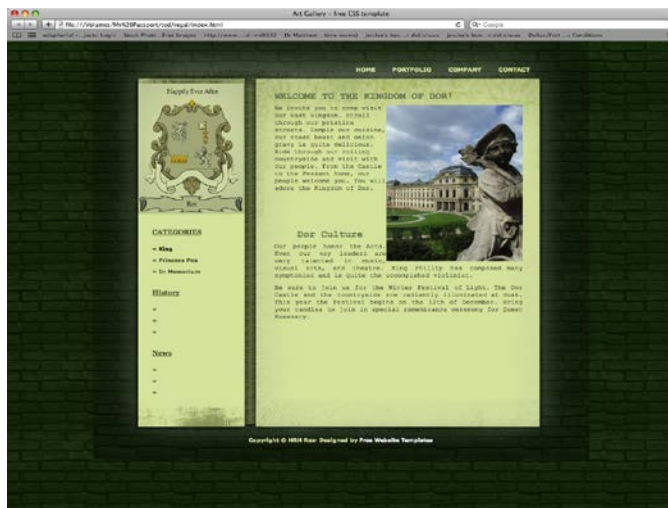


Figure 3.1. Kingdom of Dor from The Truth.

The problem-based learning structure resulted from student interaction with the characters from *The Tale of Despereaux: Being the Story of a Mouse, a Princess, Some Soup, and a Spool of Thread* (DiCamillo, 2003). This book was chosen for its rich, complex characters and underlying theme of tolerance. The quests inherent in the game were presented as problems that two of the characters, Despereaux and Roscuro presented. Students discussed, developed, and presented solutions to these problems via a learning management system. The design of the project required students to research, present the results in various forms, design a survey, analyze the results, and present the information in various formats. Students interacted with an opposing character through a voice over IP (VoIP) application. Students were challenged to consider multiple points-of-view and support the views from both perspectives. During debriefing, students were expected to discuss the underlying themes that they felt were present in the activity. While the results of this teacher designed AltRG are not the focus of this study, its problem-based learning structure laid the foundation for the student-led design of an AltRG that is.

3.3. Design by Students

This study sought to investigate the experiences of 5th grade students through problem-based learning. In order to develop the curriculum, the instructors used the analyze, design, develop, implement, and evaluate (ADDIE) model of instructional design. However, the instructors used a LBD™ approach for this project as described in chapter 2 of this dissertation (Kolodner, 2002). The *design by* student AltRG was a problem-based module compared to the *design for* students, which held PBL

components. The PBL in this study was much more student-directed rather than teacher-directed.

Though Kolodner's (2002) original approach was meant for science, this approach worked with PBL in language arts as well. The problem for the students was to select a theme that was connected to real life problems within literature and express it through an AltRG. Students were therefore placed in groups based on a survey of common novels read by the students as independent reading. The groups were heterogeneous with varying levels of ability. Some groups naturally evolved into all-girl or all-boy groups. Students chosen due to their representation of distinct learner types were in such groups.

Before students began the project, they set goals and time management guidelines. These included, but were not limited to: 1.) self-directed checkpoints, 2.) conferences with instructor, and 3.) daily task checklists. Students also signed a contract that included one section created by the groups. Students communicated through the student email and blogging system.

Students began the actual PBL activity by brainstorming different topics presented in the book and converted them to themes. This type of analysis was established early in the school year. When the group decided on a theme that presented an authentic, real world problem, students clearly defined the problem and listed several possible solutions.

The groups identified characters and theme through a KWL chart (see Figure 5). This chart helped students identify what they knew, what they wanted to know, and what they learned after the experience was concluded. Students began brainstorming

on different topics presented in the books that related to “real world” issues, and created themes based on the topics identified. The collaborative groups agreed on the theme to present, it was added to the *L* column on the KWL chart, and they began planning how their themes would be integrated into the AltRG. Though they had many choices in which technologies to use, a website with a narrative was the one required artifact. Direct lessons on how to create a website were delivered earlier in the year before this project began. This prior knowledge reduced the necessity of “hard scaffolding” during the design section of the project. However, tutorials for Weebly were online if the students had difficulty recalling the drag-and-drop design.

Each group created a flowchart of tasks that should help the audience gain a better understanding of the theme. Students then chose jobs based on personal interest and self-identified strengths. Each group met at the beginning of class to monitor progress in the project, and proceeded to work on individual tasks. The student designers delivered the game through the websites required by the instructors (see Figure 3.2), but the groups were free to choose the particular methods that they would use to distribute the game. Many students chose to integrate technologies that had been employed in the teacher-created AltRG; however, they were also free to explore other technologies such as virtual agents presented in Adobe Flash-driven videos, QR barcodes, and image editing software.

Students then spent three weeks building the game and, at the end of this period, a trial run was planned. Students also checked their AltRGs against the student/instructor created checklist and did a quick test of their game. During the following three days, the other groups played the games.

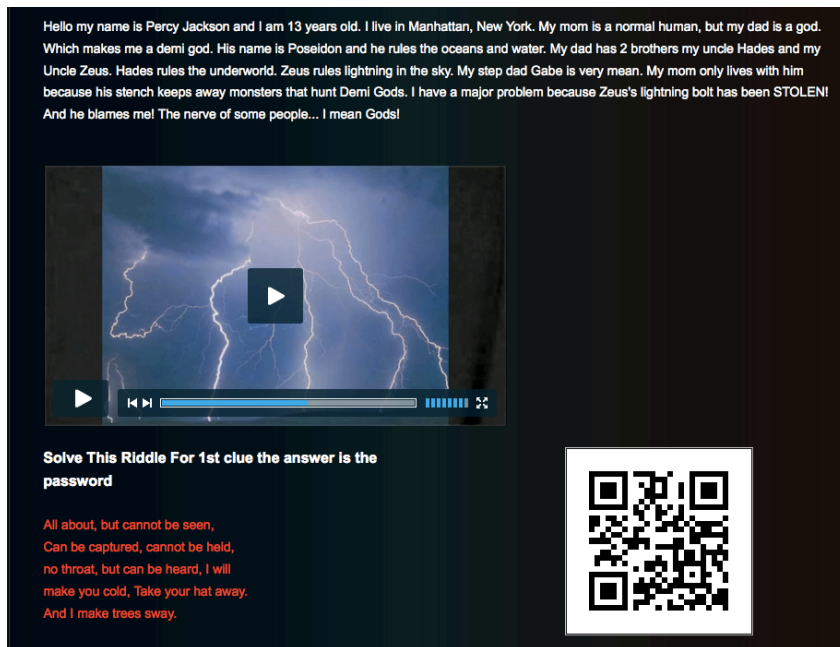


Figure 3.2. Webpage from *The Lightning Thief*.

As part of their design plan, students received peer feedback from those playing the games. They then presented their AltRGs to different groups in order to receive feedback on their games. Players completed a document to evaluate and provide feedback to the game designers, which provided formative assessment and allowed for improvement of their product. After receiving feedback from fellow students and instructor, students had an opportunity to revise the game one more week before it was fully launched. Once implemented, the PBL task was considered complete and then evaluated by the instructor using a summative assessment checklist. This checklist included sections on group collaboration, the design process, and the depth of the narrative presented in the game. This final product was only one component of the evaluation of the project. Student interaction as a collaborative group, opportunities for self and group reflection, and self-regulated learning skills were monitored using to blogs (see Figure 3.3), instructor observation and notes from student/instructor-

scheduled debriefings. The debriefing included discussing progress in the games, technical problems that arose, and positive experiences. The final debriefing compared creating their games to playing The Truth. Many expressed their feelings about creating the game in their blogs as well.

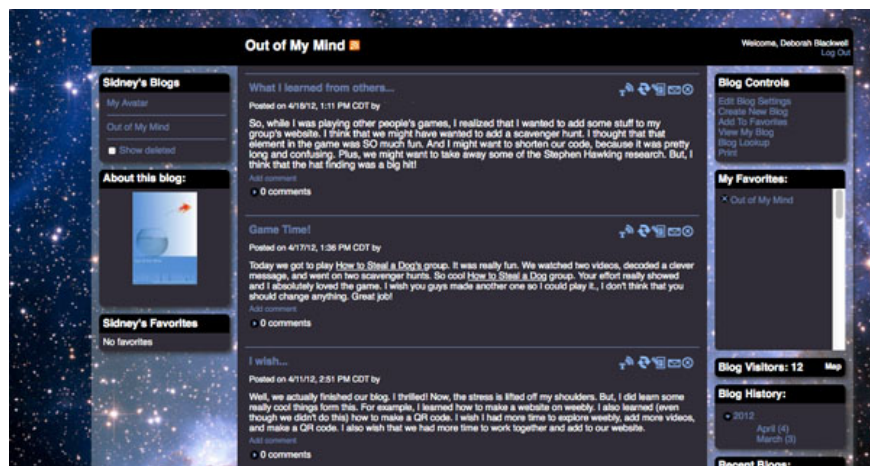


Figure 3.3. Student blogs.

3.4. Summary

To summarize, the design of the PBL activity was linked to the model of the original alternate reality game (AltRG) design. While the original AltRG used the ADDIE model for the instructional design, students instead used a Design-based Learning approach. Learners thus began with a game in mind and worked backward to achieve their objectives, planning and organizing the flow of their project before constructing their own AltRG. Students were then able to analyze the sections of the game in order to design their own games. The instructional design of this project provided the instructors with a systematic approach to implementing PBL in a 5th grade classroom and further produced a plan that transformed the traditional classroom environment into one that was supported by social constructivist theory and practice. The plan also

provided students with opportunities for soft and hard scaffolding as described in chapter 2 as well as a chance at autonomy.

Chapter 4 continues the study of methodology by explaining the research methodology used for this study.

CHAPTER 4

RESEARCH METHODS

4.1. Introduction

This study, which focused on the lived experiences of 5th grade students as they engaged in PBL activities, took place in a naturalistic classroom environment. The district, principal, and campus instructional design team encouraged a focus on designing engaging lessons. This support allowed instructors to explore problem-based learning (PBL) and alternate reality games (AltRG) to support classroom instruction. The complexity of design, culture, and age of the participants lends itself to design-based research utilizing descriptive case study methods. The purpose of this study was to analyze how PBL affected 5th grade students in both a general education class and a class with identified gifted students that had been integrated into a broader, general education class. In order to discover the “how” of the study, we designed and participated in the class as the students are observed. Since research on PBL has primarily focused on secondary and post-secondary education (Drake & Long, 2009), this study sought to explore the effects of PBL and AltRGs on students at the elementary level. (Barell, 2010; Drake & Long, 2009; Partnership for 21st Century Skills, 2009).

4.2. Research Design

4.2.1. Design-based Research

Design-based research (DBR) is a continuing process that occurs in a naturalistic setting. In this conception, the researcher is a participant in the instructional design as

well as in the classroom itself. She collaborates with the instructor and may also take on the mantle of instructor at times (Barab & Squire, 2004; Brown, 1992; Confrey, 2006; Wang & Hannafin, 2005). Ann Brown (1992), considered to be one of the founders of DBR, decided to leave the rigid laboratory-based research to engage in research “devoted” to what she called “the blooming, buzzing confusion of inner-city classrooms” (p. 141). She acknowledged the importance of obtaining data that reflected both depth and complexity (Confrey, 2006). In fact, Wang and Hannafin (2004) suggested that the variety of recognized research methods used in DBR promote high rigor in the research. McKenny, Nieveen, and Van den Akker (2006) posit that building the a thick record (educational artifacts, direct observation field notes, interviews, and other such evidence of learning and instruction, etc) can also ensure rigor. This provides a way for others to draw conclusions, make “inferences” and “gain insight on what happened during research stages” (p. 85); therefore, while researchers do not seek generalizability from their findings, this becomes a guide for other researchers and practitioners wanting to add to the research base (McKenney et al., 2006).

4.2.2. Characteristics and Approaches of Design-based Research (DBR)

Several authors have pointed to different characteristics of DBR (Barab & Squire, 2004; Brown, 1992; Wang & Hannafin, 2004); however, though it has been not quite 20 years since Brown (1992) and Collins (1992) wrote their foundational pieces about design experiments, DBR has not reached maturity status compared to other methodologies (Barab & Squire, 2004). The number of recognized characteristics varies widely among its theory bases. In fact, most authors seem reluctant to use the phrase

because the field itself is very diverse. Wang and Hannafin (2004) attempted to synthesize the literature and have designated five characteristics of DBR. The following table (Table 4.1) illustrates Wang’s and Hannafin’s identified characteristics.

Table 4.1

Characteristics of Design-Based Research

Characteristics of Design-Based Research	
Pragmatic	Design-based research marries theory and practice. Occurs in the naturalistic setting of a classroom
Grounded	“Theory-driven and grounded in relevant research, theory, and practice.” Rigor and trustworthiness are embedded into the design through thick record and triangulation
Iterative	Design is revised and refined through a “cycle of analysis, design, implementation, and redesign.
Collaborative and participatory	Researcher and practitioner work together to design Researcher often intervenes and at times is the practitioner as well.
Flexible	Multiple methods are used to conduct research, including quantitative, qualitative, and mixed methods Changes occur due to the iterative process; however, it its “well documented”

Adapted from Wang & Hannafin (2004, p. 8)

Tom Reeves (2006) contrasted the “approaches” of both DBR and predictive research presented in a linear fashion (see Figure 4.1). The iterative nature of DBR allows the researcher and practitioner to revisit and revise throughout the collaborative processes engaged in during the study. These approaches are fluid and flexible. During this process, the research team, researchers, and practitioners, refine the design several times during any point in the process. There may be multiple iterations of the instructional design during the study before the reflection. This is all well documented in the “thick record” (Wang & Hannafin, 2004).

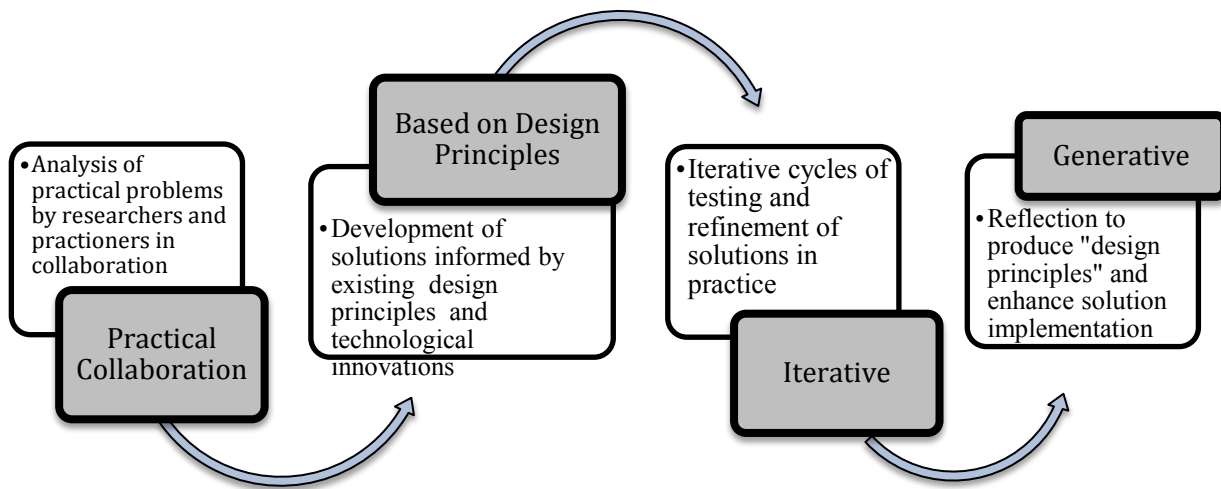


Figure 4.1. Reeve's approach to design-based research (p. 57).

The descriptive study contained in this dissertation follows the design-based research (DBR) approach. Since the purpose of this study was to investigate the affect of PBL on a particular set of fifth grade students, it did not seek to generate generalizations, but rather, the study sought to investigate this phenomenon as a snapshot in time. Qualitative methods serve this purpose better than a quantitative or mixed methods approach. Though serving as one of the researchers in this study, the author also served as one of the practitioners as described by Cobb, Confrey, Disessa, Lehrer, and Schauble (2003) and Confrey (2006).

4.2.3. Summary

DBR is a method that blends theory with practice. It takes place in the naturalistic setting of a school instead of a lab. In this method, the researcher and practitioner, or teacher, collaborate in order to design the lesson, implement it, re-evaluate it and revise, and finally implement it again. This could go through several iterations. As the

researcher collects and analyzes data, two peer coders joined to help through triangulation. This helps to build the trustworthiness of the study.

4.3. Iterations

This study is an iteration of an instructional design process that began with The Door. The Door was a course redesign that integrated an AltRG into an undergraduate computer applications course. (Warren, Dondlinger, McLeod, & Bigenho, 2011). The Door saw two more iterations based on feedback from students and instructors that changed fundamental components of the course, while leaving the immersive narrative intact.

The next iteration changed the from one of *designed for* students into one in which the game was *designed by* students. The Global Village Playground (GVP) was not a computer applications course; instead, as Dondlinger and Wilson (2012) explained, it “was a capstone learning experience designed to address institutional assessment needs while providing an integrated, contextualized, and authentic learning experience for students” (p. 154). This course also used an AltRG; however, in this instance, the groups in the class constructed their own game rather than only played the instructor-designed game. The next iteration came with Broken Window. This course implemented an initial AltRG, Broken Window, which the undergraduate students played for several weeks before designing their own games based on United Nations millennium development goals (Warren & Lin, 2012; Warren & Najmi, 2013).

The educational game design studied in this dissertation was the sixth iteration of a problem-based learning alternate reality game following methods pioneered in The

Door. Further, it followed the *designed by* approach employed in Broken Window and the GVP. The major break from the previous iterations in this instance was that this project was conducted with fifth grade students in a language arts classroom rather than undergraduates in a basic technology course or in a capstone experience course. In addition, the current research covered a period of 4 weeks and 4 days rather than a full 16 week semester. The other iterations were also complete course designs for students at the undergraduate level.

4.4. Participants and Setting

4.4.1. Setting

A 5th grade classroom was the primary setting of this study; in addition, school computer labs, library labs, and the other campus locations provided supplemental settings. The campus was in a mid-sized intermediate school located in a large city in northeast Texas. The library labs provided workspace and a computer lab within the library. This provided students with the opportunity to work with the technology and then gather as groups to discuss issues with technology, plan for the day, and organize their artifacts. Though much time was spent in computer and library labs, the 5th grade classrooms were also often supplied with technologies such as laptops and Cisco Flip video cameras, which were accessed on a daily basis.

This study occurred in the spring semester of the school year. The first 3 weeks of the study focused on design of the AltRG as students' primary problem-based learning experience. Language arts classes consisted of 15 days of classes that were 70 minutes each; however, student used 50 minutes on the project. This section was

12.5 hours. An additional 10 days allowed peers to play the games, provide feedback, and gave student designers adequate time to revise their games based on this feedback. This took 35 minutes of the 70-minute class providing an approximate 6 hours for the AltRG.

4.4.2. Participants

The participants were a sample of convenience. Since school district computers systems selected students for these particular classrooms before the school year began, the investigator had no input on which students were selected for classes A or B. The initial participants included 19 students in two 5th grade classrooms. Three students were in one class, and 16 were in the other class. The students consisted of 11 male and 8 female students. Of the 19, 9 students were chosen as representative of the group according to behaviors observed during the study and identified in the coding process. Initially, four students were chosen because they represented students not in a functional group. Five students were selected to represent members in functional groups. In addition to collaboration, students were selected to represent other characteristics found in the initial group. Two students represented the gifted students in the class. Two students represented students who preferred direct instruction. Two students were selected to represent students engaged in the process, and one represented a student who was engaged with the project in the beginning but did not maintain the engagement. Two students represented students with video game experience who exhibited low understanding of alternate reality games. Eight of the students were from Class B and one was in Class A. Two students were identified as

gifted and talented. One was attending a pullout class for gifted instruction while the other was identified during the study. The remaining students were in a general education classroom. The nine students' ages ranged between 10 and 11 during the study and each student was given a pseudonym. See Table 4.2.

Table 4.2

Descriptions of Students in Study

Participant	Age	Sex	Class
Kelly	10	female	B
Thomas	11	male	B
Whitney	11	female	B
Andrew	11	male	B
Chance	10	male	B
Robin	10-11	female	A
Eli	11	male	B
Erin	10	female	B
Robert	11	male	B

4.4.2.1. Description of the Student Participants

Kelly was one of the youngest in the class and is quite short. She was a self-described “over-reactor.” It was not unusual to see Kelly burst into tears when she was frustrated or confused. She is very organized and likes to have everything in its place. In the past, she has not dealt well with ambiguity. She had a solid base of friends in the classroom. Kelly was selected to represent students engaged with the project and as a member of a functional group.

Thomas was a bright young man with a positive disposition. He rarely said anything negative about anyone. Thomas had red hair, freckles and was a teacher

pleaser with a good sense of humor. Thomas often talked with his hands when he was excited about something. Thomas was well liked by his peers and was friends with everyone in the class. Thomas was selected to represent a students engaged in the project as a member in a functional group.

Whitney was the tallest girl in the class. She was athletic, yet she wore large colorful bows in her hair everyday. It did not matter that she was the only one wearing bows in fifth grade; she wore them anyway. It was not long after she began this, that several other girls started wearing large bows in class. Whitney was popular in the school, and everyone wants to be on her team, group, or lab partner. She took this in stride and did not try to impose her will on others. Whitney was selected to represent students with video game experience who exhibited low understanding of alternate reality games and as a member of a functional group.

Andrew was a relatively easygoing young man. He was easily influenced by certain peers and did not always make wise choices. Andrew was friendly and generally willing to help anyone who needed it. An avid hunter, he liked to talk about guns, hunting techniques, and the hunting expeditions he went on with his father. Usually slow to anger, when Andrew has been known to show his frustration; however, he would not show his anger by confronting the person who made him mad. Andrew would generally ignore that person. Andrew was selected to represent students with video game experience who exhibited low understanding of alternate reality games and as a member in a dysfunctional group.

Chance was the youngest and also one of the smallest students in the class. He really liked to please his teachers, but was also easily distracted. He had difficulty

keeping up with his belongings and it was not unusual to see papers, a jacket, books, and folders on the floor under his desk during the day. He had an easy smile and was well liked in the class. Sometimes his immaturity caused some students to avoid him as a partner or group member. Chance was selected to represent students who preferred direct instruction and as a member of a functional group.

Robin was a friendly girl with a calm smile. She was identified as gifted and has been part of a pull out program for the last three years. She humbly attributed her organization, study ethic, and good nature to her mother. Robin was very creative and enjoyed taking the lead in projects without overpowering the rest of the group. She was helpful to her peers and teacher. She was very eloquent and loved to talk. Robin was selected to represent students identified as gifted and as a member of a functional group.

Eli was very creative and loved attention. He did not like to share the spotlight very often. He had very definite ideas about creativity, popularity, and teacher roles. Though he appeared confident, he wanted constant affirmation on concepts, products, and problem solving he engaged with in class. He became easily frustrated and had been known to follow the teacher around hoping to wear her down. He was persuasive and, at times, had been successful in his endeavors. He is sometimes also condescending with his peers. In spite of this, he was extremely popular in the class. He was selected to represent identified gifted students and students operating in dysfunctional groups.

Erin was a bright girl, but she also a follower. She tended to take on the personas of those around her. She had a small group of close friends, but the popular girls in

class accepted her too. Erin did not have much patience with people who do contribute to the group. She became frustrated when she did not understand something immediately. Erin was selected to represent students who preferred direct instruction and as a member of a functional group.

Robert was a friendly boy of average height and he was quiet in class, but liked to interact with his friends after school. Robert disliked conflict and he would yield to another heedless of whether his needs were met or not. Robert appeared humble and unassuming, but he would reveal a perceived injustice subtly. He was well liked by his peers because he appeared to be easy going. Robert was selected to represent students who were engaged with the project in the beginning but did not maintain the engagement. He also represented students in dysfunctional groups.

4.4.2.2. Description of the Teacher Participants

The two teachers met regularly to collaborate, design, and plan for instruction. At the time of the study, Teacher A had 24 years of experience working in K-12 schools. She was one of the designated teachers of identified gifted and talented students, acted as department chair of fifth and sixth grade language arts, and was a member of a teacher sounding board for the campus. As Teacher B, I had 23 years of experience, was a member of the campus leadership committee as well as the committee to revise the district's self-directed appraisal system, and had led several professional development sessions for the district in the area of technology integration. I had used PBL in the classroom in previous years. Teacher A described herself as less

comfortable with the concept; however, she was open to new experiences. We worked in an environment that fostered innovation, academic freedom, and collaboration.

4.5. Data Collection

As the students progressed through the student-designed PBL, they used a blog as a vehicle for reflection. These blog reflections served as the primary data collected for this study. Nine open-ended questions were posed that would require a reflective response. The final reflection in these blogs used questions on a document from the Buck Institute for Education (Appendix C). Though the Buck Institute for Education (BIE) is a nonprofit organization and has been involved in project-based learning for over 20 years, the documents provided fit well with the reflective process of fifth grade learners engaged in PBL. Seven students in the study participated in semi-structured interviews ranging from 16 to 23 minutes. The interviews occurred one week after the conclusion of the project. These served to provide additional insight into student attitudes, levels of understanding, and to provide elaboration for student utterances in the blogs. These blogs and interviews represented the primary data sources in this study. Supplementary data collected included classroom observations as well as audio and video recordings of classroom activities.

4.6. Data Analysis

Three times a week students reflected on their games, learning, and groups in blogs. The students were recorded through a video that ran in the back of the room at least three times, and seven students participated in semi-structured interviews. The

transcripts gathered through video recordings of classroom activities, semi-structured interviews, and reflective blogs. These were analyzed based on critical ethnographic method described by Carspeckecken (1996). The researcher analyzed these transcripts and two other coders not involved in the study. The analysis included assigning codes to the interviews and blogs while triangulating, creating meaning fields, horizon analyses, and recognizing emerging themes through the coding. (Carspecken, 1996).

4.7. Summary

Due to the complexity of the setting, participants, and culture of the school, it was determined to use DBR to conduct descriptive case study. The qualitative methods used were more conducive to answering the research questions identified for this study.

- How does problem-based learning affect students in a fifth grade language arts classroom?
- How receptive to a new way of learning are fifth grade students in a language arts classroom?

The current study was the sixth iteration of an alternate reality game-based learning design that was originally used to teach basic computer applications through PBL and narrative that was found to increase, among other skills, collaboration, self-regulation, and problem-solving (Warren et al., 2011). Through the course of four other iterations, the focus shifted from a *designed for* students approach to a *designed by* students approach found in both the Global Village Playground (Dondlinger & Wilson, 2012) and

Broken Window (Warren & Najmi, 2012). The current design followed, with substantial modification, the model of Broken Window.

The setting of the study was a district that encouraged innovation and supplied support in terms of professional development, books, and collaboration time out of the classroom to work on the instructional design. The classroom provided much of the space and technology required to complete the AltRGs, as well as, computer and library labs. The library labs provided computers and workspaces for each group. Student design groups had three weeks to develop and build the AltRG. Learners had ten days to play the games, give feedback, and work on the improvement of their games based on feedback.

The participants of this study came from a sample of convenience; however, the teacher had no input into who could or would be put into her classroom at the beginning of the school year.

Collected data consisted of blogs, interviews, observations, as well as audio and video recordings. The interviews served to get further insight into the blogs. The analysis took place with three raters coding utterances, creating meaning fields, and agreeing upon categories and themes as well. These are discussed in depth in the following chapter.

CHAPTER 5

RESULTS

5.1. Introduction

This chapter presents the findings of this descriptive case study. The methods that secured trustworthiness and rigor are described. The codes and categories will also be explained in this section.

5.2. Process for Analysis

5.2.1. Trustworthiness and Rigor

Participants created 9 blogs over a period of 4 weeks to reflect on their learning. Semi-structured interviews were conducted as well in order to gain further understanding of the participants' experiences. Observations were kept in a journal.

Rigor was accomplished by the analyzing the blogs and transcripts line by line. Coder debriefing began in May with instructions on how the software functioned. The first blog was analyzed on May 8, 2012. The coders met for an average of 2 hours in 24 sessions set over 6 months. Utterances were also analyzed line-by-line as codes were generated that described the phenomena occurring in the blogs. Sixty-five codes were generated in May; nine were generated in June. Twenty-five were generated in July, and 3 were generated in August. The coders reached saturation at this point. The codes generated in July marked the beginning analysis of the interviews. The coders met again in October to discuss categories and themes. The coders reached 100% agreement on all codes, categories, and themes.

5.3. Analysis

One hundred eighteen codes were created, and these led to ten categories, which led, in turn, to four themes. The remainder of this chapter is dedicated to describing, illustrating, and defining these codes as they pertain to the research questions. Figure 5.1 illustrates the number of codes by documents for each student.

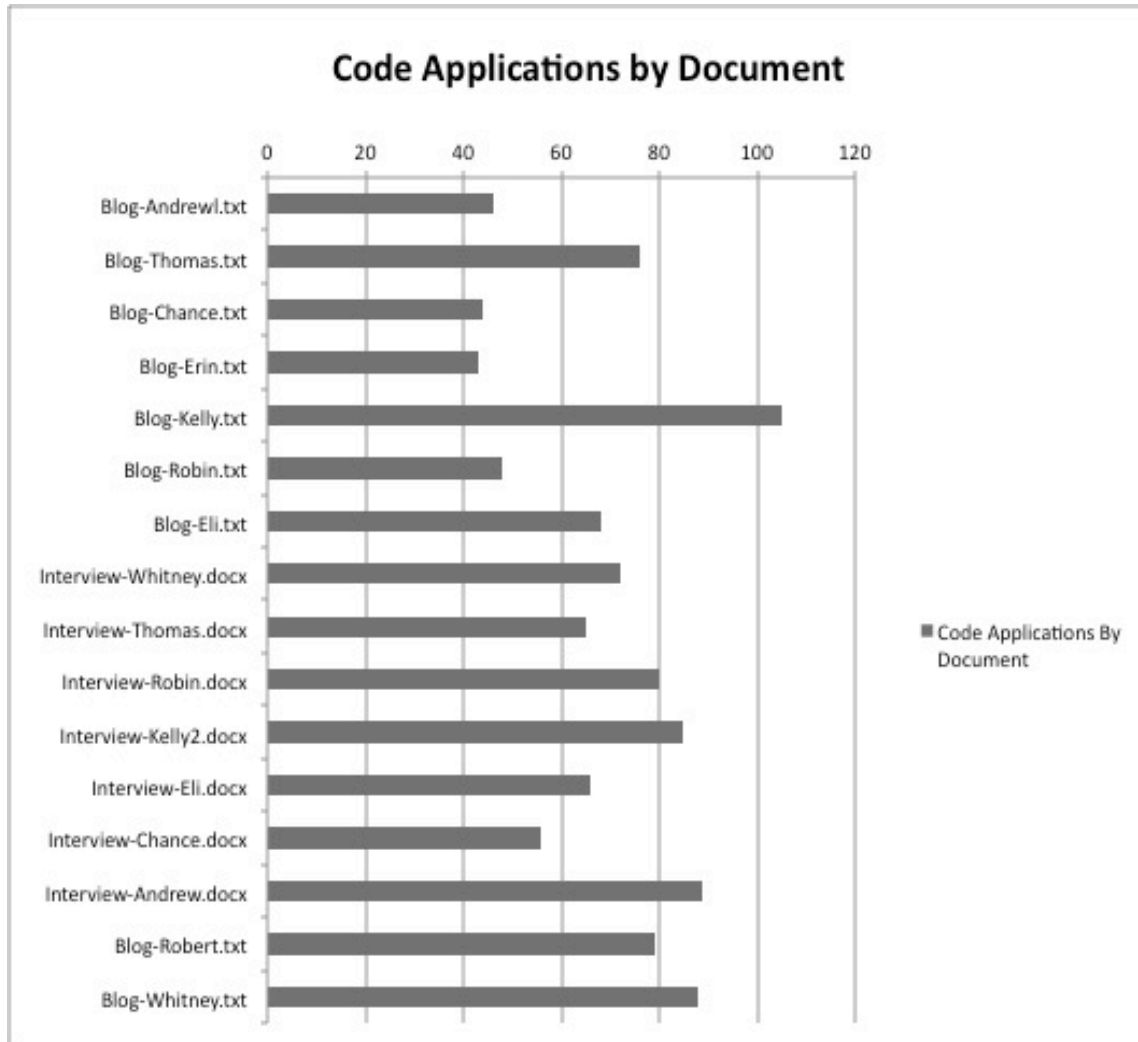


Figure 5.1. Students and their code applications.

5.3.1. Group Interactions

There were four subsections under the category, *group interactions*. As shown in Table 5.1, the occurrences for the negotiation code were higher than the other codes in this section.

Table 5.1

Subcategory-Communication Codes

Communication	Defined by Peer Coders	Number of occurrences
Self-monitoring	Evaluating own ability	3
Negotiation	The exchange of ideas to come to a common understanding	8
Expression	The delivery of ideas	3
Social interaction	The ability to work with other people to come to an understanding	3
Understanding	Comprehension of ideas	2

Sometimes *negotiation* was identified when it was present in the planning of the game. In her blog, Kelly, the self-described over-reactor, described the progression of negotiation from the beginning to understanding. She wrote, “We were a little rusty, argumentative, and confused at the beginning, but we got over all that.” Kelly and the rest of the group were able to work through several issues to come to an agreement and begin designing their game. She elaborated about how that was accomplished. Kelly said, “We had a lot of disagreements about what ideas were right, but we didn’t fight with each other. We just talked it out.” For example, sometimes when the students faced frustration as a group, they separated from the other groups and worked on resolving the issue. Negotiation was used as a strategy to solve disagreements within the groups. Whitney described the process in an interview when she was asked how

problems were solved in the group. She stated, “We just had to sit down. We just talked about it. We decided who was going to do what.” Kelly and Whitney were in the same group and were able to come to agreement in both instances through negotiation. That was not the case with all groups.

For instance, in Chance’s group, negotiation was attempted but they became polarized. Though an attempt at compromise was attempted, the group was unable to come to consensus during the project. In his blog, Chance reported, “The major thing was working in a group is harder than I thought it would be. The hard thing was that you have to agree with everybody else, or everybody will argue with you.”

Robert, the friendly boy who hates conflict, faced the same issue in his group. In this case, he described disagreements as happening because two members are thinking differently from the rest of the group. He explained, “A couple of people in the group have disagreements a lot, mostly because they have different ideas and like to do more of what they want than follow the main plan.” At this point, the group couldn’t come to consensus. No negotiation appeared to be happening within the group. If they had a “main plan” but two people veered from it, then the group developed the plan without “coming to a common understanding.” This set the tone for the duration of the project. For example, because the group was divided on which way to proceed, Eli, a creative attention-seeking boy, was able to control the entire direction of the project. No other input but Eli’s was accepted after this.

The next subcategory was coded as *group negative* shown in Table 5.2. This subcategory had more codes than the previous category. Three codes in particular stood out as ones with more occurrences identified.

Table 5.2

Subcategory-Group Negative

Group Negative	Defined by Peer Coders	Number of occurrences
Exclusion	Leaving out members for group decisions	5
Disorganization	Lack of planning and organization	6
Disparity	Inequality of group work	30
Distrust	Not trusting teammates	13
Conflict	Argument, struggle for power among the members	23
Frustration	Anxiety caused by group dynamics	17
Groupthink	Faulty decisions based on mob mentality	4
Outcome	Negative consequences	18
Tension	Lack of harmony with the group	23

The largest code in this section concerned *disparity*. Whitney spoke of negative group experiences in general. She described what happens when people are not working. After confirming that she had worked in dysfunctional groups, she described the look of a group that was a total failure.

Researcher: And what happened? What makes that kind of group a “total failure?”

Whitney: It’s just like one person doing all the work, and everyone else was not cooperating, and then when somebody has to do all the work, they just can’t do it. They just can’t do it.

Several students described this sort of disparity. Some confessed to being one of the people who did not do any work. Ironically, Andrew admitted to not working on the project one day. Andrew was very critical of anyone he felt was not performing the task assigned.

Researcher: Okay, so, what do you think made the part of it that didn’t work for you?

Andrew: Oh, like the people?

Researcher: Okay.

Andrew: Sometimes some people wouldn't work when they were supposed to. Sometimes I got really frustrated and mad, angry, but rarely it went good. I admit that one day I wasn't really working at all. I didn't know what to do, and I was just sitting around there doing nothing.

Andrew followed the same pattern as the ones that made him "really frustrated and mad." However, while he justified his own lack of action, he did not provide the same justification for his group members. For example, he told Chance, the youngest very distractible boy, that if he did not know what to do, he should look for something to do, yet when he confessed that he did not do anything because he didn't know what his job was for the day.

While many students complained of the peers that would not work, one complaint was issued by a student who wanted to participate, but was not allowed. For example Robert wanted to have a chance to work, but one member of the group insisted on doing all of the work. In his reflection Robert hinted at the disparity in his group. He wrote, "Yesterday, my group and I made four websites. Well, actually one person made all four, but I'm not going into detail about that."

In another instance, Robert was a little more explicit when discussing this issue in the blog. In the context of the rest of the blog, the following statement gave more evidence to the disparity not being a case of "slacking off" for him, but rather, it was a case of wanting to contribute, but being blocked from doing so. Robert explained, "I wish we split the work differently because one person was doing all the work." Finally, Robert described this disparity as one that became the worst part of the project for him. He wrote, "What I didn't like the most was the unequally divided work."

Conflict was another code assigned many times in this subcategory. Conflict can be positive when it challenges thinking and produces new thought. However, when groups could not get around the conflict or when it did not lead to the construction of new knowledge or collaboration, the participants could only see argumentation, or conflict, as negative. For example, Robert mentioned that he really did not want to make another AltRG because of the conflict in his group that was not resolved in a satisfactory manner. He wrote, "I don't really want to make an alternate reality game because of all the disagreements and arguments. I'd rather play them."

This type of conflict was also seen in Chance's group. In his blog, Chance mentioned the conflict and outcomes of the conflicts that never were resolved. He mentioned conflict as arguments throughout his blog. Chance explained, "The least enjoyable thing was when we argued and didn't get anything done." In his interview, Chance reiterated his feelings about the conflict and the difficulty the group had in making any progress during the game.

Researcher: So can you tell me when it was a bad experience working in a group?

Chance: When we would argue about stuff. In *Mudshark* we would argue about stuff. We wouldn't get anything done that day; we would just argue, and that was a bad time.

In this case the conflict overshadowed the entire experience in creating an AltRG. Chance's teammate agreed with him about the arguing. Andrew stated this problem as well in his interview. He explained in the interview, "we just fought way too much, and we didn't get along." He also stated that they were unsuccessful in accomplishing very much simply because of the conflict.

Researcher: Okay, how did you guys work around that, or did you, were you able to work around it?

Andrew: (wipes hand over his face) I don't think we really worked around it. Because throughout the whole, entire thing, we were arguing and everything.

In both interviews, the focus was on the fact that they didn't get along, or that they argued.

Another strong code found in the *group negative* subcategory was *tension*. This differed from conflict in that it addressed harmony, not necessarily arguments.

Whitney's blog described this tension and possible causes for it. She wrote, "I think the least enjoyable part was stressing out over everything. Some people in my group had different personalities than others, and they didn't get along very well."

She further described the tension again in her interview.

Researcher: How do you feel your group went with collaboration?

Whitney: My group, well, we had some moments. Sometimes somebody had an idea and another person had another idea, and they didn't really want to do the other person's idea.

The next subcategory in the group interactions category is group positive. This section was slightly smaller than the group negative as shown in Table 5.3.

Table 5.3

Subcategory-Group Positive

Group Positive	Defined by Peer Coders	Number of Occurrences
General Group Positive	General enjoyment of working with others	10
Harmony	Working on the same level in the same direction	9
Parity	Equality among the members	12
Cohesion	Working together	21
Norms	Rules established by the group	4
Outcome	Positive consequences	7
Peer Support	Collaboration and providing motivation	19
Group Size	Number of members in the group	4

Two codes stood out in this subcategory. The first had to do with *cohesion* and the other was with *peer support*. Both codes emphasized working together in some form. With cohesion, some students spoke of the whole experience as one that involved a struggle. In these cases, the participants working together did not mean that everyone had to agree with everyone else 100% of the time.

Robin's group was a prime example of this. When asked about a successful group experience, she did not just report that they were all of one mind from the beginning. Instead, Robin reported that this cohesion occurred through "remembering" norms the group set in the beginning. Through these "laws" they were able to achieve cohesion and collaboration.

Researcher: So, can you tell me about a time when working in a group really worked for you?

Robin: Well, this group actually, sometimes we had our little, you know, arguments, but we'd remember the law, and we tried our best to like smooth it out. It really did go really smoothly. Everyone was really working together, and we collaborated, and it was fun.

Her enjoyment of the project was linked to the ability to work with diverse group members. In spite of their differences, the group was successful for her because they were able to function "smoothly."

Whitney also reported this happening in her group in stages. By the time they reached their third stage, the group began functioning smoothly as well.

In her blog she equated working together as accomplishing tasks quickly.

Then there came the third stage, where we were all on it. We all knew what we had to do, and when we had to get it done. When that stage hit, we got it done in a snap with no problem whatsoever.

However, some saw cohesion as something that occurred when they worked with friends.

In Eli's interview, he reported about a time when a group went well.

Researcher: Have you ever been in a group that just, everybody just worked great?

Eli: Yes

Researcher: Could you tell me about that time?

Eli: In the 4th grade with my book, we had a little book reading group, and we were reading a book, and everyone in the group would always help each other, and we would always talk about our ideas and let each other speak. Those were all my really good friends in that group so we really got each other. I like that. That was a really fun group.

In a previous statement, Eli had identified issues he had with his group for the PBL. He immediately let the researcher know that he was "in a group with people I'm not really good friends with."

The second most prominent code in this subcategory was peer support. Students spoke of others helping each other and getting help. Some focused on the just in time help from each other when struggling with a technology while others wrote about helping other people when they completed their section of the game. Whitney wrote about the benefits of working in a group in her job. This was especially important to her because she missed the first three days we launched the PBL.

A lot of times, its awesome to have groups so you wont have all the weight on your shoulders in a big project. Also if there's a big project with many different parts that you don't know how to do, someone in your group most likely knows how to.

Her unique situation was addressed in her interview.

Researcher: You came into the project a couple of days later because you were out; how did you get caught up?

Whitney: I just had Kelly and everybody just to boost me up on what the plan was, and then there were other people who absent, and we had to get them included in it, and so, they really knew what they were doing by then, so they knew what to do, so they told me and everything. So I got caught up and everything,

After she had been absent for several days, her peers explained what she missed. She was able to reciprocate by providing the same support to another student who had been absent during the PBL.

Peer support was important to many students. In fact, several listed it as the reasons they like working in a group. For example, as Erin explained, "I like working in groups some times. Because [*sic*] you can ask them for help if you have a question." Thomas also gave this as a reason he liked working in groups as well. He said, "I like working in groups. People are there to help you out and give you support." Chance also wrote, "I like working in groups they will help you if you need help."

Kelly described peer support as a way to manage time. In her interview, Kelly listed many things the group did to "keep up," but her final statement summed it all up.

Researcher: Now on a project like this (It was four weeks long) how did you manage your time?

Kelly: Basically we helped each other when we finished and we didn't waste time; we didn't like looking on Google maps and telling me we're done because we were bored. That's basically how we managed our time.

Kelly gave evidence of the group's peer support, but she alluded to another group that was having internal issues with people who were not supply peer support. These members of the other group were looking on Google Maps and not working because they did not know what to do next. She gave an example of peer support, but illustrated it by giving a non-example supplied by the other group.

The next subcategory in the group interaction category was group member roles as shown in Table 5.4. Group member roles described the type of role taken on by individuals. There were three roles described.

Table 5.4

Subcategory-Group Member Roles

Group Member Roles	Defined by Peer Coders	Number of Occurrences
Self-centered Roles	Focus attention on individuals rather than the group	6
Social Roles	Affect the climate and group dynamic-harmonizer, encourager, gatekeeper	9
Task Role	Helps the group achieve its specific goals information seeker/giver	13

Only one student exhibited the *self-centered role*. Eli illustrated his initial feelings about his role in a group in his blog.

I am in a group were people have to be all equal and everything HAS to be fair for everyone, then it is not so fun for me. Sometimes if there is a project with an ok amount of work and is creative then I most likely would like to work by myself.

Eli expressed his wish for disparity not in the sense that he would be forced to do all of the work, but rather he wanted to be able to express his own creativity. When he did include the group, he emphasized his contribution. For example:

Yesterday in our group I made 4 websites for each clue. We uploaded our video onto the computer. Editing the video was just as exciting! We had a green screen so it looked really cool. Even though I had to buy \$7 software in the app store it was still worth it!

In his interview, Eli spoke of the way his group managed to solve problems on their own. Initially, he included the group in problem solving; however, he quickly focused on himself for the rest of the answer.

Researcher: If you wanted me to tell you the answer to something, many times I didn't really tell you.

Eli: No

Researcher: When I would say, "I don't know, what do you think?" or something like that then what would happen?

Eli: Well, our group and I, well I would kind of think out the problem, and really get a picture in my head, about what the whole layout of the game, and then I would figure out a solution to solve whatever problem that we had.

He also expressed how the group was reliant on him to get "done on time." While he acknowledged his group, Eli not only attributed fighting in the group as the reason "we were behind." He also credited himself as the one who made sure the project was completed.

Researcher: Now this was a long-term project, four weeks, three to make the game, and one to play. So, how did you manage the time to make sure everything got done?

Eli: I had, we had a to-do list, and I wrote down our things, and then at my house; we were behind because our group had a little fighting problem over the movie. So we were behind; I did a lot of things at my house and then I worked hard in class, and I made sure, and I thought about how much time it was going to take for each task, and I made sure that we finished on time.

The second code in this subcategory included people who saw themselves as encouragers. These were *social roles*. In Robin's interview she discussed what she would do if she were in a group that was dysfunctional.

Researcher: So what do you think you could do to help them, to make them become more engaged? Is there a way to do that, or is that something that you don't feel like you...

Robin: What I do, is if a person is sitting down, or if they're goofing off, I take time to stop what I'm doing, or even if other people are doing, to come help me do this, and I'd say, "do you guys want to help us out?" or I'd give them opportunities to do stuff, and if they didn't like that job, I'd try to help them do something that they do like. That way, they're working not just goofing off.

Similarly, Robert expressed in his blog that encouragement was one of his main contributions to the group effort. He said, “I also think I did well on keeping up the group spirit.”

Some participants expressed pure enjoyment from just working with other people. Kelly attributed this aspect as one of the best parts of the game in her blog.

Researcher: tell me what your favorite part of this.

Kelly: My favorite part was the website because it was the main part I did and because I got to work with everybody. Everybody had a page, and I got to work with all the people instead of just doing the QR codes. We only work with a partner. I got to work with everybody, and I also liked doing the tasks, like just to check because we got to spend time together; it's just fun.

Task member roles had the most occurrences in this sub-category. Participants that identified with this role were more likely to focus on the tasks at hand rather than the “big picture,” or overall purpose of the game. For example, Andrew identified strongly with this role both in his blog and in his interview. The task is most important to him; this can be seen in his interview as he equated engagement as being able to get things accomplished quickly.

Researcher: So if you're really engaged in something, if you're really personally engaged, how do you know?

Andrew: You are getting work done fast; your partner knows what you're doing, and you know what you're doing. You know what needs to be done at what, some amount of day when you need it to be done.

This also colored Andrew's understanding of cohesion in a group.

Researcher: What makes a group really work well together?

Andrew: When they just execute what they need to get done, or happy with what their work is, and don't nag around with people, and don't, like get what they get, and don't like whine about it.

Whitney also related to this role. When asked about the game her group created, she only focused on the tasks created for the game; the rationale for the game was addressed on a surface level; Whitney fixated on the tasks involve in that as well.

Researcher: First of all, tell me about your game.

Whitney: Our game? Well, our project was based on My Life in Pink and Green, and our theme was persistence, or our topic was persistence, and our theme was; actually I forgot our theme.

She was so concerned with the task that she forgot about the primary purpose of the game. This was a typical response from students classified as task member roles. After she acknowledged that she couldn't remember the group's theme, she proceeded to describe the part of the game that had the most meaning to her.

So what happened was, we had QR codes, and so the first QR codes were in your room, and before you scan the QR code, you have to do a task. And so you did the task, then you scanned the QR code, and the QR code gives you a hint to the next clue, so you go to the next clue.

She goes on to describe the sequence of following the codes and deciphering the clues. She described the final step, "Then our last QR code led to the website, and so from the website, there was a PowerPoint about persistence." After describing each step, she faltered when she began talking about the narrative.

Then there was a story about; it wasn't about Lucy. It wasn't like based on the book, it was based on like outside the book, there was a story outside the book like about Lucy and the pharmacy and stuff,

Throughout the study, Whitney made it clear that she did not understand about it being about the book, but not really about the book. Whenever she spoke about the narrative, her descriptions became vague. This could be noted when her vocabulary deteriorates to words like "stuff." She finally feels comfortable again when she can start discussing

tasks. She said, “We, Kelly made the website, and on the website we had a Home, we had About Lucy, the PowerPoint, and all that stuff.”

The final code in the group interaction subcategory was *collaboration* as seen in Table 5.5. This was a single code, but it stood out strongly.

Table 5.5

Code-Collaboration

General Collaboration	Described by Peer Coders	Number of Occurrences
Collaboration	Work jointly with others to achieve a common goal	21

The application of this code sometimes occurred when the participant was asked to define it. Eli defined collaboration in his interview.

Researcher: Okay, if somebody asked you what is collaboration, what would you say?

Eli: I would tell them it’s when a group of people let each other speak; they don’t interrupt, and they listen and care about each other’s ideas.

Whitney also defined collaboration in her interview. She said, “Collaboration is when a bunch of people work together, and everybody tries to agree on everything and work together.” Others, like Andrew, minimally defined it, but later in the interviewed other actions were identified as collaboration.

Researcher: Okay, so what about collaboration? Have you heard that word before?

Andrew: I’ve heard it but I forgot what it means.

Researcher: So if I say, “It’s important for a group to collaborate,” what do you think that means?

Andrew: Work together.

Later in the interview, Andrew was asked what “engaging work” meant. He responded by describing a situation that sounded like collaboration.

Researcher: Have you heard teachers talk about that? “This is engaging work.” What would you say it means?

Andrew: Like, you are, you are, you respond to your partner; you are working with them well. You’re talking to them. You are, like, working everything out with them.

Other students described collaboration in terms of each member having areas of expertise. They felt all members had something worthwhile to contribute.

In Whitney’s interview, she acknowledged many tasks that she did not feel she could do. By collaborating with others, the task could be accomplished.

Researcher: When we worked with this project do you think it was easier because it was in a group, and why, or do you think it was harder because it was in a group.

Whitney: Well, I think it was a lot easier because if, based on all of the things we had to do, like I didn’t know how to do half the stuff. Like, I didn’t really know how to create a website. I didn’t really know how to work a PowerPoint; I knew how to make a PowerPoint, but I didn’t know make it over the top and stuff.

Whitney did not feel comfortable with computers, and she felt free to advise her group about it as well. Whitney would rather participate in an athletic event rather than sit in front of a computer. She saw working in a group as a way to utilize the knowledge base that existed with her team. She reported:

So, I think the group was a really good idea because some people don’t know how to do everything, but when you have a group there’s a pretty much 9 out of 10 possibility that everybody knows how to do something.

Building on everyone’s knowledge appealed to Whitney. She knew she would have to participate, but she could rely on the strengths of the group to support her.

Thomas also expressed this, but he did not think in terms of unfamiliar tasks. When talking about time management, he acknowledged that some members had more experience to help out the group.

Researcher: How did you guys know who was doing what?

Thomas: Well, we kinda knew someone was good with Weebly, so we left him kind of in charge of the website, and we had kind of a few people helping him. And we kinda used people's like strengths to do things and stuff.

The group interactions category illustrated the positive and negative aspects of working with other people. Beliefs, ethics, and emotions of individuals are taken into consideration when working with other people. It was logical to connect Group interactions with the next category.

5.3.2. Affect

There were no subcategories for this category. Instead, there were nine individual codes for affect as seen in Table 5.6. As defined by the peer coders, affect deals with emotional connections. These codes were created from the utterances of the participants in interviews and/or blogs.

Three codes were stressed due to the number of occurrences as noted by the coders. *Enjoyment*, *confidence*, and *locus of control* accounted for 62 % of the total code applications for this category.

It was determined by that enjoyment was having fun with the process and/or the end result of the game. Many students expressed enjoyment during and after the study. Before the process began, many participants looked forward to creating the AltRG. The anticipation of creating the game generated excitement and thoughts of future

enjoyment. Thomas expressed this in his first blog entry, “I am excited to make an Alt RG game. It sounds like it is a lot of steps but it would be a blast!!!!. I am not nervous about anything. I can't wait to start!” Similarly, Robin’s and Whitney’s enjoyment also occurred at the beginning stages of their AltRG. For example, Robin expressed this at the designing stage, “I'm really excited about our project. We have these really cool ideas for the website/game.”

Table 5.6

Category-Affect

Affect	Described by Peer Coders	Number of Occurrences
Empathy	Being able to put oneself in another’s shoes	3
Sense of Pride for Work	Feeling accomplished for one's work	11
Enjoyment	Having fun with the process and/or the end result of designing a game	34
Confidence	Feeling positive about achieving goals	32
Locus of control	The degree to which a person feels in control	26
Self-efficacy	Feeling positive about the ability to succeed	7
Tension	Anxiety within an individual	9
Ownership	Responsible for ones own work	9
Satisfaction	Meeting expectations or needs resulting in fulfillment	17

While Whitney also cited the planning part as being enjoyable, she reflected on her enjoyment after the process was complete as well. After considering the whole project, Whitney cited it as the most enjoyable part in her blog, “I think the most enjoyable part of the project was thinking of the things we’re gunna [sic] do with the project.”

Whitney also mentioned the enjoyment of designing with other people. The fun of collaboration was combined with the fun of designing for her. In Whitney's blog, she wrote about this feeling.

We had so many great ideas starting with the topic and theme, all the way to finishing everything. It was really fun deciding and voting on everything, and seeing how many choices we could pick from.

Kelly echoed this thought in her interview. She expressed enjoyment in working with other people while working on the tasks.

Researcher: First of all, tell me what your favorite part of this was.

Kelly: I got to work with everybody, and I also liked doing the tasks, just to check because we got to spend time together, and it's just of fun.

Participants also expressed an enjoyment with using different technologies.

Several discussed the QR codes, others wrote about creating videos, and others spoke about the enjoyment of working hands-on with the technology. Robin revealed in her interview that her enjoyment came from working both with a group and with the technology.

Researcher: How was this project different from any other project you've done in the past?

Robin: Well, I worked in a group more; you don't have to do that in school projects. It was kind of fun, and a lot with the computers; often you use your hand, so I liked that part. It was kind of different actually.

One technology that several students mentioned as enjoyable was recording a video used in their games. This was true even in groups that were dysfunctional. For example, Andrew and Chance mentioned recording the video was a highlight of the game. Andrew states this in his blog, "I think it was filming. Because [sic] that's when we

had most fun. That's what I think is the most fun thing.” Chance stated that in his interview and also connected a positive experience in working with the group.

Speaker: When was working in a group just a really good thing for you?

Chance: When we would do videos because we would have a camera and actors. I just felt that was a really good time because it would be easier for a bunch of people to do that, and helping with QR codes like riddles.

Chance felt that the group was working together at that point and expressed his enjoyment because of that. Andrew’s assessment of the filming also indicated that he enjoyed working with everyone.

Another strong code was confidence. From the very beginning, students took on an air of self-confidence. Later that evolved to confidence in their groups. Even groups who struggled with negative group interactions were sure they would accomplish their goals. Chance reflects in his blog that he felt very confident in the group’s ability to move forward. He wrote that “My game is going really smooth [*sic*] right now and I think we are going to do really good on our project.” In the first blog reflection, the students were asked to tell how they felt about creating an AltRG and to explain any misgivings about the project; Andrew was very confident in his blog post and declares. “I'm not nervous about anything.”

After the three-week design process, the groups had their peers play their games. Students were asked in the blogs to describe how it felt to have someone else play their games. Many were confident that the other students would enjoy what they created. Although he begins by expressing his doubts, Eli completes the blog post in full confidence.

I think I worked really hard and I would be super disappointed if someone hated my game. I think I did a pretty good job on the game. I hope they like it. I feel fine because I know they will like it.

With some students, confidence was present when they discussed whether or not they would like to create another AltRG. While Erin expressed frustration with the teacher not acting like she thought the teacher should, she expressed confidence at being able to do it on her own in the future. Erin explained, “I would create another game because we have done it before. So we know what to do and we don’t have to spend a lot of time waiting for the teacher to help us.”

Thomas also felt confident with the quality of his work. He stated that he would not just be amenable to creating another AltRG, but wanted to create another one. He wrote, “I would like to create another game because it was one of the best projects I've done.”

The final code of note in this category was locus of control. While not a negative code, many students were concerned at the lack of control they felt while working through the problem. For example, Eli had particular issues with this as he had this code applied twelve times out of a total of 27 times the code as used by the peer coders. Eli’s problem was evident when he spoke or wrote about working within a group. In his blog, Eli referred to this in his interview when he talked about working in a group in general (See *Group Member Roles*).

Researcher: You mentioned something about your group. So tell me about your group. Tell me what was going on.

Eli: (smiles) In this game, some of it was about creativity and thinking, and I’m in a group with people I’m not really good friends with. I felt like I wanted the game to be a certain way, and my group kind of got how it was supposed to be, but they really didn’t know exactly what I pictured it, and so I wanted to make sure that it was. So I did most of the work.

This was also illustrated his need to have control within the group when he was asked about group size in his interview.

Researcher: How many people would you have in a group?

Eli: I would have liked 3 to 4 people in a group so that there's not too many ideas and stuff doesn't get too jumbled up with everyone. Like papers could get lost in people's folders if there are a lot of people.

The other participants were mainly concerned about QR codes being removed after they set up the game. Whitney explained that they had to go to several people in authority to use certain areas of the school. They were able to secure one of the gyms, a large unused conference room, and a courtyard. When asked about that, Whitney spoke of possible negative consequences if they were not allowed to use those rooms.

Researcher: How did that feel to go ask those people?

Whitney: It felt kind of weird because I mean, if they said, "No," then our whole project would have blown up, and so we had to be I really nice and like (presents a very happy smiley face) "Hey, can we hang this in here for a little bit?" And so it felt okay though.

Whitney was concerned about the project and what would have happened with the overall outcome of their game. However, she was able to come up with a strategy to secure the rooms her group needed. By the time the game was in motion, Whitney felt encouraged by taking control of the situation.

5.3.3. Project Processes

The next category had several subcategories within it. These covered the expanse of the problem from the anticipation of designing a game to feedback of the project design. *Anticipation, task orientation, scaffolding, and literary themes* were identified as subcategories.

The subcategory anticipation, as shown in Table 10, illustrates the thought-process of the participants just after learning they were going to design an AltRG. Table 5.7 presents the codes that were mainly found in the blogs.

Table 5.7

Subcategory-Anticipation

Anticipation	Described by Peer Coders	Number of Occurrences
Anticipation		2
Evaluation of Final Project	Judging the game	2
Expectation about Final Project	Outcomes regarding the project	11
Expectation of Working in Groups	Anticipating working with others	1

This was a small subcategory; however, the strongest code in this group demonstrated the overall eagerness of the participants to attack the problem. Some excitement was tempered by their insecurities about the overall outcome. The expectation about final project codes was noted eleven times in the blogs. Whitney shared some of her concerns.

I'm pretty excited about the Alternate Reality Game. It should be really fun, but I'm also kinda scared [sic]. What will happen if I mess up? Will I get in trouble? I hope everything goes great. That is my thoughts.

On the other hand, other participants displayed no such anxiety about the final outcome of their games. Andrew demonstrated this when he laid out the plan in his first blog. By the time of its writing, the final project had already emerged in his mind even before he even met with his group for the first time. Andrew wrote, "I feel excited to make my own video game. I am excited about making a clue game where you have to follow the clues to find the thing your [sic] looking for."

The second subcategory, task orientation shown in Table 5.8, had codes that expressed participants' understanding about the tasks involved in designing and creating their games. *Project Improvement* and *Evidence* stood out in this subcategory.

Table 5.8

Subcategory Task Orientation

Task Orientation	Described by Peer Coders	Number of Occurrences
Rationale	Explanation for the basis for design	4
Expectations about Project tasks	Belief that something (positive or negative) will be accomplished with the project tasks	2
Micro-perspective	Getting caught up in the details and losing sight of the big picture.	7
Project Expectation	What students expected from the project	3
Project improvement	Student suggestions on improving the project	20
Evidence	Support of theme through the tasks	17
Rehearsal	Trial run before the game is launched	3
Seeking information	Finding the clues	6
Self-monitoring	Evaluating own ability	4
Task Purpose	Reason for performing the task	2

The project improvement code included adding elements, enhancing others, and reducing, or eliminating, those that did not really work with the game. After students designed and launched their games, they played other participants' games. This was for alpha testing of the game. Groups would receive feedback from their peers in order to correct any problems within the game. Often, students observed elements in those games they would have used to improve their own. For example, Eli's group created a video using a green screen; influenced by this, Andrew wrote that he would have focused on improving their video, strengthening the narrative, and eliminating a different technology used because it was not useful to the end product.

I would have used a green screen in the background. I would cut into the film and put other films in it. More narrative. Put a background into the story of *Mudshark*. We should of had less QR codes. We should have made a 2nd website.

The same sentiment was expressed by Robin as well. Her group played and AltRG that included a scavenger hunt, and she really enjoyed it. In her blog, she reflected that she would have liked to have included one her game and eliminated other things that she did not feel worked quite as well.

I think that we might have wanted to add a scavenger hunt. I thought that that element in the game was SO much fun. And I might want to shorten our code, because it was pretty long and confusing. Plus, we might want to take away some of the Stephen Hawking research. But, I think that the hat finding was a big hit!

Other project improvement involved imagining what would be added if skill and resources were available. Whitney took the approach that she would improve everything, including her blog.

To improve my blog, I would go OVERBOARD!!! In the scavenjrhunt [sic] part, i would make like different worlds that you have to go through to get to the next clue. Every world would have a task and each one would be different. One would be Safari, one would be neon, one would be ocean, one would be fire, all different kinds of things. And for the QR codes, i would have them all different themes, HUGE, floating in the air. For the website, I would take them to a big, private, movie theater with a touch screen movie screen.

Through this reflection, Whitney's identified specific changes may have improved the game by enhancing specific elements that were already in her AltRG.

The *evidence* subcategory demonstrated the way students provide proof of statements about their games. Generally, they referred to tasks and the justification for using them. The first interaction question in the interview with the students involved the participants telling about the game they created. First, Kelly began talking about a

scavenger hunt and some of the tasks that they had to perform. The excerpt coded as *Evidence* explained why the tasks were important to her theme.

Kelly: Like in one room, we went to the North Gym, and they had to run laps and do like stuff to show persistence, which is like not giving up, and in one room they had 30 seconds to put make-up on Erin to show like they weren't going to give up, and they were trying to put on as much as possible.

Robin similarly expressed evidence of collaboration through the setting up of norms in order for the group to function well. In her interview she explained the reason why her group worked well together.

Robin: We had these kind of laws that you had to follow, and if you broke a law, once it was okay, and if you did it multiple times, you were supposed to talk to your teacher, and I think that really did help because we had to stay on task then and be nice to each other, and work together.

In the next subcategory, scaffolding was explored. This was subcategory had few excerpts associated with it as shown in Table 5.9.

Table 5.9

Subcategory-Scaffolding

Scaffolding	Described by Peer Coders	Number of Occurrences
Hard Scaffolding	Direct lesson (Brush and Saye 2002)	0
Mediating	Helping to work out problems between individuals or group	2
Soft Scaffolding	Seeking or receiving "just in time" help when needed (Brush and Saye, 2002)	10
Instructor feedback	Requested formative evaluation occurring during the design of the game	3

Soft scaffolding was the strongest code in this section. In an interview, Kelly was asked about the instructor's guidance. In this case the instructor/researcher did not give a direct answer when approaching problem solving. The students were asked to think

about it themselves. In her interview, Kelly reflected on her learning and feelings about that in this context.

Kelly: Oh yeah, I didn't really understand it and I think you were just trying to...I think you thought I did understand it, and then I figured it out because you didn't help me. Because if you would have helped me, I never would have progressed and learned anything. You would have just been telling me the answer.

In addition to the instructor, soft scaffolding sometimes came through peer students. In his interview, Thomas explained in his that the group collectively had to "figure out" the problem. He expressed his enjoyment that they were able to progress on their own. Thomas said, "Well, it felt like we were on our own because we had to figure things out. I kind of liked it because we learned some things on our own. We figured it out all by ourselves."

The next subcategory was *literary theme* as shown in Table 5.10. The codes in this subcategory related to the original educational objectives of the project to express underlying themes based on the books they read. There were only three codes generated for this subcategory.

Table 5.10

Subcategory-Literary Theme

Literary Theme	Described by Peer Coders	Number of Occurrences
Goal-setting	Trying to meet the objectives of the project	8
Successful Translation of the Theme	The theme presented in the game transcends the book's content	2
Student Feedback on Project Design	Students provide feedback of instructional design	27

The largest code was the *student feedback on project design*. This code belonged in this section because the feedback related to the original objectives. In this

section, students evaluated the effectiveness of the other groups' games according to the original objectives. For example, Eli reflected in his blog about the other people playing his game and receiving their feedback, "The people playing my game who really got involved got the theme, but the people who didn't really get involved didn't."

Chance felt the group playing his game appreciated the work, and his satisfaction with his group's work was relayed in his blog. He wrote, "I think the group that played the game liked it, and it felt good that they liked because we did hard work for them to enjoy the game."

Robin and her group played a game created by another group. She enjoyed the game and gave feedback to that group through her blog.

Today we got to play *How to Steal a Dog's* group. It was really fun. We watched two videos, decoded a clever message, and went on two scavenger hunts. So cool How to Steal a Dog group. Your effort really showed and I absolutely loved the game. I wish you guys made another one so I could play it. I don't think that you should change anything. Great job!

She later reflected how playing the games influenced her improvement of her own game. Robin added, "So, while I was playing other people's games, I realized that I wanted to add stuff to my group's website."

Another area of feedback concerned the overall design of the PBL. The final blogging assignment asked the question, "How could your teacher(s) change this project to make it better next time?" Some of the students reflected on what they felt would improve the project. Some feedback dealt with group size.

Thomas's position related to his own group; specifically; however, he was able to translate that in a general sense.

She could change the groups to 3 people because in the amount of time with the work we did, we really only needed 3 people. It was hard to find some work for the other 2 people. That's how I would improve it.

Some students answered the question, but they seemed to be unable to look at it in a general sense. They commented mostly on how it should have been changed according to how the PBL affected them personally.

These students seemed to comment on time the most. Eli expressed this in his blog as if the project was still on going.

I think that my teacher could change it by giving us more time to work on it. I had to work on it at my house a lot. Other than that I think she did a really great job with this project. I hope future classes will get to do this too!

Andrew had the same experience and he related the future PBL to his current group. He did not relate the suggestion in a general sense. "[The teacher] could have put us in another group. My group didn't work together well. I think that's what our teacher could have done."

Robert also related his suggestion to the way it would have benefited him as an individual. He wrote, "I think she shouldn't make us turn all this stuff that wasn't a big part of the project. I also think that we should have a chance to redo stuff we lost."

The second most active code related to *Setting Goals* in order to develop a game that would communicate an underlying theme found in the book. Each group had to decide on an underlying theme they felt was in their book. This was a crucial step in the process; however it was one many enjoyed. Whitney described the process that they used to select the theme. She explained, "We had so many great ideas starting with the topic and theme all the way to finishing everything. It was fun deciding and voting on everything and seeing how many choices we could pick from." Whitney also clarified their

goals in her interview and explained the purpose of the tasks they created in order to expressed the theme they had chosen.

Researcher: Tell me about the purpose of your tasks.

Whitney: Our theme was, our topic was persistence. Like one of them was run two laps around the gym when there was no PE to show persistence and stuff, and then another one was look up, we wrote the word persistence in our book, and it was in the library. Look up persistence in the book, so we did that.

Researcher: So your purpose was to make your players...

Whitney: ...It wasn't based on the book; it was based on the topic and theme about the book, and so it was to show them how they can be persistent like Lucy was.

Robin elaborated in her interview about book choice and the goal to successfully translate the theme.

Researcher: So, tell me about your game that you made. What book were you...

Robin: We used a *Bluebonnet Book*, *Out of My Mind*, and in the book, Melody, she's the main character has a disability, I forget what it's called. She can't move, or if she does move, she's really not controlled. So, our theme that we wanted to show was that it doesn't really matter how you are on the outside; it's the way you do stuff and how you are inside that matters.

5.3.4. Self-Regulation

The next category was *self-regulation*. According to Zimmerman, and Schunk (2011), "Self-regulated learning and performance refers to the process whereby learners personally activate and sustain cognition, affects, and behaviors that are systematically oriented toward the attainment of personal goals" (p. 1). Based on this definition, the coders agreed on four codes and 1 subcategory with 3 codes related to it as shown in Table 5.11.

Table 5.11

Subcategory-Self-Regulation

Self-Regulation	Described by Peer Coders	Number of Occurrences
Self-evaluation	Judging significance of one’s work and progress	25
Self-reflection	Contemplating actions and outcomes	91
Time management	Allocating time on task efficiently in respect to the scope of the project	23
Planning	Setting a framework to accomplish goals	18

The *self-evaluation* code, included instances where students were judging their own work and the progress they were making. Learners expressed areas they would have changed when creating the game while it was still in play. In his blog, Robert evaluated his game based on another game he had played noting that, “I learned that our game is a little longer than other games. Also, some of our clues aren’t as challenging as the group’s we played.”

Robin also wrote in her blog about another team’s work and how it could have impacted her game.

So while I was playing other people’s games, I realized that I wanted to add some stuff to my group’s website. I think that we might have wanted to add a scavenger hunt. I thought that element in the game was SO much fun, and I might want to shorten our code, because it was pretty long and confusing. Plus, we might want to take away some of the Stephen Hawking research. But, I think that the hat finding was a big hit!

Alternatively, Robert evaluated his individual contribution to the game and his work after the project reached its conclusion. He valued his work as group encourager as important as his acting as a character in the game. Robert stated, “I think I did my best work on being Percy. I also think I did well on keeping up the group spirit.” He

valued his work as a group encourager as important as his roleplaying responsibilities in the game.

Self-reflection was a key element in student responses in the blogs and in the interviews. It was the largest single code in the study. As defined by these coders, self-reflection is the act of contemplating actions and their outcomes in an evaluative manner. Many students contemplated on experiences in their groups. For example, Andrew's conditional response to working on this type of project reflected his group's lack of cohesion.

Researcher: If you had the opportunity to do this again, would you? Would it depend on what?

Andrew: It would probably depend on my group I would be in because I don't want a group again that just doesn't do work, and one person just does it all. I mean, I don't like getting angry at people.

In this response, Andrew reflected not only on his group, but he also on his emotional reaction to the dysfunctional nature of his group.

Chance wrote about the most important thing he learned in the project and this had to do with working in a group rather than theme, technology, or AltRG. He revealed that "The major thing was working in a group is harder than I thought it would be. The hard thing was that you have to agree with everybody else or everybody will argue with you." Andrew and Chance were in the same group.

However, Kelly's group worked through their issues. Though she echoed Chance somewhat, she also conveyed a different mindset about coming to consensus and acceptance of other ideas. Kelly wrote, "I think the most important thing I learned during this project is that working together is hard and everyone has the right to be heard."

Thomas analyzed his group in his blog, but he included himself in the reflection. In his blog, Thomas shared in missteps his group experienced in organizing their game. He wrote, "I think that we could have done a few things better. Sometimes our group just did things without thinking how it may turn out and what could be the consequences." He elaborated on this experience in his interview when he explained about the purpose of his game.

Researcher: What was the purpose of your game? What were you shooting for?

Thomas: Well, We were shooting for them to get the theme, but we kind of had trouble, but at the end we came up with a new theme.

Researcher: Well, what do you think was the problem with the theme?

Thomas: Well, we kept changing our game to improve it, but we kind of forgot about the theme along the way. So it kind of stayed the same, but then we came up with a good one at the end.

Thomas reflected on the group's tendency to fall into groupthink, described by the coders as faulty decisions based on a mob mentality.

Others reflected on the personal changes they saw in themselves. For example, Kelly described the change in herself while attacking the problem.

Researcher: How did this alternate reality game help you learn?

Kelly: It helped me learn how to take criticism well. Because they weren't trying to be mean, they were just trying to help. Sometimes I get "over-reactive." Like, "You just don't like my idea," but I had to take it well because all they're trying to do is help me. It's their grade too

Kelly had difficulty with criticism. As she mentioned, she did overreact to when someone didn't like her ideas. In the beginning there were tears when the group did not choose her designs. However, her group was patient and made sure she knew the decisions were not personal. Kelly listened to reason and was receptive to looking at her ideas

objectively. She realized that the group did choose some of her ideas as well. This experience provided her with the skills to give criticism.

I think I learned how to work on a website better because I didn't know a lot about that, and then I think I also learned how to give criticism well, not be mean. I would not be like, "That's an awful idea!" and not be like, "You stink at this; I don't think you should do this!" I would try to make them not feel bad.

The *time management* code was the third most identified in this category. The raters defined time management as allocating time-on-task efficiently in respect to the scope of the project. Some students explained how they were able to put their plans in motion. In her interview, Robin was asked how she managed her time. She gave her teacher credit for helping in the sessions in the computer lab, but she continued by listing ways they all kept their game on time.

Robin: ...knowing the amount of sessions, and probably when we were going to work on it, kind of balanced out our time, and we separated parts. She (her teacher) gave us this sheet that said who's going to do what, and when you want to finish it by, and so that really helped us to get more organized.

Robin further noted that she felt well prepared and organized after the conclusion of the AltRG. However, during her initial project feedback, she still felt she needed more time in her blog. She wrote, "*It was so much fun, but more time*" in response to how the teacher could improve the project in the future.

Many students felt that they did not manage their time wisely. Robert evaluated the work in his group in terms of rushing through the work. He wrote, "I think it would have been better if we worked a little more carefully because some of the stuff we worked on, we did in a hurry, and it could have been better than it was."

At times, some students said they felt the time pressure and tried to relieve that by working on the project at home. Eli in particular conveyed that he was working at home in addition to “working hard” because he felt that they could not finish otherwise.

Researcher: How did you manage the time to make sure everything got done?

Eli: Well I had, we had a to-do list, and I wrote down our things, and then at my house; we were behind because our group had a little fighting problem over the movie. So we were behind; I did a lot of things at my house and then I worked hard in class, and I made sure, and I thought about each task, and I made sure that we finished on time.

Whitney’s approach, as relayed in her blog, included strict rules that the group created to meet deadlines. She also referred to the deadline set by the teacher for the end of the project and also discussed the intrinsic time limit set by individual team members.

She stated:

Time-wise? I think we had a good amount of time to do it, but we also had a cut-off line, like a strict cut-off line, and we had time to finish, and if you didn’t finish it, too bad for you because we had a good amount of time, and we had strict rules to do whatever, and so you had to build your own time limit, and say, “I’m going to do this then, and I’m going to do this then.” or whatever.

These strict time limits were self-imposed in order to complete on time. She and her group set small benchmarks along the way in order to complete the project in time. The cut-off time was for the summative assessment of the project.

Table 5.12

Subcategory-Organization

Organization	Described by Peer Coders	Number of Occurrences
Extensive Organization	High levels of organization	4
Basic Organization	Uses some organization strategies	4
Superficial Organization	Having the tools, but not the understanding	4
Extensive Organization	Organization strategies specific to the AltRG	5

Organization was the only subcategory in this section as shown in Table 5.12.

This primarily came from interviews to discover student ideas about organization.

This subcategory related to student understanding and use of organizational techniques for planning and manage time and materials. Chance explained the importance of being organized as related to the AltRG itself. For Chance, this meant not losing anything related to the game. He was responsible for putting loose papers related to the project in a folder. This included contracts, KL chart, flowchart, and feedback. For Chance, this was a crucial job.

The most important thing was that keeping up with all of our stuff like all the QR codes, folder and the rubric. Because if we lost the stuff it would take another day to renew the stuff for the project.

This group was continually losing their materials for the game. However, Chance's explanation of his understanding about organization in general revealed only superficial knowledge. According to his Interview and blog, organization is connected to having tools to keep from misplacing artifacts and supplies. It is for this reason that the raters coded this as superficial organization.

Researcher: So do you feel like you are an organized person?

Chance: Yes, in projects because I always get folders, and like when it's just a project by myself, I will always have a little folder ready to present, yeah, and I have a binder to carry around.

Researcher: Okay, so tell me what that looks like for you? You said something about a binder; how does that help you stay organized?

Chance: Well, the binder keeps my folders, and it has my book for the project we're doing right now, the Culture Book, and it has my pencils, pens, and all my supplies.

Kelly also discussed these folders in her interview, but the raters felt her perspective included a more extensive understanding of organization.

Researcher: Let's go back to organization for just a little bit because I wanted to know if you feel like you're an organized person.

Kelly: I do feel like I'm an organized person. I always organize my locker. Like my desk is usually pretty neat. With this project all my stuff would go in my folder, my *done* folder or my *to-do* folder. I had two folders going, and then if something didn't get finished on the day that it was suppose to get finished, we'd put it in one side of the to-do folder, and if something we could wait on it, we'd put it on the other side, and I always kept all *My Life in Pink and Green* stuff in a corner of my locker, and I didn't let anything else go in there.

Kelly's folders served a purpose greater than fear of loss. Her strategy included a systematic way to use the folders to self-assess and plan in order to help guarantee her success.

5.3.5. Games

This category related to *game enjoyment, experience, narratives, and understanding* AltRG. The interviews generated many of the codes in this section. The largest cluster of codes was assigned to the Narrative subcategory as shown in Table 5.13.

Table 5.13

Subcategory-Narrative

Narrative	Described by Peer Coders	Number of Occurrences
Significance of story	The importance of the narrative in gameplay	11
Suspension of disbelief	Putting oneself in the character's mind	11
Role-play	Acting a part as if an individual is someone else in a scenario or skit	9
General narrative	Storytelling	5

The first code acquired 11 occurrences and referred to general game importance

of the narrative in gameplay. All of the occurrences were present in the interviews.

Thomas summed up the importance to the narrative in any game by noting its impact on gameplay without a story. Thomas explained, “Well, there’s [sic] some games that if you don’t know the background story, there’s really no point because you don’t know what you’re trying to complete or something.”

Eli explained the role a narrative plays in moving the game along and becoming engaged with the story and characters in the game.

Researcher: How important is story, or narrative, to learn?

Eli: A narrative is makes the game a lot more interesting because you know that like someone’s talking with you from the actual story, and it just gets you more involved in it. It gets helps you know your characters better.

The second code in this section spoke to *suspension of disbelief*. As defined by the analysts, this code occurred when the children could put themselves in the minds of the characters. They forgot that it was not real and discussed the characters as people they knew. In her interview, Robin spoke of the characters in her tasks were real people.

Researcher: So tell me a little about your game; what was involved in the game?

Robin: They had to watch that, another task was to decode the code that we created. It was kind of like one of the easier ones, 1 =A, 2=B, and they had to do that. Mrs. Vie, her neighbor in the book, is one of like her really good friends, and she really understands Melody, she knew even when Melody didn’t talk, that she was a really sharp kid, and so for Mrs. Vie’s page, we used Weebly, and there are different pages, so when you clicked on Mrs. Vie’s page it told you kind of about Melody, what Mrs. Vie thinks of Melody.

Role-play addressed the actual creation of the game. Some students spoke of parts they played in videos. Eli specifically posted in his blog that he enjoyed playing the part of a character. He wrote, “The most enjoyable part of this project was filming and

editing the video! When we filmed it, I had so much fun acting like Percy’s partner. Our Percy actor had a lot of fun being Percy too.”

Thomas also wrote about writing the narrative in order to move the game along. The well-written narrative helped the players of the game understand the characters, the purpose of the game, and the other point-of-view than the protagonist in the book.

Thomas: Well, I did it from Greg’s older brother’s point-of-view; so, I just; I was just trying to accomplish so that they could get what this game’s about and how, like in the book, what, who Greg is and what he does normally, and just some things about Greg so they know like how to play the game maybe.

In this instance, Thomas combined role-play with creating a suspension of disbelief for those who would play his game. He recognized the importance of his role as a writer to make the narrative deliver the game.

The next subcategory, *gaming experience* as shown in Table 5.14, revealed the schema the learner’s gaming experience. The experiences included the level of player and the types of games they played. None were considered to be expert players.

Table 5.14

Subcategory-Gaming Experience

Gaming Experience	Described by Peer Coders	Number of Occurrences
Intermediate	Player has some experience but not enough to be considered an expert	4
Novice	Inexperienced or new player	1
Simple Games	Games that require little thought and problem-solving	8
Complex Games	Games that require higher-level thinking and problem-solving	2

Robin, in particular, acknowledged that she had no real experience with video games, though she has watched her brother play. When asked if she played video games, she responded, “Not really. It’s more my brother.”

The coders initially identified Whitney as novice even though she admitted to having played console type games, responding that, “Not very often, sometimes I might play. Well, yeah, I play video games like on Wii or Xbox or something like that.” It appeared that Whitney contradicted herself in this section. Later in the interview, she described a popular first-person shooter game, Halo, and it was determined that she was actually an intermediate player.

The other intermediate player appeared to know more about first-person shooter games as well. Andrew’s initial response to the question about video games was quite brief; however, in his explanation of his game enjoyment, the coders recognized a higher level of experience.

Researcher: So do you play games at home? Video Games?

Andrew: Yes

Researcher: So what makes a video game fun, for you anyway?

Andrew: It’s got to have good graphics; because if it doesn’t look realistic, I don’t like...it has to have a good base plot, story, to it because if it doesn’t make sense, then you’re not going to get the game. It just has to be a good game. It doesn’t have to be a game that glitches up a lot, freezes, and everything like that.

The types of games the students mentioned were primarily games played on mobile devices such as phones and Apple iTouches. Eli referred to a Minecraft™ and also mentioned shooting a bird through a slingshot at other animals, Angry Birds. Thomas noted another type of game he liked to play. He said, “Well most of the time, I play games that entertain you mostly, and I like sports, so I like some sports games.” The games were simple, yet they entertained their players. This led to the next subcategory of *game enjoyment*, as shown in Table 5.15. In this section, mindless play was slightly higher than purposeful play.

Table 5.15

Subcategory-Game Enjoyment

Game Enjoyment	Described by Peer Coders	Number of Occurrences
Mindless play	Enjoying the game requires little thought while playing the game	9
Purposeful play	Mindful of progressing in the game	5

Chance described the type of game he enjoyed in the interview. The coders felt this fit with *Mindless Play*. Several things were required for him to enjoy the game.

Speaker: Okay, what makes a game fun?

Chance: When there's a story to it. I like back then, old times. Well, it's like in the medieval times, and I like knights. I think that's interesting. I play a game on that.

This type of mindless play was revealed when he described the story of the game.

Though he described the importance of the story in the game, the story was overlooked in favor of mindlessly fighting enemies and animals.

Researcher: What kinds of things do you do as a knight, or a person in this game?

Chance: Usually you like go around, like in a village, you can fight bad guys, and there's like, well, there's a dragon, an like polar bears and stuff in arctic places.

Similarly, Robin described mindless play as a novice from the perspective of her own observations of someone who played video games. Her comparison revealed attitudes about video games and AltRG.

Researcher: Well have you watched [your brother] play a game before?

Robin (*nods*): Yes.

Researcher: So what's the difference between that kind of game and what you did with this (AltRG)?

Robin: The type of games he plays is, it's more like he using, he's not as much the controller. Like in our games that we made, you like get up, or you really use your brain to think. The other games, I still think you use your brain, just not as much, like a cartoony kind of thing.

Her observation compared the mindless play in a video game with the more purposeful play found in her own AltRG.

Purposeful play was determined to occur when students were aware of their progress within a game. The researchers decided that Eli was speaking about a purposeful game due to its emphasis on design and exploring. When asked what made a game fun, Eli responded, "It depends on what you're interested in. Like if you like building things and exploring, you could play Minecraft, because it's all about exploring your world." Minecraft is a popular game among fifth grade students. On the surface, it is a building game; however, players can also fight zombies or design and build with friends.



Figure 5.2. Minecraft™ screenshot.

Thomas enjoyed purposeful games that required complexity. He spoke of a game that was difficult, yet he enjoyed it and thought it was a “cool idea.”

Researcher: What would make a game fun?

Thomas: Well, it depends on what kind of game. I think regular arcade game or something. I think it’s like a creative thing because there’s this game called *The Impossible Game*, where you’re this cube, and you have to jump on (*gestures*) these different things, and it’s like really hard. So I thought that was a really cool idea to make a game like that.

This led to an analysis of the students’ understanding of the game they designed.

The next subcategory, *alternate reality game definition* as shown in Table 5.16, referenced the awareness of what an AltRG was. Many compared video games with the game they designed.

Table 5.16

Subcategory- Alternate Reality Game Definition

AltRG Definition	Described by Peer Coders	Number of Occurrences
Lack of understanding	confused about project scope-task oriented only	6
Nominal understanding	Minimal understanding of project scope	5
Basic understanding	rudimentary comprehension of purpose and project's scope	5
Complex understanding	Completely comprehends the structure and purpose of the project	2

Andrew’s description of an AltRG lacked detail, the scope of the game was nonexistent, and the purpose was omitted. The description was also vague.

Researcher: If somebody comes up to and asks,, “Oh, you made your own alternate reality game; what is that?” What would you tell them?

Andrew: I would tell them it’s a game that my friends and I made up like in a group. I would explain to them what’s it about, what’s it based on, what you have to do, what you get. If you find anything, how you do it.

Andrew's understanding was solely focused on the task portion of the game. Whitney's lack of understanding was revealed in her interview. She focused on the tasks, but she admitted to being confused.

Researcher: If you had a chance, would you do this type of project again?

Whitney: I don't know. It kind of depends.

Researcher: What does it depend on?

Whitney: Like I didn't really, the thing about how it wasn't really made from the book kind of threw me off a little bit. But like in the beginning like really threw my group off, and then like if it was about the book then it would be really fun. The scavenger thing was really fun, and then creating everything was really fun, but if it was about the book then yeah, but if it was the same thing where it kind of wasn't about the book then probably no. It kind of threw me off.

However, she also demonstrated a nominal understanding of AltRGs when she was explaining the difference between an AltRG and standard console or computer-based digital videogames.

Researcher: If you had to explain what an alternate reality game was, what would you tell me?

Whitney: It's kind of like you're in a video game, not really, but it's like in real life. You would have to like do stuff. On the video game there's levels, right? and so, because there's levels in an alternate reality game.

Key words and phrases displayed a basic understanding of AltRGs in the interviews.

Real life and the concept of being within the game were common with three students.

Real life was a phrase that appeared in two sections of Eli's interview.

In the first section, it appeared in a comparison of video games with AltRGs.

Researcher: How is a video game different from an alternate reality game?

Eli: Well, an alternate reality game is something that could happen in real life that you do physically, like it's not on a screen most of the time, and then the video game can be like with graphics and a player, a virtual player, inside the game that he does all the work, not you.

He also mentioned it when explaining what an AltRG was.

Researcher: If somebody asked you, “Eli, I heard you made a game, an alternate reality game in class. What’s what is an alternate reality game?”

Eli: An alternate reality game is a game. It’s not like an actual video game, but it’s more of like a game that could happen in real life because it’s reality, but it can be based off of something not so much real.

Thomas and Kelly both alluded to being *in the game*, not just controlling someone, or something, in the game. They saw themselves as part of the game and not just playing a game.

Researcher: Okay, so, how are video games different, from an alternate reality game?

Thomas: Well, I think video games it’s obviously like on a TV or something; well, you control things like maybe a character or an object, but in this thing, it’s all like set up for like you kind of. You just go around like maybe you’re wrong, maybe you’re right to try to solve the puzzle in the game.

Kelly’s explanation of an AltRG revealed her basic understanding of the game. While she does relate it to a scavenger hunt, the coders felt her understanding was evident in her presence in the game.

Researcher: If you had to tell somebody what an alternate reality game was, what would you say?

Kelly: I would tell them an alternate reality game is basically, you; it’s basically like a scavenger hunt that has clues to tell people about a topic, and I would say it’s like a, running around, like you, yourself, are playing the game. It’s like you are one of the game pieces. You’re moving; the clues are moving you. It’s what’s taking you around.

This category spoke to students’ knowledge of and attitudes about games. While only three students related to playing on consoles or computers, six of seven admitted to playing games on their phones. This section also examined student understanding of AltRGs as well.

5.3.6. Engagement

This category had two subcategories. One, *engagement* as shown in Table 5.17, involved general understanding of engagement, engagement with parents, and project engagement. The other was *learning environments*.

Table 5.17

Subcategory-Engagement

Engagement	Described by Peer Coders	Number of Occurrences
Extensive understanding of engagement	Elaborated view of engagement that goes beyond basic understanding	4
Basic understanding of engagement	Rudimentary understanding, but no real elaboration	6
Lack of understanding of engagement	Sees engagement as busyness, completing one task after another.	2
Self-directed engagement	Thoroughly involved with activity other than school or parent-related	4
Lack of engagement	Lack of emotional connection to the project	11
Project engagement	Completely involved with the actual project	28

The two strongest codes were Project Engagement and *Lack of Engagement*. For example, Robin's description of a section of her game illustrated her engagement with the project.

Penny in the book really, really likes hats, and dressing up, and (*laughs*) she apparently is really cute and likes to go to work (*quotation gestures*) and so um what happened was, I think their last thing was, they would send it to my friend's email, and one or two people were at the, on her email and would reply back, like thanks or can you give us more info.

Later in the interview, Robin explained her engagement with her AltRG.

Researcher: Do you think creating a game that used a story was what helped you with being engaged?

Robin: It might've been the fact that I was using a story itself, Like I've always loved to read and incorporating my love for books, and then school, and creating a game with them, it was really fun.

Similarly, Thomas first explained his understanding of engagement and then related it to this project. While this explanation was coded as *extensive understanding of engagement*, it also gives the background to his project engagement.

Researcher: So what do you think it means when you're engaged?

Thomas: Maybe you're doing something really good, and you don't want to stop, and you just keep going. Like you just set everything to the side and just start working and going.

Researcher: Can you tell me about a time you were really engaged in something?

Thomas: Well, I was engaged in this project; well, in my part; I helped around with a lot of things, but when I was typing the narrative, I was really interested in that 'cause I just, I just kept typing and everything kept going great, so.

Many other students cited fun or excitement with the project and this was also identified as engagement. For example, Kelly's anticipation of the project revealed that she thought it would be fun. She wrote, "I am excited to make a [*sic*] Alternate Reality Game because, it will be fun and it might give me a chance to act. I am not nervous because I love computers, acting and making people curious."

Eli also wrote about being excited about getting to use a certain technology. His engagement with the project was exhibited by his willingness to spend money to work with a certain technology. Eli explained, "Editing the video was just as exciting! We had a green screen so it looked really cool. Even though I had to buy 7\$ [*sic*] software in the app store it was still worth it!" Even though it cost him a little, he still thought that was "cool."

Some students remarked about the hard work they faced when working with the project. Robert stated in his blog, "I think the process of making our games has

involved hard work, thinking, skill, and drama.” Kelly further illustrated this engagement despite the hard work, when she mentioned how enjoyable it was.

The most enjoyable part of the project was doing the tasks to make sure all the QR codes worked and they were there. I was enjoyable because, we got to see how all of our hard work payed [sic] off. I loved to do the tasks and see the others faces and knowing that they thought it was fun too.

Later in her interview, Kelly gave more insight into her view of engagement with this project.

Researcher: So tell me what, what does it mean to you to be engaged?

Kelly: I think engaged would be like I’m engaged with the game; I’m “into” it; I’m paying attention, focused, and really like trying to get it done; I’m like it feels like I’m in the project like. It’s like everyday life. It’s what you have to do to get things done, and think I was engaged by I never like stopped, just like sat there for like 30 minutes. I either I took a few breaks here and there, and went downstairs and like asked like if we could hide stuff in the courtyard. Um, that’s basically how I meant, how like I was engaged with the game.

In contrast with this engagement, the second most applied code in this subcategory was *Lack of Engagement*. In Robert and Chance’s case, lack of engagement was tied to negative group interaction. Robert alluded to this in his blog. He wrote, “I wish we split the work differently because one person was doing all the work.”

Chance also alluded to an earlier point in the interview when talking about engagement. When asked about a time when he was not engaged. He replied, “where we just argue, and we don’t get done, we don’t get anything done.”

The other subcategory revealed student engagement in types of learning environments as shown in Table 5.18. These environments included *Formal* and *Informal* environments. The formal environments were noted as being slightly less engaging.

Table 5.18

Subcategory-Learning Environments

Types of Learning Environments	Described by Peer Coders	Number of Occurrences
Formal	More structured	6
Informal	Unplanned could include authentic learning	8

Andrew stood out when discussing informal and formal learning environments. In his interview he contrasted learning informally at home versus formally at school.

Researcher: So, how is learning at home different from learning at school?

Andrew: learning at home? Learning at home is not like it's done on a daily basis where you just learn, learn, learn, learn. Like you can learn on your own rate. You can do whatever you kind of like want to. Like, you're not assigned to something. You can ask your parents or your friends like, "Hey, can I learn this?" It's not like that, and you don't have to go it every five days like a certain amount of time. You can do it whenever you want to.

5.3.7. Conceptualization

The Conceptualization category, as shown in Table 5.19, had no subcategories and only six codes. One code received noticeably more occurrences. *Creative Thinking* occurred eighteen times. Many applications of this code occurred when students were either describing their projects or the way they would improve the project.

Robin explained in her interview how they simulated a communication device for a character with cerebral palsy.

Researcher: Tell me a little about your game; what was involved in the game?

Robin: Our first task was for them to watch a video that we created with one of my friends, and she was um Melody; we used a computer in front of her, and one of my other friends did the talking, but she wasn't actually moving her mouth.

Table 5.19

Category: Conceptualization

Conceptualization	Described by Peer Coders	Number of Occurrences
Application of learning	The cross-curricular transfer of concepts	1
Authentic learning	Relates to “real world” issues	8
Cognitive complexity	Being able to evaluate from multiple perspectives	10
Confusion	Lack of understanding	12
Creative thinking	Divergent thinking; thinking “outside the box”	18
Comprehension	Making sense	7

Improving the project indicated two ways of thinking. One focused on the different types of technology tools while the other focused on making the games more challenging.

Robert’s ideas focused on the latter, but he did mention technology as well. His main emphasis was on creating more complexity. He wrote, “I would also add a game on the computer. I would make harder riddles and more puzzles. I would make the video effects better. There could be more challenges and places to go.”

Eli also had plans for creating a better AltRG. In his blog he described the complexity he would add; however, the creative improvements had technology components.

If I had better technology I would make holographic images of me to tell them the riddle. I would also make the game longer. Like make more clues and make more riddles. I would also make more videos and add more suspense like making paragraphs and websites. If I could change the passwords to the websites, I would definitely.

Conceptualization provided a glimpse of the thought processes students traveled through. It did not just show what they think, but it demonstrated how they think.

Students were able to express themselves creatively through the AltRG. Even though some experienced confusion, some were able to comprehend the scope of the project.

5.3.8. Perception

The Perception category was a relatively small category as shown in Table 5.20. It included social comparison, self-awareness, and degree of evaluation.

Table 5.20

Perception Codes and Descriptions

Perception	Described by Peer Coders	Number of Occurrences
Social comparison	How people feel about themselves through their comparison with their peers	17
Self-awareness	Capacity for introspection	4
Degree of evaluation	Perceived judgment	9

Social comparison was the code with the most occurrences. When comparing their game against those from other groups, some students felt they were lacking. In his interview, Andrew reflected on this.

Researcher: What would have made it better? What do you think could have happened?

Andrew: We could have gone along and worked better like the other groups had, known our tasks before we started working, all that stuff. Robert also felt his game was lacking. He described this in his blog. I learned that our game is a little longer than other games. Also, some of our clues aren't as challenging as the group's we played.

However, not all students felt their AltRGs were lacking. Kelly, Robin and Thomas all felt positive in the way the other groups would perceive their games.

Thomas expressed the overall feeling of their group. He explained, "We know we did a good job, so we aren't worried about what the people think and our grade."

Eli compared his game to the other one he played. He relayed this in his blog.

From playing Cabin Fevers Game I think that I did a pretty good job on our game! I loved there [*sic*] game and I think our game was pretty good. They had a few better things then we did, and we had a few better things then they did. I learned

from there [sic] game that you can still make a great game with fewer things to do! I loved cabin fevers game!

Kelly similarly explained why she was proud of her game. It related to the other players being successful and enjoying the AltRG.

I think it was pretty successful because they and the rest of the girls, all the girls, they all told us how helpful it was. Like they realized what it actually meant now. Like they told me it was persistence, and they told me what it meant, like when we asked them at the end.

Students revealed a part of themselves in this section. When students compared themselves to other groups, some felt confident. However, perception of having fallen short was another potential for gaining knowledge. Perception helped them judge their work in comparison to others. It also helped them to make appropriate changes to improve their projects.

5.3.9. Technology Attitude

The Technology Attitudes category revealed the attitudes of the students toward technology before, during and after the AltRGs were completed. Only one code really stood out in this category as shown in Table 5.21.

Table 5.21

Category-Technology Attitudes

Technology Attitude	Described by Peer Coders	Number of Occurrences
Reluctance with technology	Not feeling secure with using technology	2
Frustration with technology	Anxiety related to technology use	4
Comfort in technology	Feeling at ease with technology	4
Self-efficacy in technology	Feeling that one has the ability to perform well using technology	25

Self-efficacy in technology was evident in blogs and interviews. The blogs were useful in chronicling student attitudes about technology. Some students expressed confidence with technology before designing the AltRG. For example, Whitney expressed multiple attitudes throughout her blogs. One question in their blogs asked which skills they felt they were developing and which ones they felt they were refining. Whitney posted that she was beginning to develop new skills.

I feel like I'm learning a lot of new things. I have learned how to make a QR code, make a website, and more. I have learned even more about Power Points and Gaggles. How to use them in new ways I have never recalled learning about before.

However, two days later she admitted her reluctance to create another AltRG due to computers. She explained, "I honestly wouldn't like to do this ever again because I feel like I'm [sic] not really in the computer business [sic]."

In the final blog post, she considered the technology she used as her best work.

I did my best work on the QR codes and the scavenger hunt part. For the QR codes, I did most of it. Some people in my group helped me think of some ideas, but I printed and saved and typed them and all that stuff.

Eli also wrote that he felt a certain technology was the most important thing he learned. His expression of self-efficacy showed an element of transfer as he could see using it in the future.

The most important thing I learned in my game was how to make QR codes. I had no clue how to make them until now! I think they will be very helpful in the future with projects. Maybe [sic] I could make another game with them.

Thomas declared his own confidence in both his blog and his interview.

In his blog he spoke of improving his technology skills. He was a little more specific in his interview. When asked about elements he learned independently, he responded, "Uh, I learned how to upload videos. I got a lot better at using Weebly, and I just got

better at a lot of technology things. ”This section categorized student’s responses into four codes; however, the codes were not stagnant and student attitudes changed within the project.

This section revealed the comfort some students have with technology. It showed the progression from not feeling secure in using technology to acquiring confidence. This confidence produced a self-efficacy in that they felt secure in their ability to use mature technologies and new technologies as well.

5.3.10. Technology-Project Tasks

This final category, *technology-project tasks*, contained two codes. One was connected to project tasks connected to technology, and the other related to netiquette as shown in Table 5.22.

Table 5.22

Category-Technology-Project Tasks Code Descriptions

Technology-Project Tasks	Described by Peer Coders	Number of Occurrences
Technology-project tasks	Tasks related to the use of technology for the project	51
Netiquette	Digital citizenship-ethical behavior online	2

In this category, project tasks referred specifically to technology. Many of these were found in the blogs, but they also appeared in the interviews as well.

Researcher: Tell me what your project was about, the kinds of things you did in your project .

Andrew: We made QR codes and all the questions and everything. We made, made websites, well one website; I didn't make it. We filmed a lot. I don't think we should have filmed that much. We edited; we made comics, word searches. We worked the script and everything; we made the KWL. We signed the contract, and everything like that.

Andrew's response was coded as technology-project tasks because it was a list of the technologies he used for his AltRG.

Erin included technology tasks that were completed and those that needed to be completed before the deadline. She reported that, "We filmed a [sic] ending video for our game. We need to finish our website, and make our QR codes that lead to the website. Then we have to put it all together then we are done." Eli also spoke about QR codes in in his blog and in his interview.

Researcher: Tell me some specifics about your project.

Eli: In our project we have three sets of two QR codes, and one of the QR codes is a riddle and the other one is the actual clue to get to the next one. So the player of our game has to go all around the school to find the lightning bolt for Zeus.

Eli spoke about this particular technology; however, unlike some other student responses, he explained the rationale for using that particular tool.

Kelly also described her tasks in her blog and in her interview. In her blog, she described the technologies and ethical use of them in explaining the things she learned in making an AltRG.

I have learned how to make a QR code, transfer a Power Point to Weebly and that even if you own the book you still cant use the cover on your website. I have refined my ability to make websites and my understanding of topic and theme. I would like to learn even more about website making.

Like Eli, Kelly included the QR technology and explained the rationale for using it.

Researcher: Tell me about your game that you made, your project.

Kelly: Well, we did a scavenger hunt to find like tasks, and at the end you found these, the classroom you were in. we did QR codes to scan with like words on them, or like letters kinds of things and to tell you like what, to give hints about what room, and in each room, there was a task.

These last two categories, technology attitudes and technology-project tasks illustrated the heavy use of technology for the AltRG. It also demonstrated that most students were excited about a project that was technology-heavy.

5.4. Summary

As researcher/coder, I met with the other coders after data collection and placed this data in a web-based application for data analysis. We achieved 100% inter-rater reliability by analyzing blogs and interviews together. Discussions of the documents resulted in agreement for all codes.

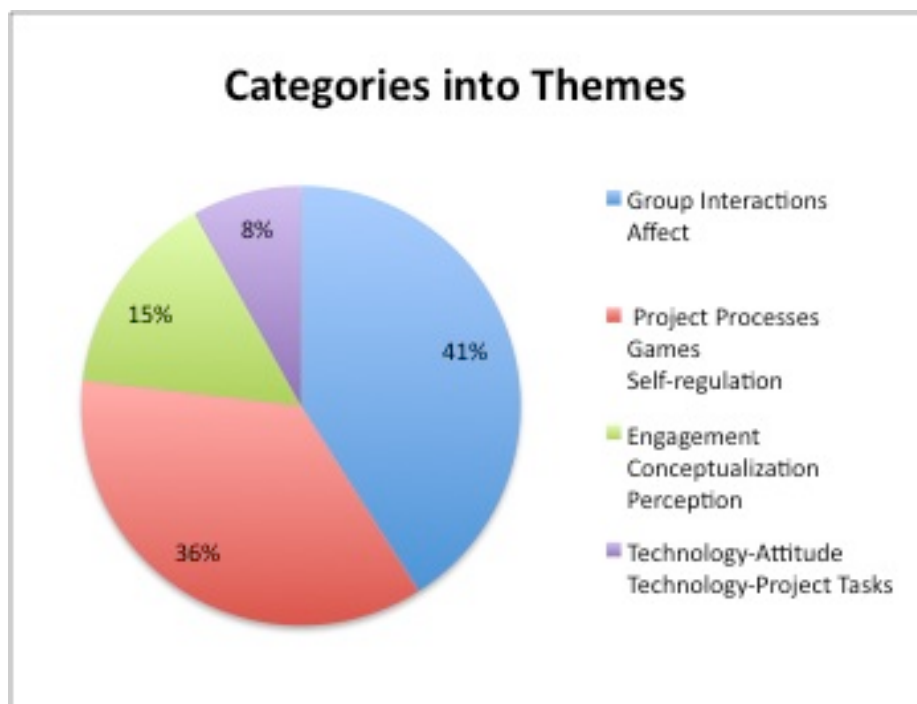


Figure 5.3. Code distribution into themes according to categories.

This analysis generated 120 codes. Two were discarded because they represented a minimal response and not answering the question response. 118 codes were placed in ten categories. These ten categories merged into four themes. These are discussed in the next chapter.

CHAPTER 6

FINDINGS AND DISCUSSIONS

6.1. Introduction

As the categories developed from the codes, certain themes emerged that answered some questions, yet they presented new questions as well. This chapter includes the major findings in this study, the themes that emerged, conclusions drawn from the findings as related to the research questions, and discussion of future research based on new questions that arose from this study.

6.2. Themes

6.2.1. Theme 1

It's hard to work in a group sometimes, but if you work together you get stuff done.

Andrew

This theme emerged primarily from *Group Interaction* and *Affect*. Peers working together often present challenges to teachers in the classroom. Two groups in the study revealed that, though they had experience working in groups, they had difficulty in working within *collaborative* groups. The first group in this discussion was dysfunctional due to the distribution of the work, mainly because one student took control and was able to direct the group in the direction he wanted.

In this case, Eli revealed early in the project, "I am in a group where people have to be all equal and everything HAS to be fair for everyone then it is not so fun for me." He decided the way the group would express their theme and distributed tasks for each member to perform. However, most of the work given to his team members was menial

in nature and required little thinking. This included tasks such as bringing props to school and acting in a one-minute video. Eli created four websites, five QR codes, five riddles as clues, and edited the video that had been produced using a green screen. The other three members of his group had little to do as a result. Two of the other members objected, but they were overruled during group meetings and gave in to Eli. In spite of the group's discontent, Eli stated, "I'm having a good time and feel that most of us are really doing our part." In the *Group Member Roles* subcategory, Eli was the only student to receive all six *Self-Centered Roles* codes.

Robert initially objected, but complied with Eli's direction due to his expressed discomfort with conflict. Nevertheless, Robert found a way to communicate about the disparity. It was never overt, but he wrote in his blog, "Yesterday, my group and I made four websites. Well, actually one person made all four, but I'm not going into detail about that." He also responded to a question related to what the members would have done differently by writing, "I wish we split the work differently because one person was doing all the work." Seven of the 30 codes applied for disparity were related to Robert's remarks in his blog. Early in the project, he mentioned a particular conflict but remarked, "I think we can solve that ourselves."

Mediation came in the form of the teacher approaching the group after reading their initial blogs. However, when spoken to, Robert said that there was no problem, they were all fine, and Eli reassured her they were all working well together. This proved not to be the case and the disparity continued throughout the creation of the game. The group gave in to Eli's wishes to get the project completed. The group interaction affected Robert negatively. He shared, "I don't really want to make an alternate reality

game because of all the disagreements and arguments; I'd rather play them. What I would do differently about our project is make everyone have an equal amount of work."

This group's dysfunction could have been triggered by several causes: 1.) Robert appeared to see conflict as only bad. He seemed to avoid it at all costs. Because of this, he would rather let his enjoyment be curtailed for peace within the group; 2.) Eli's method of leadership was reminiscent of the *factory model*. In that model, he was in control and gave specific duties to each member, expecting compliance from them. Another possibility was that, although the teacher could have intervened, 3.) she misunderstood the students' compliance with one member as consensus. The students solved the problem, yet the problem was not solved.

How receptive were Robert and Eli to a new way of learning was another open question. In this case, Eli retreated to an autocratic leadership style reminiscent of the factory model. He was the "boss" and in control. Eli assigned specific duties and expected compliance. Though he enjoyed his experience, the rest of his group did not. Eli did not seem to be receptive to a new way of learning. He rejected the bid to work collaboratively within a group.

Robert appeared receptive in the beginning; however, as the design of the game continued, he felt no ownership with it. His experience with the group inhibited his openness to this type of learning. Robert wanted peace to the exclusion of fairness and equality. Robert was receptive, but the conflict, disparity, and tension in the group stifled his willingness to repeat this particular new way of learning.

Conversely other students initially had difficulties with their groups, but there was evidence that they resolved their conflicts adequately and were able to work well

together. For example, as Robin explained, “We tried our best to smooth it out. It really did go really smoothly. Everyone was really working together, and we collaborated, and it was fun.” Working within a well-functioning group Robin’s enjoyment was enhanced when designing her AltRG. She explained their components of the game, “we plan on making a video and it sounds like so much fun! We each got a part, and I think that our website is going to rock!” She looked at her group as a crucial part of the project and recognized the importance of collaboration of the group in order to function well.

Thomas was another student who enjoyed the game design process. Specifically, he enjoyed the creative aspect of the game. “Well, I thought it was really creative because my group we had to think outside the box with it; we had to think of all these new things. We just had to be as creative as we could to come up with different ideas,” he explained. Thomas also depended on the group to provide assistance. His attitude toward peer support was evident in the number of times he spoke about it.

Thomas further mentioned some aspect of this peer support code seven times out of the 20 applications of this code. He stated, “I like working in groups. People are there to help you out and give you support.” When he spoke of the skills he felt he developed or refined, he stated, “I think I’m learning how to become a better group worker by knowing I always have a team to help.” However, Thomas’s group was not free of conflict. They initially couldn’t agree on ideas for the game. After each member presented their plans, the group came to consensus by voting on the plan they thought would work best.

Robin and Thomas were receptive to this type of learning. As such, their groups developed norms that were equitable and, though they faced some level of conflict, both

of the groups were able to resolve any disagreements. Thomas remained enthusiastic about the project throughout its duration.

I thought it still was fun like I expected. I would like to create another game because it was one of the best projects I've done. It has improved a lot of my technology skills and other types of skills.

Robin also expressed excitement about the skills she learned during the project. She reported that she learned about a technology that her group did not use, but she was still excited about it. She stated in her blog:

I did learn some really cool things form [sic] this. For example, I learned how to make a website on Weebly. I also learned (even though we didn't do this) how to make a QR code. I wish I had more time to explore Weebly, add more videos, and make a QR code. I also wish that we had more time to work together and add to our website.

In her interview, Robin further recognized the AltRG as a different way of learning and also reported her enjoyment of the project.

Researcher: So, how was this project different from any other project you've done in the past?

Robin: it was a little more, Well, I worked in a group more; you don't have to do that in school projects. It was kind of fun, and a lot with the computers; often you use your hand, so I liked that part. It was kind of different actually.

In this way, Robin showed her receptiveness to this type of learning. She connected the way she worked in her group with fun.

Kelly was another student who indicated openness to a new way of learning. Like Robin, she admitted that the group had some problems, but "we got over all of that."

Kelly described some of the issues and their responses to the conflict in her interview.

Kelly: We had a lot of disagreements about what ideas were right, but we didn't like fight with each other. We just talked it out. Like I wanted to do something on the website. I don't even know what it was, and they were like, "Well I don't think that would be a good idea; I think we should do it on the paper as a task because

then they don't have to go to three websites or something so it wouldn't be that hard," and then we worked that out, and we just did it as a task.

Kelly also responded to a question in the interview about learning and creating an AltRG. In this case, the new way of learning affected how Kelly looked at being a member of a group.

Researcher: How did this alternate reality game help you learn?

Kelly: This alternate reality game helped me learn how to work in a group better. It helped me learn how to take criticism well. Because they weren't trying to be mean, they were just trying to help. It's their grade too.

This statement was profound for Kelly because she described herself as, "over-reactive." Kelly had difficulty with criticism. If anyone offered her feedback that was not completely positive, she might have cried, yelled, or destroy the work that was being critiqued. This was a big step on the way to maturity for her. When she stated that, "It's their grade too." She was accepting that she had the ability to look beyond herself.

Evidence of Andrew's readiness for this form of learning was mixed in his statements. In his blog, he said, "Yes, I would want to create another game because it's fun making a game." However, when asked about his project in the interview, Andrew immediately began discussing the argumentative nature of his group. He finally put conditions on whether or not he would like to create another AltRG. He said, "It would probably depend on [the] group I would be in because I don't want a group again that just doesn't do work, and one person just does it all. I don't like getting angry at people." Again, group conflict tempered Andrew's openness to this style of learning.

Correspondingly, and in answer to the question, "Would you want to create another AltRG?" Chance, a member of Andrew's group answered, "No, because we didn't get along." This group had many conflicts that were grounded in disparity of work.

Each time these conflicts were mediated by the instructor,, the group reported that they were doing fine and did not want to be separated. This is akin to the psychological phenomena called “faking good,” in which the respondent provides the answers on psychometric instruments such as personality tests that they believe the therapist or doctor wants to hear (Kemp, Miltenberger, & Lumley, 1996)

For example, at the beginning of the project Chance reported in his blog, “My game is going really smooth right now and I think we are going to do really good on our project.” He also revealed that someone was saying two members were not participating, but he responded that this was not the case and gave evidence of his work, “But I disagree with that because I have let them see my journal and let them use my iPad so i [*sic*] have not done any work.” In spite of the positive statement at the beginning of the project, the conflict was just starting. Later in his interview, Chance explained one of the conflicts.

Researcher: Was there a time when you felt like people weren't listening to you?

Chance: Yes, I would come up with some ideas people would else [*sic*] would come up with ideas and write them down, and I would try to ask them, and they would just keep writing down, but they wouldn't write mine down.

This conflict became volatile at one point during a mediation session with the group and instructor. Chance and another member of the group, not involved with this study, began yelling at each other. This time, the accusation of disparity came from the other self-appointed leader of the group. Chance was accused of not working on the project. However, Chance kept insisting to the leader, “You didn't tell me what to do! You didn't tell me what to do!” He explained to the mediator and the group that he was not working because he had finished the task the other student had given him and the leader of the

group had not given him another job to do. Andrew and other group members reported that Chance would open a comic book application and create comics unrelated to the game. The mediator/instructor intervened and asked if there was a way to include comics in their game. The group discussed this and agreed it could be included; then the leader of the group instructed Chance exactly what to include in his comic. This turned into another instance where Chance only did exactly as one person in the group told him.

This case was similar to Eli and Robert's situation. Robert wanted to take a more active role in the design of the game; however, he grudgingly gave into Eli's desire for control. Robert relinquished his rights as a group member, but he revealed the inequality of it in his blogs. Chance only revealed conflict within the group but never specified what the real issue was. Once Chance gave up control, he only performed exactly as directed. While Robert gave up because of his bid for harmony in the group, Chance gave up because he genuinely did not know how to take the initiative on his own. Chance was more like Eli in that they both were trapped in roles illustrated by the factory model. Eli was the teacher and Chance was the student who did exactly what he was told. In this case, Chance wasn't ready for this new way of learning either.

This theme illustrates the importance of intentional collaboration preparation for PBLs. The affective experience was merged with the group experience. Several mentioned that working in a group was harder than they expected. However, that did not mean the student had a negative experience. Groups that never learned to collaborate and communicate with each other had the negative experience.

6.2.2. Theme 2

I kind of liked it because we kind of like learned some things on our own.

Thomas

This theme emerged from three categories, *Self-regulation*, *Games*, and *Project Processes*. This theme primarily illustrates the effect of the PBL activities on the fifth grade language arts class. Self-regulation, as defined earlier in the in Chapter 5, played a big part in this theme. In particular, planning set the framework by which the project tasks could be accomplished. Robin explained how their initial planning was accomplished, “Okay, so we have continued along and our group has made a flow chart.” She explained plans for the website in the blogs as well. She said, “For example, on each tab (excluding the homepage) we have a project for you to do or a video. I think that we should focus on assigning responsibilities and (or) more details.”

After the initial planning stage, students identified daily the tasks they’d hoped to accomplish. This were often in the form of a to-do list or sometimes broader systematic plan to complete the tasks. Whitney explained her group’s system for choosing task priority for completion,

Whitney: Well you would think about all that you have to do, then for our group what we did was we did the harder things first, and then after that, In the middle of the session, we moved on to the easier things, and so by the end we had everything done.

Other groups, however, did not have a systematic plan. According to Andrew, it was rather random in his group. He explained, “We just kind of like, one day we would to decide to do this and another we would decide to do that. One day we would plan ahead what we would do tomorrow.” Chance, also in Andrew’s group, confirmed this random planning as well. He spoke about their plan in his interview.

Oh, we would just do one, I we would get all the QR codes one day, and then another day we would number all of them, and then we would do all the riddles, all the QR codes and the stuff people did.

The lack of planning created additional tension for Chance and Andrew's already dysfunctional group.

Planning was not designated as a one time event at the beginning of the project. The PBL activity was designed to include ongoing evaluation, preparation, and revision throughout the duration of the game design. This concurrent element was meant to encourage student time management. In some ways it was successful; however, in the student feedback section of this study, students responded that they needed more time. During the game, several learners expressed confidence that they would finish in time.

For example, Thomas reported in his blog, "I feel prity [sic] good about the deadline. I think we will make it on time and do a great job." Robert also wrote about his confidence in completing on time. He said, "I don't think we will have any problem finishing by the thirteenth." Even though his Robert was fine with the time, Eli, his team member, was not and wanted more time because they were not running according to schedule. Nevertheless, Eli was confident about the outcome. He posted, "I'm sure we can get it done."

Other students like Kelly described the plans they used to complete the project on time. She said, "We managed our time by we made the checklist to make sure everybody did what they did, and if it wasn't done by that day, it had to be done by two days later, and that's the deadline." Robin also described her group's time management strategy in detail. When asked how she managed her time, she responded:

Knowing the amount of sessions, and probably when we were going to work on it, kind of balanced out our time, and we separated parts, she (the teacher) gave

us this sheet that said who's going to do what, and when you want to finish it by, and so that really helped us to get more organized.

It is important to note that the instructor did not tell them exactly who was doing what in the group in terms of specific tasks to build their game. This was how the planning sheet was organized. The students filled in the sheet accordingly. The planning sheet (Appendix C) was from The Buck Institute for Education. It had three columns. One column provided as space for a student's name, the next column provided a space for a task, and the final column provided a space for students to decide and write when something was due. It also provided a space to check of the task once it was complete.

The final section in this theme was self-reflection. This code was the single most applied code in the study. It was applied 91 times. Savery and Duffy (1995) identified reflection as one of eight "instructional principles deriving from constructivism" (p. 137). The curriculum was designed so that there were many opportunities for student self-reflection when designing their AltRG.

Students reflected on personal and group triumphs and challenges. For example, Robert wrote of his confidence that the group could solve their own problems; however,, as the game went along, the confidence dwindled. He wrote, "I think the process of making our games has involved hard work, thinking, skill, and drama." However, in his last blog Robert confirmed that the group could not solve its problems. "I didn't really like the arguing. I also didn't like the slacking off. What I really didn't like the most was the unequally divided work."

Students wrote about their own groups, but also contemplated reflected about their views on group work in general. Whitney wrote in her blog, "I think groups either go really awesome, or they could ruin everything." The group concept was therefore

conditional to her. Later in her interview, she related how her group, in particular, helped her with the process. She was absent the first few days of the PBL launch and the other students had to bring her up to speed.

Researcher: You came into the project a couple of days later because you were out. How did you get caught up?

Whitney: Everybody just kind of had to boost me up on what the plan was, and then there were other people who absent, and we had to get them I included in it, and, they really knew what they were doing by then, so they told me and everything. So I got caught up and everything,

Thomas also reflected on the errors of his group. He explained, "I think that we could of [sic] done a few of the things better. Sometimes our group just went ahead and did things without thinking how it may turn out and what could be the consequences."

Thomas did not assign blame to any one member and this particular blog entry demonstrated his willingness to take responsibility for his action along with the group's actions.

In his interview, Thomas expanded on one of the things that went wrong with his group's game. He said, "We were shooting for them to get the theme, but we kind of [sic] had trouble, but at the end we came up with a new theme." When asked to elaborate on the problem, he reflected on the way the group lost control of the theme. Thomas explained, "Well, we kind of kept changing our game to improve it, but we kind of forgot about the theme along the way." This attempt to improve was done after the feedback from the group that played his group's game.

Students reflected on becoming independent while also learning to solve problems together instead of relying on the teacher to dispense knowledge and direction. Erin mentioned about future projects, "So we know what to do, and we don't

have to spend a lot of time waiting for the teacher to help us.” She and her group were very dependent on the instructor and would become frustrated when they would receive a non-answer. Erin exhibited a *tell me what to do* mindset as she described how the instructor should have taught the game, “This is what I would do differently. If you were to teach a class to do it for the first time I would give the class an order they have to use like, Voki first then a QR code.” Her reflection demonstrated a reluctance to break away from a traditional style of learning, which makes employing PBL difficult in the classroom, because the methods rely heavily on student self-direction.

Others appeared more open to taking ownership of their learning. There were various responses to the question asked in the interview, but a thread ran through them all. The instructor would answer a question with a question and would not give a direct answer. Often, the response was along the lines of, “I don’t know; what do you think?” or “How would you solve that problem?” Six of the seven students who were asked this question were very positive about being able to learn something on their own.

Kelly: Oh yeah, I didn’t really understand it, and I think you were just trying to, I think you thought I did understand it, and then I like figured it out ‘cause you didn’t help me because if you would have helped me then I never would have progressed and learn anything; you would just be telling me the answer so.

Kelly was particularly confused at first when she would not be given a direct answer to her question. As the project progressed, she was able to work with the group to solve problems.

Whitney reflected that, “It felt like, it felt like it made me feel like I knew how to do it; I just really wasn’t thinking hard enough, or that’s what it made other people feel.” Whitney’s answer revealed a confidence she discovered when she felt the instructor had confidence in her problem solving ability.

Eli would often approach his instructor for affirmation in his search for what he believed would be the one correct answer to a problem. This would initially frustrate Eli when he was not given a hint for the answer he sought. Eli went into more depth than the other students. He reflected on the thinking process that he used to solve the problem. Eli stepped out of his comfort zone to experience this independence. He would approach the instructor/researcher for affirmation or hints in his search for the one correct answer to the problem.

Eli: Well, our group and I, well I would kind of think out the problem, and really get a picture in my head about what the whole layout of the game, and then I would figure out a solution to solve whatever problem we had.

Troublingly, Eli did not address the problem with his group. When asked the same question, Thomas replied, "Well, it felt like we were on our own because we had to you figure things out. I liked it 'cause [sic] we like learned some things on our own; we sort of figured things out all by ourselves." Thomas' group worked together to solve problems. They addressed the problems when members made suggestions and then sought a solution together. This was obvious when they were trying to solve the problem with the theme that was missing from their game.

Andrew liked the feeling as well. He said, "It felt pretty good that we got to go out on our own and do what we kind of wanted to and figure out our own problems most of the time." Chance, a member of Andrew's group, reluctantly repeated Andrew, but did not express the enjoyment Andrew did at being able to "figure out our own problems." Chance said, "Well, we just didn't understand some stuff, and we just needed help, but later on we would just figure it out as a group." Chance was more frustrated at Teacher

B's response than the other members of his group. She was just one more person not telling him what to do.

Robin replied, "It's almost like we asked ourselves that like how do we solve this [sic]. [Teacher A] didn't really have to do that." Robin did not approach the instructor to ask her to solve the problem for the group. The group instead took care of their own need to have a problem solved.

It was evident that self-reflection was key to the project. Students learned they could socially construct their own knowledge. They felt free to express their satisfaction and dissatisfaction with the project as well. Students found a vehicle in the blogs to express their thoughts and emotions without feeling that there would be repercussions from feedback. They felt they could say that they would not want to create a game as well as saying that they thought it was a great project. Their reflections revealed what they were feeling and how they were thinking.

The process of creating the game gave the students the opportunity to think beyond the repetition of textbook-type facts. In particular, once the game was designed and launched, students discussed how they could have improved them based on feedback and their own observations of how the game ran. *Project Improvement* provided the opportunity to evaluate the existing project and to propose improvements based on feedback and an intrinsic desire to perfect the AltRG. Some proposals from students included imaginative approaches that would involve state-of-the-art technology such as holographic agents, immersive video games, and skills that would go with them. Others proposed more pragmatic steps to fix what they deemed broken with their existing games. Robert described one practical approach in his blog. He wrote,

I would add a game on the computer. I would make harder riddles and more puzzles. I would make the video effects better. There could be more challenges and places to go.

His ideas for project improvement gave him a possibility of ownership in any future design of the game.

Kelly also described a practical approach that was based on teacher and peer feedback. In her blog, she stated:

I would have loved to make another website for the PowerPoint after our teacher told us that it could make the website better, and she said, "Your narratives are not exactly correct." We are going to make a new website for the PowerPoint and fix all our incorrect narratives.

During the first iteration of her game, it was discovered that Kelly did not write a narrative; instead, she had written a book review. This was discovered before the game was launched for another group to play.

In her interview, Robin was confident about her group's game and showed a complex understanding of the process of creating an AltRG. However, in her blog, she listed several things that would have enhanced her group's game. As a result of playing another group's game, she became aware of different aspects she could have used. In her blog, she explained:

So while I was playing other people's games, I realized that I wanted to add some stuff to my group's website. I think that we might have wanted to add a scavenger hunt. I thought that that element in the game was SO much fun, and I might want to shorten our code because it was pretty long and confusing.

Robin's group had an excellent game and her Instructor A related that it scored high in terms of feedback from other groups. Nevertheless, Robin was not content with her group's game and was interested in improving the game.

Playing another team's game also influenced Erin and she described what she learned from that game in her blog. "I learned that we should have ended our game with something fun." In a later blog, she also suggested improvements connected to the use of technology. She said, "To improve our game, I would put QR codes to tell were [sic] to go next."

Andrew also listed practical improvements to his game. The sentences were short and choppy and could have easily fit on a bulleted list. He stated:

I would have used a green screen in the background. I would cut into the film and put other films in it. More narrative. Put a background into the story of the book. We should of [sic] had less QR codes. We should have made a 2nd website.

Four of those improvements involved the storytelling aspect of the game. Given his task role orientation in which he submitted to Eli's direction, this appears out of character.

However, in his interview, he did reveal the importance of story to him when discussing video games.

Researcher: You said something about a plot in the game. How important is a plot to you in a game?

Andrew: It's pretty important because if it just has no meaning at all, and you can't get the idea of it, then you're just like, you're going to be like, "What?" You don't understand it, why it's happening. What happened? Why is this here and not here?

The story served an important role for games in general for Andrew. Though Andrew was not involved in creating the narrative for his group's AltRG, he was thinking of ways the narrative could be improved.

While some took a practical approach, others let their imaginations rule their improvements. In an early section of her blog, Whitney provided a practical solution to improving her group's project. She stated, "I would have probably added a video to our

website if we had the right equipment. I think the video would have made it better because then the viewer would have a better view of it.” However toward the end of the process, she described improvements that would use state-of-the art equipment and skills.

To improve my blog (game), I would go OVERBOARD!!! In the scavenjur [sic] hunt part, i [sic] would make like different worlds that you have to go through get to the next clue. Every world would have a task and each one would be different. One would be Safari, one would be neon, one would be ocean, one would be fire, all different kinds of things.

Whitney was identified as an intermediate game player and this appeared to influence her idea of project improvement. Whitney’s description is similar to a video game like World of Warcraft™. She continued with her improvement regarding elements that were currently in the game. She wrote, “And for the QR codes, I would have them all different themes. HUGE floating in the air. [sic] For the website, I would take them to a big, private, movie theater with a touch screen movie screen.” Eli also provided practical and imaginative project improvement. He wrote, “I would fix my QR code that wasn’t working right. If I had better technology, I would make holographic images of me tell them the riddle!”

Evidence was a category applied to instances where students not only made statements, but also they elaborated and provided evidence to support these statements. A few students identified the way that the tasks would translate the theme. When this occurred, they provided evidence that the tasks were meant to lead the players to the theme they chose in the beginning.

When Kelly was asked to tell about her group's project, she disclosed the tasks and also explained them in a way that revealed the purpose of the tasks, which was to help players understand the theme.

In one room, we went to the North Gym, and they had to run laps and do like stuff to show persistence, which is like not giving up, and in one room they had 30 seconds to put make-up on Erin to show like they weren't going to give up, and they were trying to put on as much as possible.

Kelly and her group consistently confused topic with theme; however, they gave evidence that at least the topic was successfully translated into their game construct.

Eli disclosed the theme of his group's story in his interview. He said, "Well, they would learn that strength comes in many ways." After he gave the purpose of the tasks, he went on to provide evidence that the tasks supported the theme.

Eli: Okay, one of our tasks was when you start on our website, so the first clue tells you to go to the third floor, and find the second clue, but it's in riddle form. So then you have to go up to the third floor, which is kind of tiring, like six flights of stairs, and so our players were tired when they got up there, and that, and the clue up there. First you solve the riddle, and then you solve, and then you clicked on the link and that's when you get the second clue.

The extent to which Eli's group was successful with these tasks was revealed in feedback from the other groups playing their games, instructor feedback, and feedback from peers. In some instances, students used the feedback to improve their games. In other cases, the feedback they received was discarded. For example, Eli's response to feedback telling him that they did not "get" the theme was to place that blame on the player. Still, students practiced the skill of giving and receiving feedback whether it was heeded or not.

Eli did not receive feedback well when it suggested changes to his group's game. He rationalized that the fault was on the side of the player, not his game, over which he

asserted full ownership. Eli explained, “The people playing my game who really got involved got the theme, but the people who didn’t really get involved didn’t.” In this case, Eli discarded any feedback that challenged his translation of the theme.

Kelly judged her group’s success by the feedback she received from those playing her group’s game. She was pleased with the overall results from the feedback provided.

Kelly: I think it was pretty successful because like Erin and the rest of the girls, all the girls, they all told us how helpful it was. Like they realized what it actually meant now. They told me it was persistence, and they told me what it meant, like when we asked them at the end.

Kelly was nervous about receiving peer feedback, but was able to remain calm while the other team played their game and wrote up their thoughts.

Robin did not report on the feedback her group received, but she gave feedback to another group publicly through her blog. She had positive things to say to that group.

Today we got to play How to Steal a Dog's group. It was really fun. We watched two videos, decoded a clever message, and went on two scavenger hunts. So cool How to Steal a Dog group. Your effort really showed and I absolutely loved the game. I wish you guys made another one so I could play it. I don't think that you should change anything. Great job!

As reported earlier in this section, playing this group’s game inspired her to want to improve her own; thus, the act of giving feedback and receiving it helped her reflect towards a goal of improving her learning product.

Another area of student feedback occurred in the provision of feedback to the instructors/designers of the PBL activity. The final evaluation blog asked, “How could your teacher change this project to make it better next time?” Most students like Thomas, made suggestions and provided a rationale for it. He said, “She could change the groups to 3 people because in the amount of time with the work, we really only

needed 3 people. It was hard to find some work for the other 2 people.” Andrew also commented on the make-up of the groups and gave his rationale. However, he used personal pronouns that did not really address future projects, only the one that had just been completed. He explained, “She could put us in another group. My group didn’t work together well.”

Robert spoke of his responsibility in the group with the short-term view as well. He stated, “I think she shouldn’t make us turn all this stuff that wasn’t a big part of the project. I also think that we should have a chance to redo stuff we lost.” He wanted the teacher to change this section because he lost some documentation required for the final grade.

Whitney’s feedback was also linked to the present project rather than future group work. She stated that she felt confused about the process and really wanted to do a website about the book rather than the game.

I think maybe our teacher could have us do a ARG that be based on the book itself. I really thought the concept of having the theme and stuff was cool and creative, but it also confused a lot of people. And when we did kinda [sic] get it, we did the wrong thing to show it. But i [sic] mean, that's just my opinion. From what I've heard, a lot of other people really like that idea. It depends on your personalities.

Whitney ‘s feedback was genuine and provided insight to her understanding of the AltRG in general. She and some of her group were confused yet their game was a successful. This indicated that while part of the group was confused, another part of the group was not. The group worked well together and were able to carry on even when a member was confused, which helps show the powerful effect of the group in a PBL activity.

One effect of this particular type of feedback was that the students felt free to express their opinions and articulate the rationale behind them. The one response that was not elaborated came from Robin. This was surprising since Robin was expressive in her other responses. She said, “It was so much fun, but more time.” Her final evaluation was submitted as a worksheet rather than a blog. This illustrated the value of a blog over a worksheet. The worksheet’s space was fixed. It was prone to having short answers while the blog had no constraints. The technology lent itself to deeper reflections and a chance for elaboration.

Many students reported needing more time; this indicated that these students had not managed their time wisely, or they underestimated the amount of time that would be necessary for technologies they had never used before. Some had not planned for the amount of time taken up by disputes. They have had little experience in self-regulated skills before the project. However, some students did improve as the game came to a close.

The responses to the final feedback on design had a short-term view rather than project improvement in the future. The use of personal pronouns indicated that they wanted the adjustment for themselves. Even though the project was over, students gave feedback that did not fit for future projects as the final blog question asked. They wanted the adjustment for themselves, not for future students. For example, Eli commented, “I think that she could change it by giving us more time to work on it. I had to work on it at my house a lot.” Kelly also said, “She could have given us a little more time to do the project.” Though some students thought the project had plenty of time, more said that they needed more time. Students like to use their phones in class, and in

the future, Teachers A and B might capitalize on that. There are many apps available for mobile phones that provide checklists, reminders, and calendars. That might be an answer to work on the self-regulation skills. Future projects could be preceded by a higher focus on time management, planning, and goal setting. The students started off well, but as time passed, the checklists were left in the folder at somebody's house and were not available.

Other feedback revealed a short-term view rather than long-term. It disclosed how much particular students were confused during the process. For example, Erin responded, "To make it better, I think that my teacher should had [sic] made us play one then we would have to make our own." One student, Robin, referenced the AltRG they played before designing their own games; whereas, Erin did not recognize it as an AltRG. Erin was another student who missed the conclusion of one game and the introduction of the other. Because she and Whitney missed three consecutive days, they also missed the energy, excitement, and anticipation. This was difficult to duplicate for K-12 students. This sort of thing was also difficult with her teacher. In the future, anticipation could be built online as well so students who were absent would be able to access the anticipatory set.

The games category included both AltRGs and video games. For example, would experience in playing video games give participants an aid in designing an AltRG? In this case, the students had varied experience with games in general, but no experience with an AltRG other than the game they played prior to the project. It was interesting to note that the three of the students who were coded as intermediate lacked understanding about AltRGs. Neither their personal game play nor their experience with

the *Despereaux* AltRG provided by the instructors appeared to aid them in their PBL construction experience. For example, Andrew had experience with first-person shooter games, but when he was asked about AltRGs his answers were vague.

Researcher: If somebody comes up to and asks, “Oh, you made your own alternate reality game; what is that?” What would you tell them?

Andrew: I would tell them it’s a game that my friends and I made up like in a group. I would explain to them what’s it about, what’s it based on, what you have to do, what you get. If you find anything, how you do it.

His response was all task related and this was expressed again when he described the difference between a video game and an AltRG.

Andrew: Well, in some games you have to find stuff and go with the clues just like in an alternate reality game, and in some games, you just run around doing stuff. Like it’s not based on anything; you can do what you want to do.

He took on a micro-perspective of both games and he was focused primarily on the physical aspects of the game.

Whitney was also identified as an intermediate player, but she had reluctantly admitted this. When asked if she played video games, she replied, “Not very often; sometimes I might play. Well, yeah, I play video games on Wii or Xbox or something like that.” Later, she disclosed that she also played a popular Halo, a first-person shooter game. However, she revealed only a nominal understanding of an AltRG in one response in the interview and a lack of understanding in another in her blog. In the former instance, she explained an AltRG by relating it to real life. She said, “It’s kind of like you’re in a video game, not really, but it’s like a real life. You would have to do stuff. On the video game there’s levels, and so because there’s levels in an alternate reality game.” However, her lack of understanding was clear when explaining whether or not she would create another AltRG. She answered:

The thing about how it wasn't really made from the book kind of threw me off a little bit. But like in the beginning like really threw my group off, and then if it was about the book then it would be really fun. The scavenger thing was really fun, and then creating everything was really fun, but if it was about the book then yeah, but if it was the same thing where it kind of wasn't about the book then probably no. It kind of threw me off.

Again, this student focused on the tasks rather than the concept of an AltRG. Her confusion settled around the narrative. She wanted to create an electronic book report instead of a game and her confusion about the project was evident.

On the other hand, Robin admitted to not playing video games at all, yet had a complex understanding of what an AltRG was according to the coders.

In her description of her game, she described blurring the lines between reality and her alternate world. She explained how they created suspension of disbelief when her group set up communication for the game players with a character in the book.

Robin: Penny in the book really, really likes hats, and dressing up, and she apparently is really cute and likes to go to work. What happened was, they would send it to my friend's email, and one or two people were on her email and would reply back, like thanks or can you give us more info.

She was the only student in the study who presented a complex understanding of the AltRG. The only experience she had with video games prior to the PBL experience was to occasionally watch her brother play them.

Kelly had experience in playing simple mobile phone games and was identified as having a *Basic Understanding of AltRGs*. She answered the question about explaining AltRGs to someone else in her interview.

Kelly: I would tell them an alternate reality game is basically, you; it's basically like a scavenger hunt that has clues to tell people about a topic, and I would say it's like a, running around, like you, yourself, are playing the game. It's like you are one of the game pieces. You're moving; the clues are moving you. It's what's taking you around.

In her blog, she recorded the progression of her understanding. In the second blog, she wrote, “I am also a little bit confused on what the entire point is and the goal.” In the sixth blog, she stated, “I would like to do another alternate reality game because I would understand the concept better and be able to do it a lot quicker because I would know what to do and how to do it.”

This theme tied together the categories of game, self-regulation and project processes. The lack of self-regulation made some processes difficult to follow through. The students had great ideas; however, without time management skills, these ideas are not seen to fruition. Project improvement involved both fixing problems and allowing the imagination run wild. Some students wanted to improve the game for a better grade; however, some had a desire to take their games to the next level. There were no bonus points, pieces of candy, or pizza parties offered if they accomplished their goal. Some students wanted to improve their game because they wanted to perfect it. The students were able to reflect on all of this in their blogs and in the interviews. Self-reflection was the single most applied code in the study.

6.2.3. Theme 3

Like in our games that we made, you get up, or you really use your brain to think.

Robin

In this theme, students revealed three major items. In particular, they explained how they arrived at the concepts used for their group’s AltRG, disclosed their level of engagement with the project, and provided the standards by which students measured their own success. Engagement, conceptualization, and perception were the categories

that supported this theme. While this was a small portion of the study (15% of code applications), the theme still revealed thought processes of the students.

Three students accounted for 80% of the utterances tied to the code project engagement. These three students were also identified initially as most ready to learn by designing a game. They also were the only students identified as having an extensive understanding of engagement. When interviewed, Thomas had the most energy of all the students when talking about his project. His hands moved constantly as he described each aspect of the project; however, he was especially animated when discussing the narrative. Though he did not work on the project outside of class, he described his high level of engagement during class time,

Researcher: So did you work on any of it after school or was it all just in school?

Thomas: Well, I spent like a whole time in class, which was like a whole period; just like looking at it, and deciding if it was good or not, and then just kept editing it, editing it, and it turned out to be really good, and I don't think I spent any time after.

At first, it appeared that engagement equaled task focus for Thomas, but later in the interview, Thomas revealed it as something else. He stated, "Well, I thought that alternate reality game was really fun because you just had something to work on, and you wouldn't want to stop because it was really fun." It was not that he just wanted to complete the task; instead, Thomas genuinely enjoyed writing the narrative and he did not want the experience to end. Thomas also indicated his engagement by the number of times he used an exclamation point in his blog. The final count was fourteen times.

Robin also used exclamation points in her blogs, but she only eight. She described herself as being "pumped" about being finished with the planning and her

group could finally begin the development of their AltRG. In her interview, she spoke about the importance of story and how she learned from stories. She was asked if she was engaged, because the AltRG was narrative-driven. She explained, “It might have been the fact that I was using a story itself. I’ve always loved to read, and incorporating my love for books and school, creating a game with them, it was really fun.” Robin equated engagement with fun in both the interview and her blogs.

Contrary to Robin’s view, Kelly did not refer to her engagement in the design process as fun. Kelly’s revealed a single-minded focus on completing the game. Kelly’s concept of engagement diverged into two thoughts. In the first, she spoke of her engagement as being an immersive event. Specifically, she stated, “I’m paying attention, focused, and really trying to get it done. It feels like I’m in the project.” Secondly, Kelly’s expressed a strong desire to complete her tasks in the project. Even when she took time away from the project in class, she still performed project tasks. For example, she said, “I never stopped. I took a few breaks here and there and went downstairs and asked if we could hide stuff in the courtyard.” The break she mentioned was to ask the administration if she and her group could hide the QR codes in various parts of the building. These three students illustrated the complexity of engagement. While engagement can be enjoyable, it can also be difficult and time consuming.

Creative thinking was the strongest code in the conceptualization category. Students demonstrated creative thought when they described the process and as their product was developed. For example, Robin utilized an information-seeking task as a clue for players of her group’s game. She explained, “It doesn’t really go into detail in this in the book, but Melody has this school project about Stephen Hawking and

Stephen Hawking has the same disability as Melody, so she wants to do research on him.” She and her group used a small reference to Stephen Hawking in the book to drive a section of the game. She related that the book did not further explore the project, so they expanded upon this in their AltRG. According to Robin, “It doesn’t really tell you how the research went, so we decided to make up a project for the players to research Stephen Hawking.” They expanded the original concept from the book to focus on something that would better illustrate their theme. Other students who played their game would learn more about cerebral palsy.

Thomas also described creative thought in which his group actually hid clues. The process involved another student who remembered something about working in the office next to the classrooms. This was the core teacher’s team office and contained books, a printer, two desks, and paper. It was also used occasionally for students to have a quiet place to work. Thomas explained, “I think we were thinking about where to hide clues, and he remembered that once he was working in the workroom, and he saw a Titanic book.” He was able to link it to his group’s theme. “It was expect the unexpected. There was a clue that said, ‘Go to the workroom and look under a big boat,’ and it was under a book about a big boat.” Thomas’ group was the one that had to create a theme after the fact because they were distracted by designing the elements of the game. Thomas further elaborated that he, “felt like I’m becoming more creative and finding more ideas for my team.”

Other creative thinking was identified when students sought to improve their products. Eli, for example, had many ideas, but he was unable to accomplish them for the game so he suggested them for improving the AltRG. He listed several elements

that he felt would have enhanced the game. He wrote, "I also would make the game longer. Like make more clues and more riddles. I would also make more videos and add more suspense like making more paragraphs and websites." Eli was also disappointed with the conclusion of his game. In particular, he had technical difficulties with passwords for the websites and these passwords were part of his clue system. However, when his teacher offered a suggestion, he dismissed it as too much work. He wrote in his blog, "If I could change the passwords to the websites, I would definitely." Part of the issue stemmed from Eli's concept of creativity versus collaboration and this was evident in statements made in his interview when he said "In this game, some of it was about being creative and thinking. I just felt like I wanted the game to be a certain way."

Eli was not open to help from the group and, in his effort to express his own creativity, he suppressed any creative thought that may have been expressed from his group. He elaborated on his thinking. "My group kind of got how it was suppose to be, but they didn't really know exactly how I pictured it, and so I wanted to make sure that it was, so I did most of the work." Subsequently, this approach was not successful. His unwillingness to collaborate, lack of self-regulated learning skills, and strong locus of control negatively impacted the creativity of his final project .

Other students exhibited creative thought throughout the game design process. This activity involved them looking for some connection to the book that could be presented in a novel way to spur player engagement. While this should have provided an opportunity to explore divergent approaches to a problem, it did not always happen.

In the final category of this theme, perception and social comparison demonstrated how the students felt about their games, groups, and themselves as they compared themselves with their peers. Thomas wrote, for example, “I came up with an idea to type it from a different person’s point-of-view. My whole group liked it and thought it was a great idea.” This encouraged him to become more engaged in his writing.

On the other hand, Chance felt excluded and discouraged by his group. He explained, “I would come up with some ideas, someone else would come up with ideas and write them down, I would try to ask them, and they would just keep writing down, but they wouldn’t write mine down.” He also felt that Andrew criticized him in his blog. Andrew stated, “Our group is doing well, but 2 of us are doing most of the work. But I don’t feel offended by it, and I’m fine with it.” Chance argued, “Although someone is saying that only 2 people did all the work, 2 other people did not work.” Due to past experience in the group, he concluded that Andrew was writing about him. He gave evidence refuting Andrew’s claim about his lack of work by saying, “But I disagree with that because I have let them see my journal and let them use my iPad.” Chance felt ostracized, yet reported that his group was “going really smooth.” This had to do with the power structure of the group. He was in a group with the most popular student in the class. Even though this student was one of Chance’s good friends, they clashed during the AltRG creation. The other student did not think Chance was working, but in Chance’s mind he was. By saying that the group was “going really smooth,” he was “faking good” in order to remain friends with the other student.

Other applications of this code related to student anticipation about the prospect of other people playing their games. Robin is normally a confident girl but, in anticipation of someone else judging her group's game, Robin appeared less secure than she normally did. Robin wrote on her blog, "I hope it is enough and people like it."

Kelly, too, was nervous about the people playing their game. In anticipation of negative feedback, she wrote, "They most likely will like the game, but if they don't, we will be upset." She later wrote, "I am happy that girls are playing our game because I think girls will understand it better and have a lot more fun with it than boys would." Finally, after someone played their game, she was pleased with their reaction. She said, "I think it was pretty successful because Erin and the rest of the girls told us how helpful it was." The opinion of others was very important to Kelly and Robin as well. Robin and Kelly both were identified as fulfilling *Social Roles* within *Group Member Roles*. Andrew and Chance were identified as fulfilling *Task Roles*. This is understandable since most of their social comparisons were related to the tasks they were supposed to perform to develop their group's games.

This theme revealed the thinking behind the project. In the beginning the students were excited about just getting to create a website and work in a group. As the game progressed, some students began to understand it took more than just skills in using technology to create a game. It took creativity, a level of engagement, and some form of introspection into how we are perceived by others and ourselves. This seemed to emphasize technology as a tool to support the game rather than it becomes the game.

6.2.4. Theme 4

I love how this was mainly on the computer. This was also a good experience to see how other people think.

Kelly

This final theme was related to the technologies used in the game. Two categories made up this minor theme. technology-project tasks and technology-attitude addressed the new technology skills that students developed. Throughout the PBL project, a new confidence in working with technology emerged among the students.

The first category, technology-project tasks were the primary focus of the students in the beginning. Initially, the groups stayed with familiar technologies. For example, Kelly and Whitney's group began with designing a PowerPoint. However, this group later advanced to creating a webpage and embedding the PowerPoint in it. They also used Quick Response (QR) codes as riddles. The player scanned the code and a text message revealed a riddle that the players had to solve in order to progress through the game. They gave the girls playing their game a small video camera, because some of the clues required players to create an improvisational skit about persistence.

When asked in the blog to describe the skills they acquired or refined, eight of nine students referenced a form of technology. The QR codes in particular were the most engaging for the students. Some may say this could have been because it was new technology for all of the students, leading to a novelty effect (Clark, 1994); however, students saw the technology as a way to deliver the game in an engaging way. Eli explained the use of QR codes for his game. He said, "In our project, we have three sets of two QR codes, and one of the QR cods is a riddle, and the other one is the

actual clue to get to the next one. So the player of our game has to go all around the school to find the lightning bolt for Zeus.”

Some technologies transcended their use for the game and QR codes were one of these. While working on the project, students saw QR codes in the hallway because a sixth grade class across the hall used them for book reviews; many times students in our class would slip out during transition time to scan the book reviews. The codes became a simple tool to get information. Robin expressed her interest in codes, “I also learned (even though we didn’t do this) how to make a QR code.” Robin learned to create the codes for her own use in the future. Not just for the project.

The other category, technology-attitudes, recorded the students’ feelings towards using technology. The strongest code was self-efficacy. Whitney described her feelings about the technologies she learned.

I feel like I’m learning a lot of new things. I have learned how to make a QR code, make a website and more. I have learned even more about PowerPoints and Goggle. How to use them in new ways I have never recalled.

However, she later said, “I honestly wouldn’t like to do this ever again because I feel like I’m not really in the computer business.” Her view again changed and Whitney talked positively about it. “The most important thing I learned in this project is new technologies. I learned how to make QR codes that lead to all sorts of things.” In this case, she was referring to the clues her group had developed that lead the players to different areas of the building. A week after the game was completed, Whitney was interviewed and the question was asked, “How do you think creating an alternate reality game affected your learning?”

Whitney: Well, I already knew a lot of stuff, but I really actually learned more about Weebly, and I also learned how to make a QR code, and I learned a lot

more technical stuff like on the computers and how to do stuff.

After time passed, she repeated what she had written in the blog about the things she learned and it revealed that she had developed an increased sense of self-efficacy about her technology ability.

Technology was only one element of engagement for these students. In some instances, the most important concept learned was that the students did not have to be limited in the products they create for school. New knowledge was even produced from older technologies. As Whitney stated, “I knew how to make a PowerPoint, but I didn’t know how to make it over the top.” As such, the project tasks and attitudes were interconnected.

These themes illustrated the level of acceptance various students had towards problem-based learning and alternate reality games. In the next section, I will discuss the themes and the conclusions I’ve reached in this study.

6.3. Conclusions

6.3.1. Introduction

The study generated several conclusions in respect to the research questions. The first theme addresses the first research question while themes two through four address the second research question.

- What are the effects of problem-based learning on students in a fifth grade language arts classroom?
- How receptive are fifth grade students to new types of learning?

6.3.2. Theme 1

It's hard to work in a group sometimes, but if you work together you get stuff done.

Andrew

Were these students ready for a new way of learning within a group? It was evident in the data that Robin, Thomas, and Kelly were; Andrew, Eli, Robert, and Chance were not. Whitney and Erin were on the cusp, but were not quite ready to completely buy in to collaboration. Those students who had a more open concept of how to collaborate were prepared and those who were able to function within a group as equals were also. Unfortunately, those students who put themselves in the roles of “teacher” or “student” were not ready for this approach to learning. They proved to be adept at group work, but not collaboration.

There are many ways to separate students into groups (Brulles, Cohn, & Saunders, 2010; Cheng, Lam, & Chan, 2008). It may have not been prudent to develop groups according to books read, because some students did not actually read the books they claimed that they did; instead, they just wanted to be in a group with their friends. This increased tension within those group because those students were not prepared to contribute.

Students also needed more experience in working within a collaborative group to learn negotiation skills. Students claimed to know how to work in a group, but the evidence contradicted this claim. The effects on some groups were tension, anger, and frustration. In others, the students developed skills to negotiate, listen to opposing ideas, and to come to consensus without damaging personal relationships, which are all necessary to successfully engage in problem-based learning activities

6.3.3. Theme 2

I kind of liked it because we kind of like learned some things on our own.

Thomas

What effects did this theme have on these students in a fifth grade language arts class? Reflection activities required students to vigorously think about their own learning processes, which, based on the metacognition literature, should have led to improved learning strategies. In blogs, they recorded how and what they were thinking as they progressed through the project from problem to solution. In interviews, learners revealed the ownership they began to take over their learning. They moved a step closer to self-regulated learning because the PBL task required them to set goals, plan, receiving and evaluate feedback to help improve their AltRG, use their imaginations to improve future projects, and reflect regularly on the whole process regularly as they developed their project. They also managed their project solution by setting goals related to deadlines that helped improve some of the student's time management skills. While the design sought to improve all students' self-regulated learning, some were successful in all achieving this and some were not.

The interviews revealed attitudes and experience with video games through consoles and mobile games. This contrasted with their understanding of AltRGs. It was noted that the student with the least amount of experience playing digital games had the most complex understanding of AltRGs by the end of the project. In fact, the two students identified as intermediate game players had the least understanding of AltRGs at the conclusion of the PBL activity. Though they acknowledged the importance of the narrative in video games, they virtually ignored it in their own AltRG. Those who had at

least a rudimentary understanding of AltRGs worked to include strong narratives in their games. By the end of the implementation, four of the nine students were revealed to be ready for this type of learning by designing a game.

On the question of whether students were they ready to invest in their own learning, two-thirds of the students in this study were open to taking ownership of their own knowledge. In order to do this, they were required by the PBL task to break out of the dependence on the teacher to supply their knowledge. This was not an easy step for most of the students, but they acknowledged that they were able to find their own solutions.

6.3.4. Theme 3

Like in our games that we made, you get up, or you really use your brain to think –

Robin

This theme indicated an effect on student cognitive processes. In terms of engagement, three students provided gave evidence of strong engagement with the project. For one learner, engagement was closely tied to enjoyment; for another, it was tied to performing tasks to get the project done. One student connected to the cognitive construct of engagement, while the other was influenced by the affective construct (Fredricks, Blumenfeld, & Paris, 2004) A single student, Thomas, referenced both the cognitive and affective constructs. Based on this evidence, these students were ready to be engaged in a new way of learning, while the others were not.

Creative thinking was demonstrated through student demonstration of finding connections and manipulating them through the AltRG. Robin's group in particular

excelled at this. She and her group imagined novel ways to present their story and theme. This included pulling out and developing the Hawking element and creating a method to simulate a speaking machine. It was in these ways that her group displayed creative thinking. Thomas' group displayed creative thinking to deliver the narrative and move players through their game. While his group did demonstrate this, they were not on the same level as Robin's group.

In another example, Eli did not speak in terms of creative thinking in collaboration with his group; however, he was disappointed that he did not get to convey all of his ideas. This was directly due to taking on the responsibility for all creative thinking in the group. This limited his creative thinking and that exhibited by his group. Despite this, eight of nine students were identified as thinking creatively; however, only three of the eight went into depth to explain the process of their creativity.

Were these students ready for a new kind of learning that focused on creative thinking? They were almost all receptive at one point or another. Unfortunately, only three took it a step farther and described the process in sufficient detail for the analysts to claim that they were truly involved in this form of thinking.

6.3.5. Theme 4

I love how this was mainly on the computer. This was also a good experience to see how other people think.

Kelly

This last theme focused on the technology used in this project. The effects were demonstrated by student willingness to transfer the use of learned technologies in other realms. Their reflections revealed that they increased their confidence and self-efficacy

with technology. Whitney, in particular, fluctuated between feeling positive about technology use and feeling insecure about it or rejecting it entirely. In the end, she acknowledged enjoyment and confidence with technology for schoolwork that developed as a result of the game development process. All nine students commented on their own self-efficacy at one point in the study. They were receptive to a new type of learning that involved both novel and older technologies.

6.4. Recommendations and Future Study

6.4.1. Recommendations

During and after the study, the findings of the research revealed areas that needed to be improved in order to equip students to be more receptive to problem-based learning. These findings of the research generated other questions. What was the difference between those that appreciated self-direction and those that did not? Why were some students able to collaborate while others could not? After consideration of these questions, I have a few recommendations that would make the problem-based learning experience more productive and enjoyable for students.

6.4.2. Collaboration

Approximately one-half of the students in this study had difficulty with collaboration. This was conveyed as tension, frustration and anger in some groups. Why did some operate well and the others did not? This is a complex issue that could have been explained in several ways. First, the students could have had little experience working collaboratively, but they have had experience in working in groups.

The latter style of group work follows the cooperative groups of the 1990s (Johnson & Johnson, 1999). The teacher gave students specific jobs in this model, and when that did not happen in this study, some students took the role of the teacher to dictate what jobs each member would take. Some accepted their roles as students and waited for instructions. Second, it also could have been that some students were not developmentally ready for abstraction (Piaget, 2001). Third, they may not have felt secure in their places in the overall power structure to feel as if they had something to contribute.

Though any of the above reasons could have been responsible for the lack of cohesion in some groups, I believe the strongest reason for the lack of collaboration was the lack of experience in collaborating. I would recommend preparing the students for collaboration in problem-based learning by first allowing the students to engage in role play through various levels of collaboration. The facilitator could assess the current level of understanding at that time. Older students who have become adept at collaborating could provide a panel to discuss collaboration and lead role play that would illustrate collaboration. Students could set norms for collaboration, and they could test those norms through scenario-based practice. This could also solve the problem with those who would not engage in open, evidence-based argumentation. The modeling would help students experience conflict not as a negative emotion, but as a way to generate and support solutions to problems.

In addition to the collaboration and communication issue, what made two-thirds of the students appreciate self-direction while others did not? Of those three, one was not interviewed due to illness, one explained in her blog that teachers should tell

students what to do and how to do it, and one student reluctantly admitted to being frustrated by having to work with the group to solve the problem on their own. The students who appreciated the independence had fewer problems with ambiguity than those who did not. A low tolerance for ambiguity might be improved by providing regular small problem “postholes” (Ertmer & Simons, 2006). The more exposure to divergent, ambiguous problems might be a way to encourage student-directed learning. Though we did include these mini-problematic situations earlier in the year, those were not scheduled in a regular manner.

A new iteration of this project is being planned for the following year. Would following the previous recommendations improve the experience for students using PBL? The designers of the original PBL and the *designed by* students PBL have discussed another substantial iteration. The idea of using AltRGs to help students internalize the themes present in novels has been discarded based on the results from this study. This is primarily because only one group successfully included the theme in their game. Other students could not even remember their own theme. The new iteration is therefore based on creative writing, authentic problems, and the creation of an AltRG utilizing some of the technologies used in this study. Without the boundary of a published book, the designers are considering working on a global forum. In conjunction with private university in the area, a liaison to global education was connected to the school. Teachers A and B are in communication with the liaison to help plan for an alternate reality game with students outside of the United States. This is the next step and will not be implemented until the following school year. Instead of

examining the overall effect, another area to explore could be collaboration in upper elementary students to see if there is a difference in their ability.

6.4.3. Longitudinal

Future research may also include following students from fifth grade and beyond in order to see how effectively their ability to work on PBL tasks remains with students from year to year. It is an open question as to whether students will be able to maintain the self-regulation skills learned during the game design process that they develop during this iteration. It will also be interesting to discover whether they purposefully reflect on their learning even if a teacher does not make it a requirement?

6.5. Summary

The significance of this study can be seen in the final statement in an interview with Kelly. One statement in particular illustrated the purpose, scope, and hope of the instructor/designers of the original game and the PBL activity that was the focus of this study. As she left the room, the researcher asked an impromptu question.

Researcher: Is there anything more you want to tell me about your game or playing.

Kelly: The learning experience; I definitely didn't think I was going to learn anything at the beginning because I thought we were just going to hang clues, and then they were going to play, but I really did learn. It wasn't just only school stuff, it was like learning how to respect others, to be more responsible, more organized, and learning how to keep up with my folders.

As Kelly left the interview, I thought about her revelation and the outcomes of this study.

The original objective was to identify and translate real world themes through the alternate reality games. Her description of what she learned was powerful and

demonstrated an awareness of her authentic learning. This is a strong indication that the affordances of problem-based learning transcended the original objective.

APPENDIX A
UNT INSTITUTIONAL REVIEW BOARD APPROVAL AND INFORMED CONSENT
FORMS

University of North Texas Institutional Review Board

Informed Consent Form

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: An Investigation of 21st Century Skills and Student Engagement

Principal Investigator: Dr. Scott Warren, University of North Texas (UNT) Department of Learning Technologies.

Student Investigator: Deborah Blackwell, University of North Texas (UNT), College of Information, Department of Learning Technologies

Study Procedures: You are being asked to participate in a research study which investigates the effect of adding a problem-based learning (PBL) component to an existing narrative driven interactive multimedia project, alternate reality game (AltRG), on student engagement and motivation. You will teach the lesson that includes this component and be asked to:

- participate in language arts instruction in your classroom through an AltRG and PBL module.
- consent to audio and video recording of instruction for between one and four weeks as these recordings will be a primary data source.
- answer informal questions about the structure of the class activities.
- keep a journal as a work log and a vehicle for reflection.
- participate in informal interviews during the lesson.
- participate in a 15-20 minute formal interview after the lesson concludes.
- Focus groups will involve general class discussion led by you and the principal investigator.

Foreseeable Risks: None

Benefits to the Subjects or Others: This study may contribute to the development of 21st century skills in your students and may guide you in designing engaging lesson in the future.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: The identity of the school, teachers, and children will be kept confidential. All participants will be given a pseudonym, and the audio/video recordings will be coded in order to maintain anonymity. The individuals who have access to the data collected are Dr. Scott Warren, Deborah Blackwell, and Anjum Najmi.

Office of Research Services
University of North Texas
Last Updated: July 11, 2011

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APPROVED BY THE UNT IRB
FROM 8/29/11 TO 8/28/12
NB

The consent forms will be kept in a locked file at the University of North Texas. Audio & video recordings will be stored on a secure server at UNT as well.

The audio/video recordings will be kept for three years after this study is complete. They may be used for additional analyses and/or possible presentations in future conferences. After three years, these recordings will be destroyed or deleted.

The confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

Questions about the Study: If you have any questions about the study, you may contact Dr. Scott J. Warren at telephone number 940-369-7489 or at scott.warren@unt.edu.

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) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights: Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Dr. Scott Warren, or Deborah Blackwell, or Anjum Najmi has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw from the study 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 have been told you will receive a copy of this form.

Printed Name of Participant

Signature of Participant

Date

Office of Research Services
University of North Texas
Last Updated: July 11, 2011

APPROVED BY THE UNT IRB
FROM 8/29/11 NJ 8/28/12
NB

For the Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

Signature of Investigator or Designee

Date

APPROVED BY THE UNIT IRB
FROM 8/29/11 TO 8/29/12
AB

University of North Texas Institutional Review Board

Informed Consent Form

Before agreeing to your child's participation 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: An Investigation of 21st Century Skills and Student Engagement

Principal Investigator: Dr. Scott Warren, University of North Texas (UNT) Department of Learning Technologies.

Student Investigator: Deborah Blackwell, University of North Texas (UNT), College of Information, Department of Learning Technologies

Purpose of the Study: You are being asked to allow your child to participate in a research study which investigates the effect of adding a problem-based learning (PBL) component to an existing narrative driven interactive multimedia project, alternate reality game (AltRG), on student engagement and motivation.

Study Procedures: Your child will be asked to:

- participate in language arts instruction in his/her classroom through an AltRG and PBL module.
- consent to audio and video recording of instruction for between one and four weeks as these recordings will be a primary data source.
- answer informal questions about the structure of the class activities and related teacher questions.
- keep a journal as a work log and a vehicle for reflection.
- participate in informal interviews during the lesson.
- participate in a 15-20 minute formal interview after the lesson concludes.
- Focus groups will involve general class discussion led by the teacher.
- Students may participate in the study, but may not be involved in interviews.

Foreseeable Risks: The potential risk involved in this study is no greater than everyday life. There are no other foreseeable risks involved in this study.

Benefits to the Subjects or Others: This study may contribute to the development of 21st century skills in your student and engaging lesson design in elementary classrooms.

Compensation for Participants: None

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Last Updated: July 11, 2011

APPROVED BY THE UNT IRB
FROM 8/29/11 TO 8/28/12
DB

Procedures for Maintaining Confidentiality of Research Records: The identity of the school, teachers, and your child will be kept confidential. All participants will be given a pseudonym, and the audio/video recordings will be coded in order to maintain anonymity. The individuals who have access to the data collected are Dr. Scott Warren, Principal Investigator, Deborah Blackwell, and Anjum Najmi. The consent forms will be kept in a locked file at the University of North Texas. Audio & video recordings will be stored on a secure server at UNT as well.

The audio/video recordings will be kept for three years after this study is complete. They may be used for additional analyses and/or possible presentations in future conferences. After three years, these recordings will be destroyed or deleted.

The confidentiality of your child's individual information will be maintained in any publications or presentations regarding this study.

Questions about the Study: If you have any questions about the study, you may contact Dr. Scott J. Warren at telephone number 940-369-7489 or at scott.warren@unt.edu.

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) 565-3940 with any questions regarding the rights of research subjects.

APPROVED BY THE UNT IRB
FROM 8/29/11 TO 8/28/12
SB

Research Participants' Rights: Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Dr. Scott Warren, or Deborah Blackwell, or Anjum Najmi has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to allow your child to take part in this study, and your refusal to allow your child to participate or your decision to withdraw him/her from the study will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your child's participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as the parent/guardian of a research participant and you voluntarily consent to your child's participation in this study.
- You have been told you will receive a copy of this form.

Printed Name of Student

Printed Name of Parent or Guardian

Signature of Parent or Guardian

Date

For the Investigator or Designee: I certify that I have reviewed the contents of this form with the parent or guardian signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the parent or guardian understood the explanation.

Signature of Principal Investigator or Designee

Date

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Student Assent

You are being asked to be part of a research project being done by the University of North Texas College of Information Learning Technology Department.

In order to study the effects of a new form of instruction on fifth grade students, you are asked to participate in a study. During the study, you will be given a problem to solve related to a unit in language arts and reading related to themes in literature.

You will be asked to keep a journal about your work with the problem and think about how you worked with other students to create a solution. We will also film you in the classroom while you work on the problem and may interview you about it. The whole study will take about four weeks.

If you decide to be part of this study, please remember you can stop participating any time you want to.

If you would like to be part of this study, please sign your name below.

Printed Name of Student

Signature of Student

Date

Signature of Principal Investigator

Date

APPROVED BY THE UNT IRB
FROM 8/29/11 to 8/28/12
NS

APPENDIX B

INTERVIEW PROTOCOL FOR EFFECTS OF PROBLEM-BASED LEARNING ON A
FIFTH GRADE LANGUAGE ARTS CLASSROOM

Brainstormed questions:

- How would a student define engagement
 - Would he/she be able to describe it?
 - What impedes students from engagement
- What do students think they need to know for the future?
 - Skills required for problem-based learning

Topic One

Student engagement

- *Lead-off question:* Tell me how you would know when you're engaged with something?

Implicit/covert categories

- What is the student's underlying, or implied, beliefs about engagement
- How does the student's attitude affect learning in and out of school?
- How does Independent learning reflect engagement?

Possible follow-up questions

- Can you tell me about a time you were really involved in an activity at home or at school?
 - Can you tell me the difference between learning at home and learning at school?
- What keeps you from being engaged, or involved, in a lesson?
- Can you describe a time when you were not really involved in a lesson
- Can you tell me about a time you were so curious about something, you learned about it on your own?

- What activities usually keep you engaged in the lesson.

Topic Two

Student attitude and problem-based learning

Lead-off question: How would you describe problem-based learning?

Implicit/covert categories

- What is the student's underlying, or implied, beliefs about problem-based learning?
- What amount of scaffolding does the student perceive is needed to learn?
- What part does self-regulation play in problem-based learning?
- What is the student's underlying, or implied beliefs about collaboration?

Possible follow-up questions

- How is problem-based learning different from other lessons in class?
 - How do you feel about a lack of direction from the teacher?
 - Can you tell me about a time you did not get the direction you thought you should have from your teacher?
- How do you manage your time when you're working on a long-term project?
- How do you organize your world?
 - Could you describe what being organized looks like?
 - Do you have to be organized to work on problem-based learning?
 - If so , can you describe a time when organizing helped you?
- *Can you tell me about a positive experience you had working in a group?*
- *Can you tell me a bout a negative experience you had working in a group?*
- *Is it beneficial for you to work collaboratively in a problem-based learning unit?*
 - *If so, could you describe why it is helpful?*

Topic Three

Student attitudes and Alternate Reality Games

Lead-off question: Can you tell me how you would explain an alternate reality game?

Implicit/covert categories

- What is the student's underlying, or implied, beliefs about games?
- What is the student's underlying, or implied, beliefs about narratives?
- How does game play affect engagement?
- How does creating games affect engagement?

Possible follow-up questions

- Can you tell me how playing an alternate reality game affects your learning?
- How is an alternate reality game like other games you've played?
- Do you like playing games?
 - If so, can you tell me what makes them fun for you?
 - If not, can you tell me why you don't like playing games?
- Can you tell me about a time a story helped you learn?
- Are stories helpful in games?
 - If so, can you describe a story found in a game?
- Can you tell me how creating an alternate reality game helped your learning?
- How did your story help you solve your problem in the alternate reality game?
- Can you tell me how creating a game increased your engagement?

APPENDIX C

FORMS FROM THE BUCK INSTITUTE FOR EDUCATION

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P R O J E C T T E A M C O N T R A C T	
Project Name:	
Team Members:	

Our Agreement

- We all promise to listen to each other's ideas with respect.
- We all promise to do our work as best as we can.
- We all promise to do our work on time.
- We all promise to ask for help if we need it.
- We all promise to _____

If someone on our team breaks one or more of our rules, the team may have a meeting and ask the person to follow our agreement. If the person still breaks the rules, we will ask our teacher to help find a solution.



Date: _____

Team Member Signatures:

_____	_____
_____	_____
_____	_____

Project Team Work Plan

Project Name:			
Team Members:			
Product:	Due:		
What needs to be done?	Who will do this part?	By when?	✓ Done
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

S E L F - R E F L E C T I O N O N P R O J E C T W O R K Think about what you did in this project, and how well the project went. Write your comments in the right column.	
Student Name:	
Project Name:	
Driving Question:	
List the major steps of the project:	
About Yourself:	
What is the most important thing you learned in this project:	
What do you wish you had spent more time on or done differently:	
What part of the project did you do your best work on:	
About the Project:	
What was the most enjoyable part of this project:	
What was the least enjoyable part of this project:	
How could your teacher(s) change this project to make it better next time:	

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