EXPLORING THE IMPACT ON SELF-REGULATED LEARNING: A COMPARATIVE ANALYSIS OF LEARNER EXPERIENCES USING PROBLEM-BASED LEARNING, GAME PLAY, AND COMPUTER-BASED INSTRUCTION

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The ability to transfer what you know to new and different contexts is a sign of successful learning. While students often graduate from college with the required number of courses many lack the skills necessary to apply appropriate strategies to solve problems in different contexts, to reason, and think critically. More than a decade ago the Boyer Report (1995) pointed to this fact as a sign that Universities were falling short in adequately supporting their undergraduate populations. As a result, it is not uncommon to see educational institutions introducing new courses and programs geared towards helping students learn better. This study explores learner experiences and the impact on self-regulated learning within a distributed learning setting when motivated by problem-based learning, game play, and computer-based instruction.

In this study the instructional design of the course introduced undergraduate students to authentic learning experiences in which students engaged in collaborative problem solving and learning activities framed within the narrative of an alternate reality game. Fifteen self-regulated learning constructs were examined. The comparison group engaged with problem solving tasks and computer-based instruction. Additionally, the study used the theory Learning and Teaching as Communicative Action and its four communicative actions as a lens to understand the full range of student interactions and how they constructed knowledge.

The research design employed computer-mediated discourse analysis to examine qualitative data. Data was triangulated through constant-comparative coding of student communication in the form of web logs, emails, student assignments, and semi-structured

interviews. Review and consensus building was embedded in the process of identifying emerging codes and categories, and used to support emergent inferences before the final themes were identified and mutually agreed upon. Finally, to evaluate the outcome of the instructional design, pre and posttest measures were used among groups using a two-sample t-test. Statistical significance was used to determine changes in learning outcomes while select qualitative codes were examined and reviewed to gauge student satisfaction with the instructional approach.

Results indicated substantial qualitative and quantitative differences among the three versions of the course related to self-regulated learning practices and communicative action in particular in terms of student interaction, and knowledge construction. Additional, findings revealed differences in epistemic beliefs about learning, which in turn influenced how students chose to learn. These outcomes are presented and discussed along with the implications for instructional design.

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CHAPTER 1

INTRODUCTION

A decade ago, The Boyer Commission Report (1995, 1998) suggested that universities were failing their undergraduate populations. As many students were graduating having accumulated the number of courses required, but lacked a coherent body of knowledge and all too often they had little ability to think logically, write clearly, or speak lucidly. Therefore students were unable to transfer knowledge and skills or use appropriate strategies to solve problems in different contexts; further they lack the ability to reason and think critically (Kiili, 2007). Almost a century ago, John Dewey almost a century ago expressed similar sentiments about undergraduate education. He believed that to improve education, learning should be based on discovery guided by mentoring rather than on the transmission of information (Dewey, 1972, p. 281). For democratic learning he emphasized three key elements, (i) the process should engage students in reaching outside the walls of the school and into the surrounding community, (ii) it should focus on problems to be solved, and (iii) it should be collaborative, both among students and faculty (Dewey, 1916, p. 416).

Extending from Dewey, the changing nature of today's workforce, the onset of the Information Age (Peters, 2007), and new understandings of the science of learning have led to changing consciousness about the goals of higher education (National Center for Educational Statistics, 2009). It is not uncommon to see educational institutions introducing new courses and programs in self-directed learning (Knowles, 1980, 1990), inquiry based learning (Bruner, 1961; Marx, et al., 2004), experiential learning (Kolb, 1984; Mezirow, 1991), problem-based learning (Barrows, 1996), and lifelong learning (Smith 1990; Knapper & Cropley, 2000). Such terms are now frequently heard in education.

These approaches point to the importance of learning-how-to-learn, which includes skills in collaborative problem solving, self-regulated learning, thinking critically as well as traditional abilities of identifying, accessing, assimilating and communicating information (Von Glaserfield, 1987). These skills engage students in a range of behaviors that promote greater self-awareness, self-monitoring, and self-control of actions and cognition, which are all elements essential for successful learning. Educational institutions recognizing the benefits of these skills are turning towards such learning practices in an effort to help students improve the way they absorb, retain, and transfer knowledge (Bransford, Brown, & Cocking, 2000).

The academic knowledge and skills necessary for success in college are grounded in two important dimensions cognitive strategies and content knowledge. Understanding and mastering of content knowledge is achieved through the exercise of broader cognitive strategies such as analysis, interpretation, precision and accuracy, problem solving, and reasoning. These require that students' employ self-regulated thinking and exhibit greater control over their cognitive and motivational beliefs, and learning strategies (Conley, 2007; 2010).

In general, most people follow a set of heuristics that include how to plan, set goals, and process feedback. These can be conscious or automatic, highly generalized or specific (Flavell, 1987). Meta-cognition is thinking about thinking, and involves knowing how to reflect, and analyze one's thoughts, how to draw conclusions from that analysis, and how to put what has been learned into practice (Pintrich 1995). In contrast, self-regulated learning is an active, goal-directed behavior that requires self-control over one's own motivation and cognition. It is an end process dependent upon the affects and cognitions that precede it (Zimmerman, Bandura, Martin-Pons, 1992; Zimmerman, 1998). When students take responsibility for managing their own learning through self-regulated learning strategies it helps them to become better, strategic learners (Biggs, 1999). For higher education, the challenge therein is how to foster the development of such learning skills so students can serve themselves better and be more prepared to meet the demands of the world beyond their academic life.

Statement of the Problem

Despite the growing awareness about the importance of self-regulated learning research studies examining the relationship between self-regulation and learning are limited (Zimmerman, 1989; 1998; 2000; Schunk, 2005; Ley & Young; 1998). Research on how students develop and practice self-regulated learning in a distributed learning environment are yet to be fully explored (Duffy & Cunningham, 1996; Moore & Kearsely, 2005; Artino, 2007b). These issues related to self-regulation and learning lead to the central problem to be explored in this dissertation. Specifically, that is to explore learner experiences and the impact on self-regulated learning (SRL) in distributed learning motivated by problem based learning, game play, and computer-based instruction (CBI). Examining these constructs can help to understand how students develop and practice such skills.

A recent US News Report and World Report indicated that thirty percent of college and university student's drop out after their first year; tangential to this, and college completion rates in the United States have been stalled for more than three decades (Bowler, 2009; AAC&U, 2009). Learning in the first year is often disconnected because students take courses as detached individual units that is to say, one course is separated from another and, one set of knowledge and skills unrelated to the content learned in other courses. Though specific programs of study are designed for each major courses have little academic or social coherence, or apparent relevance to the student's life beyond school. Thus, graduating students who do graduate often do so with little or no expertise in the ability to transfer what they have learned to new problems and settings, (National Research Council, 2000, p. 12). Furthermore the National Center for Educational Statistics, (2009) found that 40 percent of admitted and enrolled students take at least one remedial course which dramatically reduces their chances of graduating and costs students across the US up to an estimated $1 billion per year, per degree (ACT, 2005b; Conley, 2007; Bedsworth, Colby, & Doctor, 2006). The need for remediation indicates that students are unprepared even as they enter college.

Since the inception of the NCLB (2001), standardized tests have dominated the goals and objectives of state-funded public school curricula. For the most part, state high-stakes standardized tests require students to recall or recognize fragmented and isolated bits of information, with instructional focus on de-contextualized content. This means that most instruction focuses on imparting only those basic, surface level facts necessary to pass exit examinations. The tests rarely require students to apply their learning and almost never require students to exhibit proficiency in higher forms of cognition (Davis & Gray, 2007). Hence, many students lack the necessary skills of self-regulated learning—perhaps most—who go on to college are not fully prepared for what will be expected of them (Venezia, Kirst, & Antonio, 2004; Adelman, 2006). As students transition from high school to college, the need becomes ever more important to learn how to take greater personal control of a student's own learning is becoming ever more important. Research indicates the more successful students are at implementing strategies that lead to personal control of their learning, the more likely they are to be successful learners (Zimmerman & Paulsen, 1995; Zimmerman, 1998).

As the population grows in the United States and the demand for post-secondary education continues to rise, demographics predict that by 2015 a new wave of students will enter higher education that will require additional support to meet the rigors of quality undergraduate education (Education Commission of the States, 2005). An increase of more than two million students is likely and Hispanic Americans are expected to become the largest minority group in colleges (21%), followed by African Americans (18%), with only 58% of Caucasians (Education Commission of the States, 2005). Between 2008 and 2012 the Average ACT Composite scores depicted an increase for

African American, Asian, Hispanic, and white high school graduates, while that of American Indians show a declines. College Readiness Benchmarks in English, Reading, Math, and Science indicate only 1 in 4 high school graduates are academically ready for college coursework (ACT 2012).

With rising enrollment and increasing education budget cuts schools continue to offer more classes online. It is not only cost effective, but also convenient for educational institutions and students alike. Both, technology and the Internet make this possible. For the average learner to be successful, the need to develop and practice self-regulated learning grows even more important. Together these issues increase the need for schools to provide appropriate support to incoming undergraduates so they may continue to provide academic excellence. Following the Boyer Commission's Report (1995, 1998), many colleges and universities have attempted to reform their educational practices by following the benchmarks put forth by The National Survey of Student Engagement (NSSE, 2008), which are designed to aid schools to evaluate and improve their myriad undergraduate curricula. The benchmarks offer guidelines for developing rigorous, quality instruction. These are,

- Improve level of academic challenge
- Provide active and collaborative learning
- Encourage student faculty interaction
- Offer enriching educational experiences
- Provide supportive campus environment

From NSSE, (2008)

Colleges are also integrating leadership skills, civic engagement, and health education into curriculum to present clearly defined objectives that are expected to benefit students and increase academic engagement. At the University of Michigan a course titled *Learning to Learn* (Hofer, Yu, & Pintrich, 1998; Zimmerman, 1998; Murray, 2000), bases its strategies on the notion that self-regulated learning is an important aspect of student academic performance and achievement in classroom settings. The specific components of the course include instruction and activities on information processing, note taking, test taking and preparation, goal setting, and time management. Results cite outcomes such as increased grade point average, decreased level of test anxiety, increased self-efficacy, and an increase in mastery learning orientation (University of Michigan, 2000).

Similarly, the University of Texas at Austin offers seminar courses where an interdisciplinary approach is used to introduce undergraduate students to contemporary issues of "real world" importance. Coursework includes presenting in class, preparing written assignments, discussing performance or key concepts with faculty and problem solving. The ability to set goals for, process feedback, engage independently in activities and self-regulate learning becomes an essential skills for learning (University of Texas Austin, 2000; 2012).

The intent of these courses is to encourage students to use personal processes to strategically monitor and control their own behavior and learning environment as well as help them to become accustomed to personally activating, altering and sustaining their own learning (Zimmerman, 1989; Ley & Young, 1998). The goal is to strengthen the core curriculum as well as to enhance the intellectual experience of undergraduate students so they may develop communication skills and analytical thinking skills, as well as, “mature intellectually from promising high school students to able college learners” (Woodruff, Alvarado, Dickens, Harrell, McDowell, Roberts, Wilson, & Zimmaro, 2008, p.18).

Purpose and Significance of the Study

The focus of this study was to examine learner experiences and the impact on self-regulated learning (SRL) in a distributed learning environment motivated by problem based learning, game play, and computer-based instruction. The LTEC 1100 course redesign was part of a university Quality Enhancement Plan (QEP), which aimed to improve undergraduate education by making instruction more engaging, improving retention, satisfaction and academic achievement (Warren, Dondlinger, Mcleod & Bigenho, 2011). This study builds on the past research of *The Door,* which is based on an Alternate Reality Game and utilizes problem-based learning as an instructional approach. Figure 1.1 presents the entry point to *The Door* and the view down the rabbit hole,

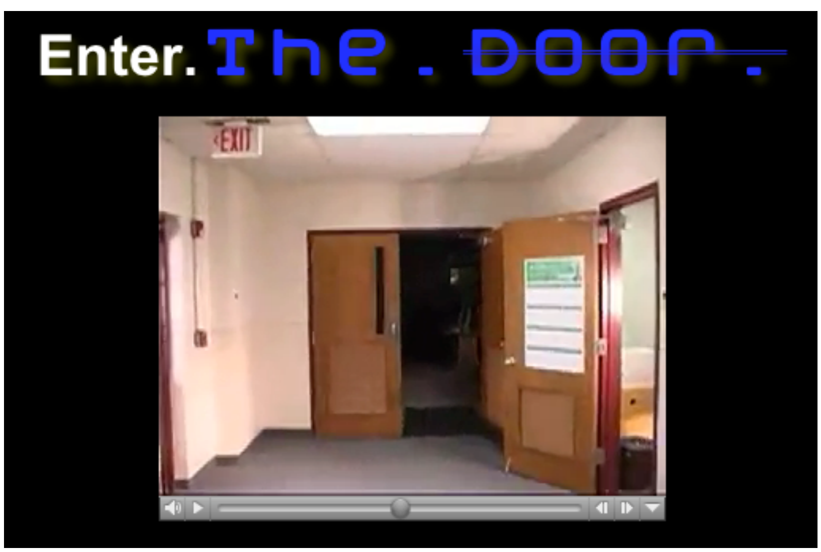

Figure 1.1. The Door (alternate reality game).

The study of *The Door* was based on a two-tiered narrative in which students were "hired" by fictional clients to work in small groups, referred to as *design teams,* to solve ill-structured problems to create specific products. The underlying, second tier of the narrative engaged students in the game structure and involved mysterious happenings to spur motivation to play, artificial conflict, and "win" conditions that rewarded players with additional information and resources for completing first tier, PBL tasks (Warren et al., 2008, p.11). Thus, *The Door* had an abstract to concrete design process with the two-tiered narrative designed to leverage the affordances of authentic contexts for situating problem-based learning tasks. Further, the designers sought to concurrently engage student interest through the fictional clients alternate personas, ongoing conflicts and storyline (Warren et al., 2008). Such narrative overlay common in computer and video games and has been found to motivate learners, particularly those that require additional feedback, peer support, and motivation to learn (Warren et al., 2008, p. 5).

Previous iterations of the course suggested that students struggle to regulate their own learning, which partly led to high drop, failure, and withdrawals of students, as witnessed by instructors and evidenced in student performance, and communication with instructor and peers (Warren et al., 2008). Warren et al.'s 2011 study, which focused on an undergraduate computer applications course, particularly suggested that there is a need to take a closer look at the factors that help or hinder student self-regulation. Understanding how students regulate their own learning and the various constructs that influence and shape such skills, can help us understand how they learn and can guide instructional design. This study utilized problem-based learning, game play, and a computer-based instructional approach to evaluate self-regulated learning practices. The fifteen particular self-regulated learning skills examined in this study these are presented in Table 1.1.

Table 1.1

Self-Regulated Learning Skills

Goal setting	Environmental structuring
Organizing & Transforming instruction	Goal based interpersonal skills (Individual)
Planning	Goal based interpersonal skills (Group)
Keeping records	Self-monitoring
Information seeking	Self-consequence
Rehearsing & memorizing	Self-evaluation
Time management	Self-reflection
Seeking assistance	

The online nature of the learning environment and the socio-emotional factors that inform self-regulated learning necessitate the need to take a closer and deeper look at how students communicate. Distributed learning environments are unique in their context as, the teacher and learner are commonly separated not only by time, but also by space, and sometimes by both. This separation creates a psychological or transactional distance between learner and instructor thus making communication key. Drawing upon the teachings of the German philosopher Jürgen Habermaas and the LTCA theory this study will look at four communicative actions i.e., *strategic, constative, normative,* and *dramaturgical* to understand the interactions that influence and shape student learning.

One of the goals of the QEP course redesign was to improve the instructional design of the course so students would feel more engaged with content and could experience greater satisfaction with their learning experience. Student satisfaction is one indicator of the success of an instructional design model. Additionally, this study examined student course expectations and related factors in order to determine whether, when students select their method of instruction, they experience greater satisfaction in learning. Finally, it was hoped that from the analysis of these constructs, and the successes and challenges that emerge during the study implications for how instructional design can be improved to support the practice of self-regulated learning would be evident in the findings.

Research Questions

The acquisition of knowledge and skills is important for academic learning and achievement; however better student control over cognition, motivation and behavior can help to sustain and make learning more effective (Dabbagh and Kitsantas, 2004, p. 40). The research focus guiding this study stemmed from the areas of discussion above and they included,

- Guiding Question: How do post-secondary learners self-regulate learning and do they practice better self-regulation when learning through problem-based learning and game play rather than computer-based instruction?
    - Sub-focus One: To examine the presence and role of communicative actions in undergraduate instruction and learning and their particular influences on learning, especially in the area of knowledge construction?
    - Sub-focus Two: To investigate when students select their instructional method if it helped improve learning satisfaction.

The overall goal of the study was to explore student practice of self-regulated learning, to shed light on the communicative actions that influence learning, and to determine when students select their instructional method if it improved learning satisfaction.

Understanding of these constructs can help to improve instructional design, and support teaching and learning.

Definition of Terms

Alternate Reality Game (*Learning and Teaching as Communicative Actions*): A game genre viewed as the first narrative art form, native to the Internet. Its storytelling relies on the two main activities conducted there: searching and sharing of information (Unfiction, 2008). It uses any and every application available on the Internet as small parts of the wider game and the real world as a platform (Warren, Dondlinger, Mcleod, & Bigenho, 2011), such as Web logs, chat, email, wiki-guides, audio/video links, and other media. Students receive feedback embedded within the system to help them overcome misconceptions and difficulties with learning tasks (Bryan et al., 2006). AltRGs blur the boundaries between reality and fiction, creating realities that are alternate to but not entirely separate from everyday life.

Augmented Reality Game: Similar to AltRGs, augmented reality games embed virtual, location-specific, and contextual information into a physical site (Mackay 1996). Some games require the use of headgear (3D glasses) to enable game players t view the virtual environment while many others use mobile or ubiquitous. Computing devices such as handheld computers for access to virtual information.

Computer-based learning: self-paced training modules delivered through a computer.

Design-based research: to engage in a mode of inquiry that is iterative in nature with the commitment to refine methods so as to directly impact practice in order to advance theory.

Distributed learning: to use various technological platforms to learn such as audio/video, web-based multimedia, satellite broadcasting etc.

Game: A game is an interactive system characterized by an artificial conflict or win scenario that is bounded by rules and a quantifiable outcome (Salen & Zimmerman, 2004). In order to attain a "win," players must follow the rules as they overcome obstacles in pursuit of game goals. *Learning and Teaching as Communicative Actions (LTCA)*: An emergent, pragmatic theory that learning and teaching take place through effective communication that that can be understood in the context of validity claim-centered critical discourses, rule-based, normative expressions, personal identity claims, and teleological speech acts. These are respectively known as constative, normative, dramaturgical, and strategic communicative actions. *Non-traditional learner:* returning degree seeker maybe part time over the age of 30 with other responsibilities than just school.

Post-secondary learner: student pursuing education beyond grade 12 but below grade16.

Problem-based learning (*PBL*): An instructional methodology within the social constructivist learning paradigm, based on authentic, ill-structured/structured problems being posed to learners who work in groups to develop socially negotiated solutions. Such problems are usually complex and can have multiple solutions.

Self-regulated learning (SRL): Self-regulated learning is "an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features of the environment" (Pintrich 2000, p.453).

Traditional learner: first time degree seeker at a college or university under age of 30.

Definitions for each of the fifteen constructs for self-regulated learning are given in the Appendices.

Limitations of the Study

This study does have limitations on any conclusions that may be drawn from it. First, due to the distributed nature of the class the number of participants who completed the study varied, and this may impact results. Those who complete the semester may be more motivated and have better self-regulative skills than those who withdraw from the class in the first few weeks. Further the influence of the instructors' personal biases and subjectivity is taken into account.

Next, discourse is examined from student Web logs, and semi-structured interviews conducted online through Wimba learning management system (LMS). Member checking is done through interviews conducted face-to-face. This is to substantiate findings and to take into consideration effects like the Hawthorne effect in which participant responses may be unduly influenced due to external factors in this instance due to the lack of physical presence of the researcher (Carspecken, 1996).

Finally, problem-based learning and game play (Lincoln & Guba, 1996) may present their own limitations; therefore, the results are not intended to support claims that this is the only means to practice self-regulated learning. This study offers a snapshot in time of students engaging in, and practicing self-regulated learning while it sought also identify differences that emerge between instructional approaches and understand the impact on learner experiences.

Overview of the Dissertation

The next chapter reviews the relevant literature and learning theories that provide context for this study. This includes support for the use of problem-based learning (PBL), games, learning and engagement, the genre of alternate reality games, and computer-based instruction (CBI). It further examines the research literature on self-regulation and learning. Finally it discusses social mediation and the construction of knowledge, and how *Learning and Teaching as Communicative Actions* (LTCA) theory supports educational activities in a distributed environment.

The third chapter presents the design of the proposed study and also discusses the underlying design theory and design elements that provide the context for the proposed study. Beginning with pedagogical and instructional design elements, the design of an alternate reality game, learning objectives and instruction, the design of the proposed study, and the instructional activities.

The fourth chapter details the research methods used to evaluate the design, including the primary means of data collection and analysis as well as their appropriateness for this study. The fifth chapter presents the results, aligning assertions grounded in the data with the research questions that framed this study. The final chapter explores the implications of the findings and discusses directions for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

One of the aims of undergraduate education is to help students develop as self-regulated and independent learners. The ability to set goals, process feedback, engage independently in activities, and to self-regulate is an essential skill for learning (Pajares & Valiante, 2002; Zimmerman, 2008). This study examined students learning experiences and the impact on self-regulated learning in a distributed learning setting. It was therefore necessary to determine whether students practice better self-regulated learning when experiencing problem-based learning and game play rather than a computer-based learning approach to instruction. Understanding communicative actions and the use of inter-subjectively constructed knowledge of concepts can help provide further insight into how students learn. Further, when students take ownership of their learning and choose their method of instruction do they experience better satisfaction in learning? Understanding such constructs can help support teaching and learning and improve instructional design.

In distributed learning environments students must exercise a high degree of self-regulatory competence to accomplish their learning goals (Dabbagh and Kitsantas, 2004, p. 40). In such environments they have the choice of where to study and when to study thus making self-regulated learning critical for academic success. To address the research questions for this study, first the relevant literature and learning theories that support problem based learning, game play, and a computer-based instructional approach towards learning is explored. Next the research and literature that supports the design of the learning environment and self-regulated learning is discussed. Followed by research for socially constructing knowledge and how the theory *Learning and Teaching as Communicative Action* supports learning.

Problem-based learning

Problem-based learning (PBL) is a learner-centered approach that helps students acquire and develop the knowledge and skills needed to solve problems effectively (Engel, 1997). Initially, introduced by Howard Barrows (1996) to prepare medical students for the realities of clinical practice in Canada it has extended across many disciplines (Eitel and Gijselars, 1997). These methods have shown the potential to improve post-secondary learning through student interaction with authentic, learning tasks (Jonassen, 1997). According to Jonassen (2011) problems can be classified as *well-structured* or *ill-structured ones*. These different types of problems engage different cognitive processes and require different problem solving skills. The aim is to prepare students to encounter ill-structured problems normally encountered in real life. Such problems are usually complex and can have multiple solutions.

In order to effectively solve problems, students need to understand how their mind functions (Frese et al., 1987). They should also perceive how they perform important cognitive tasks such as remembering, problem solving, reasoning and critical thinking. The construction of the mental representation of the problem or schema is one of the most critical problem solving processes. Problem solvers act on the problem space in order to generate and investigate hypotheses by testing and manipulating variables, and monitoring ones own progress to generate solutions (Jonassen, 2011, p. 4). This requires them to determine what they do and do not know, as well as to be able to design and follow a path that allows them to gain the knowledge they need in order to find a viable solution (Butler & Winne, 1995; Hmelo-Silver, 2004). By its very nature problem-based learning (PBL) requires a different way of using knowledge to solve problems, and it is this ‘functioning’ knowledge that is involved in self-regulated learning processes (Bransford, Brown, & Cocking, 2000; Jonassen, 2011). Bransford, Vye, Bateman, Brophy & Roselli (2003) found PBL activities to support student self-assessment of their own thinking and encourage self-regulated learning and meta-cognitive processing. Other researches note increased meta-cognition in PBL to stimulate transfer of knowledge to new contexts and settings (Lin, Hmelo & Kinzer, 1999).

The principles of PBL — contextuality, collaboration and experientialism (Boud & Feletti, 1991) — can also, utilize game-based learning. In educational games and problem-based learning, learners engage in story driven tasks, interact amongst each other and the instructor, face artificial conflict and develop defensible solutions to a problem or conflict following a set of pre-defined rules. The organization of the game system, human experiences, and larger context are part of the schema for learning through game (Warren, Stein, Jones, and Dolliver, 2012). Cognitive conflict or puzzlement is the stimulus for learning and determines the nature of what is learned. Feedback, evaluation, and assessment are embedded within the system (Duffy& Cunningham, 1996). Thus, learning is expected to go beyond the acquisition of surface level skills and memorization.

Games, Learning, and Engagement

The lure of computer games has been characterized as a combination of fantasy, challenge, curiosity and level of engagement (Prensky, 2001). Two key elements that make online games an appropriate medium for learning are that, they engage and motivate and allow learners, and allow them to participate in authentic learning practices. Engagement is defined in the context of this study as "a sense of exhilaration of deep enjoyment, and flow" (Csikszentmihalyi, 1990, p.3). For example players in *Pacman*, *Doom*, and *Mortal Kombat* overlook the need to eat or sleep in order to get to the next level of game play (Jones, 2000, p. 206). Therefore, motivation is linked to goals and rewards within the game itself or is intrinsic to the act of playing (Shaffer, Squire, Halverson & Gee, 2005; Squire, 2008).

Games such as *The Sims, Oregon Trail, Math Blaster,* and the *Civilization* series target cognitive attributes like problem solving and the development of firsthand experiences through the game narrative. In *Civilization,* students learn about a previous civilization and engage in historical thinking (Squire, 2008). Learning includes collaborative discourse, acquisition of strategic skills, and overcoming obstacles through reflective thinking about the game tasks. First hand narrative experiences can motivate and challenge students to discover more, to know more, and do more as they attempt to balance their current knowledge with their expectations. In the process they come to learn about their own thinking (Squire, 2006).

Other researchers attribute the compelling nature of games to their narrative context (Fisch, 2005). Dickey (2006) argues that, "a narrative context may include role-playing, challenges, and interactive choices within the game as well as interaction with other player" (p. 1). Motivation leads to the activation of efficient cognitive strategies for long-term memory like goal setting, monitoring, elaborating and organizing information: attributes necessary for self-regulated learning. In *Environmental Detectives,* and *River City,* students seek to develop viable solutions to real world social issues i.e., to clean up a toxic spill, or improve water quality while at the same time meeting economic and social needs of multiple stakeholders to try to save the local environment. They collaborate, and pace themselves as they investigate real time data, navigating conflicts, using the virtual space to test their ideas without fear of failure Players situate their learning in specific, recognizable context of simulated physical space to acquire real world skills through the game scenarios. (Squire, 2006; 2008; Dede, 2006). In games like *Quest Atlantis'* game environments *Taiga*, *Anytown*, and *Modern Prometheus*, the narrative and real time information drive player engagement and provide an impetus for learning (Barab, et al, 2007; Warren et al, 2008; Barab et al, 20012).

Additionally, massively multiplayer online games (MMOGs) such as *World of Warcraft* immerse players in strong narratives using visual, social, and interactive digital spaces. Goals and norms for play are provided by the system and also during player discourse with peers. Players follow the game characters and their world, and also develop their own character used to explore the game world and interact with other players. Engagement stems from a desire to know what will happen next and the need to master what can be known about a world, which always expands beyond the players grasp (Jenkins, 2007). Such digital spaces support the development of a range of skills such as attention, spatial concentration, problem solving, decision-making, collaborative work, leadership, creativity and innovative thinking. They attract and sustain their player base through strong enjoyment, and deep engagement features (Squire & Steinkuehler, 2005; Steinkuehler, 2008).

Part of the allure with games and learning is that they have the propensity to situate learning in contexts that represent reality and engage players. When combined with PBL the narrative of the game based environment provides cognitive scaffolding allowing players to regulate learning making knowledge and skills easily transferable (Brown, Collins & Duguid, 1989; Steinkuehler, 2008; Squire, 2008). Figure 2.1 presents an overview of the commonalities between problem-based learning and game elements, and how, together they inform teaching and learning.

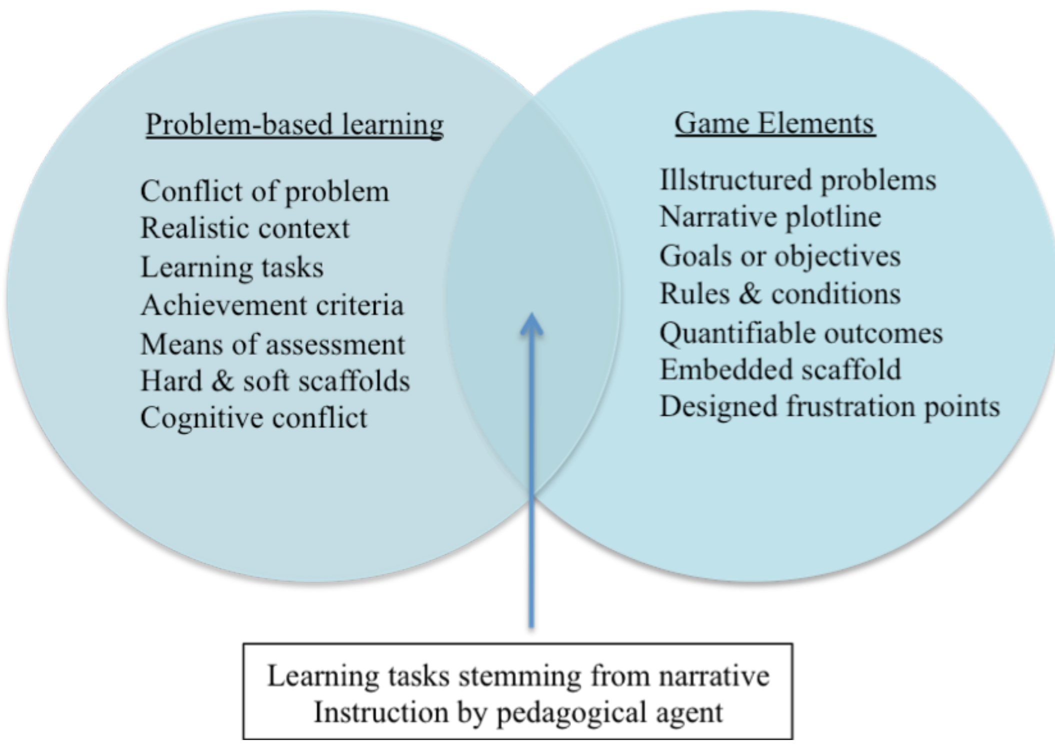

Figure 2.1. Problem-based learning and game elements. Adapted from “Opening The Door: An Evaluation of the Efficacy of a Problem-based Learning Game” by Warren, et al, 2011. *Computers & Education, 58,* p. 400. Copyright by Elsevier.

Constructivist views of learning and situated cognition theorize that learners actively construct their own knowledge instead of passively receiving information from a teacher or guide (Klopfer, Squire & Jenkins, 2003). Context and learning, knowing and doing, are seen as interdependent in this perspective (Bransford et al., 2003). Knowledge is agreed upon or constructed through social negotiation. It evolves from the interactions of the individual with the environment and from reflection on the learning process. As learners engage in the social construction of knowledge, meaning, practice and context are inextricably woven together (Lave and Wenger, 1991). The influence of social and cultural factors on cognitive development is recognized, and clearly mentioned in the works of Dewey (1944), Bruner (1959, 1961), and Piaget (1977).

Social constructivist learning environments and games both, through the elements of engagement and intrinsic motivation, can offer learners authentic practice in relevant fields. These places with established scenarios and resources that allow students to effectively work together to solve meaningful problems, and construct their own solutions, narratives, and connections within the environment where they would typically occur. The role of cognition, affect, and psychomotor domains of learning is evident (Bloom, 1984). Learning comes from active involvement that is made meaningful and relevant to the learner as they connect ideas to real life situations. Elements in the learning environment help students plan, monitor, and regulate learning (Smith & Van Doren, 2004).

Alternate Reality Games

The concept of an alternate reality game draws its inspiration from books such as G.K. Chesterton's short story *The Tremendous Adventures of Major Brown* (1905) in *The Club of Queer Trades* collection, science-fiction books such as *The Magus* (Fowles, 1965), and William Gibson's *Pattern Recognition* (Gibson, 2003). It bears the influence of performance arts and theatre that directly engage the audience (Brecht, 1964) Introduced mainly for marketing purposes AltRGs like *The Beast* (2001) were created to promote the movie *Artificial Intelligence* directed by Steven Spielberg. As an elaborate murder mystery story that took place in the future the game engaged players through movie posters, fictional characters and real world clues including phone-calls with characters, emails, and live rallies. The participatory story structure required players to use problem solving, and collective action - to solve the puzzles as the story unfolded, and to work together as a community to find solutions (Kim, 2009). The game went viral with over three million users visiting the game site as it came to an end (Kim, Alen, & Lee, 2008).

Promotional AltRGs have continued to grow including *Perplex City* (2007) by Mind Candy a U.K. based development team. Another, *I Love Bees* (2004) created to support the release of Microsoft's *Halo 2* XBOX video game, and more recently *Year Zero* was developed for the release of a music album among others. Web sites like *Unfiction.com* and *Alternate Reality Gaming Network* (*ARGNet*) regularly update community members on new games and topics of interest by moderator's Sean Stacey and Steve Peters (ARGNet, 2012).

As a game genre AltRGs are the first narrative art form native to the Internet because its storytelling relies on the two main activities conducted there: searching and sharing of information (Unfiction, 2008). Its storyline extends across multiple media platforms and many formats, using any and every application available on the Internet. These function as small parts of the wider game, and the real world as a platform. To engage players the narrative leverages elements from Literary Theory and the field of structuralism by including (i) *hermeneutic coding*, gaps to introduce, further, and conclude mystery elements; (ii) *negative capabilities*, building strategic pauses to invoke uncertainty, doubt, and mystery; and (iii) *migratory cues*, transitions to new contexts or another medium (Barthes, 1974).

In *Hamlet on the Holodeck* (1997), Murray described engagement with narrative and the fictional world as "the pleasurable surrender of the mind and players actively creating belief and using intelligence to reinforce the enjoyable experience rather than challenging its reality" (p. 110). Simple references to people, places, or events, provide hints about the characters and the larger world in which the story takes place. The narrative is not about one character instead it is the story of a world (Murray 1997; Long, 2007). Truly immersive worlds motivate players to actively engage with narrative to create meaning for themselves (Barthes, 1974).

Unlike traditional video games, players of an AltRG choose their level of participation creating their own digital experiences. A set of problems aligns interest and attention of a group pulling them into the story's action (Jenkins, 2007, Stewart, 2008). A single person does not solve the problems and therefore collaboration with others is essential. Engagement with the fictional world characters results in players becoming actors (Kim, 2007), which allows them to extend the game world experience. The narrative evolves by their responses, ideas, and actions (Jenkins, 2003; 2006). Information is accessible to everyone through Internet tools such as Web logs, chat, email, wiki-guides, audio/videos, and other media i.e., pre-recorded messages, newspapers, commercials, and occasionally live events depending on participants and the challenge. The over-arching storyline ties together all the elements of the Learning and Teaching as Communicative Actions into a cohesive whole (Stewart, 2008). Designed to tap into the power of collective problem solving through narrative, multimodal communication, and participatory mechanisms AltRGs encourage different kinds of norms, collaborative expectations, and social interactions (Jenkins et al., 2006; Stewart, 2006).

More recently, support for educational AltRGs that make "knowledge" their product has grown such as *Traces of Hope* sponsored by the British Red Cross to create awareness of the trials of civilians caught up in civil war, *The Hexagon Challenge* to teach mathematical reasoning/decision making in middle school, *Black Cloud* aimed at creating environmental awareness in high school, and *Cathy's Book* an young adult novel [online] whose starting point is its novel in print (British Red Cross, n.d.; D'Ambrosio, 2006; Eltorie, Garcia, Mercado & Niemeyer, 2007; Stewart & Weisman, 2006).

Serious AltRGs like "*World without Oil*" by Jane McGonigal and Ken Eklund (2009) tried to solve real world problems through the use of collective intelligence and opened up support from activist and educational organizations. Players not only generated strategies for coping with a peak oil crisis but also changed their real world behavior i.e. planting trees or converting cars to run on bio-diesel (Strickland, 2007).

Thus, the simulated problem presented during the game prompted real world application of the knowledge constructed by the whole group.

Others, like *The Door,* used a problem-based learning approach and employ narrative and game to engage learners in ill-structured problems to come up with feasible solutions. Learners exercise collaboration, reasoning, and critical thinking as they work with real world problem scenarios to cultivate real world thinking (Warren, Dondlinger, Mcleod, & Bigenho, 2011). The workings of this alternate reality game form the foundation of this study and will be expanded upon in Chapter 3 – Design Methodology. Yet, other games like *Global Village Playground* (2009) served as a capstone experience for students nearing completion of their general academic program at community college. Students engaged with global issues and devised strategies to address these issues, using simulated real world work experiences. These require they communicate effectively with members of small and large groups, manage a project timeline, and solve problems collaboratively. The objective is to demonstrate attainment of core perspectives as required by the Texas Higher Education Coordinating Board (THECB, 1999) (Dondlinger, 2009).

As technology grows more pervasive and processing speeds increase cross media affordances of platforms such as Second Life have offered shared virtual spaces for synchronous & asynchronous communication (Warren & Wakefield, 2012). Users explore identity, communicate, and collaborate in many ways in such virtual environments. With today's multi-channel platforms and the shift towards interactive narratives and digital experiences via social media and mobile technologies, the genre remains influenced by other emerging, cross media game genres such as transmedia storytelling (Zuckerman, Producers Guild of America, 2013). With increased Internet access, more people online greater innovative aesthetics and media forms are likely to continue to emerge (Jenkins, 2006, Long, 2007; Stewart, 2008). Problem-based learning and appropriately designed games such as AltRGs can facilitate the development of useful knowledge and skills while also scaffolding learners in the acquisition of skills like, planning, organizing, monitoring, reflecting and evaluating; key attributes of self-regulated learning (McMahon, 2002).

Computer-Based Instruction (CBI)

Computers, used as learning tool started in the 1960s with mainframe machines, that were prohibitively expensive for all but large universities and were restricted to text-based materials requiring computer-programming expertise (Allessi & Trollop, 2001, p.3). Microcomputers and personal computers have steadily evolved into powerful devices enabling the use of images, animation and sound whilst simultaneously decreasing in cost and facilitating the use of increasingly sophisticated educational software. As a result the Internet (World Wide Web) has expanded beyond government and academic networks to a worldwide resource (Allessi & Trollop, 2001, p.4).

Conflicting viewpoints exist as to whether or not computers create productive learning. Clark (1994) claimed media is merely a vehicle that delivers instruction and cannot influence learning. Kozma (1992) alternatively argued that good instructional design, the medium, and the method when integrated allow the learner to construct meaning through interaction. More recently the view that technology alone does not affect learning but instead it is the system as a whole pedagogy, instruction, and environment that creates learning seems to be gaining precedence (Salomon et al., 1996). In education, Computer-based instruction (CBI) is used synonymously with terms such as computer-assisted instruction (CAI), computer managed instruction (CMI), computer-based education (CBE), extending to the term e-learning or distance-learning. Therefore it has different meanings to different people and may take on many forms synchronous/asynchronous, multi-media capabilities (text/audio/video), discussion forums and simulations (Steinberg, 1983, 1991; Kulik & Kulik, 1994; Johnson & Aragon, 2002).

CBI is defined as a specific mode of attending a course or program of study in which students occasionally or rarely meet face-to-face because instruction is distributed in nature and mainly online (Thompson, Simonson, & Hargrave, 1993; Bates & Pool, 2003). Broadly used, it has come to represent self-paced learning activities, accessible via a computer with content presented in a linear fashion often in the form of multiple choice questions, with assessments scored by the computer to give immediate feedback, and using drag and drop, radial buttons, simulations or other interactive means (Bates & Pool, 2003).

Influenced by behaviorist and constructivist methodologies, CBI employs tutorials, drill and practice exercises, along with tests to assess the learner's progress (Allessi & Trollip, 2001, p.12). Content is broken down into concept blocks or skill objectives each addressing the same goal from different levels of difficulty with the computer managing the learning process (Druin & Solomon, 1996, p.30-31). Emphasis is on "mastery learning" and what the learner will accomplish by the end of the course. On the other hand when following a constructivist approach CBI not only engages students but also provides for manipulation of information through a variety of media and multiple formats, as well as through exploratory, interactive environments. Students use planning, strategic thinking, and reflection they set their own pace for learning, store and retrieve information more effectively, and learn concepts in multiple ways emphasis is on the collaborative and social aspects of learning (Druin & Solomon, 1996, p.120).

Researchers found that students used less instructional time and generally learned more in classes when using CBI than they did through traditional ways of instruction (Kulik & Kulik, 1991). In seventeen studies the average effect of computer-based instruction was to raise student achievement scores and improve attitude towards instruction. However, students developed better attitudes towards learning with computers when they received help during instruction (Kulik & Kulik, 1986; 1991). Thompson et al. (1993) noted that CBI was more effective for teaching certain subjects rather than others i.e., mathematics vs. language skills on the other hand high positive effects were found for studies that used simulations for unstructured work. The effectiveness of CBI varied according to the content area and skill (p. 48). Since users access information directly related to each concept students with limited domain knowledge were seen to connect literal definitions more readily and experienced greater difficulty in linking to contextual meaning than those students with higher domain knowledge (Gall & Hannafin, 1994; Jonassen, 1989; 1997).

How an application works can be as important as learning what it is about. As such, the effectiveness of such learning is based upon the levels of cognitive and meta-cognitive activity practiced by learners, and fosters active participation in the construction of knowledge (Zimmerman & Paulsen, 1995; Dabbagh & Kitsantas, 2004).

Learning through CBI allows for the following,

1. As cognitive tools computers assist learners to work independently and have greater control
2. Share cognitive load by supporting lower level cognitive skills so the learners may focus on higher-level thinking skills
3. Opportunities to engage with cognitive activities that would be out of reach otherwise such as (risk-taking, troubleshooting)
4. Generating and testing hypotheses in the context of problem solving
5. Prompts a learner's self-regulatory processes which may include (activating prior knowledge, planning, creating sub goals, and learning strategies)
6. Access to large information and databases
7. Designs and implements material to suit individual learning needs in myriad ways

(Lajoie & Azvedo, 2007)

With these transformations, the role of the instructor is more of a facilitator while students actively engage in their own learning (Richardson & Swan, 2003). Learning with CBI is seen as cost effective, convenient, flexible and accessible anytime, anywhere. Key attributes of computer-based instruction (CBI) are given in Table 2.1.

Table 2.1

Key Attributes of Computer-based Instruction (Jones, 2000)

Elements of Instruction	Computer-based Instruction
Promotes task completion	Exercises relevant to drill and practice provide learners with areas of skill to focus on and help in reinforcement
Ability to concentrate on each task	Seamless integration of tools, tasks and presentation of information
Fosters student learning	Learning is supported in a specific context through human agent or artificial agent (tutor, peer, collaborator or artificial agent)
The task has clear goals	Opportunities for problem solving
Allows for deep and effortless involvement	Visual appearance of the environment provides consistency, which helps to focus in on task
Provides immediate feedback	Prompt and timely feedback through combination of appropriate tools and software
Student-centered learning	Learners construct their own meaning, chunking of information, and have closure
Concern for self disappears during, but sense of self is stronger after	Models, prompts, supports and enhances a learners self-regulatory processes achievable goals and tasks, that are level appropriate, and helps generate self-efficacy

In a distributed learning environment that is supported by technology and is Internet-based, SRL skills are particularly important for successful learning (Schunk & Zimmerman, 1998; Dabbagh & Kitsantas, 2004). The degree to which students practice SRL is influenced by cognitive and motivational processes tied closely and related to learning, at the same time how effectively these processes are used depends greatly on the extent to which students choose to actively learn (Moos & Azvedo, 2006). With computers, student engagement with learning is related to self-perception of their ability to learn and their level of knowledge and skills (Bandura, 1986). Students with higher self-efficacy illustrate an increased degree of self-regulated learning while others with lower self-efficacy practice fewer strategies to help themselves learn (Moos & Azvedo, 2006). Due to the high degree of autonomy required when learning with computers, students must exercise a greater degree of self-regulatory competence to accomplish learning goals (Kinzie, 1990).

Despite the many affordances of computer-based instruction (CBI) such environments often lack the verbal cues and expressions that are found in face-to-face interactions in a traditional environment that are important for human learning (Richardson & Swan, 2003). The challenge to educators therefore is to create opportunities for “collaboration and discourse among learners—the social construction of knowledge” (Grabinger, 1996, p. 52), as social presence, is known to enhance information flow, learning support, group commitment, collaboration, and learning satisfaction (Richardson & Swan, 2003).

Self-Regulated Learning

As educational institutions exploit the Internet’s innate flexibility as a teaching and learning tool (Moore & Kearsley, 2005), self-regulated learning (SRL) has emerged as an important construct in education to support the successful use of online learning materials and experiences. Pintrich (1995) defined SRL as “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, control cognition, and behavior guided and constrained by their goals and the contextual features of the environment" (p. 453). Alternatively, Butler & Winne (1995) viewed SRL as an inherent, constructive and self-directed process, iterative in nature in which purposive behavior is planned, adapted, and evaluated. Schunk and Ertmer (1999) also describe the construct in terms of self-generated thoughts, feelings, and actions, which are systematically oriented toward the attainment of a learner's goals.

For Zimmerman (2000), self-regulated learning is a cyclical process of cognitive engagement with three components being especially important for academic learning, (a.) forethought: this involves influential processes that precede efforts to act and set the stage for learning (setting goals, activating relevant prior knowledge, planning time and effort allocations), (b.) performance or volitional control: this refers to processes that occur during motor efforts and affect attention and action (attempting to control one's cognitions, motivations, behaviors and contextual factors during learning), and (c.) self-reflection. This last construct refers to the processes that occur after performance efforts, which influence an individuals' response to the experience such as assessment and evaluation of one's overall performance and what changes are needed for better learning next time. These processes are not hierarchical, and therefore allow the possibility of phases operating simultaneously and dynamically (see Figure 2.2).

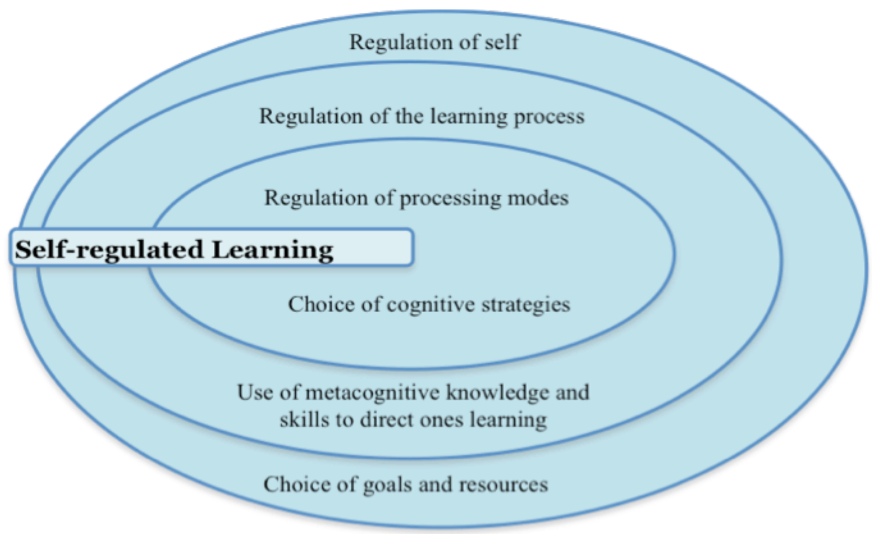

Figure 2.2. Three layered model of self-regulated learning. Adapted from Boekaerts, 1999.

Ley and Young (2001) suggested four principles that guide the development of self-regulated learning skills,

(1.) Preparing and structuring the learning environment

(2.) Organizing and transforming instructional materials

(3.) Keeping records and monitoring progress

(4.) Evaluating performance against a standard to embody, both effective and flexible guidelines for embedding SRL into instruction

The principles can be easily embedded in instruction to support self-regulation regardless of content, media, or a specific population, and can be systematically applied in various contexts such as instructor-led or web-based learning environments.

Attributes of self-regulated learning

Learners who self-regulate are seen to practice certain key attributes such as (i) *goal directedness* and *academic time management,* considerable overlap exists between the two constructs. Self-regulated learners tend to establish mastery goals rather than performance goals, and use them to plan and manage academic time (Zimmerman & Paulsen, 1995); (ii) *Meaningful and directed practice* occurs when learners create practice situations, and do not hesitate to seek instrumental help that provides minimal assistance enabling them to achieve independently without asking for answers; (iii) *Appropriate use of cognitive and meta-cognitive strategies,* enable learners to effectively use a variety of learning strategies and understand their effects. It is linking new knowledge with prior knowledge, to monitor learning and adjust strategies to compensate for progress or difficulties (Zimmerman & Paulsen, 1995).

Lastly, there is also (iv) *a sense of self-efficacy*, which is personal belief about one's capabilities to learn or to perform skills at a designated level. It is one's belief in the ability to apply strategies appropriately and to support continued cognitive and meta-cognitive strategy use (Schunk, 1994). An individual's belief about her efficacy that influences the choices he makes, the aspirations she has, how much effort is put forth, her perseverance in face of difficulty, and whether thought patterns are self-hindering or self-aiding (Bandura, 1991). Self-efficacy affects self-monitoring and cognitive processing of different aspects of one's performances it greatly determines the extent of self-regulated learning that an individual chooses to exercise (Zimmerman, 1998).

Socio-cognitive model of self-regulated learning

As a multidimensional construct that integrates cognitive, motivational, and behavioral components of learning in order to understand how students become masters of their own learning processes (Pintrich, 2000), the social cognitive model of self-regulation, assumes a broadly constructivist position (Martin, 2004). It is particularly useful in analyzing student success in distributed learning environments (Militiadou & Savenye, 2003; Hodges, 2005; Artino, 2007b). “Learners are assumed to construct their own meanings, goals and strategies… learners are not just passive recipients of information…but rather active, constructive meaning makers as they go about learning” (Pintrich, 2000, p. 452). Storing and processing of complex information through cognitive operations, allows them to anticipate consequences of actions, set goals in thought and weigh evidence from various sources to assess their own capability to learn.

Vygotsky (1978) believed learning to develop through higher- level psychological processes, on an interpersonal level through social interaction and then on an individual level, by internalization. Through this framework of scaffolding, zone-of-proximal-development (ZPD), which is a complex socio-collaborative process, takes place where social interaction and communication in the form of conversation or dialogue of some sort is prevalent. The interactions of the scaffolding mechanism create new meanings beyond that which participants already have, through shared meaning of the activity. Learning is not just an internal, passive process but is one where socio-cultural influences and context are important in forming, understanding and deeper learning. Learning takes place through multiple contributions by learners as an active, ever-evolving process (Vygotsky, 1978).

Academic information and learning

How students learn and self-regulate is a complex process. Academic learning occurs in one of two ways, the first is through rehearsal and rote memorization: a surface or shallow level of learning. The second is to understand the material to spontaneously relate ideas and arguments expressed by others to their own experiences and to the evidence around them: this is a much deeper level of learning (Boekaerts, 1999). Seventy percent (70%) of young adolescents longitudinally followed in high school were seen to primarily use surface-level learning. This meant they were predominantly engaged in reproducing activities, reading a text, re-reading it, followed by memorization and these students were unconcerned with conceptual integration. On the other hand, seventeen percent used concrete learning in which they put the learning content to use as they employed cognitive strategies to connect relevant factual information, from text to episodic information in long-term memory and to solve everyday problems. Another, sixteen percent used deeper-level learning, their target to find the underlying message of text. Only these students found pleasure in exploring new information and structuring it in ways so meaningful integration was achieved (Schommer, 1993; Boekaerts, 1999).

Self-regulated learning is a learner's mediation of learning experiences based on (i) *learning need*, the desire to ameliorate a perceived deficit in declarative or procedural knowledge to initiate the learning process, and (ii) *motivational control*, the desire to progress particular learning dependent on strategic behavior to direct the learning process. Therefore, unless the learner actually wants to learn with a goal in mind and engages in activities to progress their learning regulates learning, learning is not likely to take place (Hofer & Pintrich, 1997).

To develop self-regulated learning skills students must have the opportunities to practice strategies of planning, organizing, monitoring, and evaluating their learning. Research has indicated that students who self-regulate tend to be mentally more active during instruction (Zimmerman, 1998). For example, “homework is invaluable because it provides students with the practice necessary to self-monitor and regulate a study skill” (Zimmerman, 1998, p. 11). Self-regulated learning can be domain specific varying from one domain to another; however just being able to self-regulate learning in a particular context i.e. mathematics does not necessarily mean one can regulate learning in other contexts i.e. language (Ryan, 1991).

Learner willingness to identify with learning goals and the context of the task is important (Deci & Ryan, 1985). Motivation research revealed that students who were meta-cognitively aware of the choices they had, and were knowledgeable about how to invest resources to achieve a learning goal may not always be willing to invest the resources to regulate learning (Deci & Ryan, 1985). In such cases, perhaps one or more psychological needs may have been thwarted e.g. need for autonomy, competence, or social belonging therefore they may view the planning, monitoring, and evaluating of the learning process takes too much effort or requires too much time (Ryan, 1991). Subsequently, how students' self-regulate learning is also informed through social forces (aspects of the learning environment) such as parents, and teachers (Bandura, 1991; Zimmerman, 1998). Students who reported parents and family context as emotionally close were more likely to rate their self-regulation skills high. When parents were perceived as authoritarian and the family context as nagging or enmeshed, students reported concern for a lack of self-regulated learning skills (Zimmerman et al., 1992).

Thus, while all students engage in a degree of self-regulated learning those with an *internal* locus of control have been found to take greater responsibility for their own actions and outcomes. These students also, and tend to self-regulate more than those students with an *external* locus of control who primarily believe that others or other factors control the outcomes and results of their behavior (Bandura, 1986). Learners may not choose to self-regulate at all times or in all learning contexts, but the monitoring, controlling, and regulating of learning is possible regardless. Instructional interventions can help enhance or supplant existing capacities and skills for learners who experience difficulties with self-regulated learning (Bandura, 1986).

Additionally, many students view external regulation as essential to extending their knowledge and skills. They expect the teacher to tell them what to do, how and when to do it, and when to stop doing it. By relying on the teacher's meta-cognitive guidance many average and even below average students graduate from high school. These students may even leave school with the impression that they are capable of directing their own learning (Zimmerman et al., 1992). When they have to study in an environment where they have to direct their own learning process, often a considerable decrease in achievement is noticed (Zimmerman & Paulsen, 1995). Thus, learning goals are self-initiated or teacher-initiated. The former occurs spontaneously whereas the latter is driven by the wishes, needs and expectations of others.

In sum, students who are self-regulating initiate strategies to improve their learning, thereby emphasizing internal rather than external control (Zimmerman et al., 1992). They continually plan, organize, monitor, and evaluate their learning during the process. They also establish environments that support learning, by seeking support from teachers and peers, and reinforce their existing skills through self-instruction (Zimmerman, 1989; Zimmerman & Paulsen, 1995). As successful learners, they swiftly transfer knowledge and strategies acquired in one situation to new situations, modifying and extending them as they learn. Learning is a function of the learner's personally initiated strategies to improve both achievement and environment; as such, self-regulated learning is fundamental for efficient and powerful learning (Boekaerts, 1997).

Social Mediation and the Construction of Knowledge

Given the complexities of learning in a distributed environment through PBL, game play, and computer-based instruction. In an environment that is social constructivist in nature, knowledge is situated and contextual and communication is central (Prawat & Floden, 1991; 1993). In this conception, each person's reality is different and is based on his or her individual experiences. The truth and meaning of these experiences are derived from social negotiation through understanding the perceptions of others who share the same reality (Prawat & Floden, 1991). To understand how students self-regulate through such shared interactions, this study employed the theory *Learning and Teaching as Communicative Actions* (LTCA) as its lens (Warren & Stein, 2008; Warren & Wakefield, 2012). In order to understand that theory, we must first examine Habermas' principles that underpin some of its development.

The work of Jürgen Habermas' (1984), a German sociologist and critical theorist, sheds considerable light on learner interaction and the social construction of knowledge through communicative actions. He attempts to resolve the division between values and facts, and theory and practice. Through the grounding of thought in critical theory, he links knowledge, interests and ideology. Critical theory is the critique of ideology to enable individuals to become self-aware of knowledge distortions (Habermas, 1971). Whereas empirical and interpretive social sciences describe the world, as the majority of people perceive it, critical theory tries to understand why the social world is the way it is. More importantly, through a process of critique, critical theorists seek to understand how it *should be* (Habermas, 1971).

This self-awareness of knowledge distortion is enlightenment a necessary pre-condition for individual freedom and self-determination. The individual is emancipated on the basis of his or her enlightenment he or she takes freeing action that changes the social system to permit the realization of his or her unique potential (Habermas, 1984, Ewert, 1991). Underlying this process of critique is the concept that the existing social structure and beliefs are socially constructed and therefore are changeable through social action. Critical theory is identified by its emphasis on emancipation that requires both enlightenment and action (Habermas, 1984, Ewert, 1991).

Habermas (1984) proposes a theory of how language and communication can work to create shared meaning among participants "the theory of communicative action" (Habermas, 1984). Communicative actions are "acts oriented to achieving, sustaining and reviewing consensus" (p.17). The speech acts used in communicative action raise validity claims as they assert statements to be valid or acceptable representations of some facet of the world. He argues that, with the participants' implicit response of "yes" or "no," that the speaker accepts a speech-act offer and grounds an agreement (p. 296). If the hearer does not agree, then that listener proposes claims and evidence that counter the validity of the speaker's claim. Therefore, communicative action is the exchange of validity claims and these demand agreement, rejection or modifications based upon the strength of the stronger argument or reason (Habermas, 1993). These maybe seen as human communication towards particular goals, such as (a.) getting what one wants, (b.) being understood by another, (c.) being seen to tell the truth, or (d.) to make a personal, subjective claim to truth or identity. These three types of speech acts and the validity and the validity claims are presented in Table 2.2.

Table 2.2

Typology of Communicative Speech-acts (Habermas, 1984, p. 328)

	Basic Attitudes	*Validity Claims*	*World Relations*
Constatives	Objectivating	Truth	Objective world
Regulatives	Norm-conformative	Rightness	Social world
Expressives	Expressive	Truthfulness	Subjective world

In any utterance, all three facets of speech acts are present and the speaker is at all times in contact with the objective world, the social world, and their own subjective world and perceptions. The insight of Habermas' view is that language use is always centered about these three concerns: the objective, the social, and the subjective worlds in which a human exists.

Learning and Teaching as Communicative Action

Building on Habermas' four types of communicative actions, which are *constative, normative, strategic* (*teleological*), and *dramaturgical,* this theory seeks to improve human communication in the context of teaching and learning (Wakefield, Warren & Alsobrook, 2012). Learning and Teaching as Communicative Actions theory (LTCA) hypothesizes that all four communicative actions are necessary for learning and teaching to be successful and therefore educational experiences should be designed to encourage each (Warren & Stein, 2008). Learning is a complex process and instructional activities that comprise these communicative actions generate discourse from multiple perspectives. These require a learner to examine the teacher and peer student claims and evidence critically, either accepting or rejecting their inherent validity, which may lead to further discourse as a means of constructing inter subjectively agreed upon truths. It is through such discourse and effective communication that both learner and instructor achieve greater understanding (Warren & Najmi, 2013).

According to this theory, there are four types of communicative action and associated discourse:

(1.) *Constative* action, geared towards allowing students to interactively make and challenge claims to the validity of objective knowledge, e.g. the claim is challenged or accepted through communicative negotiation.

(2.) *Normative* action, relate to the validity of claims about group, institution, and societal rules, e.g. through consensus with other faculty and the students of a class a teacher communicates the norms of appropriate behavior (rules for grading, required assignments, attendance and class expectations.

(3.) *Strategic* (teleological) action, geared towards effectively getting what the student or teacher wants from the objective world e.g. a student reads text or listens to a lecture and then evaluates what information is helpful.

(4.) *Dramaturgical* action, that allow for individual expressions of truth and personal identity e.g. a teacher teaches with an inner passion for the subject matter with the goal of inspiring similar passion in students. It is about taking action to achieve a purpose and is open to interpretation by the participants, students, and instructors alike (Habermas, 1984; Warren & Stein, 2008; Wakefield et al., 2012).

Research on *The Door,* a learning-focused alternate reality game, and the study presented in this dissertation were both informed by the LTCA theory. How teaching and learning are influenced will be covered in further detail in Chapter Four. The instructional design, the methods of instruction, and the process of inquiry used to evaluate the effectiveness of the learning experiences presented in this study follow the socio-constructivist perspective of knowledge construction, and were informed by this theory.

Epistemological Beliefs and Learning

How learners choose to employ their self-regulatory strategies greatly depends on their beliefs about their capabilities to do so (Zimmerman et al., 1992). Intellectual maturity and epistemic development help to shape the values and beliefs about what we know or believe to be true. Epistemic beliefs influence our cognitive processes of thinking, reasoning, and our understandings of knowledge and truth, and how they change over time (Hofer & Pintrich, 1997, p.435). Kitchner (1983) describes the meta-cognitive process of epistemic development as engaging with a cognitive task i.e., memorizing, reading or problem solving, reasoning to improve performance, and then developing the understanding of the limits and certainty of knowing, as well as acquiring the skills to find alternative solutions to problems (Jonassen, 2011, p.342). Beliefs about knowing are important predictors of successful use of self-regulatory skills and strategies across all academic domains (Zimmerman et al., 1992; Zimmerman, 2000).

Several theories describe epistemological development in stages they are, *epistemological reflection* (Baxter-Magolda, 1992), *reflective judgment* (King & Kitchener, 1994), and *levels of intellectual development* (Perry, 1970). Whereas the stages differ in range and scope they move from simple to relativistic thinking (Jonassen, 2011). Other scholars view a learner's epistemic beliefs as multidimensional and independent, rather than stage-like and these develop in a continuum from more "naive" views (i.e., knowledge is absolute) to more sophisticated beliefs (i.e., knowledge is relative and contextual; knowledge is a complex network). This means that, at any one time, individuals may hold a combination of sophisticated and naive beliefs across a range of dimensions (Schommer, 1990, 1993).

Jacobson and Spiro (1995) found that students with more sophisticated epistemological beliefs were more able to learn and apply their knowledge than students with simpler epistemological beliefs. Such individuals were also more likely to use more adequate learning strategies to engage in personal reflections and analysis about their understandings, and achieved better learning outcomes. When problem solving is the instructional approach and ill-structured problems spur learning higher levels of epistemic development are required since there is no right or wrong answer. This resulted because students must examine different perspectives through collaborative discourse and reasoning (Dunkle, Schraw, Bendixen, 1995; Jonassen, 2011). Therefore, the knowledge of self-regulatory strategies is not enough; instead, students must also possess the belief that they can use these strategies effectively and be willing to put forth effort to learn (Bandura, 1986; Zimmerman et al., 1992). Given that students' beliefs about knowledge and conceptions of learning vary significantly, they are often very different from the demands of the educational institution. Understanding of epistemic beliefs can help educators work more effectively with students, improving personal belief in their ability to learn, develop better study habits, and utilize self-regulated learning (Hofer & Pintrich, 1997; Schommer-Aikens, Duell, & Barker, 2003).

Summary

This chapter examined the relevant literature that supports problem-based learning, the genre of an alternate reality game, the theory of Learning and Teaching as Communicative Actions, computer-based instruction as well as research and the theoretical basis for self-regulated learning. The following chapter will present the instructional design that was under study in this research report.

CHAPTER 3

DESIGN METHODOLOGY

Introduction

The primary impetus for this study emerged from the need to examine learner experiences and the impact on self-regulated learning by introducing in post-secondary learners to contemporary issues of real world importance. These came through problem solving, game play, and computer-based instruction. The underlying focus of this study, developed from research on *The Door* alternate reality game is that it is important for instructors and learning designers to understand how students choose to communicate and construct meaning and also how ownership of learner satisfaction should help make instruction more meaningful and improve achievement. The design of the study was driven by the consideration of the activities involved in the instructional design process. This included the selection of the instructional method, working with ill-structured problems to find defensible solutions, playing and designing a game using Learning and Teaching as Communicative Actions theory, and completing weekly skill based modules. This chapter presents the pedagogical and instructional design elements of the successor of *The Door*, called *Broken Window*. Overviewed here is the interactive design of the alternate reality game, learning goals and objectives that drove the design contained therein, and related instructional activities.

Pedagogical and Instructional Design Elements

The approach to designing learning in *Broken Window* was social constructivist in nature and one in which learners were active participants engaged in purposeful learning. As such, selecting the instructional method was the first step, in helping students take ownership of their own learning. By selecting a strategy for pursuing knowledge from this perspective, students were expected to consciously develop awareness of learning processes and inquiry strategies that develop their capabilities to seek knowledge, progress in learning, and fulfill learning objectives. Personal engagement and self-direction were also expected to enable the acquisition of academic skills that lead to the transfer of knowledge and skills practice (Savery & Duffy, 1995). As students make their selection of the instructional method i.e., problem-based learning & game play or computer-based instruction, they set their expectations to engage with learning (Pintrich, 1997).

Whereas more objectivist, knowledge acquisition-focused beliefs of teaching and learning follow the assumption that knowledge is best acquired with the teacher or instructor showing students how to interpret reality, accept set truths, use the correct way to think about specific concepts as well as adopt ways of how to think about concepts (Sfard, 1998). Traditional, teaching methods "rel[y] on the objectivist stance that there is only one true representation of reality, and a single, best way of learning it" (Jonassen, 2011, p.342). In contrast, social constructivist-influenced methods such as problem-based learning employ approaches in which learners individually construct meaning from events based on their experiences. This requires not only finding an acceptable solution to a problem but also recognizing similar problems later on and having the ability to transfer previously learned skills to new and different contexts.

Problem schema or knowledge structures help in the interpretation of things around us (Jonassen, 2011). These conceptual models or cognitive tools include both semantic and situational information about the problem and the associations between the problem elements (Riley, Greeno & Heller, 1983). Solving a problem requires matching a conceptual model to a problem scenario in order to understand it. It further aids in the transfer of acquired knowledge to the novel situation, requires testing and revising the strategy to generate a solution, and helps learners store the workable solution in memory for future retrieval (Aamodt & Plaza, 1996; Jonassen, 2011, p.243). The narrative or storyline inherent in social constructivist approaches such as case-based reasoning (CBR) help bring meaning to the problem scenario and aids in sense making and mentally organizing information (Jonassen, 2011). Therefore knowledge is situated in the context in which it is learned i.e., real world scenario, discipline specific, domain or culture (Brown & Duguid, 1994). Bruno (1990) posited that stories require less cognitive effort to remember as the narrative form frames the experiences.

Savery and Duffy (1996) proposed eight design principles that link social constructivism with the methodology of problem-based learning. It was this that offered a sound basis for learning these are presented in Table 3.1.

Table 3.1

Savery & Duffy's Social Constructivist Design Principles (p. 137)

Design Principles
1. Learning should be relevant.
2. Instructional goals should be consistent with the learner's goals.
3. Design an authentic task.
4. Design the task in the learning environment to be consistent with the cognitive demands and tasks for the environment for which the learner is being prepared for.
5. Give the learner ownership of the process used to develop a solution.
6. Design the learning environment to support and challenge the learner's thinking.
7. Student ideas should be tested against alternative views through social negotiation and collaborative learning groups.
8. Encourage reflection on content learned and the learning process.

These elements lend themselves to the authenticity of learning situations and tasks, which are important for facilitating learner self-regulation and higher order thinking (Brown, Collins & Duguid, 1989). They support the general principles of PBL in that: "understanding is in our interactions with the environment…cognitive conflict or puzzlement is the stimulus for learning and determines the organization and nature of what is learned…and; knowledge evolves through social negotiation and through the evaluation of the viability of individual understandings" (Savery & Duffy, 1996, p.1-2).

From a critical thinking and reasoning perspective, Tiwari and Lai (2002) found that PBL encourages learners to hone a variety of thinking skills such as:

(i) Analyze and synthesize data
(ii) Develop hypothesis
(iii) Apply deductive reasoning to a problem situation
(iv) Draw conclusions after analysis, synthesis, and evaluation of new information
(v) Synthesize strategies/solutions
(vi) Monitor and evaluate own thinking process (p.2)

With ill-structured problems, the conceptual models presented are not as consistent and tend to have multiple representations, perspectives, and solutions in order to spur cognitive conflict and deeper inquiry by students. Therefore, the concepts and methods needed to solve them are often uncertain (Jonassen, 2011). Students must know how to sort through these perspectives to determine the most important and relevant. Jonassen's model for the design of a learning environment learning centers on the solution of an ill-structured problem in the context of narrative, which is defined by the attributes given in Table 3.2.

Table 3.2

Jonassen's Attributes of an Ill-structured Problem

(U)nstated goals and constraints.
(M)ultiple solutions, solution paths, or no solutions at all.
(M)ultiple criteria for evaluating solutions.
(U)ncertainty about which concepts, rules, and principles are necessary for the solution or how they are organized.
(N)o general rules or principles for describing or predicting the outcome of most cases.
(A) requirement that learners …make judgments about the problem and defend their judgments by expressing personal opinions or beliefs.

Problem solving requires the application of knowledge and the interpretation of multiple perspectives, and often the pre-set interpretations of reality that students learn with are not easily applicable (Jonassen, 2011).

Problem-based learning and games

To understand how games impact learning, it is necessary to understand the nature of gaming, the nature of learning, and the learner. Social theorist Clark Abt (2002) suggested that "a game is a particular way of looking at something, anything" (p.171), and it is a way of understanding concepts in the world around us. It is perceived to be a medium for interactive storytelling as well as a way for learners to understand rules (Juul, 2001). In *Supercharged,* a video game on electromagnetism, players were required to master the rules of electromagnetism to accomplish the objectives of the game (Jenkins, Klopfer, Squire and Tan, 2003).

Salzman, Loftin, Dede, and McGlynn (1996) found multisensory cues to be significant components of successful game environments. “They engage learners, direct their attention to important behaviors and relationships, help them to understand new sensory perspectives, prevent errors through feedback cues, and enhance ease of use” (p. 2). Aguilera and Mendiz (2003) noted that, “adolescents with medium or long-term experience playing video games show greater visual capacity, motor activity, and spatial abilities-reflexes and responses” (p. 6).

Therefore, game play supports the development of valuable skills like goal setting, planning, organizing, communication, negotiating, strategic thinking, and decision-making (Kirriemuir & McFarlane, 2006). Warren, Jones, Dolliver, and Stein (2012) state that, for a game to be educational the following should be included:

1. A form of play activity,
2. Some conflict to drive play and cognitive activity,
3. Rules, readily apparent to the learner that mirrors a reality that governs,
4. Interactivity between player and game that includes,
5. Feedback from the game system, and
6. Results in a win or loss for the learner/player.

The following section describes the design of standard entertainment focused alternate reality games that influenced the design of *Broken Window*, the educational game that was the focus of this study.

Design of an Alternate Reality Game

The design and development of an educational game stemming from Learning and Teaching as Communicative Actions theory takes considerable effort in terms of time and energy, because it seeks to spur multiple forms of communication that ask students to challenge what they know and how they can know it. However, in terms of technological aspects, it is not costly to develop like other computer and video games, as the genre uses any or every application on the Internet and is not device dependent (Warren, Dondlinger, McLeod, & Bigenho, 2011). The skills required are storytelling, information structuring, management and web development, which are far more accessible skills than those required in other types of game development. Of the many advantages: players are their own agents and use their own experience and knowledge to play the game, rather than play just the role of a fictional character. Tasks and puzzles require social interaction and collaboration and are not reliant on pre-defined save points, which makes most computer games inflexible in terms of logistics and time and therefore inappropriate for educational settings in some instances (Jones & Warren, 2008).

Four terms essential to leading the discussions about most AltRGs and their significance are given in Table 3.3.

Table 3.3

Unique Vocabulary of Alternate Reality Game

Unique Vocabulary of Alternate Reality Game	
Puppet-master	Runs the game, creates obstacles, provides resources through the narrative and fictional game characters
The Curtain	The separation between Puppetmaster and players
Rabbit-hole	The entrance into the game world and its narrative
This-Is-Not-A-Game (TINAG)	The immersive quality of the game and that it does not seem like a game

Puppetmasters an analog of dungeon or game masters in role playing games like Dungeons and Dragons, run the game. They function as the allies and adversaries of the player. To that end, they create develop the initial story and adapt it as they provide obstacles, provide resources, and interact with players as the game narrative unfolds. Their identity may or may not be known and they remain behind the scenes while the game is running. In the case of *The Door* (Warren et al., 2011) and *Broken Window* (Warren & Najmi, 2012), the game may start out with the instructor as the Puppetmaster; however, it is conceivable that, as students become adept at playing, they may become their own Puppetmaster, creating their own masterpieces (McGonigal, 2003; Saleem, 2007). The Curtain refers to the separation between Puppetmasters and players, and the convention is that Puppetmasters do not interact directly with players, but instead communicate through the fictional characters and design elements of the game. The *Rabbit Hole* is the entry point of the game draws players into the game beyond, which the distinction between reality and fiction blurs. This may be a puzzle, an object/artifact or website. Lastly, This Is Not A Game (TINAG) alludes to the immersive quality of the game genre and the popular sentiment set by players themselves that one of the goals of an alternate reality game is to disguise the fact that it is even a game. TINAG refers to real world events that lead the game and the suspension of disbelief that drives players (Argnet, 2008).

Alternate reality games (AltRGs) have powerful user engagement and motivation tools factors that make them compelling are,

- A captivating story that extends beyond to make the event dynamic and more appealing,
- The discovery and deciphering elements of the narrative revealed in an obscure way so as to allow people to discover information and work together to help the story progress,
- Cross medium interactivity using several mediums, and must be available and accessible on as many as possible i.e. email, Web logs, videos, text, print ads etc.
- There is progression of the storyline; as it helps blur the line between reality and fiction,
- Decisions are required to be made instantaneously as the narrative advances

(Saleem, 2007)

Four steps guide the process, (1.) *the premise*: plot or storyline addresses a problem and is intriguing getting the player to think of what if? (2.) *The theme*: addresses the purpose or knowledge gained and why the player would want to engage with the fictional world and game elements. (3.) *The scope*: includes cross media interactivity and room for player contribution blurring the line between reality and fiction. (4.) Finally, *the execution* is about players engaging with the narrative and cross platform media, ensuring enough resources exist this may require pushing information through multiple means (Stewart, 2008; Bell, 2013).

Several features to avoid in the design of educational AltRGs are, (a.) lack of interactivity and a too linear approach; (b.) lack of reward, no instant gratification, and too difficult a process to earn the reward; (c.) same game different name, and (d.) making the game too scripted and commercialized (Saleem, 2007; ARGnet, 2012). Game designer Jane McGonigal (2003) contended that besides being a powerful way of getting people involved and the ability to create strong communities of action AltRGs offer safe arenas for students to practice and develop self-regulation of cognition and actions during the process of play, which are skills much needed in the real world.

Learning Objectives and Instruction

As social and cultural changes occur, especially on a global level, so do the requirements for accomplishment. When it comes to assessing a graduates' level of knowledge and potential to succeed it is not uncommon for employers to dismiss tests of general content knowledge in favor of self-directed, real-world applied learning. This emphasis on real world applied learning is often reflected in their recommendations to college and universities for assessing student learning (AACU, 2008).

Emphasis on application to real situations requires that learners acquire additional attributes beyond the sequential, detail- and text-oriented way of thinking along with learning how to problem solve, reason, and think critically. In addition, it is important for learners to acquire self-regulative skills: of self-awareness, self-control, self-monitoring, reflection, and evaluation (Whipp & Chiarelli, 2005). The acquisition of such skills helps learners to develop a broader much deeper process of thought, one that encompasses positive emotional and motivational beliefs about their learning capabilities (Schunk & Zimmerman, 1994, 1998). These perspectives guide affective values and attitudes vital for development of global skills essential for life in school and beyond.

The learning objectives of *The Door* and the study of *The Broken Window* in this dissertation were informed by these perspectives. At the heart of each design was the creation of a consensus-driven curriculum that clearly distinguished between what is just worth being *familiar* with versus what students *should know*, be able to *do*, and *understand* (Brown, 2004). The study sought to contextualize these competencies as fundamental components of the course design in order to determine the effectiveness of these educational practices. Independent thinking and the regulation of learning set expectations and were embedded from the start of the game, as students were required to select the instructional approach that suited them best.

For example, in *Broken Window*, PBL and game play challenged learners to develop solutions to large-scale, ill-structured problems. This happened as learners played a United Nations Millennium Development Goals-focused AltRG and then developed their own learning game using what they experienced as a model. However, method alone as not expected to foster self-regulated learning and higher order thinking. Instead, to address these learning goals the design of the learning further required learners to engage with global issues through the eight goals shown in Figure 3.1.

Figure 3.1. The 2015 Millennium Goals website.

The ill-structured problems contained in the UN Millennium Development goals were tied to learning objectives that were expected to produce broad intellectual competencies related to global perspectives, and higher order thinking. These problems as goals that guided the skill development constituted both the focus of some of the content as well as the problem to be designed around in the student-designed alternate reality games. The UN Millennium Development Goals specifically are:

(E)radicate extreme poverty & hunger
(A)chieve universal primary education
(P)romote gender equality and empower women
(R)educe child mortality
(I)mprove maternal health
(C)ombat HIV/AIDS, malaria and other diseases
(E)nsure environmental sustainability
(D)evelop a global partnership for development

Typically, game development for learning is led by the creative and innovative process of instructional designers and faculty (Salen & Zimmerman, 2004). In contrast when students design a learning AltRG, the process was expected to involve multiple aspects: (a.) understanding the concepts of an AltRG and the design process, (b.) creating a coherent game narrative, (c.) researching necessary informational and contextual content, (d.) structuring the game challenges and rewards, and (e.) developing the distributed game world.

As part of this design and development process, students were expected to generate their own performance criteria upon which individual and group products would be assessed. To guide the design of *Broken Window,* the process required students to engage with the following objectives and activities:

- Devise collaborative solutions to global problems
- Deploy research, productivity, and creativity skills and tools
- Create written design documents, such as narrative outlines, character profiles, and research reports
- Deliver presentations to share information, pitch ideas, evaluate progress
- Communicate effectively in small and large groups of diverse membership
- Construct game spaces using a variety of technological tools

The learning goals and objectives of the associated computer-based instruction (CBI) took a different approach and required the foregrounding of skills. Students started with training modules to develop general computer literacy-focused productivity and communication skills such as word processing, spreadsheets, and presentation skills. The computer-based modules scaffold students to help regulate their learning. In the CBI, the focus was on mastery and improving performance, and followed the framework below,

1. **Prepare:** This mode provides learners with an overview of learning goals for a task.

2. **Observe:** This provides students with a demonstration of a skill-based task along with audio instructions.

3. **Practice:** This allows students to practice the learning task. It also provides tips and corrective feedback, allowing students to retry a task if not completed correctly. The practice mode has no limitations on the number of times it can be performed.

4. **Apply:** This is similar to the practice mode in that students can demonstrate their skill with the task prior to taking the Exam.

(Warren, Whitworth, Dondlinger, & Robertson, 2007)

Students then used the skills in broader contexts to solve problem tasks related to real world issues. These problems were ill structured in kind with the narrative of each problem scenario specific to the authentic task, and decontextualized from any overarching narrative. The emphasis was therefore on communicating and working online with peers to develop defensible solutions.

Design of the Study

A vast body of emerging literature indicates that when students engage in more than one challenge and with a wide variety of resources to learn targeted skills and knowledge — they acquire the subtleties and richness of the discipline itself (Cognition and Technology Group at Vanderbilt [CTGV] 1990, 1997). Educators can play an important role in designing learning environments that support the development of self-regulated learning and help students become independent learners (Hofer & Pintrich, 1997; Schunk & Zimmerman, 1998; Dabbagh & Kitsantas, 2004). The following section details the alternate reality game upon which *Broken Window* was based.

Background: *The Door*

To fully understand the instructional design that will drive this study it is essential to first examine the underlying elements that influenced the design process of *The Door* (Warren, et al., 2011). The design was created by faculty and students at the University of North Texas and was later on revised based on instructor and student feedback (Warren & Dondlinger, 2008). It followed the ADDIE model of instructional design as a basic framework within which problem-based learning activities were developed (Bichelmeyer, 2005; Warren & Dondlinger, 2008). This process began with an *analysis* of needs to be addressed by the design, followed by *design and development* of course materials, and finally a pilot *implementation* and *evaluation* of the effectiveness of the redesign (Molenda, Pershing, & Reigeluth, 1996). Each phase of the design process sought to answer specific questions pertaining to the design, development, and implementation of the game elements and course content. An over view of the questions that guide the design process are presented in Table 3.4.

Table 3.4

Questions Guiding ADDIE Design Process (from Warren & Dondlinger, 2008)

ADDIE MODEL OF INSTRUCTIONAL DESIGN	
Analysis	What game elements must be present? What instructional method best serves game play? What narrative will be most compelling for writing? Should the game teach or support teaching?
Design	How can the selected instructional method and identified game elements be blended properly? What learning objectives can the game support? What will this game look like physically?
Development	Can we create a viable world with agents/NPCs that can support student learning? Can we create this world with minimal staff (2) and develop dynamic content, that supports narrative, and have it support practice?
Implementation	Can we fit this game in the school day? Can school technology resources support an online game? Can our server? Will the facilitation of the game match the intention of the design of the game?
Evaluation	How do we assess learning with all the confounding variables? Can we attribute the game to the learning outcomes? What research methods make sense in this context? Did the teacher like it/could they use it? Did the students like it/could they use?

Problem-based learning and Learning and Teaching as Communicative Actions concepts were used to guide the design or emerged from research on *The Door*. Within the AltRG game experience, students worked on ill-structured problems in small groups of two or three employing the computer applications targeted in the course, the learning management system, Moodle or Blackboard; a course web site with links to resources, podcasts, videos, web logs, and a meeting space in the three dimensional digital world of

Linden Labs' *Second Life* as a complement to e-mail and discussion boards that allowed for the sharing of socially constructed knowledge (Warren, Dondlinger, & McLeod, 2008; Warren, et al., 2011). Further, students responded to weekly reflection prompts in web logs as a means of engaging in meta-cognitive thinking about their learning experiences towards a goal of improving learning strategies. Each of these tools was expected to provide learners with exposure to a greater variety of computer applications, resources, and experiences that formed the basis of their learning experiences (Warren & Dondlinger, 2009; Warren & Dondlinger, 2010; Warren et al., 2011).

The Door AltRG yielded mixed statistical results in terms of student satisfaction; in particular, a single semester implementation study indicated an 8.55% difference in the percent of students who dropped, failed, or withdrew between the comparison course and the treatment. Satisfaction with the redesigned course was statistically significantly higher than in sections using the existing course design. Finally, student achievement, as measured by posttest in both groups and compared using a two-sample t-test assuming unequal variances, showed greater improvement in the treatment group than the comparison group (Warren et al., 2011, p.16). Details are presented in Table 3.5.

Table 3.5
Quantitative Results for Student Retention, Satisfaction, and Achievement

	Comparison n=57	Treatment n=32	Differences
Retention (% DFW)	21.05%	12.50%	-8.55%
# of drops	1	2	
# of failures	2	0	
# of withdrawals	9	2	
Satisfaction	3.64	4.2	alpha=.05, z(6)=6.86 p=1.64
Achievement	M=78.83	M=85.96	t=3.90, crit=1.67

Despite the mixed results in the quantitative findings, students appeared to gain many skills useful to their university experience and life beyond. Some of their challenges identified in the study's associated qualitative analysis which were gathered through interviews and web log reflections, revealed several challenges arising related to group cooperation, teamwork, and interpersonal communication. Students struggled with completing tasks in a group and instructors noted student resistance to asking questions of the fictional clients or seeking assistance from peers created a challenge for instructors. This required constant redirection to these resources (Warren et al., 2011, p. 26). Overall, students were unprepared to engage in independent learning and lacked self-regulated learning practices that would help them to be successful.

These findings necessitated revisions to the current future designs and research sought to determine whether or not students had sufficient self-regulated learning skills (SRL) to support their learning and successfully learn from an immersive learning AltRG. Zimmerman (1998) and Schunk (2000) described self- regulated learning (SRL) as: organizing, planning, goal setting, time-management, seeking assistance, self-reflection and evaluation among others. Further, student lack of experience with group management and problem solving brought up the need to improve interpersonal skills in communication and learning (Warren et al., 2011). Additionally, course designers found the ADDIE model restrictive in accommodating information from multiple resources and the changing dynamics of the distributed learning environment and so other approaches were sought.

Broken Window *for Design-Based Research*

Once *The Door* had concluded, the new design sought to address these issues and moved towards a design based research model for instruction (Barab & Squire, 2004; Barab, 2006). This method was expected to readily accommodate the many iterations of the course and allow appropriate changes based on formative assessment and evaluation of the course as communicated through student and instructor feedback. It was also expected to allow students to engage in the process of design and the designer researchers to better accommodate evolving learner and instructor needs. It was meant to better place learning and cognition in context as a means of understanding their relevance in naturalistic settings (Warren & Najmi, 2012). Further, the designers sought to help students understand the relevance of derived findings in situations beyond the immediate environment in which they were generated, selected, and refined by learners (Brown & Collins, 1992).

Messick (1992) argued that the validity of a claim is based on the changes it produces in a given system "The narrative conveys the series of related plots and describes the unfolding of the design through multiple transformations over time (Abbot, 1992, p.63)." Brown & Collins (1992) perceived it as a way for researchers to systematically adjust various aspects of the design context that allows researchers to test and generate theory in naturalistic settings. Central to a design-based research approach is the focus on understanding the messiness of real world practices and the involvement of multiple dependent variables, the many iterative cycles, flexibility in design revision, and capturing social interaction (Barab & Squire, 2004, p.3). The goal is to engage in a mode of inquiry that is iterative in nature with a commitment to continually refine theoretical assertions leading to ontological innovations (Cobb, Stephan, Lehrer & Schauble, 2003, p.10). Barab & Squire (2004) described the design-based research approach as meant to directly impact practice in order to advance theory that is useful to others (p.3).

Of concern is that the iterative nature of the method raises concerns about excessive data collection, and little contribution to overall theory, and challenges generalizibility across participants, contexts, and findings (Brown 1992; Dede, 2004). Advocates contend the value of theory is assessed in terms of its sharability with others (e.g. practitioners & designers) and the "usable knowledge" of how well it really works in practice (Brown & Collins, 1992). Further, the underlying epistemic stance of the LTCA and social constructivist-influenced design of *Broken Window* rejected the idea that the findings of associated research was meant to generalize to other populations. Terms of *trustworthiness* and *credibility* (Glauser & Straus, 1967; Lincoln & Guba, 1985) are akin to positivist criteria of reliability and validity, and *usefulness* to generalizability and external validity (Schonfield, 1992). The proposed study was informed and shaped by these research findings.

The Design-Based Study of the Broken Window Alternate Reality Game

Problem-based learning and game play guide learning and challenge students to think globally, as they engage in interdisciplinary inquiry to solve ill-structured problems of social, political, and scientific importance, embodied by the United Nations Millennium Development Goals (UN MDGs). Taken from social policy and theory, its name eludes to the state of disorder; empty buildings, broken windows, unkempt yards in urban areas which leads to people devaluing their neighborhood allowing them to fall into further disrepair. This theory frames the UN as being one of the main reasons for industrialized nations failing to help other countries from meeting their developmental goals (Warren et al., 2009).

Students engaged with discovering clues for locating missing Research Associates of the *Havenwyrd Institute* a fictional organization who were seeking to address the UN MDGs. Entrance into the game world is through Walter's Office Figure 3.2 presents the view down the rabbit hole,

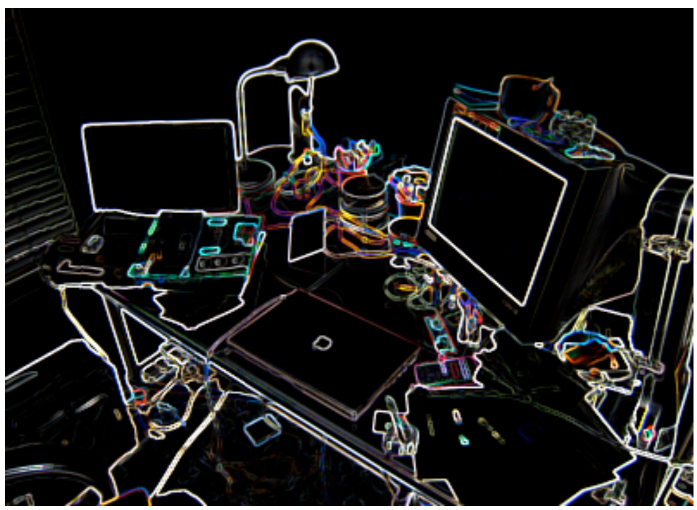

Figure 3.2. Walter Black's office.

Additional clues and information were released periodically through the Havenwyrd Blog as students played a 6-week AltRG to learn basic technology concepts, Internet search skills, communication, and worked on the basics of collaborative, problem solving.

The narrative is two-fold: the first level has students working with ill-structured problems relatively simple to locate the missing associates and learning Microsoft Applications and integrating these with other Web applications on the Internet along with information seeking skills. The second level includes solving the over arching global issue of the UN MDGs which are the main focus of the work of the Research Associates of the *Havenwyrd Institute*. In the latter nine weeks of the course students then move on to create their own AltRG, by applying the knowledge and skills learned, working in small groups with a clearly defined method of design, development and implementation. Figure 3.3 presents the initial entry of the *Havenwyrd Institute Blog.*

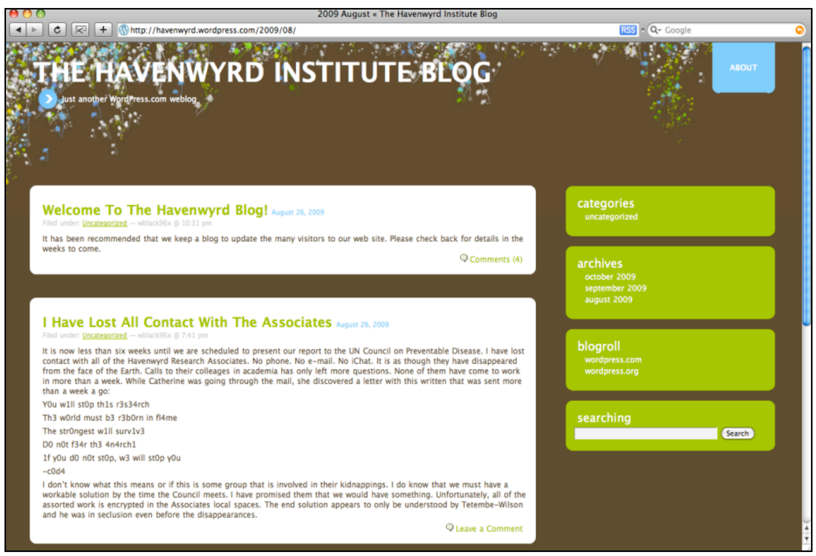

Figure 3.3. The Havenwyrd Institute blog – Version 3.

Prior iterations: Broken Window *as immersive model.* Research from an initial iteration noted that students lacked the skills necessary to complete the level of literacy stated in the course goals and objectives. Therefore a new iteration presented students with a guided choice between two versions with more or less direct instruction and problem-based learning activity. The details, findings, and results of this iteration are presented in a separate study (Bigenho, 2011).

Present iteration: A mix of PBL, game and CBI. Zimmerman & Paulsen (1995) asserted that learning is best optimized when students evaluate their learning through the use of appropriate cognitive and meta-cognitive strategies. Students in this iteration of *Broken Window* utilized PBL and game or computer-based instruction (CBI). To set learning expectations and guide regulated learning practice, they were asked to make a choice between three versions each requiring different levels of cognitive thinking and challenges. The following section details the process of guiding students in selecting a version of the course, which is necessary to understand, as it was central to this study's design.

Selection of the instructional method

Students take a pretest and familiarize themselves with the content of the course. The purpose was to inform them of the course objectives and help them identify their existing skills. This was expected to help them determine what they already *know* and can *do*, as well as what they need to *learn* or *improve* upon through their coursework. To that end students were given information about each of the three versions of the course and then required to take a series of quizzes, make a 100% on each in order to proceed to the next step, so they understood the differences among the three versions of the course. This was intended to guide students in making an informed decision about the instructional method by which they preferred to learn while ensuring the method was appropriate to their existing skill level. Students were required to complete the full sequence of steps before they could enroll in the course of study, while also providing them with some choice. The criterion students followed for selecting instructional method and determining course version is given in Table 3.6.

Table 3.6

Criteria for Selecting Instructional Method and Determining Course Version

Score	Recommendation
Score of 60% or below	Student may do V1 or V2 - recommend V1 – CBI plus 1 PBL task
61 - 75 %	Student may do V2 or V3 - recommend V2 – CBI plus 3PBL tasks
76 – 80%	Student may do V2 or V3 - recommend V3 – Broken Window (AltRG)
81 – 90%	Student may do V2 or V3 - recommend V3 – Broken Window (AltRG)
91 -100%	Student must take V3 – Broken Window (AltRG)

Based on the results of the pretest and these short quizzes, students then enrolled in the version of the course best suited to their entry level. They chose from or were guided into one of the following: *Version 1*– Computer-based instruction with one PBL task. Students in this version were required to apply the newly acquired skills they gained in SAMS in a broader context of a single ill-structured problem to find a defensible solution. Version 2 – Computer-based instruction accompanied by three PBL tasks. Students enrolled in this version were required to develop solutions to three ill-structured problems at separate times during the semester and to create defensible solutions for each using the applications and other computer literacy skills they had acquired in order to show transfer to other contexts. *Version 3* – a full problem-based learning experience contextualized through *Broken Window* game play and the design of their own alternate reality learning game.

The instructional activities in the first week of the class were geared towards helping students identify their existing knowledge and skills through this process of selecting an instructional method and course version students were introduced to goal setting, planning, organizing, reflecting, evaluating, and decision-making early in the learning process. A conceptual map of the instructional design sequence of these steps is given in Figure 3.4 and criterion used for student placement is given in Table 3.7.

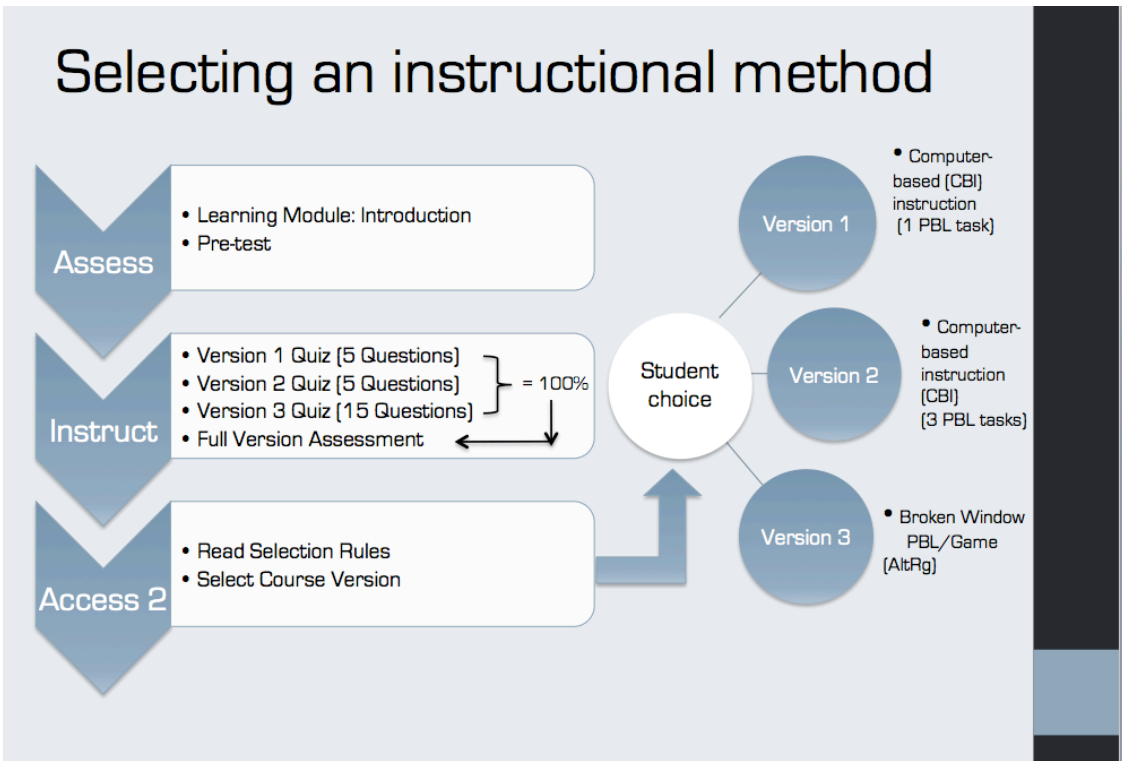

Figure 3.4. Instructional design intervention for the LTEC 1100 course.

Instructional Activities

Undergraduates in LTEC 1100 were introduced to real world issues as a means of fostering their practice of self-regulated learning through problem based learning, game play, or computer-based instruction in distributed learning. Typically in a traditional face-to-face classroom setting, "the instructor exercises significant control over the learning process and is able to monitor student attention and progress closely;" however in a distributed learning setting "students must exercise a high degree of self-regulatory competence to accomplish their learning goals" (Dabbagh and Kitsantas, 2004, p. 40). Though learning in such environments readily provides multiple representations of information and numerous opportunities to manipulate them, it is often up to learners themselves to determine which representations are most helpful, based on their self-knowledge, beliefs and strategic thinking. This carefully considered engagement is indicative of self-regulated learners (Winne and Hadwin 1998; Pintrich 2000; Zimmerman 2000, 2001).

Version One, and *Version Two*. In both these versions of the course, students used Microsoft Office applications to work with self-paced computer based modules to acquire skills in word processing, spreadsheets, and PowerPoint. The goal main goal of the course was to learn general productivity, communication, and Internet-based skills. The online platform used SAMS (Thomson Course Technology, 2007) used Adobe Flash ™ to simulate Microsoft Office while providing specific practice activities and testing. Using that product, students had access to weekly modules that illustrated both basic and advanced skills. Each week, these modules followed the same format of simulated trainings, projects, and exams; however, the content varied depending on the particular concept covered. Figure 3.5 presents the login page for SAMS that students used as a portal to enter the CBI training.

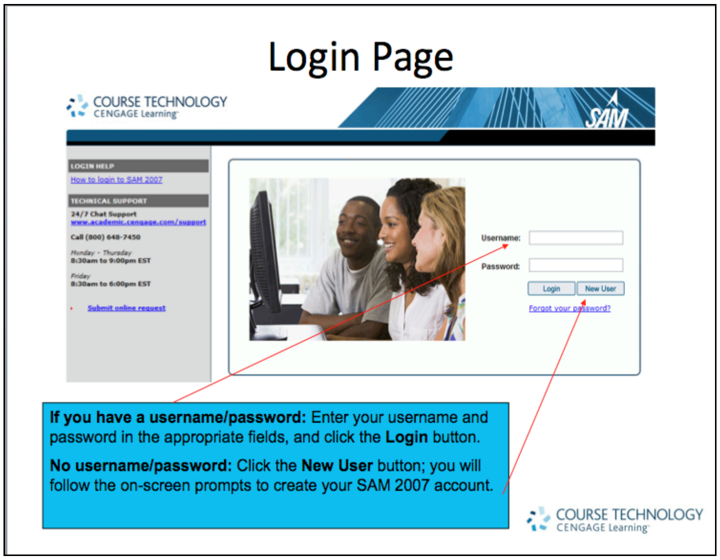

Figure 3.5. SAMS login page (from Thomson Course Technology, 2007).

During simulated trainings, the system provided feedback through features such as *hints,* which provided tips on the process to choose, and *show me,* which demonstrated how the concept should be executed. After the training, a project was available that allowed students to demonstrate what they learned followed through short assessment. Scores are posted in the SAMS grade book. At the end of the week, the module closed and a new weekly module opened. Students were expected to complete each module fully before they moved on to the next. They were also given opportunities to practice previously acquired skills while building onto linked new ones. Focus was on improving performance and mastery of skills. Figure 3.6 presents an example of a simulated training in Word in SAMS.

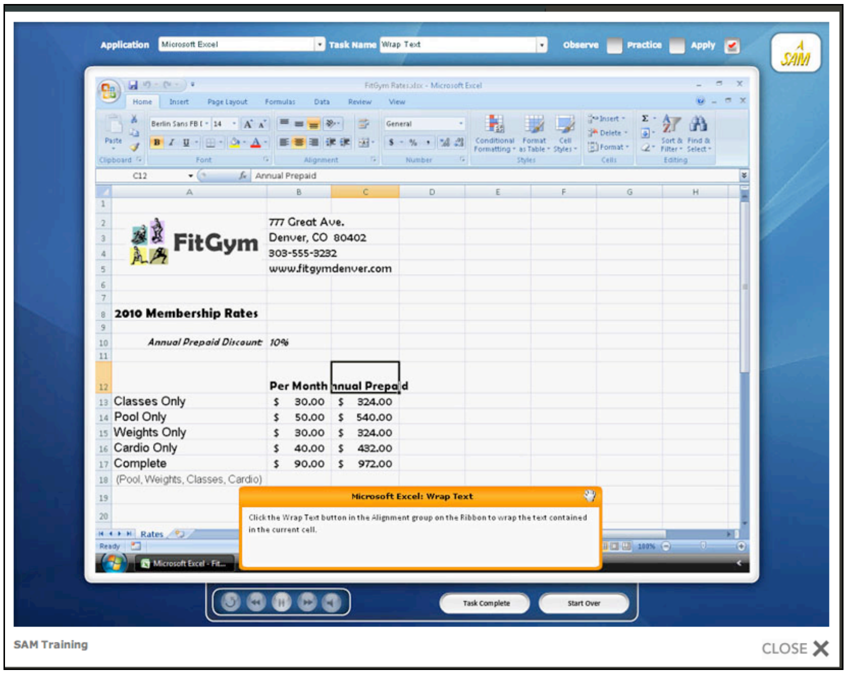

Figure 3.6. Simulated training for Word (Thomson Course Technology, 2007).

In addition to the weekly CBI modules, students were required to work with problem tasks Version 1 students were assigned one PBL task during the middle of the semester. They were required to collaborate within their group to come up with a defensible solution to the issue. In contrast students in Version 3 were assigned three PBL tasks over the course of the semester the expectations for group work were similar. The problem scenarios are presented in Table 3.4.

Version Three: PBL & Game. In this version students played the *Broken Window* AltRG for the first six weeks as previously described. Through the fictional characters, they explored a global issue tied to one of the eight UN Millennium goals and were required to develop a possible solution to one of these complex, ill-structured problems (Warren et al., 2008). Students worked collaboratively to uncover clues as they unraveled the mystery behind the Havenwyrd Associates. The goal of this learning design was to provide students with cognitive and affective experiences that are part of playing such a construct. Figure 3.7 presents examples of the clues posted on through the Havenwyrd Blog,

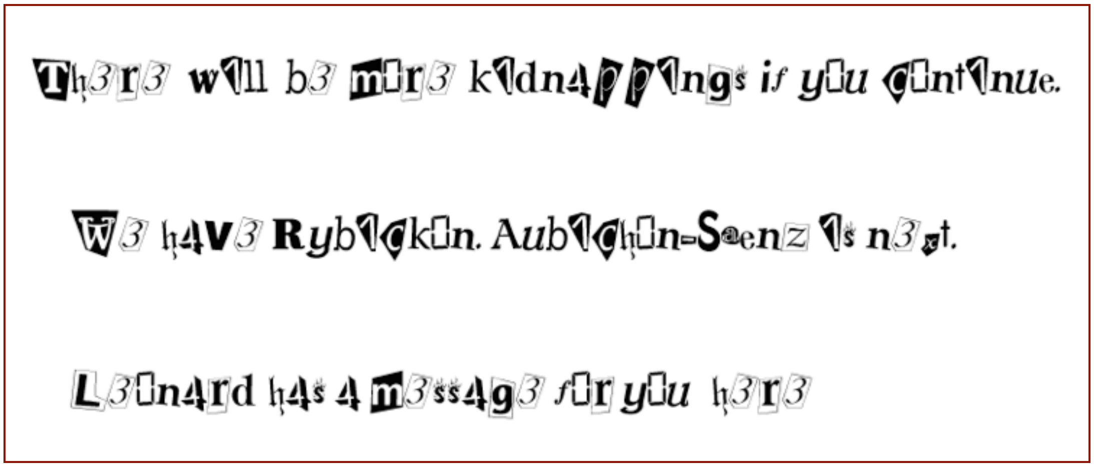

Figure 3.7. Havenwyrd blog entries.

Hidden messages were embedded within images and clickable such as Walter Black's Office desk. As students played the game and developed their own, students were asked by characters to submit their solutions by appropriately using a variety of productivity tools (i.e. Microsoft Word, Excel) in a professional manner. In addition, they were asked to interact with numerous online resources as they prepare documents, present their ideas, and organize course, and game materials. They also developed their own game spaces that were distributed across the Internet. To do this, they researched information and used Web 2.0 tools such as blogs, podcasts, wikis, Facebook (social networks), Twitter, and interact with 3D environments such as Linden Labs' *Second Life* or game worlds such as *World of Warcraft*. Working in small groups called Design Teams, they practiced collaborative problem solving, communication and became familiar with assorted technological tools. In addition, they were required to create research-based reports of their findings and solutions as they also further developed their technology and literacy skills.

Following the end of the first six weeks, students experienced a debriefing period in which they familiarized themselves with PBL and AltRG concepts as well as a basic ADDIE model instructional design process. They then moved on to creating their own AltRG in the next nine weeks by applying the knowledge and skills learned, again working in small groups with a clearly defined method of design, development and implementation. The student teams were provided weekly instructions and materials explaining each step of the instructional design model as they worked together to produce their game. Figure 3.8 presents an example of a weekly instruction posted in the learning management system (LMS) used to help facilitate the design process.

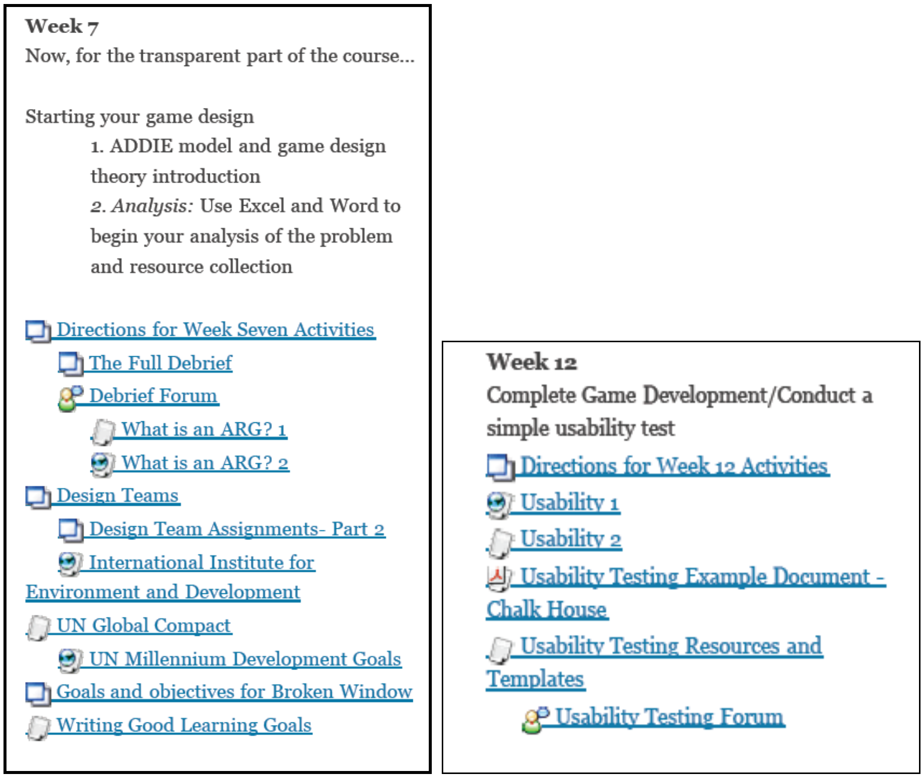

Figure 3.8. Weekly instructions posted for the design process.

The *Broken Window* AltRg was intended to introduce players to a global problem of their choice from the United Nations Millennium Development Goals. They were required to research the problem, devise solutions, pitch ideas, produce design documents, and develop the game. They used their basic technology skills in a more advanced manner to show transfer and to help teach others about the ill-structured problem of their choice. Peer groups reviewed and played the student created AltRGs and provide feedback through survey and interviews to evaluate the success of the designs. The expectation was that students would learn through their individual and group communication and associated struggles as they generated solutions to the ill-structured problems framed within the game narrative. Feedback came from peers, instructor, and in-game characters that challenged and helped learners revise their existing knowledge constructions. The PBL tasks and game structure of the environment lent themselves to motivating students as well as presented opportunities to regulate learning.

Summary

This chapter reviewed the instructional design of this study and the underlying design theory to provide context to the research design, which will be presented in the next chapter. These questions were informed by the pedagogical and instructional design elements, and related instructional activities presented in this chapter.

CHAPTER 4

RESEARCH METHODOLOGY

Introduction

The study examined learner experiences and how students developed and practiced self-regulated learning (SRL) through problem based learning, game play, and computer-based instruction within a distributed learning. The learning design introduced undergraduate students to authentic learning experiences in which student's engaged in collaborative problem solving, self-regulated learning, communication, and critical thinking. Learners participated in activities that were expected to promote higher level thinking to guide them to develop self-directed learning practices.

Given the situated nature of the instructional design and the distributed nature of learning in the course, the variables were heavily intertwined and not easily parsed into components that are easily studied. Therefore, it was necessary to employ a qualitative method of analysis to uncover the salient patterns of how students chose to self regulate. To fully evaluate participant experiences and gain an understanding of the outcomes of the implementation of the design pre- and posttest measures were taken into consideration to evaluate learning outcomes and determine overall student satisfaction with instructional approach. In conjunction with the design-based methodology that guided the course, the research methods used in this study used a method of triangulation to validate the data analysis that came from different sources (Tashakori & Teddlie, 2003). This was intended to build connections to theoretical assertions and claims that transcend local contexts in order to build connections (Dewey, 1938; Messick, 1992; Barab & Squire, 2004). The following focus guided the investigation,

- Guiding Question: How do post-secondary learners self regulate learning and do they practice better self-regulation when learning through problem-based learning and game play rather than computer-based instruction?

    - Sub-focus One: To examine the presence and role of communicative actions in undergraduate instruction and learning and their particular influences on learning, especially in the area of knowledge construction?

    - Sub-focus Two: To investigate when students select their instructional method if it helped improve learning satisfaction.

These questions were used to examine the fifteen categories of self-regulated behaviors as identified by Zimmerman et al., (1992), and examined by Ley and Young (1998). They are presented in Table 4.1.

Table 4.1

Self-Regulated Learning Skills

Goal setting	Environmental structuring
Organizing-Transforming instruction	Goal based interpersonal skills (Individual)
Planning	Goal based interpersonal skills (Group)
Information seeking	Self-monitoring
Keeping records	Self-consequence
Rehearsing & memorizing	Self-reflection
Time management	Self-evaluation
Seeking assistance	

Theory and Practice of Inquiry

The ontological suppositions and epistemological beliefs about knowledge influence an educator's orientation towards classroom practices and their belief about curriculum, pedagogy, and assessment. In order to make sense of phenomena, underlying perspectives must be consistent with the methods employed (Bernstein, 1983). Therefore researcher must seek answers to the following questions "What exists?" "Can we know it?" "If so, by what means can we know?" and "How do we make meaning of things?"

The *objectivist/empiricist/realist* approach to knowing is to state that reality is independent of the knower. Therefore reality, truth, and knowledge are independent of the person's volition and the researcher's subjective bias (Peca, 2000; Brumbaugh, 1966). Knowledge and truth are questions of correspondence that are discoverable through induction and empirical methods. They are absolute and universal (Brumbaugh, 1966). It exists outside the human mind and can be observed, measured and understood through the human senses (Bernstein, 1983), therefore, truth is discovered by inferring generalizations about reality from specific facts to other contexts (Brumbaugh, 1966).

On the other hand, the *relativist/subjectivist* belief in knowledge is that it is subjective and highly changeable. The learner constructs a unique knowledge base that is different but equal to that of other learners (Bruner, 1961). The only real knowledge and truth is in the eye of the beholder; therefore, reality cannot be understood objectively as it is dependent on the tools of human construction and methods of inquiry (Denzin & Lincoln, 2003). Interpretations of phenomenon are thus limited by the subjective biases of the researcher and to the specific context in which they are observed (Denzin & Lincoln, 2003).

In contrast, the *contextualist/social constructivist* view of knowledge is that reality exists, but our understanding of it is imperfect and therefore must be actively and socially constructed by learners. It follows the premise that knowledge is a social product; that is to say, it is an inter subjectively agreed upon creation and contains a shared set of truths that change over time rather than being simply a product individual experience from the senses. It is developed by the dialectical interplay of many minds (Goodman, 1986, p.87).

Locus of control and the manner in which knowledge is processed is therefore with the learner in this conception. They are thus encouraged to generate self-relevant knowledge through critical, interactive, and collaborative inquiry. Constructivist inquiry does not attempt to *control* for the influences of subject or context, but rather *accounts* for them. It acknowledges the influences on interpretation and presents it as fully as possible so that others can draw their own inferences about the usefulness of observed phenomenon. This is based on their situational contexts (Prawat & Floden, 1994). It asserts that optimal learning environments are those in which a dynamic interaction between instructors, learners and tasks provide opportunities for learners to construct their own knowledge through social interaction with others (Brown, Collins & Duguid, 1989). Though there is general agreement on the outcome, which is socially produced knowledge, there is little agreement on what aspects of knowledge lend themselves to negotiation and what it means to negotiate knowledge (Prawat & Floden, 1994, p.37). To better understand such interactions, we look to Habermas.

Learning and Teaching as Communicative Actions. Jürgen Habermas (1981) gives us a better sense of what it means to negotiate knowledge. He refers to communicative actions as “acts oriented to achieving, sustaining and reviewing consensus” (p.17). These communicative actions raise “validity claims” as they claim to be valid or acceptable representations of some facet of the world (Habermas, 1984). They enable us as individuals to become self-aware of knowledge distortions and create shared meaning among participants through social negotiation (Habermas, 1971). This maybe seen as human communication towards particular goals such as getting what one wants, being understood by another, being seen to tell the truth, or to make a personal, subjective claim to truth (Habermas, 1981, 1984; Warren et al., 2008).

According to Habermas (1981) communicative actions have four means of discourse, *strategic* (teleological) actions that learners use to determine the validity of objective knowledge, *constative* actions that allow learners to interactively make and challenge the claims to the validity of objective knowledge, *normative* actions the validity of claims of truth about group, institution, and societal rules, and *dramaturgical* actions that allow individual expression of truth through poetry, painting, music and other artistic and creative forms of expression (Warren, 2009; Warren et al., 2008). “In order for an instructional sequence or unit to be valid all four forms of communicative action must be present. While this may be more complicated for the teacher (and possibly for the learners), it generates more valid communicative actions than other theoretical models, because all aspects of human communication are elicited and addressed” (Warren, 2009; Warren et al., 2008). Therefore, LTCA proposes that each epistemic view is necessary for learning to occur, because the holistic nature of the world is relativistic at times, contextualist at others, and purely objective on occasion. This matches the lived experiences of teachers and students who experience each concurrently or in rapid succession (Wakefield & Warren, 2011). As such, it has much to contribute to instructional design and that the presence of each is necessary for effective learning to occur (Warren, 2009; Warren et al., 2008).

For example, in *The Door* AltRG students were strategically presented a variety of resources: texts, tools, tutorials, and instructions. The ill-structured nature of the problems engage students in *constative* negotiation over the underlying truth (either constructed or acquired) as to which resources are the best to use to devise a solution for the problem on hand. They can accept or reject any or all of the provided resources. *Normative* expectations for the class and the consequences for failure to follow them were communicated through the syllabi e.g. university or college policies related to cheating and plagiarism, and are in the form of the grading procedures or the system of rules governing success in the game. Some, normative guidelines were established by students themselves for participating in teams (Warren, 2009; Warren et al., 2008).

Dramaturgical communicative actions were used in several instances such as students keeping blogs in which they reported their experiences within the course along with their perceptions of self and their identity as a learner within the institution as well as in their own lifeworld. Teams were encouraged to use a variety of expressive media in their problem solutions. Students had to engage with the non-player, fictional characters of the game, and develop an understanding of how to communicate effectively with widely differing personae rather than a single instructor (Warren, 2009; Warren et al., 2008). Therefore, learners' were seen to use all four communicative actions to achieve their learning goals, often concurrently or in rapid succession. In this perspective, assessment took place using all four perspectives within the context of the learning activities and the communicative action that it is grounded in (Warren, 2009; Warren et al., 2008). The design of the study and the methods of instruction and inquiry followed the social constructivist perspective of learning and were informed by LTCA theory.

Context of the Study

The study was designed as a sixteen-week *Introduction to Computer Applications* course in a distributed learning setting for post-secondary learners and was informed by the above research findings.

Participants

There were 34 undergraduate students overall. This included thirteen (13) males and 21 females taking part in the three versions of the course. In college rank other than at the freshman level (2), all years were well represented. This included juniors (12), sophomores (11), seniors (7), and two undeclared. Of these undergraduates, twenty-five (25) students are traditional students and nine (9) are non-traditional. Students represented a variety of majors. These ranged from education, public affairs & community service/criminal justice, psychology, merchandising and hospitality, information/applied technology, kinesiology and health promotion, to arts and sciences.

Version 1. Jeff was a freshman a traditional student but with an undeclared major. He remained a mystery throughout as he seldom reflected in his blog; he did not pass the class. Brad, Kayla, Marie, Ken and Amber were juniors Brad was an undeclared major while Kayla and Marie's major were Education & Family Studies and Information and Applied Technology. They signed up for this version for many different reasons. Brad liked the convenience of working online and was looking for an easy course to add to his schedule. For Kayla and Marie taking an online class was the best option considering there busy schedules and other responsibilities. While Kaiser preferred the convenience and shied away from group work, as he believed his peers were often not reliable. All with the exception of Amber were traditional students.

Steve was a sophomore an undeclared major a traditional student he came to realize he was severely challenged when it came to time-management in a course online. However they all indicated they would consider taking such a course again despite the many challenges. Eddie, Ana, Peggy, and Sam were seniors and looking to graduate they came from the following majors, Education/Kinesiology, Education/Family studies, and Construction/Engineering. They all were non-traditional students with the exception of Sam. They were taking an online class because of its convenience and were familiar with working online. Ana and Peggy had family and work responsibilities. Sam did not pass the class.

Version 2. Jo Ally, and Robin were juniors Education/Kinesiology majors both were non-traditional students. Jo had a full work schedule while Ally had family and work responsibilities and was taking the class online because that was what her schedule allowed. Robin had family responsibilities. Sharon, Dee, Jack, Jake, and Rachel were sophomores their majors were Business and Education/Family Studies they were traditional students with work responsibilities. Stella and Jon were seniors with majors in Education/Kinesiology and Psychology both were traditional students. Stella indicated she would consider taking the class again even though she found the course challenging she relied on family for motivation and support. Jon was challenged when it came to managing his time in an online environment he never responded to the question.

Version 3. Sonya was a freshman with a major in Education she was a traditional student who played soccer during high school. She was very cognizant about teamwork and getting her work done. However this was her first online class and her perceptions of learning were ingrained with acquisition-model-learning. Ben, Dan, Tami, Sally, and Abby were sophomores. Ben was a computer science/applied behavioral analysis major who had come back to school after serving in active duty in Iraq. During his interview he emphasized the importance of acquiring a good education. He enjoyed working with computer programs and new challenges and referred to himself as a computer wizard. Dan, Tami, and Sally were Education/Kinesiology/Health Promotion majors. Dan was a returning student and had spent time in the Air Force, while Sally was an international student and a mother with two kids. While she had taken online classes before Sally was mainly used to traditional ways of learning. Abby was a traditional student and quite comfortable using the Internet and its applications. She demonstrated substantial initiative in getting her group together and working with each other. She acknowledged the challenges and that she got a lot out the course. Tami was a traditional student and was open to trying new ways for learning however she did indicate she was more of a follower than leader and was used to taking cues from the group members she was working with. Of these students, Dan and Tami were unable to pass the course successfully.

Tory, Amelia, Becky, and Tanya were all juniors and came from a range of majors including (Public Affairs & Community Service, Education/Health Promotion, and Arts & Science pre-psychology). They all were traditional students and though challenged throughout the course they demonstrated initiative and motivation working in their groups. Tanya lived at home and in her final blog did mention she would not take this kind of class again. Karen was a senior with a major in Education/Family Development and wanted to try ways other than traditional methods for learning. However in her final reflection she indicated she preferred prescriptive ways of learning and would not take such a course again.

Both Jerry and Emily both were traditional students who had undeclared majors unfortunately Jerry did not do well in the course while Emily was on the team that won the final recognition however both indicated in spite of the challenges they got a lot out of this course and would consider taking such a course again.

Setting

The institution is a large four-year public research institution enrolling more than 36,000 students in southwestern, United States. The student body is diverse with 58% Anglo, Hispanic 17%, African American 13%, Asian 6%, and American Indian 1% (UNT, 2013). The institution has been recognized in the region for its distance learning programs. The course was offered in three versions as follows, *Version 1* (n=11), Computer-based instruction with one PBL task, *Version 2* (n=10) Computer-based instruction (CBI) three PBL tasks, and *Version 3* (n=13) PBL & Game. Students take a pretest and a series of short quizzes, and are informed about course expectations and content. Those scoring under 90% on the pretest and above 60% then determined the instructional method they felt was most suitable to their literacy skills and meta-cognitive level after which they then enrolled in the course version of their choice. Those scoring below 60% were automatically placed in Version 1 and those above 90% were required to enroll in Version 3.

Learning experiences and student self-regulated learning practices were compared between the versions of the course. The virtual classroom was in the Blackboard learning management system (LMS) and the transmedia platform of the distributed setting i.e., the Internet (Warren & Najmi, 2012). Students working mainly with direct instruction used the Thompson Course Technology, SAMS 2007 Adobe Flash platform. The degree of engagement, problem solving and critical thinking required of students varied among each version of the course.

Data Collection

Data was gathered from multiple sources with the objective of understanding the events not only in a particular context but also to reveal the relevance of the findings in a broader context to inform practice. Data is collected using the following,

- *Web logs (blogs):* These were used to determine student practice of self-regulated learning and to document participant learning experiences through PBL and game, or computer-based instruction.
- *Semi-structured interviews*: These were conducted through Wimba (audio/text) LMS conducted in the middle and end of the semester to allow participants to describe their interactions with each other and the course materials.
- *Quantitative scores*: Pre- and posttest measures were used to determine the student achievement outcomes of the implementation of the design on as well as student satisfaction with their chosen instructional method.

In addition, course documents were analyzed including such as email responses, course syllabus, written peer reviews, scoring rubrics, student reports and media presentations which helped to substantiate findings and triangulate data collected in the blogs and interviews. This process was meant to ground assertions made about student perceptions of self-regulated learning practices and their overall views of their learning experiences.

Data Analysis

A qualitative method was employed for data interpretation using computer-mediated discourse analysis (CMDA). Coined by Herring (2004), the emphasis of the method is content analysis through four domains of language i.e., *structure, meaning, interaction*, and *social behavior* (p. 341). The importance of language structure (syntactic) is inherent in word, passage, and character count of the transcripts. These were coded and counted as well and their frequencies were summarized. While numeric in nature, the focus of the method is on understanding semantic patterns of speech acts, utterances, communication, and social dynamics (Herring, 2004). The analysis is influenced by practices recommended by Glaser and Strauss (1967) and Carspecken (1996).

Three researchers triangulated the outcomes of the analysis in several ways. The transcripts from the blogs were first analyzed employing constant comparison coding in which the researcher and two peer coders reviewed, identified and came to 100% agreement on similarities and differences in text which allowed the creation of a set of codes. After additional review and consensus building, they refined the codes followed by grouping similar codes and eliminating others that did not exist in sufficient numbers to be considered valid. These groupings were used to build larger collections or categories with a goal of later development into broad themes evident in the data. Cross checking, review, and mutual agreement were embodied in each step of analysis to validate inferences made by the researchers. Finally, the emergent codes and categories were re-examined and used to support to overarching themes (Glaser & Straus, 1967).

The themes were further verified through meaning fields that were used to clarify interpretations and understand tacit realms within the data (Carspecken, 1996). The process of validly developing these required that the primary researcher work to construct initial possible meanings, sending them to the other researchers for peer debriefing (review and cross-checking), reconstructing the meaning fields from feedback from the other coders after which they are solidified and used to verify the themes. Carspecken (1996) stated, “articulating such tacit claims allows the researcher greater awareness of what is missing, understanding of bias, and other cultural implications” (p. 102). In addition, transcripts from student interviews conducting using Wimba chat sessions were used for comparison with blogs for member checking against participant responses to ensure the validity of coded interpretations.

To grasp the full extent of utterances, speech acts, and the range of student interactions communicative actions are examined to understand how knowledge and skills transfer to newer contexts beyond the immediate task (Ruiz-Primo, Shavelson, Hamilton & Kline, 2002). Barab & Squire (2004) pointed to how evidence-based claims help researchers to move beyond particular design exemplars to address theoretical issues to further knowledge (p. 6).

Finally, to evaluate learning outcomes and overall student satisfaction with the instructional approach in terms of the implementation of design, pre- and posttest measures (quantitative) were compared among groups using a two-sample t-test. Statistical significance was used to determine changes in learning outcomes while select qualitative codes were examined and reviewed to gauge student satisfaction with the instructional approach. Table 6.2 lists the selected codes,

Throughout the analysis, three researchers met in the department lab of the principal designer of the course or online using Adobe Connect. This allowed the coders to identify emergent themes tied to self-regulated learning behaviors, problem-based learning, game, experience, and the computer-based instruction contexts of the course. Microsoft Word and Excel were used to record the emerging codes. After establishing a framework for analysis in a face-to-face setting, the coding meetings were moved online with all three researchers meeting on a weekly basis through Adobe Connect in order to improve the efficacy of the analysis process. Once consensus was reached amongst researchers on the codes and categories, the primary researcher constructed initial themes, which were sent to the other two researchers for review and verification. After agreement was reached, these final themes were confirmed.

Summary

The research methodology used to evaluate data and the methods of data collection grounded in the framework of the research questions. The next chapter describes the findings and results.

CHAPTER 5

RESULTS

Introduction

This chapter presents the results of the study beginning with the process of coding and data interpretation relative to their strength to the total text. These are followed by an overview of each of the themes resulting from this analysis which tie to the research focus of the study,

- Guiding Question: How do post-secondary learners self-regulate learning and do they practice better self-regulation when learning through problem-based learning and game play rather than computer-based instruction?
    - Sub-focus One: To examine the presence and role of communicative actions in undergraduate instruction and learning and their particular influences on learning, especially in the area of knowledge construction?
    - Sub-focus Two: To investigate when students select their instructional method if it helped improve learning satisfaction.

Further the categories and codes within each theme are then discussed and their relative weights within the total texts and how they are situated. Herring (2004) describes the computer-mediated discourse analysis (CMDA) process as "content analysis of multi-modal semiotic systems grounded in empirical textual observations that help shape the questions likely to get asked" (p. 339). The data analysis revealed four overarching themes agreed upon by researchers. A total of 7,697 passages, 232,215 words comprised of 1,242,478 characters were coded yielding 48 categories and 228 unique codes.

presents the amount of text that comprises the categories of each theme for each version of the course.

Table 5.1

Themes and Categories for the Three Course Versions

Version 1

Theme	Categories	Codes	Passages	Total Char
PBL, game play, thinking-outside the comfort zone				
	Cognitive-Puzzlement	2	26	3579
	Critical-thinking	5	89	15302
	Engagement-with-Game	3	8	385
	Engagement-with-Narrative	3	25	1448
	Theme Totals	**22**	**148**	**20714**
Self-regulation, acquisition-model-learning, teacher facilitator				
	SRL	15	1068	226474
	Acquisition-Model-Learning	10	304	34075
	Learning-strategies	2	63	8358
	Literacy	4	52	4843
	Affect	4	61	8087
	Motivation	2	34	2745
	Theme Totals	**37**	**1582**	**284582**
Life-world, identity, understanding worldview				
	Life-world	4	81	12237
	Power-relationships	3	29	3935
	Epistemic-belief	6	123	23032
	Theme Totals	**13**	**233**	**39204**
Technology, learners, situating social presence				
	Online	9	237	31903
	FTF	2	20	2593
	Theme Totals	**11**	257	**34496**
Text Totals		**83**	**2220**	**378996**

Table 5.1 *(continued)*.

Version 2

Theme	Categories	Codes	Passages	Total Char
PBL, game play, thinking-outside the comfort zone				
	Cognitive-Puzzlement	2	23	2329
	Critical-thinking	5	106	15696
	Engagement-with-Game	3	8	695
	Engagement-with-Narrative	3	12	1107
	Theme Totals	**22**	**149**	**19827**
Self-regulation, acquisition-model-learning, teacher facilitator				
	SRL	15	829	139618
	Acquisition-Model-Learning	10	466	61307
	Learning-strategies	2	62	9414
	Literacy	4	48	5291
	Affect	4	63	9776
	Motivation	2	41	5135
	Theme Totals	**37**	**1509**	**230541**
Life-world, identity, understanding worldview				
	Life-world	4	115	15247
	Power-relationships	3	43	5929
	Epistemic-belief	6	107	19657
	Theme Totals	**13**	**265**	**40833**
Technology, learners, situating social presence				
	Online	9	217	28404
	FTF	2	13	1189
	Theme Totals	**11**	**230**	29593
Text Totals		**83**	**2153**	**320794**

Table 5.1 *(continued)*.

Version 3

Theme	Categories	Codes	Passages	Total Char
PBL, game play, thinking-outside the comfort zone				
	Cognitive-Puzzlement	2	40	3431
	Critical-thinking	5	71	8741
	Engagement-with-Game	3	176	20259
	Engagement-with-Narrative	3	180	28008
	Student-AltRG	9	254	30480
	Theme Totals	**22**	**721**	**90919**
Self-regulation, acquisition-model-learning, teacher facilitator				
	SRL	15	1226	137216
	Acquisition-Model-Learning	10	605	48805
	Learning-strategies	2	2	43
	Literacy	4	18	1152
	Affect	4	101	8619
	Motivation	2	58	4899
	Theme Totals	**37**	**2010**	**200734**
Life-world, identity, understanding worldview				
	Life-world	4	25	2798
	Power-relationships	3	17	1207
	Epistemic-belief	6	9	813
	Theme Totals	**13**	**51**	**4818**
Technology, learners, situating social presence				
	Online	9	220	23828
	FTF	2	27	2137
	Theme Totals	**11**	**247**	**25965**
Text Totals		**83**	**3029**	**322436**

To determine how much text each category represents, the percentage of characters and the percentage of passages of each category were calculated and averaged. For example, In Version 1 Brad's response to describing his approach to goal setting consisted of a phrase, “I pretty much plan them out, like cross out the goals that I completed.” In contrast, Kayla's response was, I set goals for myself during the week and then on the weekends I went back over the assignment to make sure I didn’t want to make any changes before submitting them. Therefore, some students may reflect on a certain aspect of their experience while others response to the topic maybe shorter or consist of no response at all. Similarly, some codes may occur more times in the text than others.

The resulting passage/character mean percentage was used for further interpretation of text. The discussion for analysis will focus on percent of text of theme rather than the percent of the total text. To maintain clarity of discussion, the computer-based instruction (CBI) – Version 1 (One PBL task) and computer-based instruction - Version 2 (Three PBL tasks) are referred to as Version 1 and Version 2. While the problem-based learning and alternate reality game (AltRG) version of the course will be referred to as Version 3.

Description of Themes

This study examined learner experiences and the impact on self-regulated learning in distributed learning when students were motivated by problem-based learning, game play, or computer-based instructional approach. The research focus of the study helped shape the analysis of the transcripts (blogs & interviews), which led researchers to identify four overarching themes of *PBL, game play, thinking outside the comfort zone*, *Self-regulation, acquisition-model-learning*, *teacher facilitator, Life-world, identity, understanding worldview*, and *Technology, learners, situating social presence*. A short introduction to each theme and how it relates to self-regulated learning follows.

The first theme *PBL, game play, thinking outside the comfort zone* contained codes and categories that related to problem solving and playing the game such as *cognitive puzzlement, critical thinking, engagement with game and narrative*. The degree of problem solving and level of play required of students varied among each version of the course based on the instructional approach that was used. Students in Version 1 worked with weekly CBI modules and were required to solve one PBL task, students in Version 2 worked with weekly CBI modules and 3 PBL tasks, and students in Version 3 worked with PBL tasks and game through out the semester. The three different approaches exposed students to different levels of complexities and required different levels of engagement and effort. The next theme, *Self-regulation, acquisition-model-learning, teacher facilitator*, provides insight to the central question of the study. The codes and categories of *self-regulated learning skills, acquisition-model-learning, learning strategies, literacy, affect, and motivation* represent the attributes that influence student learning and reveal how students differ in their learning practices among the three versions of the course based on their respective instructional approaches.

The third theme, *Life-world, identity, understanding worldview,* demonstrates the influence of beliefs and value systems on the individual learner. It was not possible to examine in full the impact of these attributes on student learning as their scope was beyond this study. However, these attributes provide evidence of some of the systemic influences that shaped student learning in the course that may impact learners in other courses as well as the complexities related to evaluating self-regulation. The codes and categories within this theme of *Life-world, power relationships*, and *epistemic-beliefs* reveal how such influences shape student learning.

The final theme *Technology, learners, situating social presence* shed light on the tensions and successes that students face when learning with technology. The categories *Online-Learning* and *Face-to-Face Learning* within this theme reveal the dynamics of learning in an online environment in terms of navigating the environment and communicating. These diverse codes and categories from the each of the above themes come together to influence and shape learner experiences. Figure 5.1 provides a visual representation of the overall text for each theme and displays the weights of the categories that comprise them.

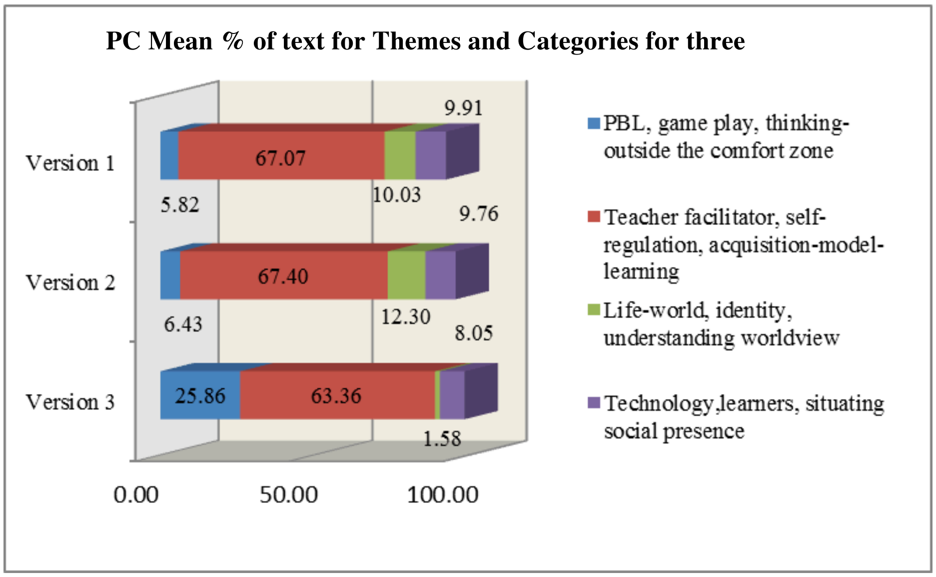

Figure 5.1. PC Mean % of text for themes and categories for the three course versions.

Theme: *PBL, Game Play, Thinking Outside the Comfort Zone*

This represents the smallest portion of total text in Version 1 and Version 2, but is the highest in Version 3. The P/C Mean percentage is 5.82% (Version 1), 6.43% (Version 2), and 25.94% (Version 3). The theme includes four categories comprised of 13 unique codes with (721), (148), and (149) passages, including (90,919), (20,714), and (19,827) characters of text in each version respectively. The categories are *Cognitive-Puzzlement*, *Critical-Thinking, Engagement-with-Game,* and *Engagement-with-narrative*. Figure 5.2 provides an overview of the theme and categories.

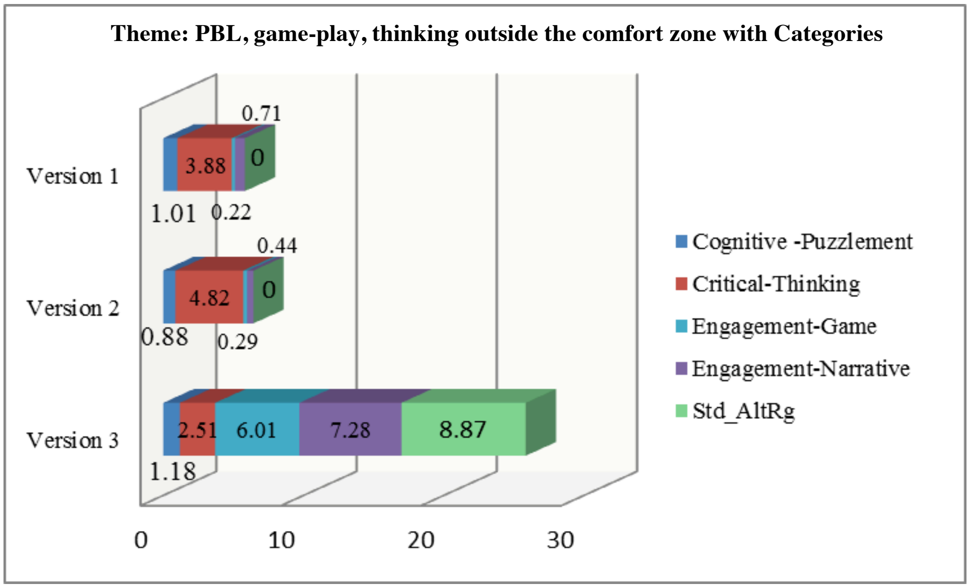

Figure 5.2. Theme: PBL, game play, thinking outside the comfort zone and categories.

Table 5.2 presents the percent of category, percent of theme, and percent of total text of the categories in this theme for each version of the course.

Table 5.2

Theme PBL, Game Play and Thinking Outside the Comfort Zone Categories for the Three Course Versions

Version 1

Categories	Codes	Passages	Total Char	PC Mean% of Theme	PC Mean% of Text
Cognitive-Puzzlement	2	26	3579	20.78	1.01
Critical-thinking	5	89	15302	79.22	3.88
Total (PBL)	**7**	**115**	**18881**	**100.00**	**4.89**
Engagement-Game	3	8	385	22.62	0.22
Engagement-Narrative	3	25	1448	77.38	0.71
Total (Game)	6	**33**	**1833**	**100.00**	**0.93**
Theme Total	**13**	**148**	**20714**	**100.00**	**5.82**

Version 2

Categories	Codes	Passages	Total Char	PC Mean% of Theme	PC Mean% of Text
Cognitive-Puzzlement	2	23	2329	15.38	0.88
Critical-thinking	5	106	15696	84.62	4.82
Total (PBL)	**7**	**129**	**18025**	**100.00**	**5.70**
Engagement-Game	3	8	695	39.28	0.29
Engagement-Narrative	3	12	1107	60.72	0.44
Total (Game)	6	**20**	**1802**	**100.00**	**0.73**
Theme Total	13	**149**	19827	100.00	**6.43**

Version 3

Categories	Codes	Passages	Total Char	PC Mean% of Theme	PC Mean % of Text
Cognitive-Puzzlement	2	40	3431	32.11	1.18
Critical-thinking	5	71	8741	67.89	2.51
Total (PBL)	**7**	**111**	**12172**	**100.00**	**3.70**
Engagement-Game	3	176	20259	27.29	6.01
Engagement-Narrative	3	180	28008	32.54	7.28
Student-AltRg	9	254	30480	40.17	8.87
Total (Game)	15	**610**	**78747**	**100.00**	**22.16**
Theme Total	**22**	721	90919	100.00	**25.86**

The level of abstract thinking required and the level of complexity of the problem tasks were different for each of the course versions as a result students engaged with the course content differently and were required to problem solve at varying levels. Version 1 students faced the least complex task (1PBL task) followed by Version 2 (3 PBL tasks) while in Version 3 the game elements required students to function at much higher levels of abstraction. Detail of text representation of categories and codes with percent of category, text, and theme are presented in Table 5.3.

Table 5.3

Theme PBL, Game-Play, Thinking Outside the Comfort Zone Categories and Codes – Version 1

Version 1

Cognitive-puzzlement			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Problem solving	22	3200	87.01	8.57	0.88
	Tension	4	379	12.99	1.02	0.13
Cognitive-Puzzlement	2	**26**	**3579**	**100.00**	**20.78**	**1.01**
Theme Total	**13**	**115**	**18881**	**100.00**	**100.00**	**4.89**

Critical-thinking			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Making-sense	25	3718	26.19	20.72	1.01
	Reasoning	35	6723	41.63	33.02	1.62
	Discrimination	7	1561	9.03	7.18	0.35
	Compare-Contrast	14	2528	16.13	12.78	0.63
	Underst-point-view	8	772	7.02	5.52	0.27
Critical-thinking	**5**	**89**	**15302**	**100.00**	**79.22**	**3.88**
Theme Total	**7**	**115**	**18881**	**100.00**	**100.00**	**4.89**

Table 5.3 *(continued).*

Engagement-Game			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Learn-play (role-play)	6	309	77.63	17.52	0.17
	Game-attitude	0	0	0.00	0.00	0.00
	Game-challenge	2	76	22.37	5.10	0.05
Engagement-Game	**3**	**8**	**385**	**100.00**	**22.62**	**0.22**
Theme Total	**6**	**33**	**1833**	**100.00**	**100.00**	**0.93**

Engagement-Narrative			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Work-client	14	790	55.28	42.76	0.40
	Suspension-disbelief	7	436	29.06	22.50	0.20
	Story-line	4	222	15.67	12.12	0.11
Engagement-Narrative	**3**	**25**	**1448**	**100.00**	**77.38**	**0.71**
Theme Total	**6**	**33**	**1833**	**100.00**	**100.00**	**0.93**

Version 1

Cognitive-puzzlement. The first category represents 21% of the text of theme and is comprised of two codes *Problem-solving* and *Tension*. Students in this version worked with weekly CBI modules, which meant navigating the different levels of the SAMS software, and the Blackboard interface. This in itself proved to be challenging for many students as they were not used to learning without instructor direction, others misjudged their own computer skill levels and the time needed to complete the different tasks. With the result they ended up spending more time than they had estimated some were unable to complete the weekly modules missing certain sections. Incomplete units were more evident in this version than other versions especially at the beginning of the semester. Additionally, students in this version were assigned one problem task, mid-semester and were required to find a defensible solution while collaborating with a group member.

Amber found *problem-solving* difficult and described it as, "…it was a loosely defined problem not having an actual illustration to base our answer upon we had to assume a lot of information." She reflected about it saying,

> Maybe just trying to discern for myself if the information that the problem gave could even be true like before i would look at a problem and say this is what it is, this [is] how it has to be. Not thinking that maybe the problem is wrong maybe there's something in the problem [,] that is you know is not correct.

Likewise, Marie described her problem solving experience as, "I did learn new strategies because I had to think about ways to help myself in this course. Solving problems on my own brings out all the senses in me. It makes me work extra hard and outside my comfortable zone." Although the level of difficulty of the problem task was the lowest among all three versions of the course both students were perplexed and had to stretch their thinking to find a solution. The problem scenarios challenged students' as did the methods needed to solve them they were different from what students believed to be true about learning.

Further working with group members online proved not to be a simple task. Students faced *tension* and cognitive stress some more than others. Version 1 students faced moderately less cognitive stress in contrast to students in other versions of the course as evident by percent of the text of theme however the stress was still unnerving. Kayla and Marie juniors described the tension of working with a single problem task as, "…difficult…to figure out everything by myself and not having the professor show me made it hard[er]." both students were challenged by the greater level of autonomy required for learning online.

Critical thinking. The second category represents 79.22% of the text of theme and consists of five codes *Making-sense, Reasoning*, *Discrimination, Compare-contrast,* and *Understanding-point-of-view*. Students found themselves employing a range of strategies at varying degrees to understand course material and online resources. Brad described his approach towards *making-sense* of course content as, "When I was working on my own…the module for the PBL task wasn't available anymore, so I went on like what I basically remembered, and what the solution to the problem meant from what I remembered."

Others tried to connect information using *reasoning* Amber realized she might understand better by, "…. look[ing] at a problem from different angles and work[ing] through all the info logically". In her blog she reflected, "…maybe I don't always do that try to look at a problem from several different ways before I decide on a course of action." She came to realize ways she could improve her approach to problem solving and learning. Casey utilized the strategies of *discrimination* and *compare-contrast* she described her approach as,

> When information comes from different sources it's hard to know what's true and what's not. When I research on the [I]nternet I choose about 3 different websites I trust and compare them. Do they all say the same thing, do they all say something different, [are they similar or different]. I also research books, which usually leads me in the direction of correct information.

Marie mentioned, "Working in teams taught me that everyone thinks and finds solutions differently." After working with others she realized the benefit of shared ideas and *understanding-point-of-view* in particular how different point of view could help in finding a defensible solution to the problem task. In Version 1 students made greater use of strategies such as *Compare-contrast* and some *Discrimination.* They were greatly challenged by the weekly CBI modules and one PBL task with the result they represented moderately high on code: *Reasoning* much higher than students in Version 3 as indicated by percent of the text of theme.

Engagement-with-game. The third category represents 22.62% of the text of theme and it has three unique codes *Learning-thru-play*, *Game-attitude*, and *Game-challenge*. These codes revealed student attitudes about learning through play, their preferences for games, and the challenges they foresaw thereon. Brad during his interview expressed his approval of the idea of learning through play as, "I would learn better through game cause it would be entertaining so I'd be having fun and learning at the same time." However, he found himself changing his views mid semester describing his challenge with learning through the problem task as, "… the most difficult thing about this course was the lesson assignment." His perceptions of learning through play changed he realized traditional modes of learning to better match his expectations of learning that they required less investment of time and effort.

Engagement-with-narrative the fourth category represents 22.62% of the text of theme, and consists of three codes *Working-for-client*, *Suspension-of-disbelief*, and *Storyline*. In this version students were required to work with one PBL task assigned mid-semester. When it came to problem solving and finding a defensible solution one that would satisfy all the characters in the problem scenario students found they were challenged. Kayla a junior described her struggle to engage and understand what was required for the problem task stating, "If you are talking about the PBL task and the project with the client being Mr. Leto and Mr. Hunter, it was difficult. I think I thought too much into because we were just given the basic ideas for the problem." She expressed her view of how learning should be more teacher directed and her need for further scaffolding during the activity. She was unable to truly engage with the characters of the problem scenario or fully understand their needs. In this version few students engaged in role-play with the characters of the problem task.

Version 2

In Version 2 students were tasked with working with weekly CBI modules and three PBL tasks assigned over the course of the semester. The level of difficulty increased with each problem task i.e., PBL task 1 being easier than PBL task 2, and PBL task 2 being easier than PBL task 3. They were required to work in groups to find defensible solutions i.e., discuss and negotiate the one right answer for each task. Details of text representation of categories and codes with percent of category, theme, and total text are presented in Table 5.4.

Table 5.4

Theme: PBL, Game Play, Thinking Outside the Comfort Zone

Categories and Codes – Version 2

Version 2

Cognitive-puzzlement **Categories**	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
	Problem solving	19	1843	80.87	12.48	0.71
	Tension	4	486	19.13	2.90	0.17
Cognitive-Puzzlement	2	**23**	**2329**	**100.00**	**15.38**	**0.88**
Theme Total	**13**	**129**	**18025**	**100.00**	**100.00**	**5.70**

Table 5.4 *(continued)*.

Critical-thinking			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Making-sense	40	6802	40.54	34.37	1.96
	Reasoning	23	3184	20.99	17.75	1.01
	Discrimination	15	1527	11.94	10.05	0.57
	Compare-Contrast	6	630	4.84	4.07	0.23
	Undstand-point-view	22	3553	21.70	18.38	1.05
Critical-thinking	**5**	**106**	**15696**	**100.00**	**84.62**	**4.82**
Theme Total	**7**	**129**	**18025**	**100.00**	**100.00**	**5.70**

Engagement-Game			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Learn-play (role-play)	6	567	78.29	30.73	0.22
	Game-attitude	2	128	21.71	8.50	0.06
	Game-challenge	0	0	0.00	0.00	0.00
Engagement-Game	**3**	**8**	**695**	**100.00**	**39.28**	**0.29**
Theme Total	**6**	**20**	**1802**	**100.00**	**100.00**	**0.73**

Engagement-Narrative			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Work-client	12	1107	100.00	60.72	0.44
	Suspension-disbelief	0	0	0.00	0.00	0.00
	Story-line	0	0	0.00	0.00	0.00
Engagement-Narrative	**3**	**12**	**1107**	**100.00**	**60.72**	**0.44**
Theme Total	**6**	**20**	**1802**	**100.00**	**100.00**	**0.73**

Cognitive-Puzzlement. This category represents 15% of the text of theme and is comprised of the codes *Problem-solving* and *Tension*. Stella reflected on her *problem solving* approach as, "You have to research the issue, brainstorm solutions, figure out the best solution, and work your way from there. Once you have picked the best solution you have to explain to the client why you have chosen it and how it will be successful." She went on to elaborate on her strategy,

> I would type up a few solutions numbered from 1-5 best to worst. I would research each solution and come up with different ways each would work. After I narrowed it down to 2[,] I would then choose the one I thought would be best that correlated with the issue.

She found herself adopting a more logical and systematic approach to solving the problem task and finding a solution. However, other students found working with the PBL tasks with group members was challenging Jack described his experience as "… not really the only anxious moments that I have had on the PBL's hear back from my partner and make sure things are ready to go just to post it whatever." He found the problem task itself not to be difficult but working with group members communicating effectively online to be hard. The unreliability of peers not coming through on time with their share of the assignment was stressful and created t*ension*.

Critical thinking. This category represents 84% of the text of theme and has five codes *Making-sense, Reasoning*, *Discrimination, Compare-contrast,* and *Understanding-point-of-view*. Student approach to critical thinking in this version was much different from students in the previous version. Sharon applied both *making-sense* and some *discrimination* she described this as,

> … reading through information on more than one website to see if the information [was] consistent" and "you can tell if something is real or true by looking at how the website is set up. Does it have appropriate links or when was the last time the website was updated?

Robin found utilizing a systematic approach to solve and understand the problem task was more helpful. She described her approach as, "I learned to think about the problem, write down ideas, organize them and then work to find the solution with a partner." In this version students made greater use of strategies such as *making-sense, reasoning,* and *understanding-point-of-view* in order to understand information.

Engagement-with-game. This category represents 39.28% of text of the theme and consists of the codes *Learning-thru-play*, *Game-attitude*, and *Game-challenge*. Not all students saw play as a means to learn most related it learning to traditional, prescriptive methods of learning. Amber described her thoughts about how she preferred not to learn through play saying, "I saw that in Version 3 and looked at it a bit…with me as unsure as I am and as much as I have to struggle with each application I just found it a little bit intimidating." She expressed her hesitation of learning through ways that did not match her beliefs about learning. Her perceptions about learning and play mirrored what most students believed**.** Version 2 students did not respond to codes *game-attitude* and *game-challenge*.

Engagement-with-narrative. This category represents 60.72% of the text of theme with codes *Working-for-client*, *Suspension-of-disbelief*, and *Storyline*. With the opportunity to work with three PBL tasks in Version 2 students have several chances to interact with client needs i.e., the characters in the story of the problem scenario. However few recognized that the characters represented an opportunity for the exchange of ideas with peers and social negotiation to decide on a solution that would work. Sharon confessed, "I did not know we worked with a client?" She did not catch on to the concept of the client-worker relationship.

Version 3

In contrast in Version 3 students worked with ill-structured problems engaging with the fictional research associates of Havenwyrd Research Institute who were tasked with solving global issues related to the UN Millennium goals. In order to move forward in the game they were required to build the narrative through their perceptions of what was happening. In this version students were required to think abstractly at a much higher level. Details of text representation of categories and codes with percent of category, theme, and total text are presented in Table 5.5

Table 5.5

Theme: PBL, Game Play, Thinking Outside the Comfort Zone Categories and Codes - Version 3

Version 3

Cognitive-Puzzlement			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Problem solving	19	1842	50.59	16.13	0.60
	Tension	21	1589	49.41	15.99	0.59
Cognitive-Puzzlement	2	**40**	**3431**	**100.00**	**32.11**	**1.18**
Theme Total	**22**	**111**	**12172**	**100.00**	**100.00**	**3.70**

Critical-thinking			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Pass ages**	**Char**	**Category**	**Theme**	**Text**
	Making-sense	40	4601	54.49	36.92	1.37
	Reasoning	29	4052	43.60	29.71	1.10
	Discrimination	0	0	0.00	0.00	0.00
	Compare-Contrast	0	0	0.00	0.00	0.00
	Undstand-point-view	2	88	1.91	1.26	0.05
Critical-thinking	**5**	**71**	**8741**	**100.00**	**67.89**	**2.51**
Theme Total	**7**	**111**	**12172**	**100.00**	**100.00**	**3.70**

Table 5.5 *(continued)*.

Engagement-Game			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Learn-play (role-play)	63	6757	34.57	9.45	2.07
	Game-attitude	49	7186	31.66	8.58	1.91
	Game-challenge	64	6316	33.77	9.26	2.02
Engagement-Game	**3**	**176**	**20259**	**100.00**	**27.29**	**6.01**
Theme Total	**15**	**610**	**78747**	**100.00**	**100.00**	**22.16**

Engagement-Narrative			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Categor y**	**Them e**	**Text**
	Work-client	40	2988	16.45	5.18	1.12
	Suspension-disbelief	76	12048	42.62	13.88	3.11
	Story-line	64	12972	40.94	13.48	3.05
Engagement-Narrative	**3**	**180**	**28008**	**100.00**	**32.54**	**7.28**
Theme Total	**15**	**610**	**78747**	**100.00**	**100.00**	**22.16**

Cognitive Puzzlement. This category represents 32% of the text of theme and is the highest for all versions. It has the codes *Problem solving* and *Tension*. Emma described her experience at *problem-solving* as, “You have to figure things out yourself, solve problems…sometimes there’s not always one, clear answer. ” She went on to add, “I have learned that when playing, you have the freedom to be creative and come up with your own ideas and somewhat predict your own outcome of the game you are playing.”

In Version 3 students faced the highest level of *tension* and cognitive stress. Sonya, described this as,

> The most difficult part was having no type of instruction or guidance in the Broken Window part of the course. I understand that was part of the class to understand things without the help of a professor, but this class took it to an extreme level.”

Tanya attributed her success at completing the assignments successfully to her ability to manage when under stress she described this as,

> I think what motivated me the most was stress and adrenaline. When the due date for an assignment was passed and I wasn't finished I would get stressed of course. So I think that is what kept me going.

As students engaged with the game narrative and collaborated with group members to find solutions to the ill-structured tasks they were challenged and faced the highest levels of cognitive stress over all versions of the course.

Critical-thinking. This category represents 67.89% of the text of theme and consists of five codes *Making-sense, Reasoning*, *Discrimination, Compare-contrast,* and *Understanding-point-of-view*. As students navigated the game world and information from multiple sources they found themselves finding ways to understand. Tami described her efforts at *making-sense* of the game and ill-structured tasks she said, "I just kept looking at the Moodle account and kept looking at things, I was like I guess this is what they're talking about, and I just tried to put them together and I thought based on all the blogs and other stuff, that was made most sense to me." Similarly, Sally described her attempts as "I try to click on every page or image to find some clues."

Sonya took a more logical approach and tried to apply reasoning to the facts that she uncovered. She described her approach as,

> I am trying to make sense of it all by using outside resources and trying to connect the dots in multiple different ways to not leave any possibility out of my mind…the lack of information in the email is a red flag. Like who he just said a small University in Delaware (Baxter misspelled it Deleware even though he supposedly lives and works there)…

Thus students were challenged in communicating with the game characters, uncovering information, interacting with each other as they worked on finding answers and solutions. This group relied heavily on strategies of *making-sense* and *reasoning* but showed no representation for strategies such as *discrimination* and *compare-contrast*.

Engagement-with-game this category represents 27.29% of the text of theme. It has three unique codes *Learning-thru-play*, *Game-attitude*, and *Game-challenge*. Jerry described the kind of games he liked to play as Call of Duty, Halo Wars, and Empire Earth because he found them to be interactive he commented, “They allow you to build a kingdom from a few soldiers and the months and months of time finally pay off when you invade another kingdom and conquer.” He found them to be entertaining and that it helped him improve his existing game strategies. However when it came to engaging and playing the AltRG game he reflected, “starting off is kind of hard because you have no idea what to do.” He found the level of engagement required to interact with the fictional characters of the Havenwyrd Institute difficult and was not very successful in responding to the client needs.

Similarly, Tanya acknowledged that she was not much of a gamer and preferred active games such as Dance-Dance Revolution and Guitar Hero. To her “school [was] not designed to be easy and fun, it [was] hard work. Games are supposed to be mostly fun and easy going.” However, as the AltRG game progressed, she found her attitude towards games and learning changing she described this as,

> I have to admit this week I have surprised myself. I have not really been a very creative person but this project has sparked an interest. I really hope that this newfound creativity does not fade when this project is over. Playing is an exciting way to learn about what is being taught.

Whereas, Abby revealed she enjoyed playing cards and board games because of the healthy competition and good conversation that it allowed her to have with friends. She described her experience of learning through play and the challenge of the game as "…with playing and developing the ARG, I have learned a lot. For one, I learned a different meaning for the word 'play!' Now, I am seeing 'play' as more of just a verb meaning, you are doing something and figuring it out; you are participating." Several students in this group revealed they were slightly more flexible in their views especially when it came to trying alternate ways of instruction.

Engagement-with-narrative. This category represents 32.54% of the text of theme and consists of three codes *Working-for-client*, *Suspension-of-disbelief*, and *Storyline*. In contrast to Version 1 and Version 2, several students in Version 3 allowed themselves to engage with the characters, which required that they suspend their disbelief about the fictional nature of the characters played by the instructor a.k.a. the instructor. Ben in *Broken Window* section described this as,

> I try to communicate as much as possible when possible. I have found a few clues the specifics I will not mention because I do not want other groups to find out before my group does, but I think that its showing that possibly *c0d4* may not be as bad as they are portrayed, though not right in their actions. I have been getting to caught up in finding out who is doing what and need to focus more on the disease part of it as well.

Abby described her engagement with the narrative as, "I actually thought when I read the emails from our teacher, that there was a real hacker into our system." While Becky reflected on the game narrative and her progress she wrote,

> So far everyone has gone missing or into hiding. We still have contact with Chinua, Siri, and Catherine, and possibly Javier. We are still receiving

information about c0d4, some in which I have yet to be able to piece together. All that I know about their research so far is that it starts with waterborne diseases. I will need a good day or two to piece the rest together.

Student designed AltRG

In Version 3 in addition to playing the alternate reality game students were assigned the task to develop their own AltRG game. Codes for the student designed AltRG represents 40.17% of the text of theme and includes nine unique codes. The code names and detail of the weights are given in Table 5.6.

Table 5.6

Theme: PBL, Game Play, Thinking Outside the Comfort Zone Category: Student-AltRG - Version 3

Version 3 Categories	Codes	Passages	Total Char	% of Category	% of Theme	% of Text
	Design-expectations	11	805	3.49	1.41	0.30
	Goal-setting	14	1533	5.27	2.12	0.47
	Planning	13	1522	5.06	2.03	0.45
	Design-challenge	44	5285	13.79	5.49	1.24
	Design-frustrations	4	279	9.12	3.78	0.76
	Game-narrative	26	2360	4.66	1.83	0.43
	Use-technology	16	1665	5.88	2.37	0.52
	Player-engagement	29	2836	10.36	4.18	0.91
	Design-elements	97	14195	42.38	16.96	3.78
Student-AltRG	**9**	**254**	**30480**	**100.00**	**40.17**	**8.87**

On designing their own AltRG game, students found the prospect of designing an entire game scenario and playing the role of Puppetmaster exciting. They realized that being a Puppet master was challenging; it was not just about controlling the game but also required that they successfully lead players to the next level. Several students found designing a game to be challenging and felt it was important that players find the game interesting, are engaged, and can relate to their game. Abby said, “our main goal was to make out players be able to understand it and be able to use the sources better than we could in the game we played."

Liz described her group's expectations for their game as, "It is something I am familiar with. They are expected to learn which site on campus is the most polluted. They should also learn communication and problem-solving skills while playing the game." Others looked forward to developing the game and seeing it work. Sonya wrote, "[I am] looking forward to playing another teams game and getting feedback on ours." One group expressed disappointment at not getting timely feedback on their game from their peers. Thus several students were engaged with the idea of developing their game and having their peers play it. Design elements that were considered important by most students were player engagement, design detail, the problem task, and game resources. Figure 5.3 presents the codes in category: Stud-AltRG.

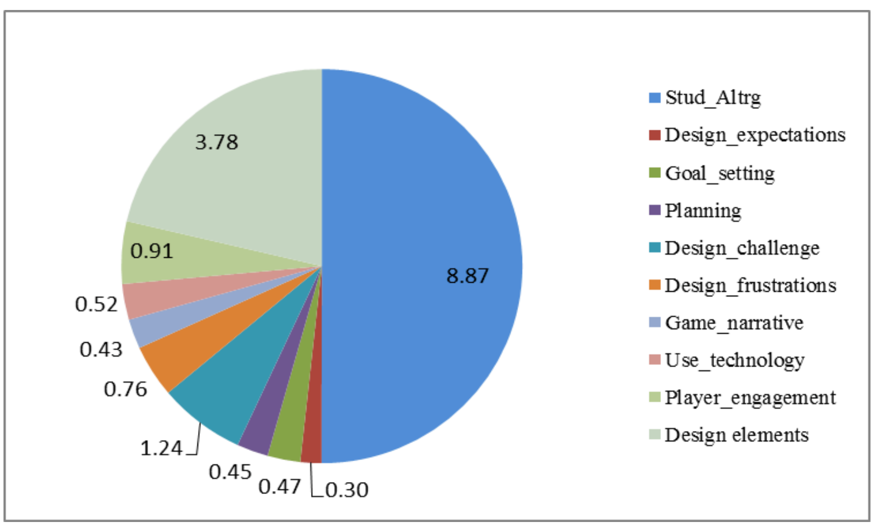

Figure 5.3. Category: Stud-AltRG and codes – Version 3.

Table 5.7

Team Abby - Perceptions of Designing an AltRG

Team Abby

Design-expectations	"I've never really done anything like this before, so I think that it will be really interesting to make a whole scenario where I can basically control everything. I'm excited to see where my ARG goes with me as the puppetmaster!"
Goal-setting	"I have found that it is much easier and more effective for me to sit down for a couple of hours and work on the development and design of the game."
Planning	"You must carefully plan and pace the weeks and activities so that the players are 1) not overwhelmed and 2) not bored!"
Design-challenge	"I can say, what I have found challenging about designing something for others is that it is really hard to know your audience and their interests. "
Design-frustrations	"I had originally skipped this blog because we did not receive any feedback from from the group that was supposed to review our game."
Game-narrative	"Once the rest of the group was brought in, it was nice to say, "Ok, we will EACH develop a character" rather than I will develop all 5 on my own."
Use-technology	"Also, Facebook proved useful also when developing our game." This became a source that we used to communicate information to our players about different characters."
Player-engagement	"A game that I develop may be incredibly interesting and something that would keep my attention. However, when played by a peer of mine, it may be completely irrelevant and they could lose interest instantly. "
Design-elements	"The main thing that I have learned about creating this game is that you have to be consistent throughout. For example, if you have put something in your design document, you must also make sure that this is obvious and will come out in your game. "

Therefore, theme *PBL, game play, thinking outside the comfort zone* reveals student experiences of working with the ill-structured problems, playing the alternate reality game (AltRG), and the collaborative endeavors undertaken during the course over all three versions of the course. The codes and categories provide insights into student engagement with the tasks, the strategies they used, the challenges they faced, and the critical thinking skills they applied. Students faced different levels of complexities, which required them to use varying levels of abstract thinking based on the version of the course they enrolled in. In sum, this theme touches upon student engagement and motivation with problem based tasks, the narrative of the game, and the challenges of thinking and learning outside the comfort zone.

Theme: *Self-Regulation, Acquisition-Model-Learning, Teacher Facilitator*

This theme represents the largest segment of text in this study. The P/C Mean percentage is 67.07% (Version 1), 67.40% (Version 2), and 63.36% (Version 3). The theme has six categories comprised of 37 unique codes with (2010), (1582), and (1509) passages, including (19,782), (258,123), and (215,775) characters of text in each version respectively. The categories are *Self-regulated learning (SRL) Acquisition learning, Learning strategies, Literacy, Affect,* and *Motivation*. The first category sheds light on self-regulated learning practices, which is the primary focus of the study. The others are emergent categories and surfaced during the analysis of data each is discussed briefly to determine its influence on learner experiences. Figure 5.4 provides an overview of the theme and categories.

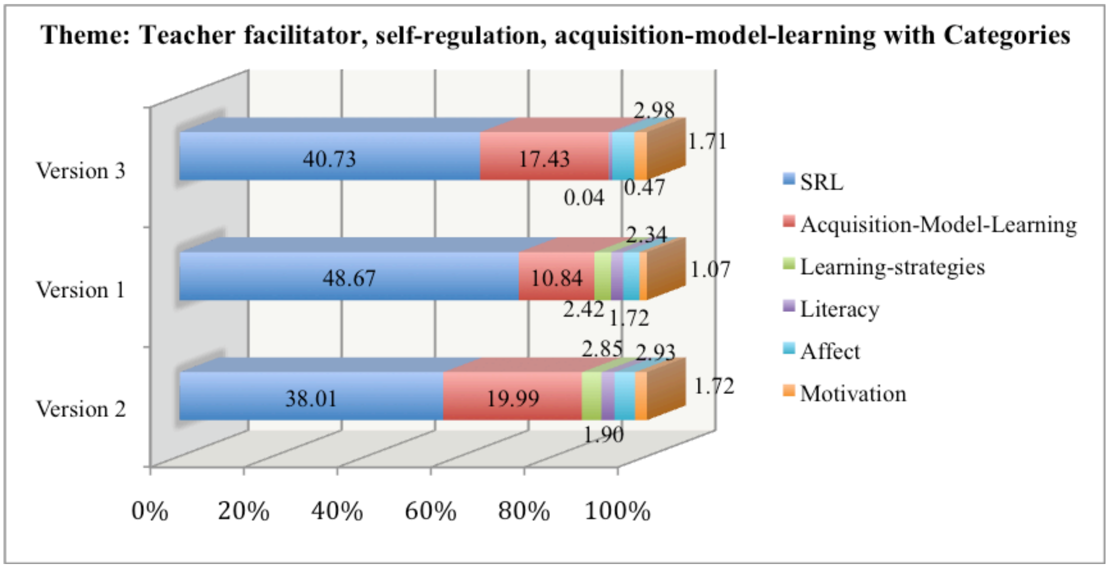

Figure 5.4. Theme: Self-regulation, acquisition-model-learning, teacher facilitator with categories.

Table 5.8 presents the percent of category, percent of theme, and percent of total text of the categories in this theme for each version of the course.

Table 5.8

Theme: Self-Regulation, Acquisition-Model-Learning, Teacher Facilitator

Categories for the Three Course Versions

Version 1 Categories	Codes	Passages	Total Char	PC Mean % of Theme	PC Mean % of Text
SRL	15	1068	200015	72.50	48.67
Acquisition-Model-L	10	304	34075	16.21	10.84
Learning-strategies	2	63	8358	3.61	2.42
Literacy	4	52	4843	2.58	1.72
Affect	4	61	8087	3.49	2.34
Motivation	2	34	2745	1.61	1.07
Theme Total	**37**	**1582**	**258123**	**100.00**	**67.07**

Table 5.8 *(continued)*.

Version 2			**Total**	**PC Mean % of**	**PC Mean % of**
Categories	**Codes**	**Passages**	**Char**	**Theme**	**Text**
SRL	15	829	124852	56.40	38.01
Acquisition-Model-L	10	466	61307	29.65	19.99
Learning-strategies	2	62	9414	4.24	2.85
Literacy	4	48	5291	2.82	1.90
Affect	4	63	9776	4.35	2.93
Motivation	2	41	5135	2.55	1.72
Theme Total	**37**	**1509**	**215775**	**100.00**	**67.40**

Version 3			**Total**	**PC Mean % of**	**PC Mean % of**
Categories	**Codes**	**Passages**	**Char**	**Theme**	**Text**
SRL	15	1226	133764	64.40	40.73
Acquisition-Model-L	10	605	48805	27.42	17.43
Learning-strategies	2	2	43	0.06	0.04
Literacy	4	18	1152	0.74	0.00
Affect	4	101	8619	4.70	2.98
Motivation	2	58	4899	2.68	1.71
Theme Total	**37**	**2010**	**197282**	**100.00**	**63.36**

Version 1

In Version 1 students worked with weekly CBI modules and a single problem task their practice of self-regulated learning varied accordingly. Distribution of weights for categories and codes of this theme are presented in Table 5.9.

Table 5.9

Theme *Self-Regulation, Acquisition-Model-Learning, Teacher Facilitator Categories and Codes – Version 1*

Version 1

Self-regulated-Learning			**Total**	**% of**	**% of**	**% of**
	Codes	**Passages**	**Char**	**Category**	**Theme**	**Text**
Goal-setting		39	5505	3.20	2.30	1.54
Organizing-transform-instruction		84	15801	7.88	5.72	3.84
Planning		61	8060	4.87	3.49	2.34
Seeking-information		66	14396	6.69	4.87	3.28
Keeping-records		18	3593	1.74	1.26	0.85
Rehearsing-memorizing		55	7676	4.49	3.23	2.16
Time-management		67	7976	5.13	3.66	2.45
Seeking-assistance		32	3372	2.34	1.66	1.11
Environmental-structuring		0	0	0	0	0
GBIC-individual		170	26219	14.51	10.45	7.01
GBIC-group		81	11892	6.76	4.86	3.26
Self-monitoring		26	5279	2.54	1.84	1.24
Self-consequating		22	3028	1.79	1.28	0.86
Self-reflection		232	57071	25.13	18.39	12.37
Self-evaluation		115	30147	12.92	9.47	6.38
SRL	**15**	**1068**	**200015**	**100.00**	**72.50**	**48.67**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Acquisition-model-learning			**Total**	**% of**	**% of**	**% of**
	Codes	**Passages**	**Char**	**Category**	**Theme**	**Text**
Course-expectations		58	8209	21.58	3.42	2.29
Semester-Load		6	436	1.63	0.27	0.12
Instructional-content		13	1036	3.66	0.61	0.41
Prior-knowledge		59	8617	22.35	3.53	2.37
Scaffolding		37	5534	14.21	2.24	1.50
Grades		9	531	2.26	0.39	0.26
Info-overload		4	140	0.86	0.15	0.10
Workforce-Learning		18	1690	5.44	0.90	0.60
Frustration		28	1955	7.47	1.26	0.84
Surface-L-response		72	5927	20.54	3.42	2.28
Acquisition-model-learning	**10**	**304**	**34075**	**100.00**	**16.21**	**10.84**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Learning-strategies		**Total**	**% of**	**% of**	**% of**	
	Codes	**Passages**	**Char**	**Category**	**Theme**	**Text**
assim&accom		14	1627	20.84	0.76	0.51
visual-Learning		49	6731	79.16	2.85	1.91
Learn-strategies	**2**	**63**	**8358**	**100.00**	**3.61**	**2.42**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Table 5.9 *(continued)*.

Literacy	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
Spelling		21	1635	37.07	0.98	0.65
punctuation		8	339	16.96	0.51	0.34
Grammar		9	881	16.79	0.42	0.28
Sentence-construction		14	1988	33.99	0.67	0.45
Literacy	4	52	4843	**100.00**	**1.88**	**1.28**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Affect	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
Repoire/rapport		24	3915	43.88	1.52	1.02
Locus-control		17	1842	25.32	0.89	0.60
Self-efficacy		10	974	14.22	0.50	0.34
Social-presence		10	1356	16.58	0.58	0.39
Affect	**4**	**61**	**8087**	**100.00**	**3.49**	**2.34**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Motivation	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
Intrinsic-M		8	950	29.07	0.44	0.29
Extrinsic-M		26	1795	70.93	1.17	0.98
Motivation	**2**	**34**	**2745**	**100.00**	**1.61**	**1.07**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Self-Regulation. This first category represents 72.50% of the text of theme in Version 1 and is the highest among all versions. It consists of 15 codes, *Goal-Setting*, *Organization-Transforming-Instructions*, *Planning, Seeking-Information, Keeping-Records, Rehearsing-Memorizing, Time-Management, Seeking-Assistance, Environmental-Structuring, Goal-Based-Interpersonal-Skills Group, Goal-Based-*

Interpersonal-Skills Individual, Self-Monitoring, Self-Consequences, Self-Reflection, and Self-Evaluation. Figure 5.5 presents an overview of each of the fifteen self-regulated learning constructs.

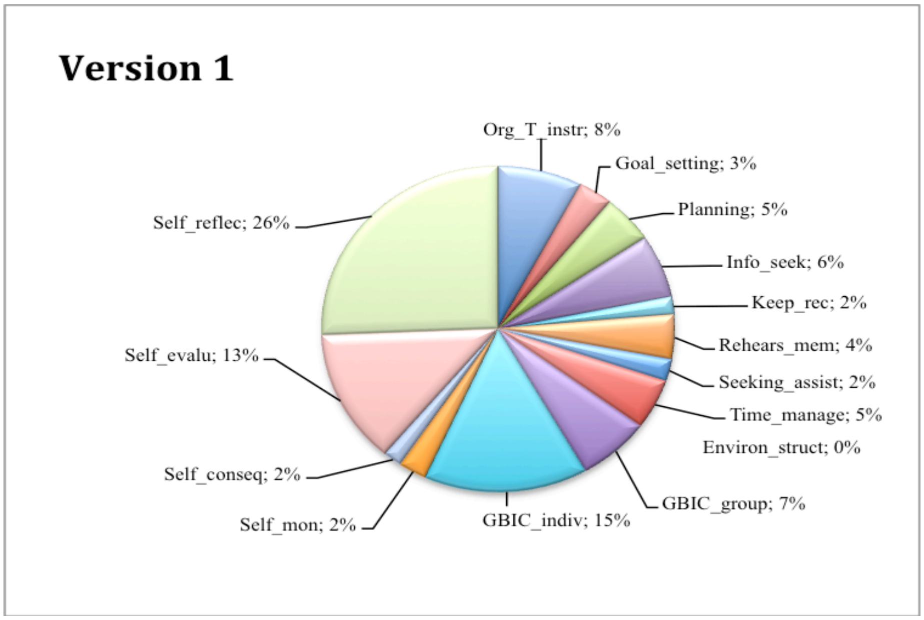

Figure 5.5. Category: Self-regulated learning and codes – Version 1.

Goal-setting, and Organizing-Transforming-Instruction. Students practiced goal-setting and organizing-transforming-instruction in a variety of ways. The following are instances. Brad described the efforts he made saying,

> "I try to remember to do my most important tasks 1st and then what's least important in order. I have like a calendar in my phone and I write out each week what to do in my phone. I check them off as I complete them. I also set reward s for myself for completing a goal, such as buying myself something or treating myself to a drink or two."

However, later on towards the end of the interview he did inquire about his assignments asking, "I'm missing 6 [assignments] I haven't turned in 6 yet and I have turned in 4 late and 5 late I turned in lesson 4 but it doesn't show under submitted? How much is the assignment worth on the final grade?" He did not seem to have experienced much success in meeting his goals for learning. Other students used examples from everyday life to describe their goals. Casey detailed her goal-setting practices stating,

> My organizational practices with my priorities basically goes from "most important" to "least important." Work is my number one priority. It pays my bills and strengthens my mind. School comes second. I don't have to go to school every day, but making good grades and learning is very important to me. Earning my degree is extremely important to me. Having time for me comes in whenever I can fit it in. Maybe I'll go to a friend's to watch a movie after I finish homework or sit and watch a [TV] show after work for an hour.

Clearly her priorities for school were different with other influences shaping her actions. Yet others like Kayla reflected on how they organized their daily routine as well as personal life applying skills from one context to another she described her goal setting as,

> When it comes to organizing, my calendar is my most important item. That is what keeps me on track lets me know what is left for that week. When it comes to my personal life, I use a spreadsheet to communicate with my dad on expenses. It keeps me organized each month on my bills, rent, gas, and other expenses. It shows me exactly what I am spending my money on and I can figure out ways to cut back if I need some extra cash. It is a good way to keep for records and compare to other months.

Thus in Version 1 students kept track of deadlines using calendars or electronic means and described in great detail their view of what it meant to set goals and organize course work. However, many found they were struggling to keep up with the work and realized they under estimated the time required for completing the work assigned. They were unsuccessful in implementing many of their ideas for goal setting.

Record Keeping, and Rehearsing/Memorizing. Eddie followed traditional methods of learning placing emphasis on the ability to memorize and recall information accurately. He described the logic behind his method of keeping track of his work as,

> I learn more along visual lines I can't just have information spit out at me and then just learn. I need to be able to digest the information, re-write it, and then come up with clever ways to study so that I can retain it. At my last job when I was in the Air Force one of my many duties was to keep a weekly inventory log of all of our supplies so I could know what we needed to purchase for the following weeks.

Although he related learning to events in his past life such like his work successful learning to him was based on practice, repetition, and recall.

Planning, and *Seeking-Information.* Student perceptions and thoughts about planning their course work and the steps they took to find information were different based on the version they were enrolled in. Brad in his final blog reflected on what he would do differently if he were to take the course again, "I would pay more attention to assignments, and not wait to the last minute to do lessons." He recognized his efforts at planning had not worked and that he could have done better. When it came to seeking-information Brad's view was "When searching for information on the [I]nternet I use [G]oogle." Kayla had similar views she said, "If you are not for sure if things are real or true, then look it up. This is why we have the [I]nternet is so that we can research things. It is the best way to get different facts and learn."

Time Management, and *Seeking Assistance.* The autonomous environment of the distributed online course and the different degrees of complexity that the PBL instructional format offered required students manage their time and seek assistance in order to move forward and be successful in their learning. Many students recognized the importance of time-management however not everyone's experiences were successful some students reflected in their blogs. For example, Kayla said, “when it comes to school, I don’t like waiting until the last minute to get things done.” However she also commented, “there does come times when I do get a little behind, I mean who doesn’t. I don’t necessarily have certain priorities that I put first or last. I basically do them based on deadlines or what is most important.” Shane, a sophomore, described his struggles, “What was most difficult for me was keeping up with all the things this class had going I would do a lot better job at keeping up with the course work and do better job at getting things done, since I might have to take this class again.” In seeking-assistance students like Marie viewed the instructor as first contact she described this as, “If I needed help I would email my professor right away. I did not like to communicate by email though; I’d rather ask questions in person.” She valued the face-to-face contact and saw that as being more effective. Most students viewed the instructor as the one to show them the way and many often failed to read the simple instructions instead they waited to be led.

Therefore time management was a challenge students used different approaches few followed a consistent systematic approach.

Environmental-Structuring. This construct was not represented at all in Version 1 with few students acknowledging the need to change their schedule or surroundings in order to manage their study time better.

Goal based Interpersonal Skills (GBIC-Individual). The degree to which students were able to use interpersonal skills determined how they moved forward in the course i.e., both in the game world and in the different units of the CBI modules. In an online environment such skills hold special importance as they determine how students engage with course materials, online resources, and interact with each other. Marie described the interpersonal skills she used and the challenges she had when working in her group as, "…it can be difficult to set up meetings since everyone has different schedules. So I learned it is best to open a document that everyone can work on and edit in their own time." She continued to reflect on the cues she uses to connect with an audience and determine their level of interest she said,

> When giving a presentation I can see the expressions of the audience. A bored audience will be looking away or playing with anything else more interesting. But if the presentation is good the audience will be up and listening their heads and eyes will be facing me, and the presentation. They're bodies will be erect and they will send positive body language.

Marie essentially described how she perceived engagement for her it was in the hidden nuances that emanate from an audience and in the body language of attendees.

Goal based Interpersonal Skills (GBIC-Group). The weekly CBI modules (SAMS) and one PBL task t required of student in this version required they demonstrate strong goal-based interpersonal skills, at both individual and group levels, not all students were able to do so. Amber said,

> Working in groups makes learning easier. Mostly. I believe the better you actually know the members of your group the better you can work together. When working alone, you might get stuck and become upset. These feelings off frustration can lead you to want to give up and not finish. When you're working in a group there is someone else there to say, "Come on, we can do this.

She saw the benefit of collaboration but went on to add, "Chatting was a love/hate relationship. Peggy and I were able to chat together on BB, but Brad had [I]nternet problems every time we tried to get together. It would have been great except for this."

Shane on the other hand saw working in a group to reduce his own work load he recognized the benefit of cooperative learning and stated, "You did not have to do everything."

Self-Monitoring. When it came to monitoring learning students were either not very aware of the need to track their progress or the measures they took they were not effective. Therefore this code represented fairly low in this version. Ken acknowledged the personal responsibility of monitoring progress stating, "That you must check them frequently or you will be left behind." However, Marie described it in greater detail saying, "I knew I was doing better when I completed the assignments faster. Plus the test showed me how good or bad I was doing. Keeping up with due dates and track of time helped me. Also reading the lessons and practicing the tests." Performance and grades were viewed as indicators of success.

Self-Consequating. In general, students were puzzled and did not seem to understand the need to have identifiable steps in their daily life and the responses they gave in their blogs were often incomplete. Several students related self-consequating to missing out on something. The representation for this code was one of the lowest in Version 1. Ken recognized his shortcomings he described them as, "No consequences except I feel pretty bad if I don't get done what needed to get done that day. Some things do get thrown to the way side but mostly I keep up with my studies, and other priorities." He was quite comfortable about his approach. Amber did not perceive self-consequating to apply to herself and described it a bit differently, "No, most of the things I set goals for are not important that way; they usually are just to keep my and my families' lives running smoothly. My schoolwork will be affected if I don't complete assignments on time and that's enough of a consequence for me, so I don't add any more to it." Students were not cognizant about the need to monitor their learning.

Self-Regulation, and *Self-Evaluation*. The course required students to reflect about their learning experiences, evaluate their progress, and/or make changes as a result of their reflection during the course of the semester. Kayla reflected about her experience with SAMS,

> I think that the entire course was self-explanatory with each lesson. I don't think that it was too difficult, just lots of information. I think the easiest part of this course was posting for our blogs. I enjoyed it because it shows how each person thinks and it lets us get our opinions out there. I don't think that I would have done anything differently. I am glad that I chose to take Version 1 since I am not familiar with all the programs. This version did challenge me at times so maybe I would have just set aside a little more time to complete the work.

Shane had similar views he stated quite emphatically "I would not do anything differently if I were to retake this course. I feel the things I did this semester were appropriate and effective to complete this course." Percent of the text of theme for self-reflection for students in Version 1 was fairly high when compared to the other versions of the course.

Acquisition-model-learning. This second category represents 16.21% of the text of theme and consists of 10 codes *Course-Expectations, Semester-Course-Load, Instructional-Content, Prior-Knowledge, Scaffolding, Grades, Information-Overload, Workforce-Learning, Frustration,* and *Surface-Level-Response*. Figure 5.6 provides an overview of the category and its codes.

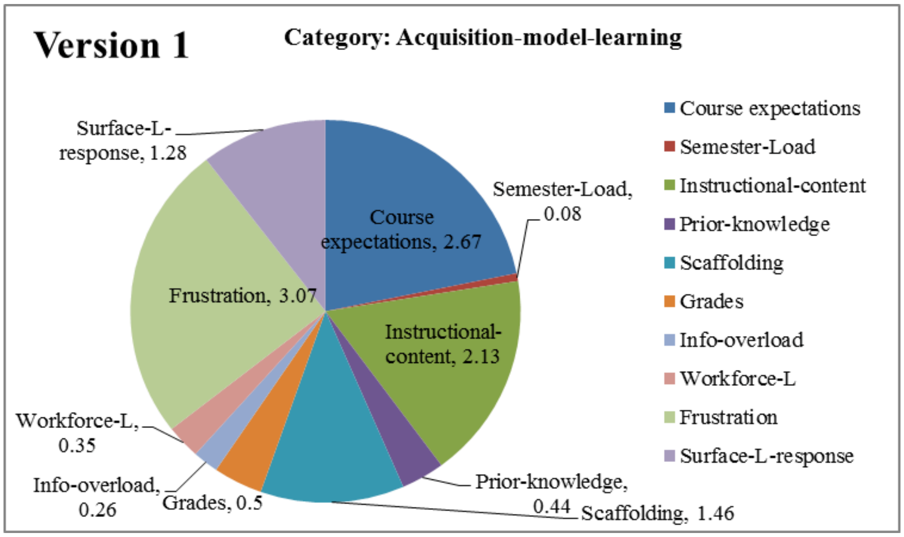

Figure 5.6. Category: Acquisition-model-learning and codes – Version 1.

Student *course-expectations* were based on a variety of reasons of which some were 1) to learn many things and improve computer skills, 2) pre-test score indicated enroll in this version as it was a 63, 3) the course was on the degree plan, and 4) belief about learning skills not adequate for Version 1 or Version 3. Several students based their expectations on their other life commitments Shane described this as,

> The reason I choose Version 1 was based solely on time management. I have three online courses and two courses in class and a full time job. I figured it would be more manageable to meet a group only once rather twice this semester. This course is going to be hard enough to keep track of with work on Blackboard and SAM 2007 and this blog just a lot to do for one course.

The number of classes being taken in a semester or *semester-course-load* also determined expectations. When it came to engaging with the *instructional-content* students related content to the weekly CBI modules, information from a textbook, and presented through a test few perceived play as a medium to gain instruction. *Prior-knowledge* was important for true learning. Shane described this as, “It is easier when it is concepts you are use to learn. Knowing what you know to be true by experience is simple cause it has worked in the past." Students required *scaffolding* in numerous ways their perception of learning was of being shown how to learn. The teacher was viewed as the leader; the student the follower. Lack of such support left them feeling uneasy. Marie described her need for support as, "…the most difficult thing about working for a client was the lack of response and detail. We made good suggestions but at the end it was up to them to accept or reject them."

Many students experienced *information-overload,* Shane described what many of his peers were feeling he said, "What was most difficult for me was keeping up with all the things this class had going." Many students lacked the necessary skills for dealing with vast amounts of information that were available to them over the Internet and through the CBI modules. Most students viewed school as a way to improve their career and future life. Marie expressed this as, "Technology will continue to influence me after college because it constantly changes and those changes impact our lives. Technology is used all over including the workplace." *Frustration* was related to the challenges students faced. In Version 1 it was more to do with navigating the CBI modules Brad expressed frustration in terms of working with the clients he described it as, "having to please their every need trying the best to make sure they are happy." Amber expressed her biggest frustration more simply as "The exams in SAMS." The requirement to maintain and reflect in an online blog throughout the duration of the class was to get students to think about their responses to class assignments such as problem tasks and their interactions with each other to understand their own learning patterns. However more times than less students responded with minimal responses as evident by code *surface-level-response.*

Percent of the text of theme in Version 1 represented the highest incidence for such responses.

Learning Strategies. The third category represents 3.61% it consists of two codes *Assimilation-Accommodation* and *Visual-Learning*. Figure 5.7 provides an overview of the category and its codes

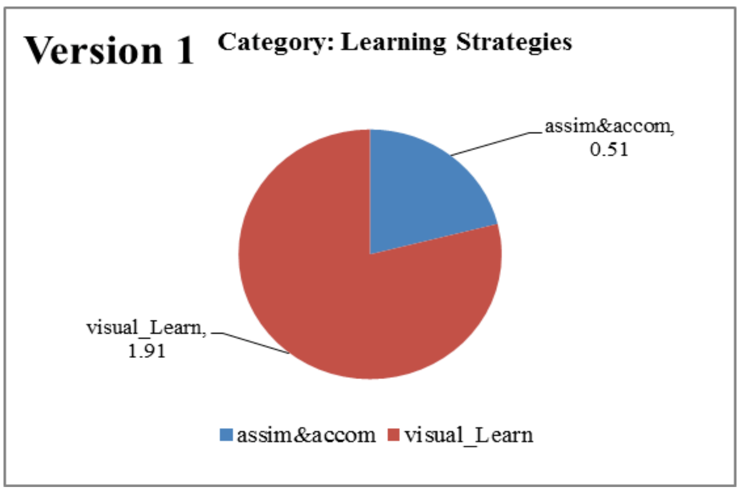

Figure 5.7. Category: Learning-strategies and codes – Version 1.

As they worked with the CBI modules students' utilized strategies that they were familiar with. Marie compared learning to, "our experiences are like trial and error, they allow us to learn and modify our imperfections as the years pass by. Through experiences we grow and learn what is real or fake what is good or bad and we keep that knowledge for future encounters. Therefore our experiences shape what we hold true." Her beliefs reflected the transmission model where learning is the accumulation of a large body of knowledge, and greater emphasis is towards the Piagetian view of assimilation and accommodation. How the tension between the two creates new understanding and less recognition on the integrating and coordinating the different elements of knowledge.

Students held strong beliefs about transmission of content through visual material and gaining information through multiple formats many firmly believing this was the best way for them to learn. Marie described this in great detail saying,

> Pictures and graphics are more expressive and therefore help get a presentation's message across. There is even an old quote that says, "A picture is worth thousand words." For example a picture can show the conditions abused animals live in versus having the conditions explained. A picture...helps…get the message across...

Students coined this type of learning as 'visual learning'.

Literacy. This fourth category represents 2.58% of the text of theme. Four codes are *Spelling*, *Punctuation*, *Grammar,* and *Sentence-Construction*. Figure 5.8 provides an overview of the category and its codes.

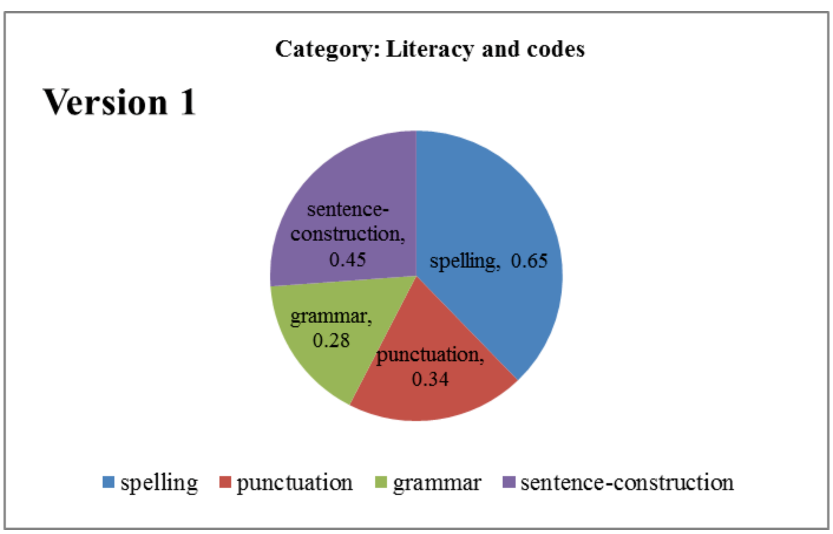

Figure 5.8. Category: Literacy and codes –Version 1.

Not many students were mindful of their spelling or made the effort at using correct spelling when reflecting in their blogs. Misspelling and poor sentence construction was quite common in the blog responses of students in Version 1.

Affect. The fifth category represents 3.49% of the text of theme and is made up of four codes *Rapport, Locus-of-Control, Self-Efficacy,* and *Social-Presence*. Figure 5.9 provides an overview of the category and its codes in Version 1

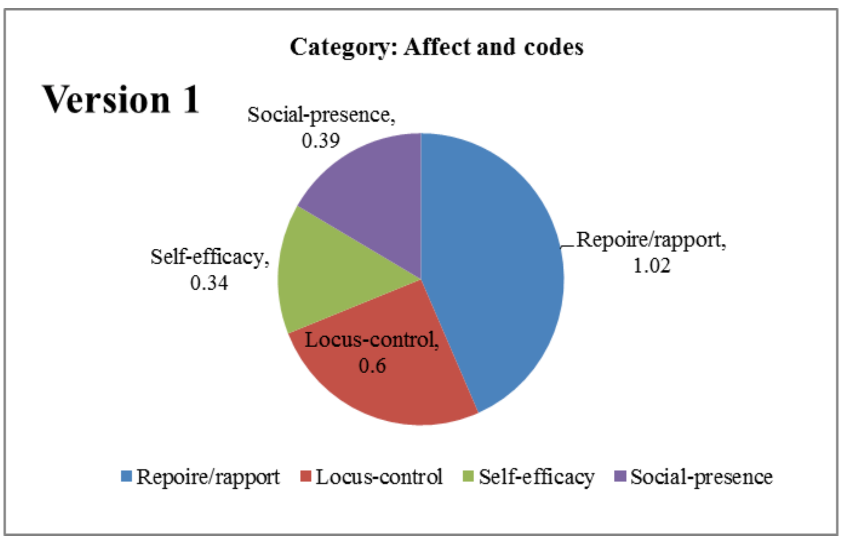

Figure 5.9. Category: Affect and codes – Version 1.

One of the requirements of the course was for students to establish an online Blog and to engage in reflection about each learning activity. The purpose to get them to think about the learning process student reflections revealed they found it important to be able to establish *Rapport* and to connect and relate with the course material, the course resources, and their peers. Though they were adept at using a range of technology tools to communicate for different purposes such as email, phone call, text-messages, and Facebook many believed it was easy to misunderstand when communicating through technology. Brad expressed this gap as, “the most challenging was not being able to communicate face to face. Shane concurred, “When I need to have a personal conversation that may be more in depth, I will call that person or meet face to face.” Text-messages were the preferred method for sending quick messages because of their convenience however most students still preferred some face-to-face component of interaction. Overall students agreed that technology alone was not sufficient in making personal connections. Amber voiced what many students had hinted at stating, “I prefer face-to-face communication. It’s less confusing — less likely to misinterpret what is said.”

How students viewed their ability to learn was different for each version. Kayla described her views, “When I needed assistance, I either emailed the professor or emailed another student. If it was problems with SAM 2007, I did chats to figure out the best solution.” She went on to comment “you really have to depend on yourself in case your partners didn’t communicate with you.” Similarly student expectations and beliefs about achieving academic success varied. Version 1 students demonstrated slightly less *Locus-of-Control* that is controlling the outcome of their own learning and demonstrated less independent learning behavior when compared with students in Version 2 or Version 3. They looked to the instructor to show them the way. Many struggled a few came to realize the benefits of developing and having better control.

Many students did not take the time to read the material posted in the Blackboard (LMS) with the result they often misunderstood the requirements and course material Most followed prescriptive, traditional methods of learning and were surprised when the outcomes were not as they expected. Student's differed in *self-efficacy* and how they perceived their abilities to learn. Ken held slightly different views than his peers he said, "I am a self-motivator. I want to do well and keep my GPA up. I used to not care about school but I am turning myself around and getting my priorities straight. His response suggests he was trying to work on improving self-efficacy.

Motivation. The sixth category represents 1.61% of the text of theme and it consists of two codes *Intrinsic-Motivation,* and *Extrinsic-Motivation*. Figure 5.10 provides an overview of the category and its codes.

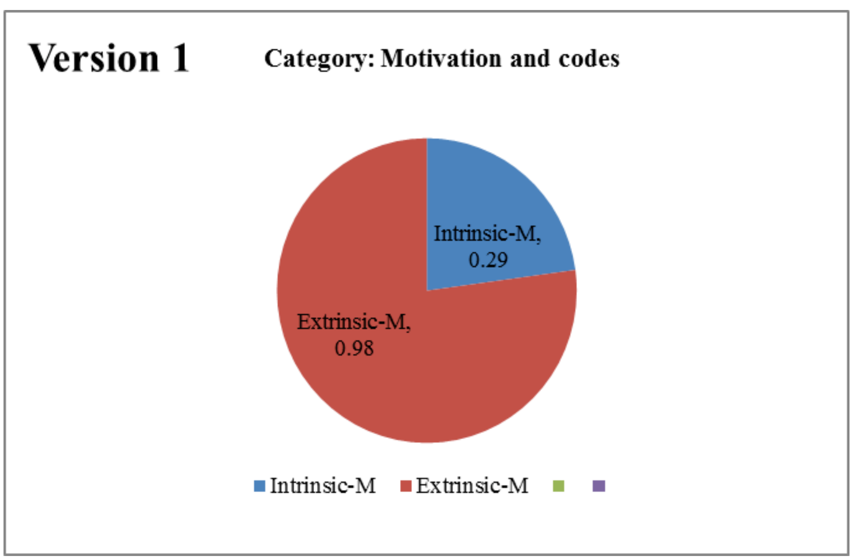

Figure 5.10. Category: Motivation and its codes – Version 1.

How students engage with learning is often related to their belief about the importance of a task. Individual orientations are internal, intrinsically related to likes and interest or external, extrinsically related to factors in their environment. In Version 1 student's engaged with the course and its content at different levels. Several students acknowledged upfront that during the semester there were times when they found it difficult to stay connected and motivated. The weekly CBI modules proved to be tedious, time-consuming, and focused on emphasizing one prescribed method of completing each activity. Shane recognized his lack of commitment and described it as, “I did not do well at motivating myself to complete any task in this course.”

In contrast Marie a junior described her beliefs as “when you believe in something you try your best and your hard work makes your desire real.” Many students in this version gave reasons as evidence of their inner motivation, however their responses did not always reflect intrinsic motives for their actions. Brad described the single most motivating factor for him during his interview, “My instructor,” while Shane said, “I motivate myself to complete my work I want to receive the best grades I possibly can and I know that means completing my work timely and accurately.” Overall students in Version 1 showed little intrinsic motivation and represented high for extrinsic motivation as evident by percent of the text of theme. Their learning was motivated in order to make a good grade or other external factors in their environment i.e., to graduate and get a better job.

Version 2

Students in Version 2 worked with weekly CBI modules and three PBL tasks. The learning environment was structured to be slightly more complex but also more engaging. Many of these student's pre-test scores were in the range of 61 – 80 and their knowledge and skills in computer use was moderate. Distribution of weights for categories and codes of this theme for Version 2 are presented in Table 5.10.

Table 5.10

Theme *Self-Regulation, Acquisition-Model-Learning, Teacher Facilitator Categories and Codes – Version 2*

Version 2

Self-regulated-Learning	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
Goal-setting		39	5505	3.20	2.30	1.54
Organizing-transform-instruction		84	15801	7.88	5.72	3.84
Planning		61	8060	4.87	3.49	2.34
Seeking-information		66	14396	6.69	4.87	3.28
Keeping-records		18	3593	1.74	1.26	0.85
Rehearsing-memorizing		55	7676	4.49	3.23	2.16
Time-management		67	7976	5.13	3.66	2.45
Seeking-assistance		32	3372	2.34	1.66	1.11
Environmental-structuring		0	0	0	0	0
GBIC-individual		170	26219	14.51	10.45	7.01
GBIC-group		81	11892	6.76	4.86	3.26
Self-monitoring		26	5279	2.54	1.84	1.24
Self-consequating		22	3028	1.79	1.28	0.86
Self-reflection		232	57071	25.13	18.39	12.37
Self-evaluation		115	30147	12.92	9.47	6.38
SRL	**15**	**1068**	**200015**	**100.00**	**72.50**	**48.67**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Table 5.10 *(continued)*.

Version 2

Acquisition-model-learning	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
Course-expectations		58	8209	21.58	3.42	2.29
Semester-Load		6	436	1.63	0.27	0.12
Instructional-content		13	1036	3.66	0.61	0.41
Prior-knowledge		59	8617	22.35	3.53	2.37
Scaffolding		37	5534	14.21	2.24	1.50
Grades		9	531	2.26	0.39	0.26
Info-overload		4	140	0.86	0.15	0.10
Workforce-Learning		18	1690	5.44	0.90	0.60
Frustration		28	1955	7.47	1.26	0.84
Surface-L-response		72	5927	20.54	3.42	2.28
Acquisition-model-learning	**10**	**304**	**34075**	**100.00**	**16.21**	**10.84**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Learning-strategies	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
assim&accom		14	1627	20.84	0.76	0.51
visual-Learning		49	6731	79.16	2.85	1.91
Learn-strategies	**2**	**63**	**8358**	**100.00**	**3.61**	**2.42**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Affect						
Categories	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
	Repoire/rapport	24	3915	43.88	1.52	1.02
	Locus-control	17	1842	25.32	0.89	0.60
	Self-efficacy	10	974	14.22	0.50	0.34
	Social-presence	10	1356	16.58	0.58	0.39
Affect	**4**	**61**	**8087**	**100.00**	**3.49**	**2.34**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Motivation						
Categories	**Codes**	**Passages**	**Total Char**	**% of Category**	**% of Theme**	**% of Text**
	Intrinsic-M	8	950	29.07	0.44	0.29
	Extrinsic-M	26	1795	70.93	1.17	0.98
Motivation	**2**	**34**	**2745**	**100.00**	**1.61**	**1.07**
Theme Total	**37**	**1582**	**258123**	**100.00**	**100.00**	**67.07**

Self-Regulation. This first category represents 56.40% of the text of theme in Version 2 and consists of 15 codes, *Goal-Setting*, *Organization-Transforming-Instructions*, *Planning, Seeking-Information, Keeping-Records, Rehearsing-Memorizing, Time-Management, Seeking-Assistance, Environmental-Structuring, Goal-Based-Interpersonal-Skills Group, Goal-Based-Interpersonal-Skills Individual, Self-Monitoring, Self-Consequences, Self-Reflection, and Self-Evaluation.* Figure 5.11 presents an overview of each of the fifteen self-regulated learning constructs.

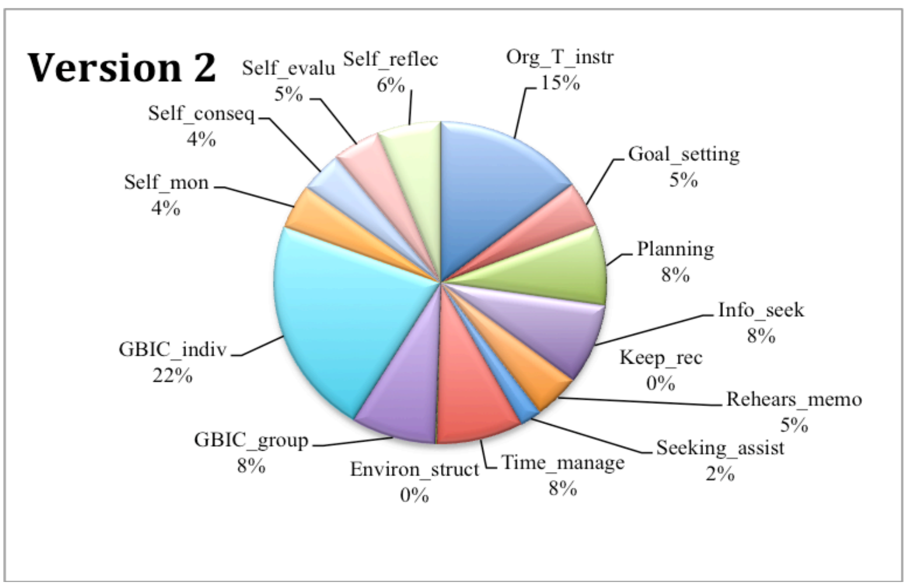

Figure 5.11. Category: Self-regulated learning and codes – Version 2.

Goal-Setting, and Organizing-Transforming-Instruction. The weekly CBI modules and problem solving tasks required student's not only set goals for learning but manage also interact with large amounts of information as well as their time. Dee followed a slightly more pragmatic approach to goal setting she described it as,

> I do set personal goals for myself, some I actually do accomplish. I have goals that are obtainable in a matter of days or weeks. Then I do have some that will take years to obtain. To do this, I plan days ahead before my work. By doing so, it gives me time to recover if something was to go wrong and to give me spare time when I finish early.

She seemed to give herself extra time for when things don't work on time. Others found they were drawing on everyday experiences Jake described this as,

> Spreadsheets are very useful in communicating information to others because you can organize information in a way that everyone can understand. I used to mow lawns when I was in Junior High and High School. While I did this, I had a spreadsheet that I used to keep track of payments, and specific instructions for the yard, and other important material.

He was transforming his views from the context of the classroom to every day practice his view of goal setting was of a more practical approach. Several students in Version 2 used daily experiences to relate to their learning activities especially when it came to problem solving Students like Dee and Jake experienced greater success with their coursework.

Planning, and *Seeking-Information.* Students in Version 2 were required to plan their learning a little bit more than students in Version 1 Sharon reflected on how she planned her work for the week saying, “I read over the syllabus every week to see what was due and what work I needed to start.” She chose a traditional approach based identifying assigned readings and completing assignments. While that was a beginning the online environment and PBL nature of the course did require a little bit more than just being cognizant of deadlines. Thus traditional ways of preparing and studying material was not effective several students attempted to make changes to their approach others just continued in ways they were familiar with and had been using for learning. Stella had a more logical approach she described this as,

> I would type up a few solutions numbered from 1-5 best to worst. I would research each solution and come up with different ways each would work. After I narrowed it down to 2 I would then choose the one I thought would be best that correlated with the issue.

She realized tracking the information was necessary and she chose to use the paper and pencil approach to make connections between all the different types of information.

Record Keeping, and Rehearsing/Memorizing. The distributed nature of learning necessitated students to manage information and the online resources. Information was presented in multiple ways and required making connections, recognizing patterns and keeping track. Most students relied on traditional ways of understanding. Jake described his approach to prepping,

> For the exams, I would take the time to go over in my head everything that I had learned that I was being tested over. If needed I would look up information on the computer or in my book.

While, Stella gave a more detailed reflection stating, “I would read each chapter prior to taking the exam and would then take the exam with my book in front of me. I also would look online if I was having trouble with a question. Reading each chapter first worked best for me.” Thus, students placed emphasis on reading and memorizing few focused on other aspects of learning. Learning was about accurate recall of facts this is not surprising especially in the context of our high stakes testing culture with its focus on rote memorization of facts and regurgitation of information.

Time Management, and *Seeking Assistance.* Managing time wisely and estimating correctly how much was needed to successfully complete each CBI module and the problem solving tasks was essential but they proved to be challenging for many students. Jake was up front about the challenge of doing assignments on time, “I was not very good about managing my time on assignments. For the most part I would wait till the last minute to begin an assignment.” Similarly, Robin concurred with this difficulty and described it as,

> Ha! I try…I have tried just about every method of organization there is. I tried the Blackberry method (when I worked full time) that was ok, but I found myself spending too much time trying to add things in, trying to find things, it was just too frustrating. I kept my families (sic) calendar on outlook for a while, that was great but couldn’t go with me if I was not at home.

She was resigned to the fact that managing time for her was a challenge both in her everyday life and school. Quite the opposite other students like Jack believed, “I have a fear of it, I am very independent and I think asking for help is a weakness and that I have made it far on my own in school I can make it all the way.” His independent nature limited him in seeking-assistance even when it would be helpful. Therefore not everyone followed a consistent systematic approach students managed their time in different ways based on familiarity and comfort level.

Environmental-Structuring. Taking steps to change routine or surroundings to be more successful at learning and improve as a learner was an option available to all students however few students reflected or mentioned taking such measures. Stella was one of the few who described her efforts as; “I allotted a certain amount of time at night to complete the tasks. I would put everything away and focus only on that. I would have no distractions and would work on it until I finished.” She realized the benefits of focused un-interrupted study.

Goal based Interpersonal Skills (GBIC-Individual). Inter personal skills were key to interacting with the course content (CBI modules) as well as online to uncover information, engage with peers, the instructor and for successful learning. The online environment and the problem solving tasks required students to use many of these skills as they communicated. Robin described her skills as, "The interpersonal skills that I used, was mainly communication. We also used our ability to share our ideas and put them together as a team." She was describing her experience with working in a group to find a defensible solution. Different students found different ways to communicate and connect with peers however not everyone was successful. Many came to realize that interpersonal skills whether individual or group were important for effective communication and that such skills superseded the use of any of the technology tools that existed.

Goal based Interpersonal Skills (GBIC-Group). Communicating through technology whether it was to complete a weekly unit through the SAMS interface or with peers collaborating to solve a problem task to find a solution was a challenge. Students in this version struggled just like students in the previous version. Trust was a major concern. Jake said, "I learned that when you work in groups or teams that it takes a group effort to get the desired grade. That was the toughest part for me, relying on others for your own grade." However, a few like Stella saw their experience of working with her group member as a positive experience and described it as,

> Working on a team was helpful due to the intensity of the PBL tasks. I know would not have been able to accomplish them on my own. Having a teammate was very helpful with creating a power point and the spreadsheet.

Few students found it easy to communicate well through technology Jack was one who was able to do just that he described in detail his preferred way of communicating with others and the interpersonal skills he used he said,

> I prefer to text because it is easier and I can also be doing other things or going to other places while I communicate with some one. In [t]exting, we use visual graphics to emote how we are feeling at that moment. Those graphics are called emoticons. Some symbols are: >:(, this would allow some one to know your emotion behind a message you written. It allows the reader to have a picture on your facial expression. An example would be someone [t]exting, "I don't really like seafood >:(," this allows some one to visually see that the person dislikes seafood.

He seemed to be adept at not only using technology to connect with others but also being able to express the emotions that went along with each communicative action. Others like Robin shared similar views when it came to choosing options she described this as,

> My main form of communication is through my phone. I text all the time …my preferred way of communicating has got to be "[T]exting. I love it! The benefits to [T]exting are: 1) no interruptions, you answer when you want to 2) you don't have to make small talk, you get right to the reason for the communication 3) no noise, you can answer anywhere and no one is being bugged by the ring, sound, music or talking, and 4) time, [T]exting is quick.

Self-Monitoring. When it came to monitoring progress during learning not many students reflected on this however in Version 2 those he did were more consistent and did so more frequently than students in Version 1. Stella mentioned one instance she described this as,

> Writing everything down and once it was complete I would mark through it or check it off. I like making lists and seeing what I have accomplished at the end of the day. I tracked my progress by checking the web site daily and making sure I was keeping up with everything.

She used a more systemic approach combining traditional methods of making lists and tracking website information.

Self-Consequating. This construct was poorly recognized most students equated the concept to exceptions and the outcomes that followed and did not connect it with their academic work. Others looked to everyday life occurrences as examples. Robin a junior described her understanding of the term in more detail,

> As far as consequences for not meeting my deadlines. Everything in life has a consequence. There is no need for punishing myself if I don't meet a deadline. There is ALWAYS a consequence. Examples: I don't study in the time that I have prescheduled as study time…. Consequence …I don't make my son's football game because I may have to study then. I don't study for the test……..Consequence ….. I make a bad grade….. Consequence …….GPA goes down……this could keep going and going.

She also recognized the cyclical nature of *action* and *consequence* but equated outcomes of learning with grades measuring success in terms of the score achieved. In the process she shifted the burden of responsibility for meeting goals away from her personal self to other external factors.

Self-Regulation, and *Self-Evaluation*. Percent of text of theme for both of these codes represented fairly low in this version. Jon reflected about his coursework stating,

As for my other classes there is a lot of tedious work and reading to do for them work however is going good, I am enjoying it… A little low but for the lack of studying I am ok with the 64 I got. I am organized because I have so much going on and it is all too important to me to let it slip between my fingers. Unfortunately I do not have as much self-control over things in my life to be able to stick to the plan letter by letter. Whereas, Robin evaluated her performance and described it as, "I think the course itself was easy, I learned a lot. If I could take this course again, I would know the time that it took to complete the course and I would probably set aside more time. There were things that I rushed and probably should have taken more time." Student's like Robin found themselves reflecting on their learning tasks and performance. Few students were familiar with using a blog or on the practice of reflecting on past activity, most discovered it as a way to express their thoughts and evaluate their progress, they found the reflective exercise helpful and pleasing.

Acquisition-Model-Learning. The second category represents 29.65% of the text of the theme and consist of 10 codes they are *Course-Expectations, Semester-Course-Load, Instructional-Content, Prior-Knowledge, Scaffolding, Grades, Information-Overload, Workforce-Learning, Frustration,* and *Surface-Level-Response*. Figure 5.12 provides an overview of the category and its codes.

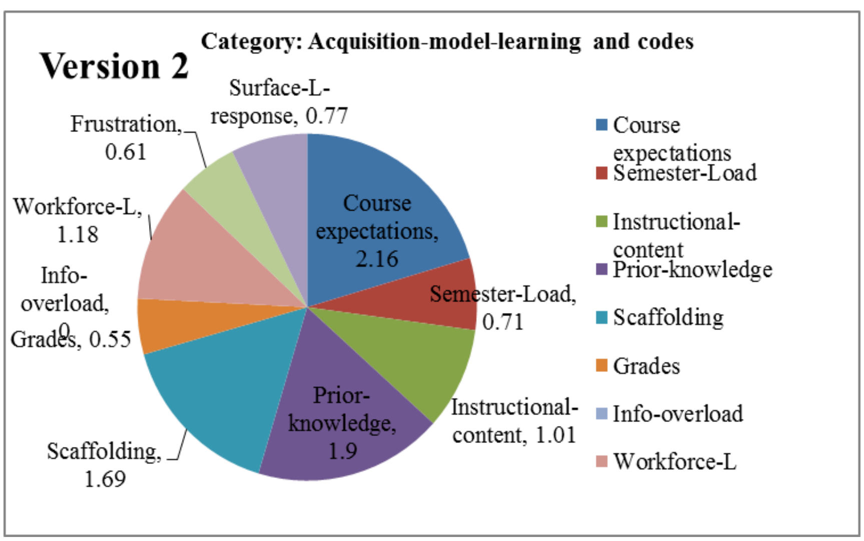

Figure 5.12. Category: Acquisition-model-learning and codes – Version 2.

What students expected by taking the course set expectations for learning *course-expectations* revealed what students felt, not all students wanted to be challenged by alternate methods of learning. Rachel said “I chose Version 2 of the course because of my grade on the pretest. Plus I don’t feel like I would succeed in a gaming version, because I don’t particularly like games, or at least the inner workings of them.” Thus, personal goals and life events molded *course expectations*. Few students were comfortable working online or through methods other than traditional ways of instruction. Several in their blogs reflected about their uncertainty.

Additionally, students justified to themselves reasons for enrolling in a particular version. Jo described this as, “Going to Version three would present too much of a challenge especially with my course load. I enjoy challenges, however I am taking some difficult classes and I did not want to bite off more than I can chew.” *Semester-Course-load* combined with other life responsibilities influenced student choice of version. Jo stated this aptly, “Last week blurred together with 19 hours of school and 38 hours of work, the days tend to seam like one giant dream. School is challenging, but I am thoroughly enjoying my classes, and I think I am going to make it through and I can finally see the light at the end of the tunnel. My class have a lot of outside work and studying time, but they are for my major, so after this semester I should be more knowledgeable in my subject area.”

Students in Version 2 engaged with *instructional content* i.e., CBI modules in different ways and at different levels. They found the work challenging and many struggled to navigate the modules however there were some who saw the advantage. Dee described her interaction with course content in positive terms stating, “I developed a lot of new strategies simply from my teammates and from the modules. I would stay connected on a daily basis and read the material more thoroughly so I could get a better grasp of the material." She recognized the extensiveness of information, the need to have a systematic approach and to dedicate more time to be successful.

Many students shared the same beliefs as students in Version 1 that *prior-knowledge* is a must for learning however those like Stella took it one step further she described her perceptions in the following terms,

> It is easier when it relates to concepts I already know. Since I have that knowledge, I can easily relate to other people and their concepts since they are similar. I can put myself in their position as well as them in mine because I already know what it is like to experience the situation.

For Stella prior-knowledge was about making connections with past concepts building on the old to create new experiences. It was about active participation and cognitive familiarity. Their need for *scaffolding* was similar to their peers in Version 1 Ally gave a specific example, "I prefer when I have had access to the tutorials that come with it to kind of walk you through the basic steps. I have also had to just fumble my way through I much prefer the tutorials…" She was referring to situation specific assistance typically given by the teacher and eluded to the need and importance of such kinds of scaffolding. Robin related to the concept of working for a client, but believed more direction would have been more helpful she said,

> [By] "working for a client," I assume you mean working in the groups for our PBL tasks. I found the most challenging to be not being able to communicate with them and get more feedback on what exactly they were looking for and if the ideas that we were coming up with were on track or not.

Stella expressed the similar views but in more detail saying, "When someone is learning something where they cannot seem to grasp the concept, another person might be able to explain it in a different way to help them understand better while a book or website cannot do that." Therefore, students indicated the need for constant feedback and support few demonstrated independent thinking. G*rades* were equally important and signified achievement and success many related them with success beyond school. Stella described her views stating "this is my final semester in college and I wan[t] to succeed in each assignment and task given." Version 2 students did not represent on code *information-overload* they seemed to have life skill strategies that helped them manage and overcome the vast amounts of information they came across.

External factors influenced learning for many students Jake described the reasons behind his motivation as, "I continuously motivated myself for this class by reminding myself that I needed this class for my major and that what I learn in this class could deem useful in the years to come." Others, like Robin had similar views, "I work full time, go to school full time, and take care of a family and elderly mother. My motivation comes from wanting better for my family." Thus students in all versions of the course had more or less similar reasons for taking the class and the importance of school. Most perceived the skills they would learn would better their career and life. Like students in Version 1 this group faced many frustrations when working with the literal nature of the CBI modules and the problem solving tasks. Students in this version had more exposure to problem solving Peggy had similar experiences and described her challenge as, "ya (sic) I'm not getting along well with SAMS." In contrast, Sharon described her biggest challenge as, “having to work with groups not being able to get in touch with group members.”

Learning Strategies. The third category represents 4.24% with two codes *Assimilation-Accommodation* and *Visual-Learning*. Figure 5.13 provides an overview of the category and its codes.

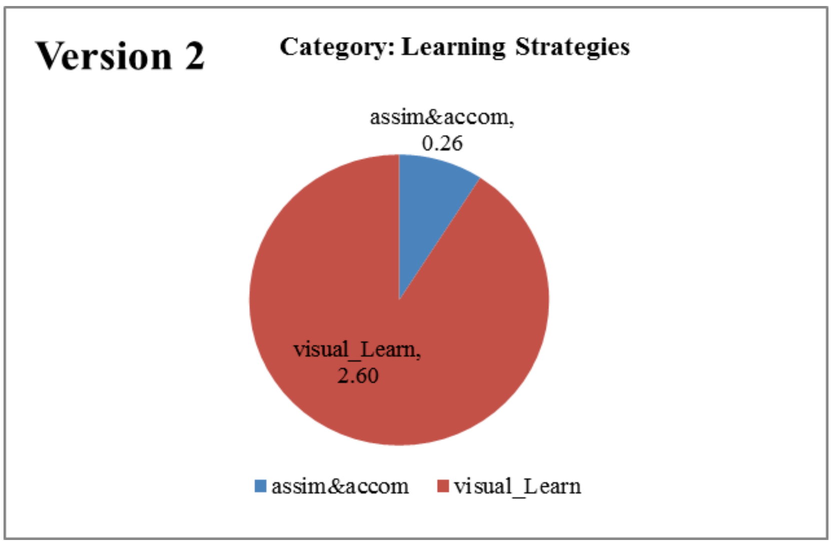

Figure 5.13. Category: Learning-strategies and codes – Version 2.

As students faced the challenge of making sense of the course content and instructional information they found themselves drawing on strategies they were familiar with. Many struggled with coming up with a defensible solution to the problem tasks a.k.a. client needs some expressed frustration at the open-endedness of the task. Dee provided justification stating, “You have to suck it up and one day, hopefully you will be able to have someone work for you.” While, Jake presented this in slightly more appropriate terms stating, “learning is the ability to take experiences and have the ability to adapt.” Students in this version like their counter parts mirrored traditional beliefs about learning giving importance to prior knowledge for adapting new ideas. V*isual-learning* was important to this group of students however they spoke about how it in terms of internalizing learning. Jack related it with daily experience describing it as “If you are a business or trying to market something, you can just always expect people to look into you to know what you are trying to promote. People do not have time for that. But, if you can visually stun them and then put a symbol on top of that vision, you will embed that symbol in their mind. ” He emphasized that visuals help to remember long term. Thus students in Version 2 attempted to look at the course concepts at a slightly much higher level, relating them to life experiences.

Literacy. The fourth category represents 2.82% of the text of theme with codes *Spelling*, *Punctuation*, *Grammar,* and *Sentence-Construction*. Figure 5.14 provides an overview of category and its codes.

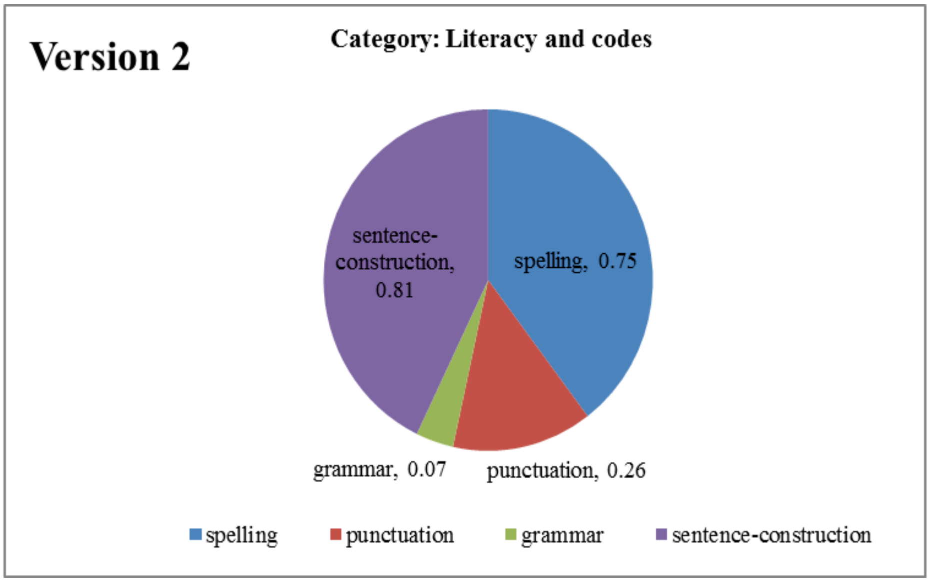

Figure 5.14. Category: Literacy and codes – Version 2.

These students were not very different from Version 1 students when it came to paying attention to sentence construction or spelling they did as poorly as their peers in Version 1.

Affect. The fifth category represents 4.35% of text of theme Made up of four codes *Rapport, Locus-of-Control, Self-Efficacy,* and *Social-Presence*. Figure 5.15 provides an overview of category and its codes.

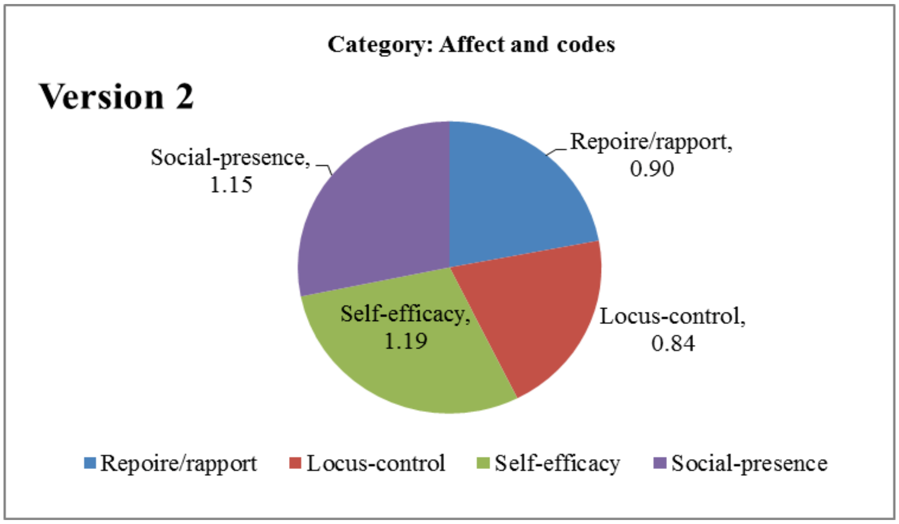

Figure 5.15. Category: Affect and codes – Version 2.

Rapport the desire to connect and relate when communicating was equally important for students in Version 2 Sharon described this saying, “my least favorite was the Wimba-session because they made me nervous and I felt awkward talking to my computer.” She was referring to the two online interviews she had agreed to participate in and found the social connection missing. In comparison, Jack was able to navigate technology to make the personal connections he described his approach as,

> I prefer to text because it is easier and I can also be doing other things or going to other places while I communicate with some one. In [T]exting, we use visual graphics to emote how we are feeling at that moment. An example would be someone [T]exting, “I don't really like seafood >:(”, this allows some one to visually see that the person dislikes seafood.

He was able to transcend this gap and did not feel so constrained. Students in Version 2 found managing their learning in an online environment equally challenging many struggled with *locus-of-control*. Stella justified herself and said,

> …this is my final semester in college and I wanted to succeed in each assignment and task given. I know I did not complete every task but that was because I was very busy and unable to access the assignments in time. My parents also helped

> motivate me quite a bit.

She recognized her struggle and came to realize the benefits of having better control. Several students in Version 2 demonstrated better *self-efficacy* Sharon did not find it hard to rely on her own abilities she summed up her belief about her learning efforts stating,

> I have always been good at using computers and even taking them apart, but everything I have learned is from exploring myself so I think I will have a lot to learn this semester! On the other hand, I think that learning independently helps to build self-esteem and good character qualities.

They too desired *social presence* and believed technology was isolating Sharon expressed her needs as, “Most people talk through text messages or through emails. I think it is important to have face-to-face contact with some one because it helps keeps you involved with other people.” Communicating via text-messages was a common habit and students were quite comfortable with both the strengths and weaknesses of the method Stella said of this,

> Nonverbal communication is a huge factor when communicating. Due to my boyfriend not liking to talk on the phone, we are constantly texting, and we sometimes get into an argument because we cannot tell what tone of voice the other is using.

Daily life experiences were frequently used to understand many of the learning activities of the course however successfully communicating through the same methods with peers was a different challenge.

Motivation. The sixth category represents 2.55% of text of theme and it consists of two codes *Intrinsic-Motivation,* and *Extrinsic-Motivation*. Figure 5.16 provides an overview of the category and codes.

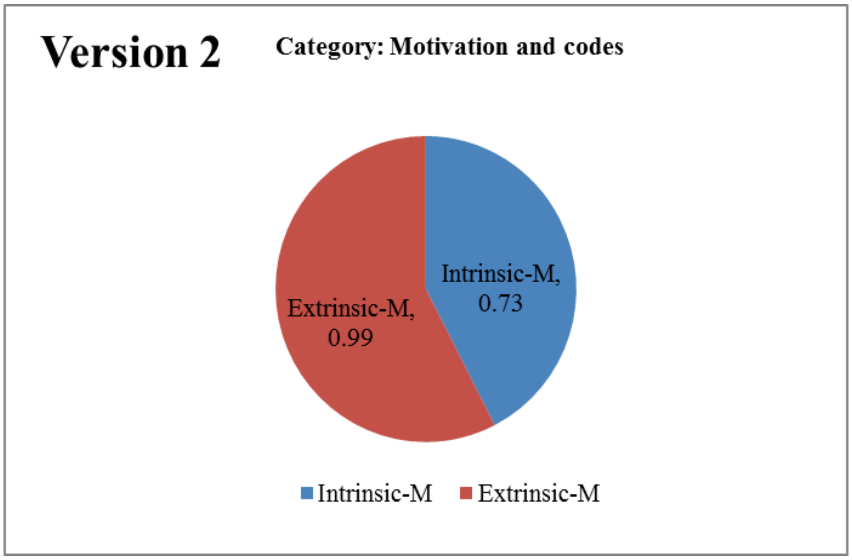

Figure 5.16. Category: Motivation and codes – Version 2.

Again motivation for this group was more extrinsically related tied to grade and graduation. Stella described her motivation in the following terms, “I am a very motivated and driven person and when I know graduation is at the end of this course, I will try my hardest to succeed.” Jake described his challenges with motivation as, “I continuously motivated myself for this class by reminding myself that I needed this class for my major and that what I learn in this class could deem useful in the years to come.”

Version 3

In, Version 3 students worked with PBL and game-play over the semester Table 5.11 presents details of the distribution of the weights for each of the 15 codes along with percent of category, text, and theme.

Table 5.11

Theme *Self-Regulation, Acquisition-Model-Learning, Teacher Facilitator*

Categories and Codes – Version 3

Version 3

Self-regulated learning			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
Goal-setting		32	2513	2.24	1.43	0.91
Org-transform-instruction		39	3481	2.89	1.85	1.18
Planning		38	2566	2.51	1.60	1.02
Seeking-information		148	21034	13.90	8.95	5.67
Keeping-records		42	3229	2.92	1.86	1.19
Rehearsing-memorizing		34	3571	2.72	1.74	1.11
Time-management		57	4562	4.03	2.57	1.64
Seeking-assistance		60	4708	4.21	2.69	1.71
Environ-structuring		6	522	0.44	0.28	0.18
GBIC-individual		297	27715	22.47	14.41	9.14
GBIC-group		129	12074	9.77	6.27	3.98
Self-monitoring		12	1591	1.08	0.70	0.44
Self-consequating		5	283	0.31	0.20	0.13
Self-reflection		245	36147	23.50	15.26	9.60
Self-evaluation		82	9768	7.00	4.52	2.85
SRL	**15**	**1226**	**133764**	**100.00**	**64.40**	**40.73**
Theme Total	**37**	**2010**	**197282**	**100.00**	**100.00**	**63.36**

Acquisition-model-learning			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
Course-expectations		86	8207	15.52	4.22	2.67
Semester-Load		4	91	0.42	0.12	0.08
Instructional-content		65	6920	12.46	3.37	2.13
Prior-knowledge		17	1072	2.50	0.69	0.44
Scaffolding		42	4973	8.57	2.31	1.46
Grades		17	1449	2.89	0.79	0.50
Info-overload		10	595	44.00	0.40	0.26
Workforce-Learning		11	1072	2.01	0.55	0.35
Frustration		112	8001	475.00	4.81	3.07
SurfaceL-response		62	1712	6.88	1.98	1.28
Aquisition-model-learning	**10**	**605**	**48805**	**100.00**	**27.42**	**17.43**
Theme Total	**37**	**2010**	**197282**	**100.00**	**100.00**	**63.26**

Table 5.11 *(continued)*.

Version 3

Learning-strategies			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	assim&accom	0	0	0	0	0
	visual-Learning	2	43	100.00	0.06	0.04
Learn-strategies	**2**	**2**	**43**	**100.00**	**0.06**	**0.04**
Theme Total	**37**	**2010**	**197282**	**100.00**	**100.00**	**63.26**

Literacy			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Spelling	6	488	37.85	0.27	0.17
	Punctuation	8	364	38.02	0.29	0.19
	Grammar	4	300	24.13	0.18	0.11
	sentence-construction	0	0	0	0	0
Literacy	**4**	**18**	**1152**	**100.00**	**0.74**	**0.47**

Affect			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Repoire/rapport	11	857	1042	0.49	0.31
	Locus-control	38	3268	37.77	1.77	1.13
	Self-efficacy	41	3553	40.91	1.91	1.22
	Social-presence	11	941	10.90	0.51	0.33
Affect	**4**	**101**	**8619**	**100.00**	**4.70**	**2.98**
Theme Total	**37**	**2010**	**197282**	**100.00**	**100.00**	**63.26**

Motivation			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Intrinsic-M	35	3444	65.32	1.74	1.10
	Extrinsic-M	23	1455	34.68	0.94	0.60
Motivation	**2**	**58**	**4899**	**100.00**	**2.68**	**1.71**
Theme Total	**37**	**2010**	**197282**	**100.00**	**100.00**	**63.26**

Self-Regulation. This second category represents 63.36% of the text of theme in Version 3 and consists of 15 codes, *Goal-Setting*, *Organization-Transforming-Instructions*, *Planning, Seeking-Information, Keeping-Records, Rehearsing-Memorizing, Time-Management, Seeking-Assistance, Environmental-Structuring, Goal-Based-Interpersonal-Skills Group, Goal-Based-Interpersonal-Skills Individual, Self-Monitoring, Self-Consequences, Self-Reflection, and Self-Evaluation.* Figure 5.17 presents an overview of each of the fifteen self-regulated learning constructs.

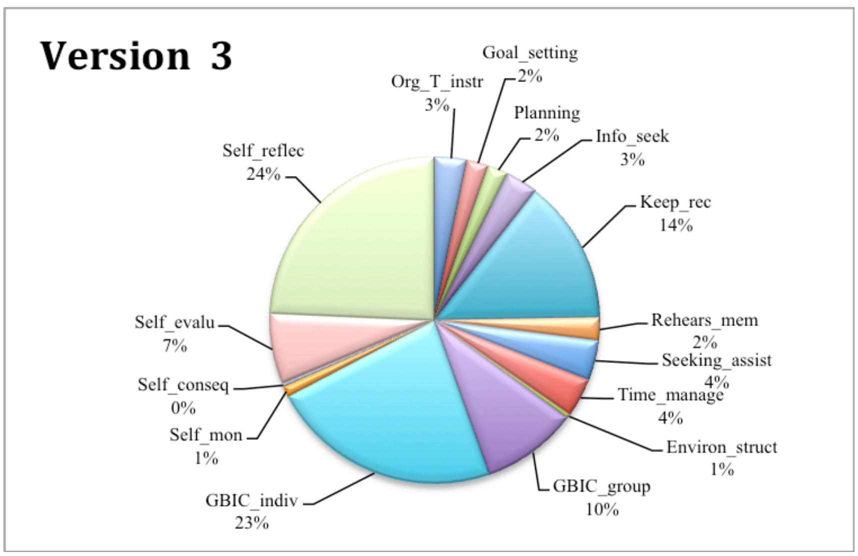

Figure 5.17. Category: Self-regulated learning and codes - Version 3.

This version required student's play the alternate reality game AltRG of *Broken Window* for the first six weeks of the semester, and then design an AltRG game in the last 9 weeks. This required students not only set goals for learning but also that they interact and manage large amounts of information as well as their time

Goal-Setting, and Organizing-Transforming-Instruction. Jerry described goal setting as, "…due dates and what needed to be done…using different programs to see which ones were the most/least effective setting personal deadlines yes, there were some goals, but there were times in which they could not be achieved." Karen on the other hand stated, "As my week starts I plan at the beginning of my day when I will do each task." These two students based their goals on proximity immediate tasks versus remote some goals like Jerry's were not met. Tanya, saw it differently and to avoid becoming overwhelmed with all the information she found she took small steps she described this and emphasized this as,

> The method I used to get through this game is simple, ONE ASSIGNMENT AT A TIME! I had to stop looking at everything that was due that week but rather at one thing at a time that needed to be done and I noticed it made me less stressed.

Others like Abby found themselves trying to make connections and identify patterns she wrote,

> I got my thoughts and information more organized by starting Report 2 and making a spreadsheet. This helped to organize my thoughts and figure out what I do already know.

Thus students found themselves goal setting and organizing-transforming-instruction at various levels in order to meet their learning needs.

Planning, and *Seeking-Information.* To keep up with the information and make progress in the game structure was important. Sonya described her approach for pacing herself as, **"**For the course I have a planner that I write everything down in so I would look at the Moodle website then write down the due date. I would then budget time to do the work for the week." Others were challenged Tami described her approach, "the only thing that plans out my time is my sleeping and my other obligations that I have so it's like what can I get done before I have to go here? What can I get done before I go to sleep? So that's pretty much how the structure starts."

Similarly a planned approach for finding information was needed. When it came to *seeking-information* Ben described his perceptions as, "it was kind of easy in my opinion because they gave you a bunch of clues." Other students used approaches, like Tanya who acknowledge that she did not follow a particular approach she described it as,

> I didn't have a specific approach to finding things on the [I]nternet, I just [G]oogled everything I saw in the clues to see if any of them pulled up more clues. If what I found didn't seem to fit then I moved on and didn't record the information.

Abby chose to follow a more systematic method she wrote,

> By reading this blog, I have seen a lot of other clues and information that *cod4* has left. I am not sure how all of this fits together quite yet, but I am picking up clues and keeping record of them so I can keep up and figure it out eventually!
> I have also learned that you must go beyond just what you see and following directions. For this kind of play, you must dig deeper and search for meaning in everything.

Thus, students in this group planned their work in their own ways but not all students actually planned. Many looked towards the Internet and Google for their informational needs, but did not always question the reliability or validity of the information they found or saw the necessity to look beyond the immediate information that they found. Few were in a habit of systematically approaching content their approach to seeking-information remained surface level.

Record Keeping, and Rehearsing/Memorizing. The design of the course required students track the information they came across and devise a method of going back to reference it as they played the AltRG game. Bens' approach was more of jump in and take charge of things with the need to identify patterns many of the instincts he used during his time on the field. Ben was a student coming back to school after active duty in the military. He reflected on his groups' strategy for tracking and recording information for later reference he described it as,

> Piece of paper you write down and just draw**,** we had lines going, ideas of who is what little labels for people bunch of sticky notes, and I'm a multi-task king when I'm on my computer like connecting the dots over it but it's still easier to have when you're on paper, a little bit more easy to view.

Time Management, and *Seeking Assistance.* The autonomous environment of the online course, the PBL instructional format of the game AltRG, and independently assigned problem tasks all required time management and seeking assistance in order to move forward and experience successful learning. Students paced their work and sought help when needed this version offered help in three different formats from the instructor, the characters of the game narrative, or peers. Liz described her time management, "Well, I'm a couple weeks behind on my blogs (sorry) because I wasn't sure of the instructions for the blog assignments." Tanya acknowledged the challenge, "finding time and staying on task was by far the most difficult part for me." Abby approached the challenge quite differently she described how her group managed their time during the game and at the same time helped each other saying,

> … I gave everybody a job that needed to be done in the two-hour period that we were together. "I felt a little dicatator-rish but there was no other way to do it

> other than on my own. This is not my personality at all I am very laid back and friendly, but I always get my work done; whether it be on my own or in a group. Also, we decided what we would bring to the group meetings and what we would accomplish at them.

Her group was able to overcome some of the challenges of communicating and working together. Other students like Sonya found working with a group a huge support she described this as,

> I definitely decided to use my partner and other resources. I would look up key words in documents then reference them to something else. I wanted to try and understand this course as best as I could.

So, student's experiences different degrees of success with some making adjustments to their initial approaches to accommodate changing needs.

Students in Version 3 were required to seek assistance and had three points of contact: the fictional characters, their peers, and the instructor. Karen described her approach as, “Walter is head of Havenwyrd and is searching for his associate. So far they have kidnapped Rybickoni and he has delivered a message to us. I have contacted Walter but have not heard anything from him as of yet.” Similarly, Becky a junior wrote, “We emailed Baxter and he responded saying that he was being framed. I went to the meeting in Second Life and met up with Chinua and other members.” Both students attempted to contact a missing research associate to get help each getting a different level of response.

Environmental-Structuring. Communicating was a challenge as student schedules were different and the online environment required navigating. A few students realizing communication was not happening chose to meet face-to-face to play the AltRG game and for designing and developing their own. In Version 3 Sonya described this as, “…so that’s when we like, we have to get together this isn’t working so that’s when we decided to meet we met about three times now.” However not all students perceived the need to change their surroundings to better manage their study time.

Goal based Interpersonal Skills (GBIC-Individual). Percent of text of theme for this code in Version 3 was the largest across all versions Becky described her interaction with a missing associate in *Broken Window*, “I emailed Cathy, but have yet to get a response. I emailed Walter and he asked for verification that I [am] on his side. I responded with my proof and have not yet heard back.” Abby described how all her group members communicated the best through Facebook she said,

> Facebook proved useful also when developing our game. This became a source that we used to communicate information to our players about different characters.

Sally reflected on the most common means of communication with instructor and course information was the through the Learning management system she described this as, *“*most instructors use Blackboard applications in order to distribute class notes or other useful documents.” While student's faced challenges when it came to practicing inter-personal skills many found themselves making the effort using ways they found familiar.

Goal based Interpersonal Skills (GBIC-Group). How students chose to communicate with each other especially when working together on group projects resulted in students trying different approaches and facing both success and failure. This was the area in which students faced the most challenges. Both, *collaboration* and *cooperation* were evident in student interaction; however, not everyone experienced success. Dan acknowledged that it was challenging to meet with peers who did not respond on time. Tanya described her own challenge with group work and communication, “Since, we worked in teams I learned that patience is the biggest issue to overcome, at least within myself.” However Liz described her group communication a bit differently she said,

> It was too difficult for my group members and I. We realized that we are all too busy to just communicate through [I]nternet. It went from emailing, to [F]acebooking, to [T]exting, to [C]alling And, then eventually meeting face-to-face. This helped out greatly.

She went on to elaborate, “I actually really enjoyed it. I really liked my group members we all had mostly the same ideas on everything and worked very well together.” Her group members were successful in working out the issues primarily conflicting schedules. For Abby this required a little a bit more initiative and assertion she too was able to successfully navigate the challenges. She described it as,

> The main thing that I learned about working in teams with my peers is that you have to be a little bit forceful, or strict. What ended up working for us was setting up a group message through [F]acebook with the three of us. So, whenever anybody responded, the other two were able to read it also this is how we would decide on days and times that we would meet as a group. Once the rest of the group was brought in, it was nice to say, “Ok, we will EACH develop a character” rather than I will develop all 5 on my own. In addition, it was nice to get new and fun ideas.

Self-Monitoring. This code represented fairly in this version. Students were not used to monitoring their progress during learning. Tami reflected on her practice of self-monitoring,

> [A]s far as like tests and things like that like I normally I try to figure out what my grade is as I’m taking it as far as written assignments and the things that I have to turn in like I try to keep up with like what grades I got on what how I’m doing on that to improve off of it.

However, not all students were able to implement such measures. For example, Sonya said, "I just tracked my progress with [partner's] and my assignments." It was hard for me to track myself because I didn't know where I was going." Most students were used to keeping up with due dates and preparing for tests they those who experienced difficulties simply did not know how to adopt other ways to track their activity that would be effective. "

Self-Consequating. Overall students were recognized they were challenged and that their efforts were not always successful. However they remained puzzled and unsure of how to amend their approach. The representation for this code was one of the lowest across versions of the course. Ben described his views about the need to give himself consequences for failing to reach a deadline or goal, "…no its just something I know I need to work on and so it." Using identifiable steps during learning was not considered by most as necessary for learning.

Self-Regulation, and *Self-Evaluation.* Students in this group like others were required to reflect about their learning experiences, evaluate their progress, and/or make changes as a result of their reflection during the course of the semester. Abby summed it up as, "…when it came to blogging about it, I felt that I could express what I did know, voice what I was confused about, and tell where I was going to go from there." Liz evaluated her overall experience of designing and developing her AltRG game saying,

> Near the end of the design process the group members and I started feeling really good about our game and our final presentation. Overall, I feel like I learned quite

> a few things from this class I have come to realize, if this were merely a BCIS class I would not have learned a thing this semester.

She described how her group selected the topic for their alternate reality game and the considerations they had in mind saying,

> In the [AltRG] that we played as a class, I would say the topic was worldwide diseases, so it somehow could relate to everybody. This is the reason that we chose the topic of pollution, or litter. This affects pretty much everybody. We found it helpful to develop a flowchart and job aid to solve many of these problems.

Clearly her group were transforming what they learned during their own experience of playing the AltRG game i.e., job aid and were using the same to improve the design of their own game.

Acquisition-Model-Learning. The second category represents 27.42% of the text of the theme and is comprised of 10 codes *Course-Expectations, Semester-Course-Load, Instructional-Content, Prior-Knowledge, Scaffolding, Grades, Information-Overload, Workforce-Learning, Frustration,* and *Surface-Level-Response*. Figure 5.18 provides an overview of the category and codes.

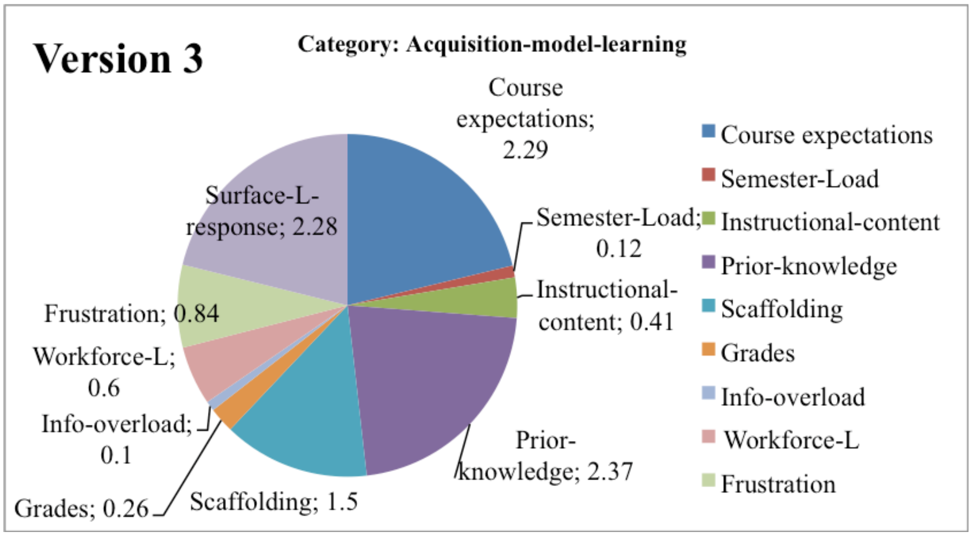

Figure 5.18. Category: Acquisition-model-learning and codes – Version 3.

In Version 3 the code *course-expectations* was the most visible Karen described her expectations as,

> I chose version 3 because it seemed like a better way to learn. For years I have learned through textbooks and lectures with an occasional lab and it just hasn't been the best experience for me. Education is supposed to be for me, for my benefit, but so far I haven't learned the ways that really motivate and inspire me. …When I am just reading from textbooks all I do is memorize the material for the test and then forget it right after. I just hope I am able to keep up.

This student expressed her dissatisfaction with traditional print literacy modes of learning and opted to go with Version 3 hoping to be challenged and engaged. Students interacted with *instructional content* and online resources at different levels. Abby described this as,

> The aspect of the course that I found most difficult was the fact that I was being introduced to something completely new…for the first time on the [I]nternet. On the contrary, I was incredibly confused by week 2. When I heard "What is Havenwyrd up to?" and I had NO clue what that meant or who that was.

She did however reconsider her initial misgivings of learning in this manner stating,

> As far as learning about preventable diseases, I have read several articles from Swine Flu spreading in other countries to the spread of Cholera in Cameroon. I have learned a lot about how these diseases spread and what experts say should be done to help stop or at least reduce the chances of these preventable diseases.

Others did not value some of the instructional activities and perceived them to have little meaning like Ben who said, "… the blogs are ridiculous, I think they're the biggest waste of time. I still haven't blogged in the past month and a half I just keep forgetting you know I have an application in my phone and I still forget to do it."

The importance that students attributed to *prior knowledge* or previous experiences and being able to relate to content was a key preference as evident by the following responses. Abby said, "In the ARG that we played as a class, I would say the topic was world-wide diseases, so it somehow could relate to everybody. This is the reason that we chose the topic of pollution, or litter. This affects pretty much everybody." So students in Version 3 were no different than there peers in other version about their belief about learning.

The extent of support students needed with the game resources and course tasks were considerable many students were challenged. However *scaffolding* in this version was available in through multiple means i.e., through the fictional characters, peers, feedback on the reports, and instructor. Sonya relied on her group member she described this as,

> I really used [my partner] a lot because early on in this semester I realized [the instructor] was not going to be much help...I also started looking and past student blogs. The hardest part was never meeting the "clients" and not getting a feeling for what they needed and wanted. We tried to overcome this by the information we could find about them personally.

The autonomous learning required in the online environment challenged her existing beliefs about how learning should be. Of the feedback she received on her first report she said,

> [O]ne of my biggest mistakes was I didn't put like my names, our names on [the paper] and that's 2 points out of 10 so every time I'd get 2 points off because I thought with it being a computer class you would know, like [the instructor] would know it was mine by looking at my file.

Clearly, She was unaware of the requirements of electronic communication for clearly labeling files and the depth of the Internet. She equated submitting assignments online to that of turning in an assignment in class like a paper in print. Tami saw this slightly differently and described it as, "…there was constant feedback from the game we were playing and that [was] just helped to know you had to do something." She recognized the interactive nature of the game world but faced uncertainty in deciding which direction to pursue. Tanya reflected on the peer feedback her team received on the design of their AltRG game she said,

> …one of the weaknesses was the fact that there were not enough social sites like I mentioned in the previous blog. This is an easy fix, we just simply have to create some more and tie them into the game somehow. It is challenging because you rarely see stuff you miss to explain, because it already makes sense you in your own mind but not to an onlooker who is reading it.

She came to realize the value of peer review and how understanding is contextual in nature each individual possessing their own perceptions. Quite the opposite, Sally expressed her disappointment at the lack of feedback her team received on their game she described this as,

> Honestly I was not expecting a lot of peer review and comments on my game. This is because in online classes people do not spend extra time for the class for

other people. However, I was expecting at least one or two comments. Unfortunately this did not happen.

Thus, students required different levels of scaffolding both soft and hard some reached out to the fictional characters, others to peers while others took support from the elements of the game environment; the narrative, yet others looked towards the instructor. When it came to the designing their own game, student engagement was high with the result that when feedback on the design of their game was not received they experienced and expressed disappointment.

Grades were an important aspect of learning their beliefs about learning reflected traditional views based one that is outcome based and grade oriented. Course material was presented through multiple channels and concepts had multiple representations many students experienced *information-overload* however only a few students reflected on the challenge of dealing with extensive information. Abby described this as, “I don’t think that can quite be decided yet! I have received just loads of information by this point and I do feel that I have some of the pieces that will be necessary for putting this puzzle together.”

Most students in this group also viewed school as a way to improve their career and future lifeAbby described the importance of taking the class, “this is especially important in my profession, being an education major. We do so many things in class, such as lesson plans that I would like to keep for the future.” Amelia described this using the following terms,

> From this course I hope to gain skills necessary and useful to the business work for when I graduate. Computer knowledge and skills are vital and ever growing in today's business world and markets. I hope the skills and knowledge I acquire from this course will keep me competitive in the workforce and further my career.

Students faced challenges at different levels some with the course content, others with online game resources, and others with technology. Frustration was high Liz expressed this saying, “I honestly didn’t learn about preventable diseases throughout the playing process.” She expressed her extreme frustration by refusing to acknowledge that there were any benefits to learning this way. Abby described it as, “…I was introduced to the crazy world of AltRGs. Before this class, I had honestly never heard of this before and had no clue as to what they were. I don't know what is going on? I don't know what to do to help myself.” In her final blog reflection she did change her beliefs, “Although I didn’t think this was fair, I do agree with the order of events/activities in the class.” She came to realize the benefit of learning through such methods.

Amy found some support in the fact that she was not completely alone her group member's felt the same. She said, “It was helpful to know that they were just as lost as I am.” Others like Ben expressed frustration at not being able to make full contact with one of the main characters in the narrative and described this as,

> You worked really hard by ya! kick butt! The red queen site that sucked, but there was nothing we could find or figure out to get into it. We even tried to hack into it and it still didn't work.

His frustration was based on not being successful in solving the mystery and reflected engagement with narrative and game. Thus students in this version experienced the highest amount of cognitive stress as they struggles with their inner belief of learning in an environment that required they use alternate strategies for achieving success.

Learning Strategies. The third category represents 0.06% of the text of theme and two codes *Assimilation-Accommodation* and *Visual-Learning*. In Version 3 the code *assimilation-accommodation* was not represented as indicated by percent of text of theme while *visual learning* was fairly low however this group did reflect on the importance of how content should be engaging and concepts should be presented in multiple ways.

Literacy. The fourth category represents 0.74% of the text of theme and codes are as follows *Spelling*, *Punctuation*, *Grammar,* and *Sentence-Construction*. Figure 5.19 provides an overview of the category and codes.

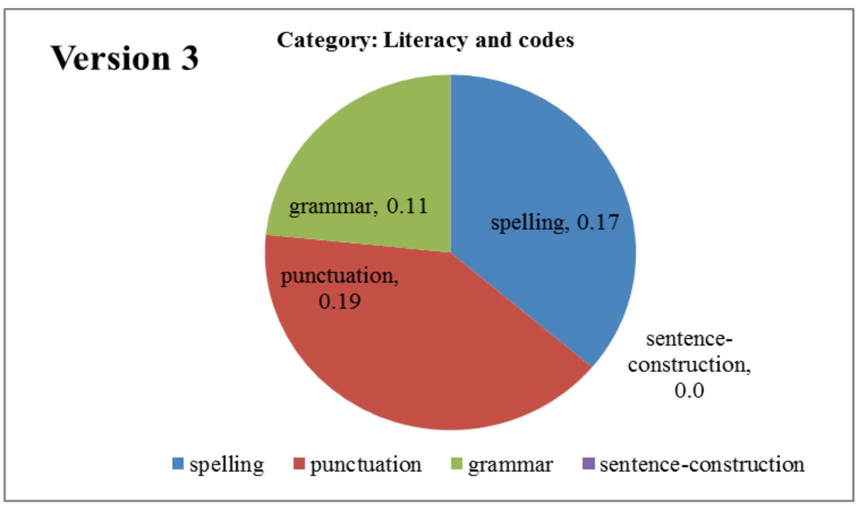

Figure 5.19. Category: Literacy and codes – Version 3.

This group had similar issues as previous groups with writing literacy however they fared better with sentence-construction.

Affect. The fifth category represents 4.70% of the text of theme and is made up of four codes *Rapport, Locus-of-Control, Self-Efficacy,* and *Social-Presence*. Figure 5.20 provides an overview of the category and codes

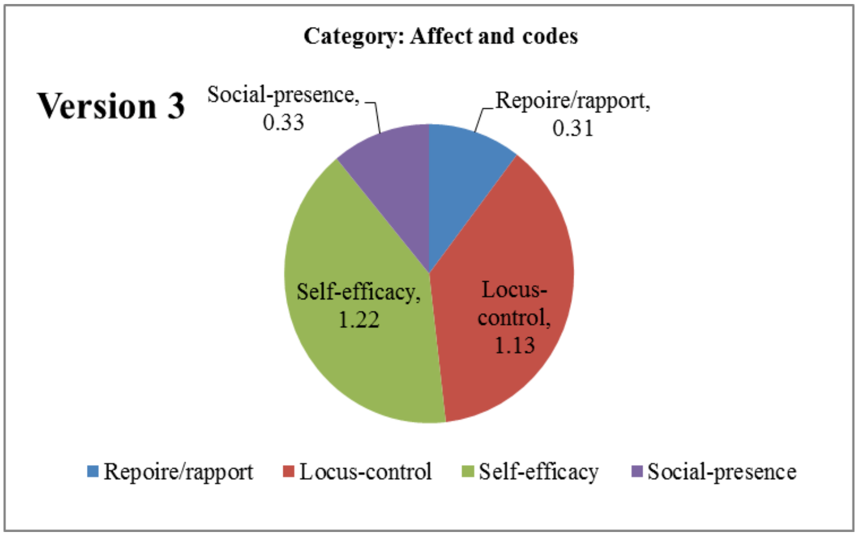

Figure 5.20. Category: Affect and codes – Version 3.

Blog reflections revealed students found it important to be able to connect and relate with course materials, and resources as well as with each other. *Rapport* was important for effective communication. Karen described this as “One of the negatives is that technology makes communication easy to misinterpret because one cannot convey emotions, tone of voice or body language through technology.” Student expectations about their own ability to control their learning outcomes differed. Some students revealed a strong belief in their abilities and so they were able to engage with the tasks and persist at them versus others who did not share the same belief and found themselves losing motivation. Amelia reflected on this stating, “I have learned that you need to take problems into your own hands because they won't always be someone there to help you. Taking this course has definitely made me feel more independent because there was not a professor holding your hand and telling you exactly what to do." Similarly Sally reflected,

> "I have learned that you need to take problems into your own hands because they won't always be someone there to help you." While, Abby a senior described her solution, "the main thing that I learned about working in teams with my peers is that you have to be a little bit forceful, or strict."

As they played the game and worked with the activities many students came to realize the importance of independent thinking.

Similarly, students understood course requirements and materials quite differently. Many followed prescriptive, traditional methods of learning and were surprised when the outcomes were not as they expected. Not all students spent the time to understand the requirements of course materials. Student's also differed in their *self-efficacy* in how they perceived their abilities to learn. Tami described her perceptions of her ability to learn she said,

> [I]n past group projects I always take the following role instead of the leader role. I don't like to be in charge of everyone and their grades. I don't like dealing with a lot of responsibility when it comes to a group project. I don't want to let people down if I don't succeed in the task.

Abby described the steps she took to collaborate with her group saying,

> Our group began by emailing each other in the first part of this class. There were several problems with this. First, there were three people in our group. I wrote to both group members with the information that we were supposed to be providing each other. One group member responded several days later. The other group member I never heard from. The group member that I was communicating with would take several days to write back and I had already moved on by this time.

Not all students had self-efficacy to independently manage their learning needs. In spite of the convenience of using technology, students expressed a need for greater social presence and the need to connect with each other. They described it often in terms of face-to-face contact. Sonya said. "The most challenging was not meeting them to start with, but after meeting Rob, I felt like the work was easier to understand." Other students like Tanya mentioned it in terms of knowing someone without actually ever meeting him or her. She described this as, "It is difficult, however for technology to be the only form of communication in a group. I worked all semester with [Karen] and I have never heard her voice, but I felt like I did get to know her a little. It is very weird how that can happen." Thus, many students felt limited in their communication and interaction. They desired *social presence* and missed the interpersonal contacts that as humans we hold important for successful communication such as the feelings of intimacy, non-verbal factors such as facial expressions and body language.

Motivation. The sixth category represents 2.68% of text of theme it consists of two codes *Intrinsic-Motivation,* and *Extrinsic-Motivation*. Figure 5.21 provides an overview of the category and codes.

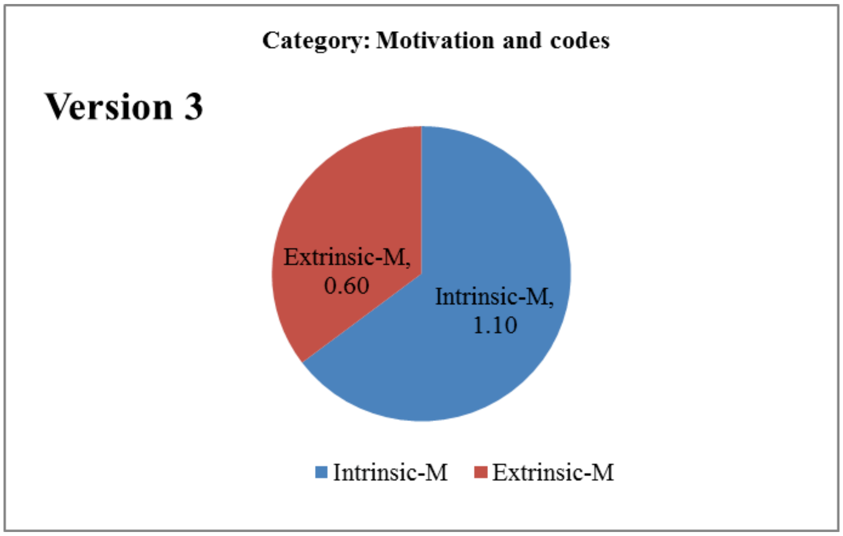

Figure 5.21. Category: Motivation and codes – Version 3.

Several students acknowledged upfront that during the semester there were times when they found it difficult to stay connected and motivated. Not all engaged with the narrative of the game. Karen reflected in her final reflection, “I think the most difficult part was my lack of interest. I didn’t find the objectives difficult but I did find that I didn’t have much motivation because I didn’t enjoy it.” She was expressing some of the frustration she faced during the semester.

On the other hand, Becky described her involvement as, “I have managed to hack into Bedlam Blacks gmail account and have reviewed all of his emails. I found many client lists and am still trying to find the password to the [B]ox.net and [B]ravehost webpage.” Ben a junior a member of the group who won first prize said, “I love winning our name was [T]eam 1 so we already planned it. [W]e’re not taking the final [exam], one last test ‘cause if I had to do Version 1 I'd be...punching myself in the face literally.” Several students were intrinsically motivated the game was a challenge to overcome percent of the text of theme for intrinsic motivation was the highest in Version 3 when compared to the other versions of the course.

Many students were taking the class for extrinsically driven reasons though they perceived these motives to be intrinsic. Karen expressed this as,

> I motivated myself by reminding myself that if I didn't keep up or make the grade that I wouldn't be able to graduate…Though the instructor and my team member were [definite] factors, graduation was always only days away and I used that to encourage myself to press on.

Like their counterparts external factors drove their need for learning.

The theme: *Self-regulation, acquisition-model-learning, teacher facilitator* reflects student practice of self-regulated learning and the influences that impact learner experiences. The three different course versions offered varying levels of engagement and complexity with Version 1 students facing the least complexity (I PBL task), Version 2 students facing moderate levels of complexity (3 PBL tasks), and Version 3 students facing the highest level of complexity (PBL & game play). As a result engagement and motivation varied as students in Version 1 and Version 2 fared fairly low and students in Version 3 fared fairly high.

In terms of percent of the text of theme student practices in self-regulated learning did not vary a whole lot between course versions. Version 1 students fared moderately high, followed by Version 2 students who represented the highest while Version 3 students fared the lowest in all three. Nevertheless there were many qualitative differences between each course version. Overall, students were greatly challenged with goal-setting, time-management, inter-personal skills both individually and group-wise. While communication centered at four levels, *student-to-content*, *student-*

instructor/client, *peer-to-peer*, and *other*. Emergent codes during data analysis revealed, students to value four elements for effective communication. Those were: (a.) to connect and relate, (b.) to engage, (c.) for relevance, and (d.) exchange information. All students were challenged when it came to working in a group student communication was more co-operative than collaborative.

The autonomous conditions of the distributed online learning environment, problem based tasks and game world elements challenged student's ways of thinking; ways instilled by years of acquisition-model-learning. Students required greater scaffolding and perceived the teacher as the leader the disseminator of knowledge not the facilitator. They faced cognitive stress as they struggled with what they believed true of learning. Preference for acquisition-model-learning was higher in Versions 1 & 2 however in Version 3 students faced higher levels of cognitive stress as they struggled to come to terms with their beliefs about learning which were different from what they were required to engage in to be successful at learning.

Theme: *Life-World, Identity, Understanding Worldview*

This represents 23.91% of the total text. The P/C Mean percentage is 1.58% (Version 3), 10.03% (Version 1), and 12.30% (Version 2). The theme has three categories comprised of 13 unique codes with (51), (233), and (265) passages, including (4,818), (39,204), and (40,833) characters of text in each version respectively. Figure 5.21 provides an overview of the theme and categories.

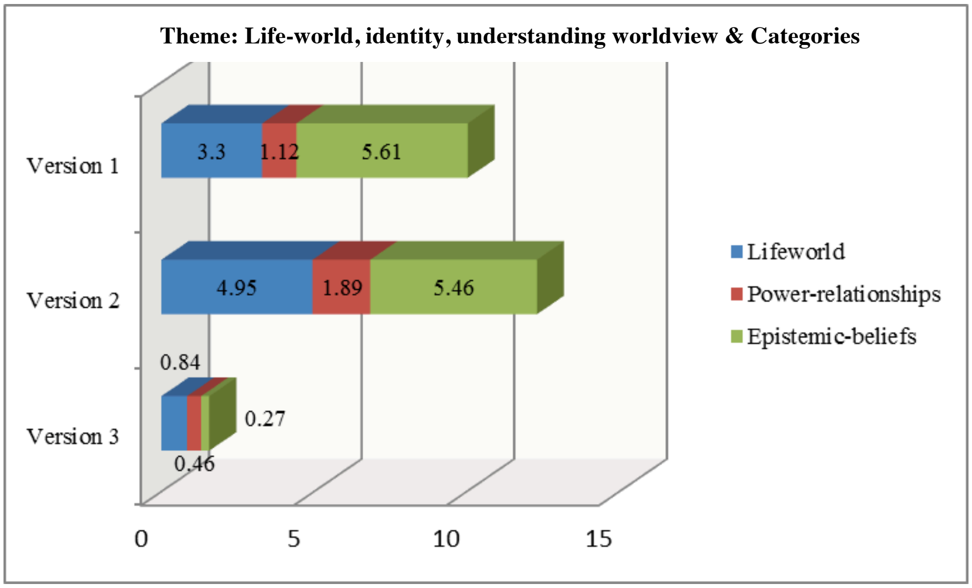

Figure 5.22. Theme: Life-world, identity, understanding worldview & categories.

Table 5.12 presents the percent of category, percent of theme, and percent of total text of the categories in this theme for each version of the course.

Table 5.12

Theme: Life-World, Identity, Understanding Worldview Categories for the Three Course Versions

Version 1			**Total**	**PC Mean % of**	**PC Mean % of**
Categories	**Codes**	**Passages**	**Char**	**Theme**	**Text**
Life-world	4	81	12237	32.99	3.30
Power-relationships	3	29	3935	11.24	1.12
Epistemic-beliefs	6	123	23032	55.77	5.61
Theme Total	**12**	**233**	**39204**	**100.00**	**10.03**

Version 2			**Total**	**PC Mean % of**	**PC Mean % of**
Categories	**Codes**	**Passages**	**Char**	**Theme**	**Text**
Life-world	**4**	115	15247	40.37	4.95
Power-relationships	**3**	43	5929	15.37	1.89
Epistemic-beliefs	**6**	107	19657	44.26	5.46
Theme Total	**12**	**265**	**40833**	**100.00**	**12.30**

Version 3			**Total**	**PC Mean % of**	**PC Mean % of**
Categories	**Codes**	**Passages**	**Char**	**Theme**	**Text**
Life-world	4	25	2798	53.55	0.84
Power-relationships	3	17	1207	29.19	0.46
Epistemic-beliefs	6	9	813	17.26	0.27
Theme Total	**12**	**51**	**4818**	**100.00**	**1.58**

Version 1

Life-world is the first category and it represents 53.55% of text of theme in Version 3 It is comprised of four codes: *faith*, *family*, *school*, and *work*. Figure 5.23 presents an overview of the codes in this category.

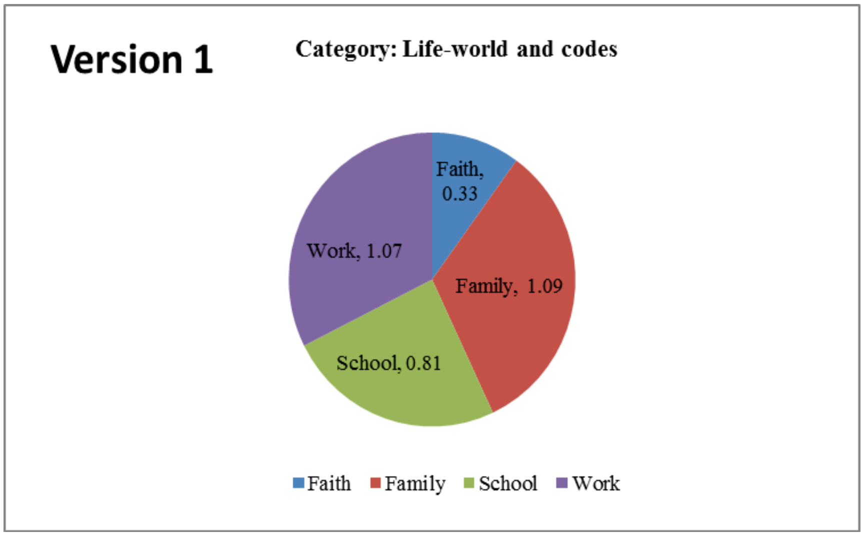

Figure 5.23. Category: Life-world and codes – Version 1.

Student beliefs and attitudes influenced how they learned several students referenced strong convictions faith being one of them. Many students referred to *Faith* in their blogs and how it provided structure and guidance. Brad reflected in his blog stating, "Most of my time goes to school & work. I try to balance my time between the two & God."

In Version 1, the codes *family, school,* and *work* are much lower as evidenced by the percentage of text of theme. However, student experiences are similar with considerable overlap existing in all three areas with student experiences in other versions. Peggy described these influences as, "I am not only organizing five class schedules, labs, and homework but have to manage my household, family, and children's activities." Ken a junior put it simply, "First, comes family, friends and of course my girlfriend, next comes school and football and everything else just kinda (sic) just falls into place." Others viewed family as a major force Robin a junior described this influence as,

> I have a large case load this semester, plus work and family, but at the same time want to get something out of this course…I had to resort back to the old fashioned datebook…this helps with, hopefully, meeting all due dates for school and actually have a family life and taking care of a disabled parent. Priorities … FAMILY! Everything revolves around them. It is the reason I went back to school …it's the reason I want to succeed…

Thus, student life-experiences beyond school influenced how and when they chose to learn which in turn influenced their perspectives about school and their approach towards learning.

Power-Relationships. The second category represents 29.19% of the text of theme and is comprised of 3 codes *Identity*, *Power*, and *Trust*. This code represents the largest among the three versions.

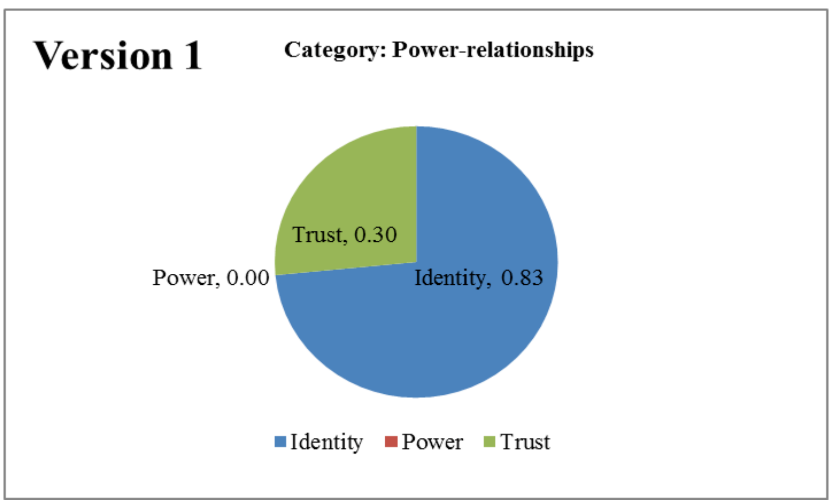

Figure 5.24 Category: Power-relationships and codes – Version 1.

This category reveals student perceptions, attitudes and beliefs towards school and learning. The code *Identity* was represented the highest in Version 1. Many students identified with the various cultural symbols and values in their environment, which in turn shaped their views about learning. Marie recognized the need for *identity* and the power of cultural values she reflected on her beliefs as, “There is some kind of prestige in wearing name brand clothing that make people want to buy it and show it off to others. The Nike swoosh is also important because it is one of the biggest name brands in our consumer culture.” Whereas, Peggy, used the following example to explain similar views, “The design of a website entices and promotes interest. It is a little like art and people get a representation of the authors (or business) and their ideas.” Both saw such influences to shape their perceptions and ways of communication.

Students in Version 1 made no explicit references to code: *power*. However many were challenged when working in group's *trust* was a major issue as evident by percent of the text of theme. Most struggled and experienced discomfort. Ken a junior clearly stated his belief and the reasons why, “I prefer to work alone especially if I am working towards something that concerns my GPA. It's tough working in groups and trying to coordinate with people who may have different work ethics than you.” Therefore in their own ways students recognized the importance of identity, and the embodied power of shared values and beliefs however most expressed unease with relying on peers and the sharing of power.

Epistemic-Belief. The third category represents 17.26% of the text of theme and is comprised of six codes *Behaviorist/Subjectivist*, *Objectivist/Positivist*, *Constructivist*/*Contextualist*, *Information processing*, and *Relativist*. Figure 5.25

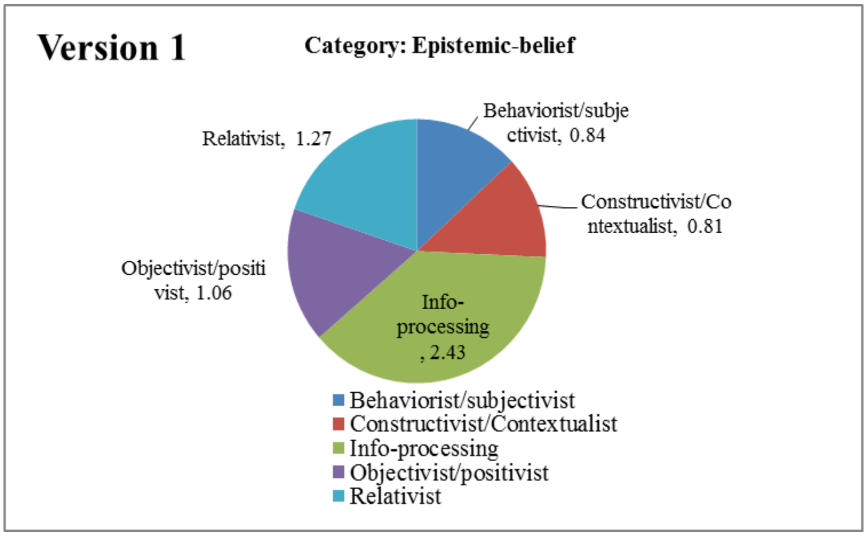

Figure 5.25. Category: Epistemic belief and codes – Version 1.

When it came to beliefs about learning and knowing students expressed a range of ideas and preferences. These, worldviews shaped their approach and attitude towards learning. These views were well represented in Version 1 and Version 2 as evident by percent of text of theme. The following section provides examples of some of the most common beliefs expressed. Shane described his view of knowing truth as, "to know is to be aware to have knowledge. Truth and reality is subjective, truth and real can mean something different to other people. The knowledge I have gain has changed my views." He expressed a *Behaviorist-Subjectivist* approach towards learning. Point to note *Constructivist/Contextualist* beliefs about learning were not represented in Version 1.

Marie seemed unsure of how to know truth and followed an *Objectivist/Positivist* view describing it as,

> You can know when something is real by using your senses. You can start by looking at the object if it is possible. Then you can touch it and feel it, but not all real things can be touched or seen. Sentimental things for example are felt and you can tell they are real by the feeling they provoke.

She expressed *Objectivist-Positivist* position a view that was most represented in all versions. The percentage of text of theme was large in Version 1 for *Information-Processing* Brad put more emphasis on this approach describing the process of learning as,

> Information retrieval from a database is similar to that of knowing and learning because when you retrieve information you are pulling it from a database that already knows it similar to pulling something from your brain after learned and can use it because it was stored as something you know. To know is to be knowledge of the information given.

This seemed consistent to the ways most student in Version 1 had approached learning. When compared with other versions percent of the text of theme was large in Version 1 towards *Relativist* views of learning. Ken described his views of learning and knowing as, "Learning is the process of taking in information from an outside source and making it your own. It's taking ideas, facts, events, data from outside your own mind and putting them into a format you understand and one you can turn around and tell other people in your own way." In sum students in Version 1 found themselves leaning more towards *Information Processing* and *Objectivist-Positivist* views of learning.

Version 2

Life-world is the first category and it represents 40.37% of the text of theme in Version 2 and is comprised of four codes: *faith*, *family*, *school*, and *work*. Figure 5.26 presents an overview of the codes in this category.

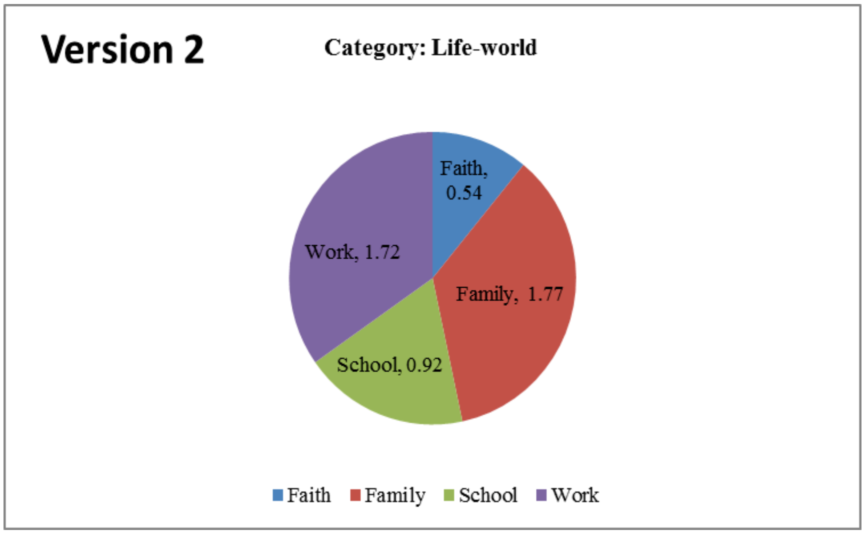

Figure 5.26. Category: Life-world and codes – Version 2.

In Version 2 many student's views about learning were influenced by *Faith*. They recognized a structure and the hierarchy of levels of authority. Dee equated faith with success she described it as, "my priorities are basically to honor God and my mother. I am here to make my mother proud, and to obey her. To do that, I have to complete school and to gain a college education. She wants me to be as successful as I can be." On the other hand Jim described his priorities as,

> My life is relatively organized and my priorities are clearly defined if you know me at all. A ranking of my priorities would look something like this: Church [faith based], Friends, School, [and] Work. I prioritize based on what I view as most important. I put my religion and relationship with my God over everything else. I Love: Sports, Teaching, Kids, Friends, Family, Music, Movies and most, important... my GOD :) Phillipians 1:21 for me to live is Christ and to die is gain.

These student reflections showed strong convictions and how school was equated to success. Life experiences were a driving force in this group with students dealing with all three simultaneously *family, school, and work.* Jack succinctly described his schedule for school and work as,

> I organize my world through the schedule given to me by my jobs and school. On, [M]onday, [W]ednesday, and [F]riday from 8 a.m. to 1 p.m. I go to [University, Monday through [T]hursday at 4 p.m. to 5 p.m. I open the gym at Diamond Hill High School.

Thus, *Life-world* experiences influenced how and when students learned and shaped their perspectives about school and learning. They were quite noticeable with students in Version 2 and were the reason for many taking classes online as students were able to accommodate their other responsibilities and school.

Power-Relationships. The second category represents 15.37% of the text of the theme in Version 2 and is comprised of 3 codes *Identity*, *Power*, and *Trust*. This is the largest among the three versions. Figure 5.27

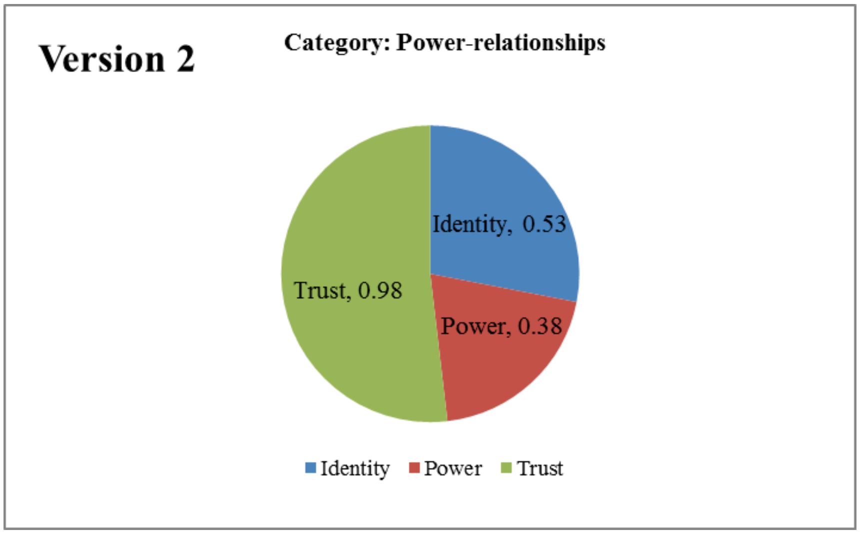

Figure 5.27. Category: Power-relationships and codes – Version 2.

Many students in Version 2 recognized the importance of establishing an *identity* Jim described this as, "First impressions sets the tone for how someone will view that website or symbol, when you are able to leave a good impression people are more readily willing to listen and pay attention." Dee a sophomore perceived identity as a way of conforming and stated,

> Technology has changed so much in today's society. Everyone has the newest phone, from the iPhone to the BlackBerry. It's basically a way to fit it. I have a bond with technology that most of my friends tend to push away. I tend to hide my knowledge of technology because I have another personality other than my geeky side.

These students recognized the conforming power of these cultural values. Version 2 students made no explicit references to code *power*. Robin a junior expressed similar views about *trust* when it came to relying on peers and sharing she stated, "the most challenging part of working with peers is the 'unknown.' Are they going to show up with their part? Did they turn it in on time with the part that I did attached?" Therefore students in Version 2 faced similar issues with group work that students in Version 1 faced.

Epistemic-Belief. The third category represents 44.26% of text of theme and is comprised of six codes *Behaviorist/Subjectivist*, *Objectivist/Positivist*, *Constructivist/Contextualist*, *Information processing*, and *Relativist*. Figure 5.28 presents an overview of the codes in this category.

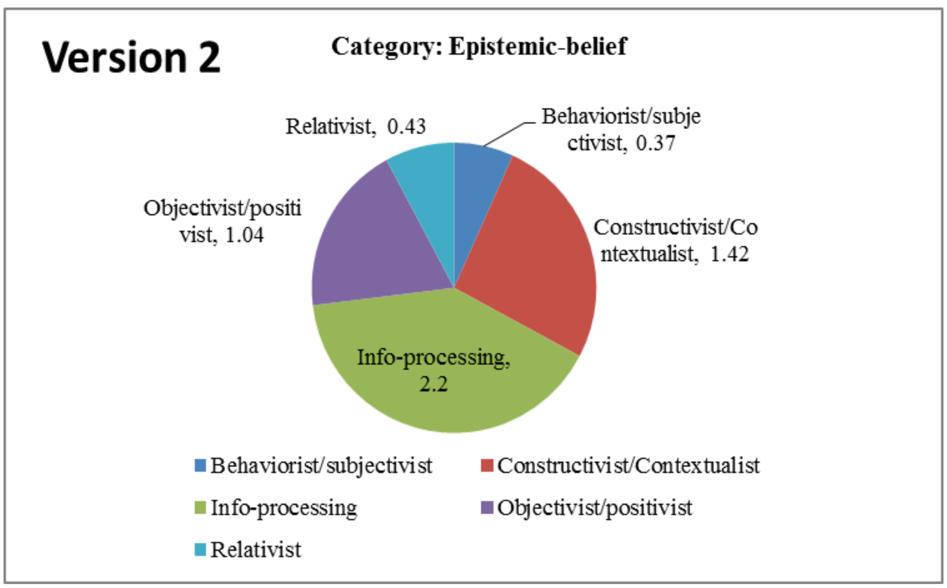

Figure 5.28. Category Epistemic belief and codes –Version 2

In Version 2 students faced shared very similar beliefs about learning however but in different degrees. The following section provides examples of some of the most common beliefs expressed. Carrie perceived knowing and learning more from a *Behaviorist-Subjectivist* perspective she described this as,

> For instance, when I wish to learn new material presented in my calculus class, I study my notes and practice problems associated with my notes. Through repeated practice, I am able to learn the new material and store the information in my mind. I need to "practice" in order for me to learn. I think learning is practicing. People can learn from their mistakes.

The *Constructivist/Contextualist* perspective similar to student's in Version 1 not did not represent high as evident by percent of text of theme**.** Dee believed that, "Learning with other individuals can help you to gain knowledge. We do not know everything on our own, so having another opinion is not bad for us at all. It expands our thinking process as well as us getting to understand that everyone does not think like us." Jack described an *Objectivist-Positivist* views of learning as, "I think learning is the ability to remember things that we learned and be able to recall them at a later date. In order to achieve learning we have to use our senses, for the input to get to our brain." He was expressing a view many of his other classmates believed in. Code *Information-Processing* represented the highest in Version 2 and was consistent to how many students approached their learning. Sharon described how she learned as,

> I think that the way I learn is extremely similar to how a computer functions. When I learn something new, I first have to…soak in to my brain, process it and get more in depth with it until I can be able to recite certain facts or information. I believe 100% that computers learn. For example on my iPhone there is predictive text and there are certain words I use that was not in the predictive text dictionary. After I had used a certain word a few times the phone recognized it and the word is now in that dictionary. I think learning is similar to a database when you input information and similar to knowing when you can go back into a database and look up information that's already been input[ed].

Others like Jim emulated a *Relativist* view he described this as,

> Our personal beliefs and what we believe to be true is affected by situations and past experiences. Someone might not like a celebrity because of an unpleasant encounter with that celebrity while someone else who did not have that

experience may not have the same opinion. This is just one example but every part of our lives is shaped by our past experiences.

In short the most students in Version 2 followed the *information processing* approach.

Version 3

Life-world is the first category and it represents 53.55% of text of theme in Version and is comprised of four codes: *faith*, *family*, *school*, and *work*. Figure 5.29 presents an overview of the codes in this category.

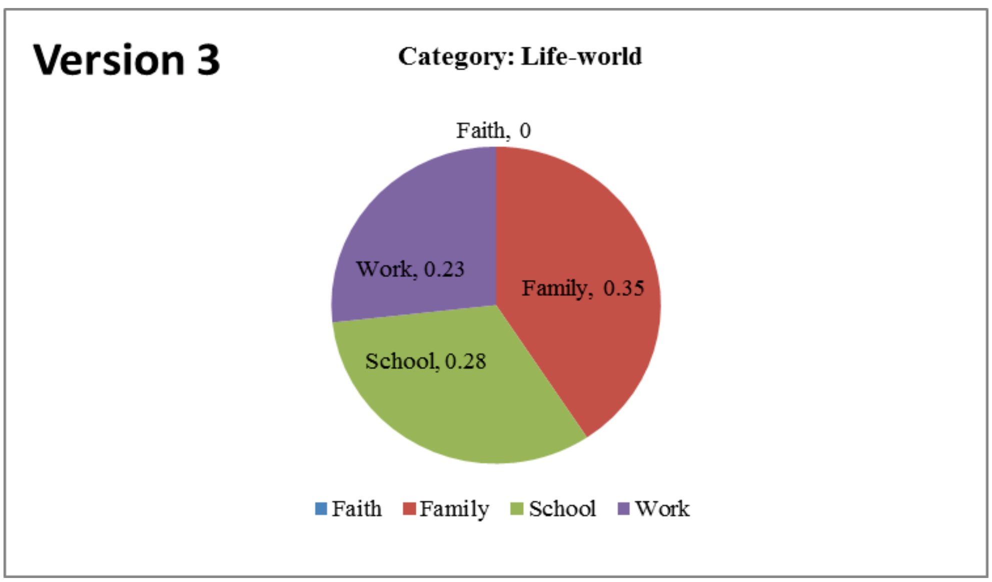

Figure 5.29. Category Life-world and codes – Version 3

Students enrolled in the PBL and game play Version 3 of the course because they were open to new ways of learning.

Point to note code *Faith* had no explicit representation. Of the three codes *Family, School, and Work***;** *family* is the largest in Version 3 followed by *school*, and then *work*. Sally described her role in family as, "Being a mother of two children I barely have time to study …" For Sonya, family and friends meant fun often playing, board games such as Scrabble, Clue, Jenga and card games, as well as sports pursuing like as soccer, basketball, and tennis with friends. She explained the importance of taking this class by relating it to her future plans, "I took this course because I am wanting to become high school history teacher and soccer coach. And I know that technology is becoming a vital part of the classroom and that future students are going to be more successful with it."

While Abby described school and work as "unbelievably busy…with student teaching and trying to graduate. Hopefully, I will be able to focus some attention to this course and gain some valuable knowledge in the process." Therefore life experiences influenced these students often taking precedence over school.

Power-Relationships. The second category represents 29.19% of the text of this theme and is comprised of 3 codes *Identity*, *Power*, and *Trust*. This is the largest among the three versions. Figure 5.30 provides an overview of the category and codes

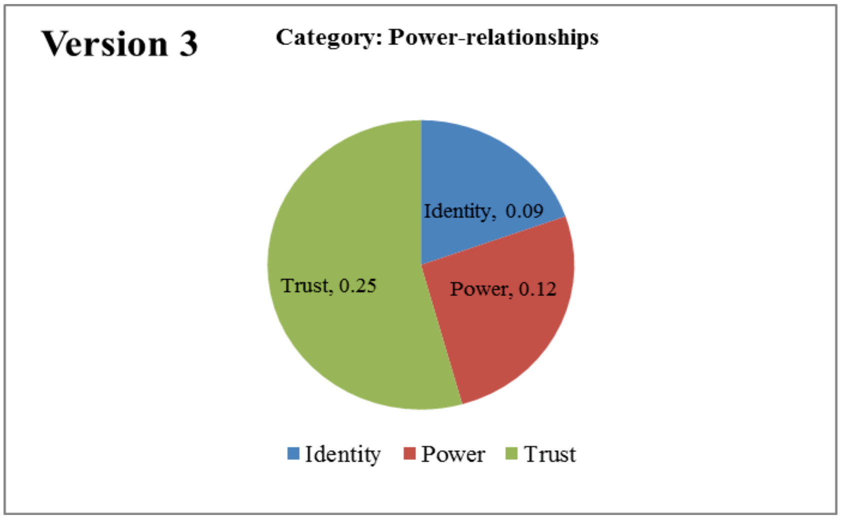

Figure 5.30. Category Power-relationships and codes – Version 3

Becky recognized that the online games she liked were somewhat different from the norm. She described her preferences as,

> Most people like role playing games such as Sims and World of Warcraft (WOW) because they are more widespread and popular however I identify better with racing games as they allowed [me] to take risks; speed and crash legally without anyone getting hurt.

On the other hand, Abby's thoughts about school and learning were not typical among respondents. She described her view of school, "[as] a game to be played and conquered." Both students identified with games that were popular but revealed a difference in their preferences. These two students who came to realize that learning through play was a different way of learning.

In Version 3 students mainly related to code *power* when it came to designing and developing their own AltRG game and playing the role of Puppetmaster. Abby reflected about her anticipation regarding developing and designing her game when she stated, "It is interesting to control an AltRG, and I am excited to see where I take the game. How will I do as a Puppet master?" Leading, driving, and shaping were terms that described how she perceived her role as the Puppet master and her connection to the game.

Student in this version were challenged the most when working in groups as evident by references this code. Most struggled and experienced discomfort. Karen described her experiences as, "It took a lot of communication and keeping up. I also learned that I don't work well in groups. It is hard for me to trust others with my grade." Tanya a junior expressed this as "relying on someone else to do their part is frustrating because I want everything done on my time, and of course the world is never going to be like that. So I did learn a lot of patience." *Trust* was a major issue.

Epistemic-Belief. This represents 17.26% of the text of theme and is comprised of six codes *Behaviorist/Subjectivist*, *Objectivist/Positivist*, *Constructivist/Contextualist*, *Information processing*, and *Relativist*. Figure 5.31 provides an overview of the category and codes.

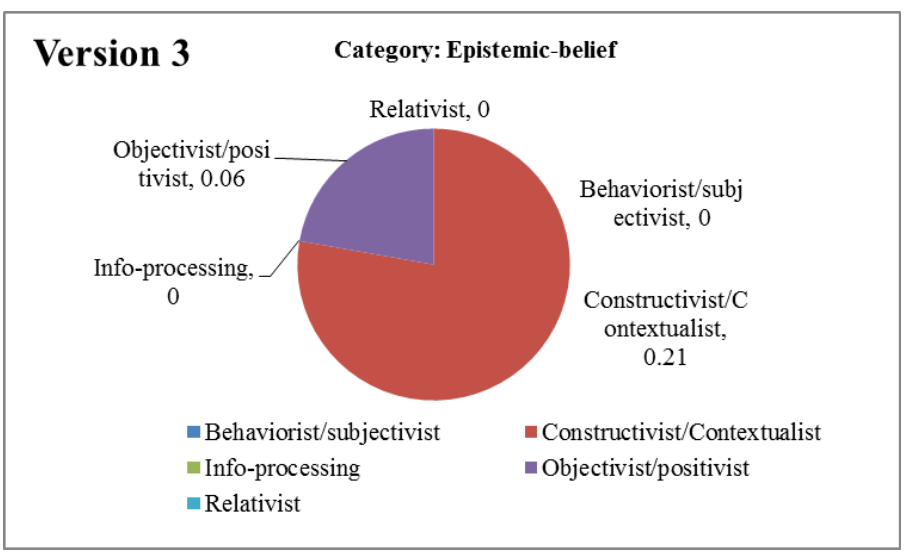

Figure 5.31. Category Epistemic belief and codes – Version 3

Student in Version 3 used a range of strategies to meet the challenges of learning online, through game and in groups. As they faced challenges they realized many of their approaches were not working several attempted to adopt alternate ways. The following section provides examples of some of the most common beliefs expressed. A point to note a *Behaviorist-Subjectivist* approach was not represented at all. While *Constructivist/Contextualist* view of learning represented the highest among all versions of the course. Karen described these preferences as, "I like to learn by doing and seeing…Play for me is being interactive with the things you are learning." She elaborated on her views by giving an example of her recent experience,

> One way that I have learned by playing is having an internship. It has been the most interactive thing I have participated in throughout my years in school. I have learned more in this semester through the internship than I have sitting in a classroom.

The other views towards learning were minimal with fairly low representation of the *Objectivist-Positivist* approach to learning. Amelia described how she distinguished the veracity of information and took a more generalized view based on specific facts stating, "I look at the layout of the site, the author, and I also compare the author, and I also compare it to other sites and information. If they seem sketchy I look for other means and information."

Thus theme *Life-world, identity, understanding worldview* provides a brief overview of student attitudes and beliefs about learning. Life- experiences and how they impact attitudes towards learning are revealed. Each instance provides insights into how students think about knowing and how they choose to regulate learning. Identity, conformance, power and trust are other issues. Students across all versions of the course were uncomfortable relying on peers in particular when it was matter of their grade. Students mostly expressed Objectivist/Positivist views of learning where knowledge exists outside the human mind, and is observable and measurable. Many students perceived learning from an Information processing approach few foresaw learning as active participation: the constructivist approach. This was not surprising considering the years of ingrained training of learning through traditional methods of instruction that emphasize regurgitation of facts, performance, and are outcome based. For many students this is the only way they know how to learn. The constructs in the category *Epistemic Beliefs* are multi-level, vast, and complex and present only a brief synopsis of student beliefs about learning they require greater analysis before their influence maybe fully determined therefore their scope is beyond this study.

Theme: *Technology, Learners, Situating Social Presence*

This represents less than 27.75% of the total text. The P/C Mean percentage is 8.19% (Version 3), 9.91% (Version 1), and 9.76% (Version 2). The theme has two categories comprised of 12 unique codes with (247), (230), and (257) passages, including (25,965), (29,593), and (34,496) characters of text in each version respectively. Figure 5.32 provides an overview of the theme and categories.

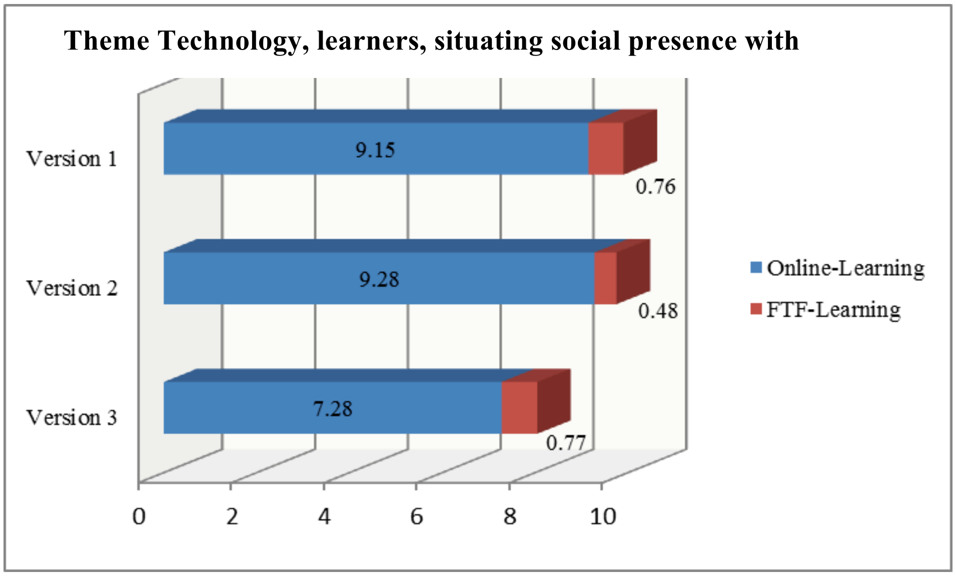

Figure 5.32. Theme Technology, learners, situating social presence & categories.

Table 5.13 presents the percent of category, percent of theme, and percent of total text of the categories in this theme for each version of the course.

Table 5.13

Theme Technology, Learners, Situating Social Presence

Categories and codes for the Three Course Versions

Version 1

Online-L			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Blackb	20	1506	6.58	6.07	0.62
	SAMS	37	3099	12.66	11.69	1.18
	Anxiety-online	6	634	2.26	2.09	0.21
	Netiquette	6	1248	3.22	2.98	0.29
	Tech-negatives	53	5891	20.41	18.85	1.88
	PervasiveT	9	1808	4.73	4.37	0.43
	Tech-positives	71	11861	33.57	31.01	3.05
	Info-access	32	5195	14.89	13.76	1.35
	Cloak-anonymity	3	661	1.67	1.54	0.15
Online-L	**9**	**237**	**31903**	**100.00**	**92.35**	**9.15**
Theme Total	**83**	**257**	**34496**	**100.00**	**100.00**	**9.91**

FTF-Learning			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
FTF-Learning	FTF-adv	14	1577	65.41	5.01	0.5
	FTF-disadv	6	1016	34.59	2.64	0.26
FTF-Learning	**2**	**20**	**2593**	**100**	**7.65**	**0.76**
Theme Total	**12**	**257**	**34496**	**100**	**100**	**9.91**

Version 2

Online-L			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Blackb	23	1941	8.72	8.28	0.82
	SAMS	43	2092	13.59	12.88	1.29
	Anxiety-online	0	0	0.00	0.00	0.00
	Netiquette	0	0	0.00	0.00	0.00
	Tech-negatives	32	2981	12.62	11.99	1.18
	PervasiveT	25	4174	13.11	12.49	1.21
	Tech-positives	42	7135	22.24	21.19	2.05
	Info-access	50	9985	29.10	27.74	2.68
	Cloak-anonymity	2	96	0.63	0.60	0.06
Online-L	**9**	**217**	**28404**	**100.00**	**95.16**	**9.28**
Theme Total	**83**	**230**	**29593**	**100.00**	**100.00**	**9.76**

FTF-Learning			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
FTF-Learning	FTF-adv	10	809	72.48	3.54	0.35
	FTF-disadv	3	380	27.52	1.29	0.13
FTF-Learning	**2**	**13**	**1189**	**100.00**	**4.84**	**0.48**
Theme Total	**12**	**230**	**29593**	**100**	**100**	**9.76**

Table 5.13 *(continued)*.

Version 3

Online-L			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	Blackb	23	1941	8.72	8.28	0.82
	SAMS	43	2092	13.59	12.88	1.29
	Anxiety-online	0	0	0.00	0.00	0.00
	Netiquette	0	0	0.00	0.00	0.00
	Tech-negatives	32	2981	12.62	11.99	1.18
	PervasiveT	25	4174	13.11	12.49	1.21
	Tech-positives	42	7135	22.24	21.19	2.05
	Info-access	50	9985	29.10	27.74	2.68
	Cloak-anonymity	2	96	0.63	0.60	0.06
Online-L	**9**	**217**	**28404**	**100.00**	**95.16**	**9.28**
Theme Total	**83**	**230**	**29593**	**100.00**	**100.00**	**9.76**

FTF-Learning			**Total**	**% of**	**% of**	**% of**
Categories	**Codes**	**Passages**	**Char**	**Category**	**Theme**	**Text**
	FTF-adv	10	809	72.48	3.54	0.35
	FTF-disadv	3	380	27.52	1.29	0.13
FTF-Learning	**2**	**13**	**1189**	**100.00**	**4.84**	**0.48**
Theme Total	**12**	**230**	**29593**	**100**	**100**	**9.76**

Version 1

Online-Learning. The first category represents 95.16% of text of theme in Version 1. It consists of nine codes *Blackboard (LMS)*, *SAMS*, *Anxiety-Online*, *Netiquette*, *Technology-Positives*, *Technology-Negatives*, *Information-Access*, *Pervasive-Technology*, and *Cloak-of-Anonymity*. Figure 5.33 provides an overview of the category and codes.

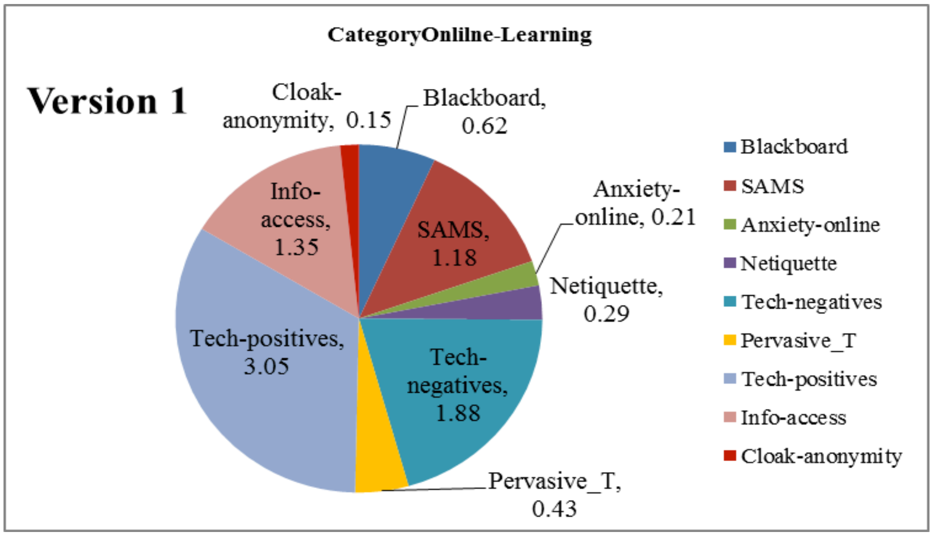

Figure 5.33. Category Online-learning and codes – Version 1.

Students in the course worked with *Blackboard or Moodle* learning management systems (LMS) based on the version of the course they chose to go with. This code reveals their experiences. Marie felt comfortable using Blackboard because she found everything was in one place including assignments, email, and assessments. Ken found working with SAMS a bit different, which he described it as, "SAMs lessons … were time consuming. It was annoying to be honest all the training was annoying, the exams were hard."

Several students in their blogs expressed their *anxiety* of learning online Peggy mentioned she was not comfortable with computers and that is why she chose to enroll in version 1 of the course. Marie had similar concerns. She felt nervous since this was her first online class she described how she felt as, "…every time I completed a lesson I gained more experience and applied it toward the next lesson. Therefore the more lessons

I completed the better I got at completing them." Others like Kayla described how they communicated differently based on the kind of technology used and the person. She described the *Netiquette* she followed as,

> The way I communicate along with the technology I use varies and depends on the person. For example, if I am talking to my mom, I prefer to talk, but we also e-mail and text. When we talk on the phone or e-mail, I am going to use proper sentences and grammar, but when we text it is usually fast and to the point. It's using short cut words such as lol, haha, and luv u.

Most students found the option to work online a benefit despite the frustrations of navigating and working with technology. Anne, saw the benefits of using technology and described it as, "My favorite technology tool to use for communication is email and texting. This is because it fits my style of getting straight to the point and responding at one's convenience." While Amber recognized the benefits but saw it a bit differently she described this as,

> I think technology has changed society. Communication is super-fast. In the past decade the rate of communication has increased exponentially. [However] we are a generation that has lost patience we expect immediate results in just about everything we do. Between cell phones, email, texting, faxing and chatting, we want to know everything and know it now.

The challenges and frustrations students faced when working online were different several reflected on their concerns. Brad made the comment, "I learned you have to check often to see if your peers have responded, email was my least favorite because it required constant attention." Whereas the percent of text of theme for code *Information-Access* was one of the largest, students approached this in different ways and at various levels. Some made little or no effort while others applied a systematic approach. The following are some examples of these experiences. Marie described her approach to accessing information,

> When I have a question about something I look it up online. That is the easiest way to get an answer. I can easily be mislead or misinformed if I get my information from a hoax site. However from my experience searching the web, I have developed my own evaluation techniques to test the authenticity of a subject or matter. First I always browse other webpages to see if they obtain similar information and most of the time they do. Next I read the contents of a page and check to see if the contents sound legitimate enough. It also helps me to have a book and compare information because the [I}nternet is more prone to have false information.

Despite the benefits there were some students who recognized the intrusive aspects of technology. Yet others like Marie found technology helped her communicate better and she described this as, "I prefer to communicate by cell phone; it is my top choice because I always have my cell phone with me. I do notice changes between the types of communication I use. For example I think the phone is less informal than face-to-face communication and therefore more comfortable for me. When I talk on the phone I am more relaxed and focus more on what I want to say. On the other hand when I am on the phone I pay more attention to the person's voice and mood." Her reflection brings to light the *cloak-of-anonymity* that technology provides and the benefits it can afford to students who face challenges in language and verbal communication.

Face-to-Face-Learning. The second category represents 7.65% of text of the theme in Version 1 It consists of two codes *Face-to-Face* (*FTF)-advantages*, and *Face-to-Face* (*FTF*)-*disadvantages*. Figure 5.34 provides an overview of the category and codes.

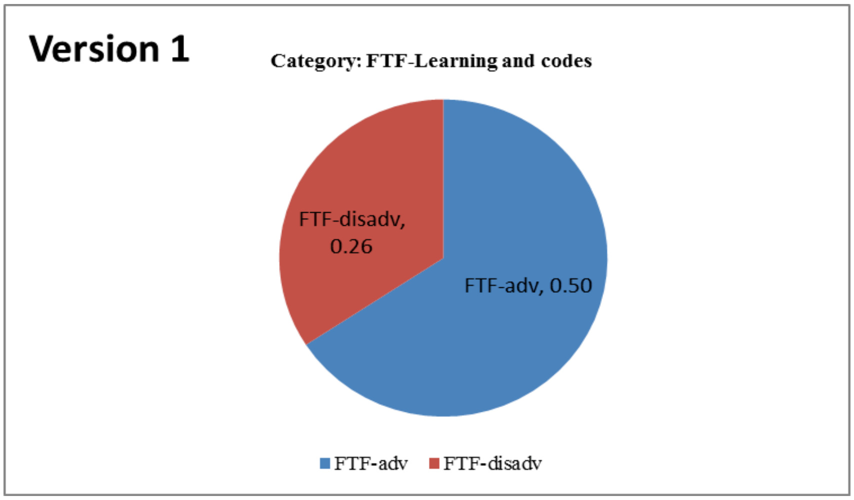

Figure 5.34. Category: FTF-learning and codes – Version 1.

This code reveals student attitudes and beliefs of working online versus face-to-face. Not all students found communicating online to be effective especially for group projects. Many students in Versions 1 preferred the online option as it allowed them the flexibility to work at their own pace and own time. Brad described his preference as, "I really don't prefer face to face when it is something that is not required because technology is so advanced these days you don't have to meet face to face to communicate." When, it came to communicating with their team online many students found it challenging a few chose to adopt alternate measures in order to complete the work moving to meeting face-to-face. Few were successful in using the various technology tools effectively to communicate those who did were not fully satisfied. Many felt limited. In Version 1 students indicated they found the convenience of working online useful.

Version 2

Online-Learning. The first category represents 92.35% of text of theme in Version 2. It consists of nine codes *Blackboard (LMS)*, *SAMS*, *Anxiety-Online*, *Netiquette*, *Technology-Positives*, *Technology-Negatives*, *Information-Access*, *Pervasive-Technology*, and *Cloak-of-Anonymity*. Figure 5.35 provides an overview of the codes in this category.

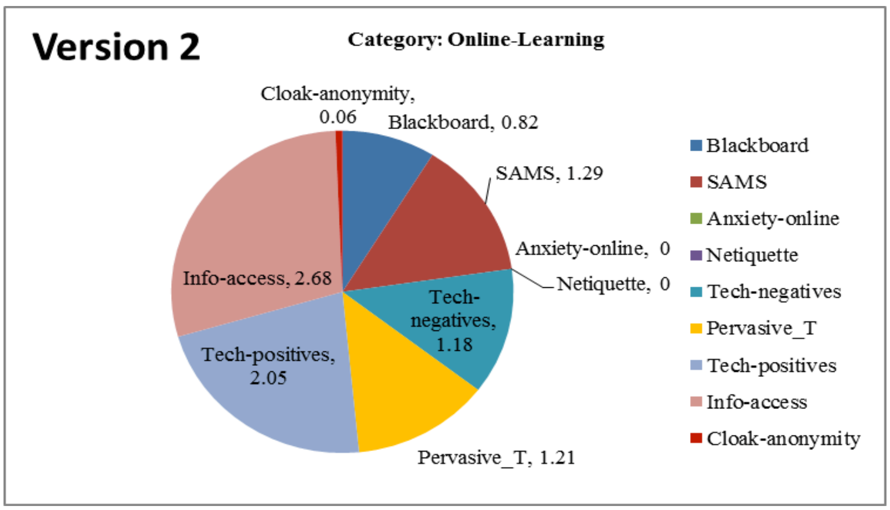

Figure 5.35 .Category Online-learning and codes – Version 2.

In Version 2 saw the many advantages of working with a LMS. Jon said of this,

> It's really easy to work with BB especially when the assignments are explained really well**.** I like it because anytime that I have a question about anything in my classes there are discussion boards and also a chat feature to connect with other students.

Similarly, Jack described working with the SAMS CBI as, "It really helped a lot because the training really teaches you and reinforces what you read and the exams help to cement in what you really learned and what you didn't learn." Codes *anxiety-online,* and *netiquette* for Version 2 were not represented well. Ally supported online learning and saw it as a benefit she described this as “I have found it very useful there is no way that I could continue my degree in this stage of my life without it I don't have the time to go to a formal classroom and sit there the travel time the sitting in the classroom time I don’t have that I have kids I have a full time job. I haven't used it that much its been a challenge getting familiar with the technology to use it to that effect, but it’s been absolutely essential and there is no way I can be in school right now without it.”

However, Jack hinted how working online takes longer however he did seem resigned to the fact he described it as, “ I think so just a little because of the scheduling and so I work nights so a lot of my work I do at night so it takes a little longer than if I had to be at a class it would make it a little easier.” Therefore, students in their blog voiced the many frustrations and challenges they faced when working with technology. Peggy viewed the aspect information access a bit differently stating,

> Technology has changed society for the better and the worse. We are able to do so much more, and from the convenience of our homes, but I am afraid for many it is a growing dependency. I have to admit I really enjoy working on research from home, banking from home, and conducting so much business on-line.”

She recognized the long-term limitations of using technology.

Face-to-Face-Learning. The second category and it represents 4.84% of the text of the theme in Version 2. It consists of two codes *Face-to-Face* (*FTF)-advantages*, and *Face-to-Face* (*FTF*)-*disadvantages*. Figure 5.36 provides an overview of the category and its codes.

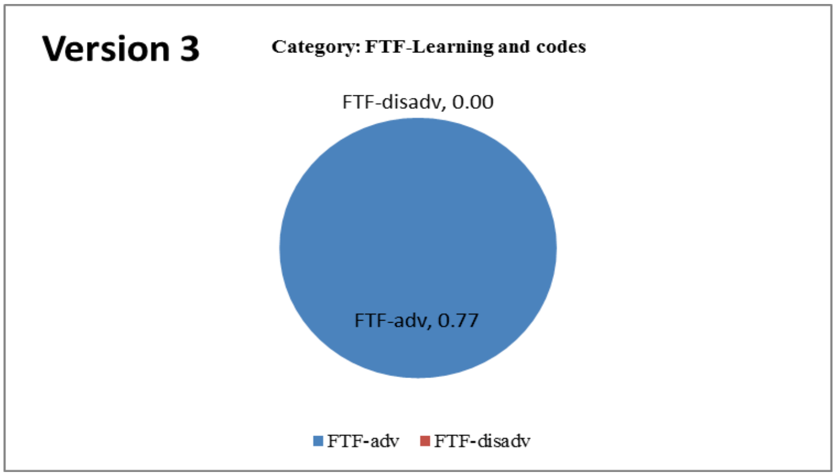

Figure 5.36. Category: Online-learning and codes – Version 3.

In Version 2 students perceived online learning as a convenience and shared the same views of students in Version 1 however they did acknowledge the need for greater social contact in an online environment. They did not reflect much on the disadvanatages.

Version 3

Online-Learning. The first category represents 90.42% of the text of theme in Version 3. It consists of nine codes *Blackboard (LMS)*, *SAMS*, *Anxiety-Online*, *Netiquette*, *Technology-Positives*, *Technology-Negatives*, *Information-Access*, *Pervasive-Technology*, and *Cloak-of-Anonymity*. Figure 5.37 presents an overview of the codes in this category.

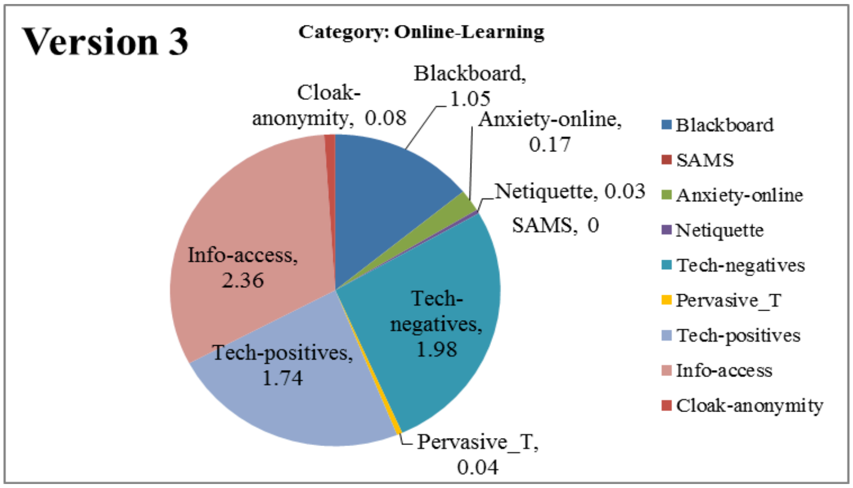

Figure 5.37. Category: Online-learning and codes – Version 3.

Students in the course worked with *Blackboard* Sonya a freshman described her challenge with working with the LMS system in Version 3,

> While exploring Moodle I was able to find where all my assignments were and all the important information that I would need for the course. I did not like the fact that I knew what I needed to do, but not how or where to go. The only thing that I would like to see changed is that the students would have more resources to show us how to do some of the beginning activities and more information on what the course entails.

Others like Amelia faced some challenges being a first time user but soon got used to the layout. There were several students who were taking an online class for the first time and expressed their anxiety Sonya expressed her anticipated fears describing them as,

> I am looking forward to this class and all the possibilities it will open [but] I am nervous about this class because this is my first [I]nternet course and I am unsure on what to do…At this moment we both [are] really worried about trying something new.

Others described the protocol they followed for successfully communicating with peers Becky describe it as, "I learned how to compromise on ideas, how to be more polite in my criticisms."

Most students found the option to work online a benefit despite the frustrations of navigating and working with technology. Karen described how she used technology she said,

> I use Word for school mainly when I am writing papers or doing assignments. I use Firefox for school, work and fun. I use it for email, facebook, blackboard, shopping, getting directions, finding sheet music, playing games and blogging. Photoshop is for fun. Photography is my favorite hobby and I like to edit the photos to give them a more distinct look. I normally use it to make my photos black and white.

Sonya noted similar benefits and described them as, "As for the [I]nternet I am like most every other college kid and love to get on [F]acebook, but I also use it as a huge resource for my classes. I can find information that would be difficult to find in a book or would not normally have access to. I enjoy the use of technology in courses because I can get ahead if I wish and it allows me to do things on my time." The challenges and frustrations students faced when working online were different for students in this Version as with the other versions of the course several reflected on their concerns. Abby found that in many instances technology limited her communication and described this in terms of, "[I] had so many questions but could only voice so many and certain parts through email." She went on to elaborate, "I…just found that ideas and thoughts [were] lost over email and [I] could not use communication to its fullest." While Dan found "…relying on email to stay in touch wasn't as successful as [he] thought it would be."

Whereas the percent of text of theme for code *Information-Access* was one of the largest, students approached this in different ways and at various levels. The following are some examples of these experiences. Ben saw the benefits as well as limitations of using technology he described this as, "Computers have made life so much easier on many levels though at the same time much more difficult at times. Research, contacting, as well as many ways to complete projects all are at the touch of a button with that comes the price of distractions such as video games and chatting." Karen a senior summed up her experience as,

> Google is my best friend, if I can't find what I am looking for I refine my search or use links on other sites to get what I am in need of. The role of computers in my life as a student has helped me a great deal. From finding information I need, for research articles to typing my professors lecture notes, I couldn't have been as successful as a student without them.

Others saw past the benefits and recognized the intrusive aspects of technology. Karen in described this in relation to herself as, "I enjoy the easy access but occasionally I don't want to hear from anyone and in order to do that I would have to turn everything off, vacate my house, and find a place that is desolate; Not an easy task."

Face-to-Face-Learning. The second category represents 7.40% of text for the theme in Version 3 and consists of two codes *Face-to-Face* (*FTF)-advantages*, and *Face-to-Face* (*FTF*)-*disadvantages*. Not all students found communicating online to be effective especially for group projects. Karen described her dilemma as, "since this in an online class we never actually met, we both commute to college and live far away from each other so communication was rough." Emily described her similar experience and how it was resolved she said, "It was too difficult for my group members and I. We realized that we are all too busy to just communicate through [I]nternet. It went from emailing, to facebooking, to texting, to calling [a]nd, then eventually meeting face-to-face. This helped out greatly." Abby expressed similar issues but elaborated on her team's approach,

> Since I was getting nowhere with emails and [F]acebook messages, I thought that meeting in person and working on the project together might be better. Our group time was pretty quiet and I was not getting a lot of feedback. The next time that we met, I gave everybody a job that needed to be done in the two-hour period that we were together. Finally, I saw results and we have met a few times since then and been successful. So, the main thing I learned was that sometimes you had to be bossy to get [the] work done!

For Ben, it was a simple matter he described it in the following way, "it was just easier to drive up. He literally lives 3 minutes away from my house."

When, it came to communicating with their team online many students found it challenging a few chose to adopt alternate measures in order to complete the work moving to meeting face-to-face. Few were successful in using the various technology tools effectively to communicate those who did were not fully satisfied. Most felt limited. Interestingly, all students favored face-to-face interaction rather than online interaction In Version 3 student opted for FTF-advantages 100%. The need for personal connections was stated over and over again in all versions of the course. Despite the affordances of technology students found the online environment isolating and stated the need for greater social contact.

In sum, the *Technology, learners, situating social presence* theme sheds light on the successes and tensions students faced when learning online and the many challenges of navigating and communicating with technology. This challenge differed based on the version students enrolled in Version1 the challenge focused mainly on navigating technology and the units in the CBI modules. Student in this version found online learning appealing due to the flexibility and convenience of working at your own pace. Students in Version 2 faced challenges in navigating technology i.e., CBI modules and working in groups with problem tasks though they saw the convenience of learning in this manner they realized how technology limited the social aspect of learning. Students in all three versions recognized the need for establishing greater social presence and that technology limited such interaction however Version 3 students supported an FTF-component for the course. Overall, this theme revealed the choices students made as they managed their learning online.

Summary

This chapter presented the results of this study beginning with the process of coding and data interpretation relative to their strength to the total text. An overview of the themes of analysis was presented which are guided by the research questions of the study. The final chapter presents conclusions drawn from these findings.

CHAPTER 6

CONCLUSION

Introduction

After examining the codes and categories within each theme and analyzing the relationships to the total text, this chapter looks at the research questions to draw conclusions about self-regulated learning practices. Each will be discussed separately. The discussion will address the implications for teaching and learning in distributed learning environments as well as for future course design. Finally, areas of further research will be identified as suggestions for future direction.

Discussion

The primary focus of the study was on understanding student self- regulated learning practices through learner experiences. Problem based learning, game play, and computer-based instruction was used to frame learning tasks. Learning and Teaching as Communicative Action theory was used to understand student interactions. Two secondary questions Sub-focus Question One and Sub-focus Question Two address student communication and interaction as well as the implementation of the design of the course, and the overall impact on student learning experience each is discussed separately below, *Sub-focus One*

- To examine the presence and role of communicative actions in undergraduate instruction and their particular influences on learning, especially in the area of knowledge construction?

To understand the interactions between learner and instructor and between the elements of the learning environment the four communicative actions; constative, strategic, normative, and dramaturgical of the LTCA theory are applied. Figure 6 presents communicative actions for all the three course versions.

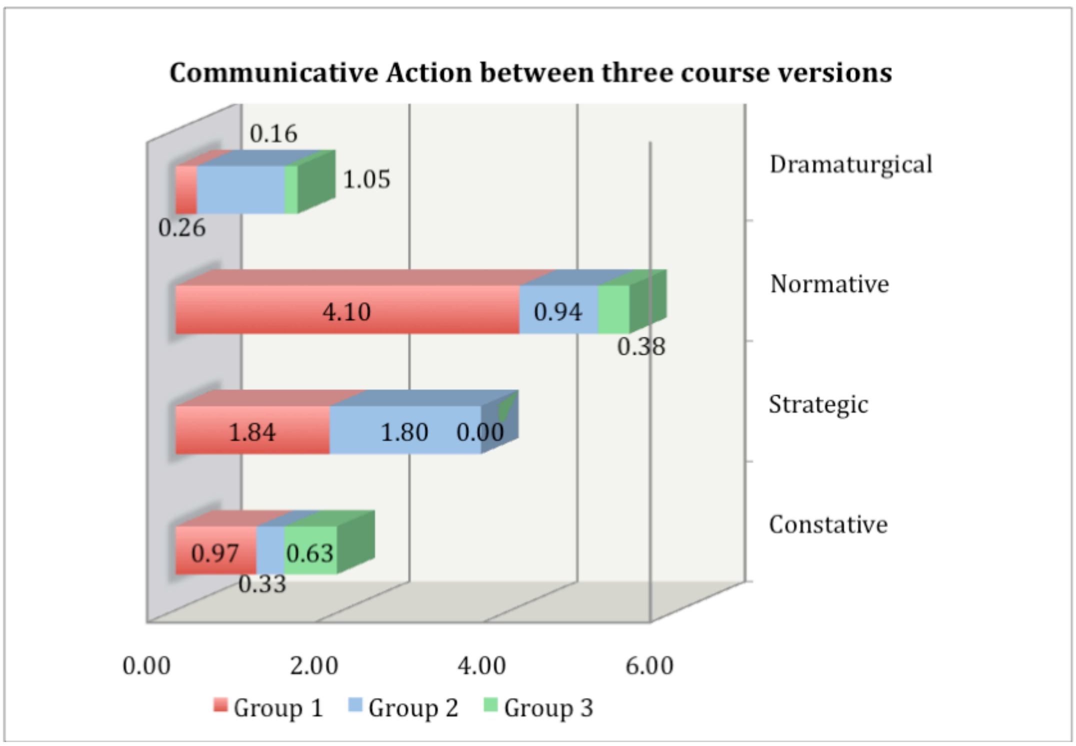

Figure 6.1. Communicative action for all three course versions.

Table 6.1 provides a breakdown of the four communicative actions between the three versions of the course.

Table 6.1

Communicative Actions

Version 1 Categories	Codes	Passages	Total Char	PC Mean % of Theme	PC Mean % of Text
Constative		24	3544	13.52	0.97
Strategic		46	6670	25.67	1.84
Normative		100	15255	57.24	4.10
Dramaturgical		6	990	3.58	0.26
Communicative-Actions	**4**	**176**	**26459**	**100.00**	**7.16**

Version 2 Categories	Codes	Passages	Total Char	PC Mean % of Theme	PC Mean % of Text
Constative		9	834	8.38	0.33
Strategic		39	5945	44.20	1.80
Normative		16	3703	22.42	0.94
Dramaturgical		17	4284	25.00	1.05
Communicative-Actions	**4**	**81**	**14766**	**100.00**	**4.11**

Version 3 Categories	Codes	Passages	Total Char	PC Mean % of Theme	PC Mean % of Text
Constative		21	1828	54.11	0.63
Strategic		0	0	0.00	0.00
Normative		13	1048	32.28	0.37
Dramaturgical		4	576	13.61	0.15
Communicative-Actions	**4**	**38**	**3452**	**100.00**	**1.15**

Constative Action

This represented the highest in Version 1, the least in Version 2, and moderately in Version 3. Students in all versions were able to engage in critical discourse to test their claims to truth but for different reasons. The task-oriented nature of the environment of the CBI modules (SAMS) required scaffolding for students in Version 1 to navigate through the different levels of each task, resulting in frequent guidance by the instructor. Though constative action was represented higher, claims to truth centered on understanding the levels of the tasks and learning environment. It often remained between students and instructor and less between peers. Marie described her interaction with her group as,

> I communicated with my group early to let them know I was there to help. The next day some replied and we kept the conversation going. I was polite and positive when replying to their emails. I also made sure to ask how I could help and let them know when my available working hours were. Our final letter was good and I was satisfied.

Other students were not as successful Amber reflected in her Web blog stating, "chatting was a love/hate relationship. [Peggy] and I were able to chat together on BB, but [Brad] had [I]nternet problems every time we tried to get together. It would have been great except for this." Amber and Peggy's bid to engage in critical discourse was partially successful as Brad the third member of the group did not respond or participate in the discourse towards understanding claims to truth presented by the ill-structured problem task and course material. In Version 2, students were slightly more independent in their thinking and learning habits than Version 1 they also had three problem-based tasks i.e., three opportunities Stella described her negotiations as,

> I was very direct when emailing my partner back and forth. I told her what we needed to do and when the deadline was and that we needed to complete the task before hand and not procrastinate. … my partner and I shared every idea we had about the power point and spreadsheet. We communicated in an effective manner and decided which solution would be the most appropriate.

However, student interaction centered on understanding the levels of the problem task and was outcome oriented based on successfully completing the task. Constative action represented low.

In Version 3 students faced challenges of navigating the game world. However, scaffolding was available through multiple sources (the narrative, the fictional characters, and Puppetmaster a.k.a. instructor), which gave context to the game tasks allowing students to validate and evaluate their claims through multiple sources, a variety of ways, and at much deeper levels. Constative action was moderately represented. Karen described her interactions to clarify her understanding of the game elements as,

> My strategy was to look for examples of the current issue. If I didn't find any I would speak to my team member about the problem and we would figure it out together. … When I was confused I would talk to her and she could explain. I usually text messaged my team member and we would talk about the issue and then continue with email.

Emily perceived this negotiation as reciprocal describing her constative action as "we could ask each other for opinions and ideas and thoughts about what was going on. If I didn't understand what something was or meant, I could just ask one of my group members to see if they knew and vice versa." Both students looked towards their group members to make and challenge claims to the validity of objective knowledge that they came across in order achieve consensus.

Strategic Action

This was more evident in Version 1 and Version 2 with little difference between the two versions, but was not represented in Version 3. The literal approach of the CBI modules provided students with a framework for understanding basic, productivity skills, which were further reinforced by the instructor. These socially valued rules of learning were set by the instructor and were non-negotiable. Claims to truth made were mainly in the realm of task orientation students could either accept or reject these, few thought to negotiate rules beyond the immediate task. Marie described her efforts as "when I needed assistance, I either emailed the professor or emailed another student. If it was problems with SAM 2007, I did chats to figure out the best solution." She also described her way of accessing basic information as, "my favorite communication tool is email. It gives me time to think about my response and lets me correct grammar … I mainly use Google to search for information. When I can't find something I use other search engines like Yahoo or Ask.com." She perceived the instructor and the syllabus as ways to validate findings. In Version 2 Stella described her actions as,

> I would read each chapter prior to taking the exam and would then take the exam with my book in front of me. I also would look online if I was having trouble with a question. It was also helpful that you could retake the exam 3 times if you were unhappy with your grade.

In general students validated their understanding through the instructor, the syllabus and course textbook. They did not find it necessary to challenge any of these views or look beyond on their own.

Normative Action

In Version 1 normative action represented the highest where emphasis was on completing units on time and turning in assignments. Success was measured by the grade with little or no flexibility. Marie's reflection was a clear example of following course norms set by the instructor she described this as,

> I knew I was doing better when I completed the assignments faster. Plus the test showed me how good or bad I was doing. Keeping up with due dates and track of time helped me. Also reading the lessons and practicing the tests. I knew I had to complete the work if I wanted a grade; therefore I made sure to complete it before the due date.

Ally acknowledged the challenge of working independently stating, "Yes, making sure I completed my work on time –but I did have some late work."

Normative actions in Version 2 students were very similar bound by the CBI modules and communicated by the instructor however along with classroom learning norms several students in this group indicated strong ties with societal and familial norms Dee described this as “My priorities are basically to honor God and my mother, I am here to make my mother proud, and to obey her. To do that, I have to complete school and to gain a college education.” These students seldom re-negotiated any of the rules and regulations that were set.

In contrast in Version 3 the game environment allowed students to negotiate and re-negotiate their own norms within the framework of the narrative that was supportive of their learning. Based on the level of interactivity that students chose to engage within the game, many of these norms were reset.

Dramaturgical Action

This represented lower in both Version 1 and Version 3 but was higher in Version 2 where CBI and 3 problem tasks provided a balance between both types of instructional methods. Students in this version faced cognitive stress but it was relatively less than for those in Version 3. They had opportunities for interaction with peers, the instructor, and the learning environment and were able to express their subjective truths, and personal beliefs. Ally expressed her view about learning saying “Learning is taking in information and internalizing it to the point that you can use it to build on other information and synthesis completely new ideas, even if the idea is just new to you and not revolutionary.” In her mind of minds she acknowledged effective learning was being able to transfer what you learn to new and different contexts. Jimmy said, “I like face-to-face because during any other form of communication there is a lot of important information that is lost in translation. There is more to communication than just words: body language, tone, voice inflections and much more." He expressed what many students believed technology to lack and was important for effective communication, the human need for affinity and social connection. Most students used the Web logs to express their thoughts, inner beliefs and passions other means were seldom used.

In terms of knowledge construction on a spectrum moving from tacit knowledge on the right to explicit knowledge on the left, communicative action of students in this study remained mainly in the tacit realm where they struggled to articulate the knowledge and skills they held. Most students were comfortable reproducing what they learned but were challenged when it came to transferring what they knew to new and different contexts. While students in Version 1 & 2 remained on the structural level of navigating the different tasks of the CBI modules and the online environment in spite of the opportunity to work with the problem solving tasks (one PBL task and three PBL tasks). Students in Version 3 had slightly more success in transferring what they learned as they designed and developed an AltRG of their own.

Thus communicative actions offered students a way to articulate tacitly held knowledge and beliefs, to test and evaluate them, and during the process gain insights on how to improve their learning processes. Overall, students lacked the skills and expertise to navigate technology to communicate effectively and overcome barriers i.e., the need for social contact. Students were unable to fully engage in such forms of discourse and knowledge construction. By default they found themselves relying on traditional learning practices, which were not fully effective for learning online. Figure 6.2 provides a visual of the knowledge construction spectrum.

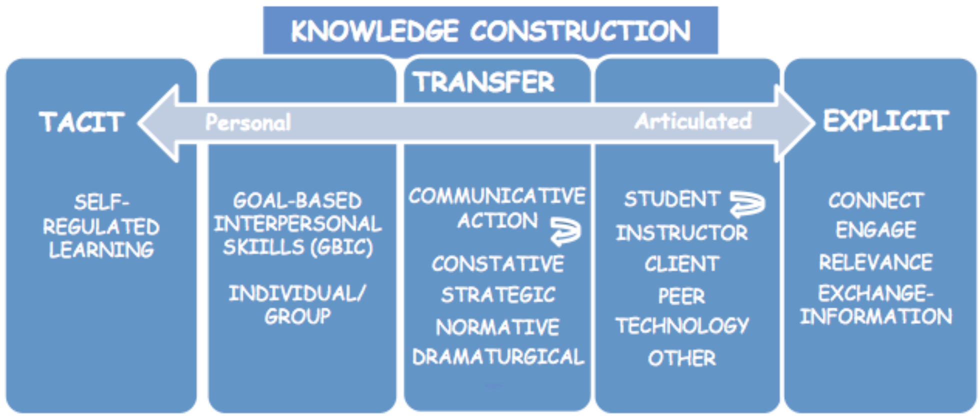

Figure 6.2. Spectrum of knowledge construction and communicative action, adapted then modified from "Tacit knowledge versus Explicit Knowledge: Approaches to Knowledge Management." By Ron Sanchez. Working paper 2004-01. Copenhagen Business School.

Sub-focus Two

- To investigate when students select their instructional method if it helped improve learning satisfaction.

Students in this sixteen-week study were required early on to select their instructional approach. To understand student expectations in terms of learning satisfaction and evaluate the outcome on the design process the following factors are examined. Student achievement scores, six selective qualitative codes, and student response to the Web log question, “Would you take the course again?" Table 6.2 presents an overview.

Table 6.2

Select Qualitative Codes

Select Qualitative Codes
Course Expectations
Semester Course Load
Goal-based communication (individual)
Goal-based communication (group)
Locus of control & Self efficacy
Frustration
Final blog response: Would you take the course again?

Results indicated a statistically significant mean score gain in student achievement scores in Version 3 (PBL & Game) $p < .0004$ a two-sample t-test assuming unequal variances, showed greater improvement in the treatment group (Version 3) than the comparison groups (Version 1 & Version 2 - CBI). A gain in learning outcomes indicates progress however it presents only one aspect it is necessary to look at the select qualitative codes to gain further understanding.

Table 6.3

Student Achievement Pre and Posttest Scores

Version 1						
	Mean	Std. Dev	Std. Error	t	df	Sig. (2-tailed)
Pre-Score Post-Score	-25.19	47.11	14.203	-1.773	10	0.0535
n = 11	alpha = .05					
Version 2						
	Mean	Std. Dev	Std. Error	t	df	Sig. (2-tailed)
Pre-Score Post-Score	-2.447	32.98	10.431	-0.235	9	0.4865
n = 10	alpha = .05					
Version 3						
	Mean	Std. Dev	Std. Error	t	df	Sig. (2-tailed)
Pre-Score Post-Score	-18.33	14.7546	4.092	-4.480	12	0.0004
n = 13	alpha = .05					

The select qualitative scores provided context to student experiences in terms of learning satisfaction. *Course-expectations* the first revealed how students came to decide the version they chose. Most students reflected they were comfortable with their choice of instructional approach several cited going by the pre-test scores as the reason for choosing Version 1. Others were wary of the time commitment required because they were taking a large number of credit hours while some wanted an easy class on their schedule. Most emphasized the importance of learning more about technology. On the other hand, those students who chose Version 2 were just curious about the different format that was being offered and were willing to try something new, but believed learning through game would be too tough so they opted to enroll in Version 2.

Those who signed up with Version 3 wanted a broader experience of using technology, a few liked the concept of learning through game and felt comfortable using technology so they wanted to be further challenged. Having a choice between instructional methods was a novelty one student however did comment that she never really had the choice to choose hinting the guidelines for choosing a course version i.e., she felt her pre-test scores limited her choice. There were a few students who expressed reservations about taking an online class but the notion of working on your own time, at your own pace, was something that appealed to most. As mentioned earlier, the *semester-load* was the number of classes students were taking these varied from 12 to 19 hours with many having a full time job and family responsibilities.

Areas where students were challenged the most included goal-based interpersonal skills (individual and group), time-management with the game and CBI modules, and communicating with peers for group work. Many students viewed group work as co-operation a way to divide the work rather than collaboration the sharing of ideas. Frustration was at different levels those in Version 1 & 2 faced difficulty navigating the online content of the CBI modules and problem solving tasks that gradually increased in complexity, while those in Version 3 faced cognitive stress navigating the game space. Overall, students in Version 1 and Version 2 indicated they were happy with their progress and would not have done anything different. Students in Version 3 faced higher levels of cognitive stress however they made the comment that they did learn a lot from the learning experience.

Of the 35 students, 45% (16) students expressed they would consider taking the class again, there were 39% (14) that gave a no response, and 16% (six) who stated they would not take the class again. Across the versions the highest was in Version 1 and the lowest incidence of no response was in Version 3. Traditional students were those who mostly, responded with “would consider.” Gender distribution was limited as females substantially outnumbered males in the sample. Student choice in selecting the instructional approach provided students the opportunity to actively manage their learning.

Quantitative results revealed statistical significance in mean score gain for student achievement scores in the treatment group suggesting students were more engaged and motivated in Version 3 (PBL and game play) than in Version 1 and Version 2 (CBI modules and problem solving tasks). Though fewer students believed they would not take the course and more indicated they would consider taking it; a greater number of responses could have provided better insight. The outcome of the implementation of the design was satisfactory across all groups most students indicated they were comfortable with the version they had enrolled with. The exception was with students in Version 3 who expressed a stronger preference for having some face-to-face component in the course.

Summation

Overall, four emergent themes were identified: *PBL, game, thinking outside the comfort zone*, *Self-regulation, acquisition-model-learning*, *teacher facilitator*, *Life-world, identity, understanding worldview*, and *Technology, learners, situating social presence*.

Table 6.4 presents an overview of the levels of engagement and complexity of the three course versions.

Table 6.4

Levels of Engagement and Complexity of the Three Course Versions

Themes	PBL, game play, thinking outside the comfort zone		Self-regulation, acquisition-model-learning, teacher-facilitator		Life-world, learners, understanding worldviews	Technology, learners, situating social presence
	Problem-based learning	Game Engagement /Motivation	Self-regulated-learning	Acquisition-model-learning	Epistemic-belief	Social-presence
Version 1	*Low	Low	**Mod	Low	Mod	Low
Version 2	Mod	Low	Mod	Mod	Mod	Mod
Version 3	***High	High	Low	Mod	Low	High

*Low ** Moderate ***High

PBL, game play, thinking outside the comfort zone

Problem-based learning was part of the course design in all three versions but it was implemented in slightly different contexts. In Version 1 students were tasked with weekly CBI modules, and one problem task this was the least complex. The narrative related to each problem task with no mythological underpinnings. The CBI modules were task-specific and oriented towards task completion. Students found they were challenged and unfamiliar in ways to proceed in order to find a solution. When confronted with information and the task of making sense most relied on the strategies that first came to their mind. They did not consider looking beyond these immediate resources or even of using a planned approach to understand the content better. The solutions required no one right answer while information and content was presented through multiple sources. Many desired additional scaffolding and were uncomfortable with taking initiative on their own they were unable to engage with the character roles of the problem scenarios. Those who engaged did so in a limited manner. Meeting client needs was viewed as work needed to be done they failed to comprehend the social negotiation and interaction aspect of the task. Independent thinking, self-regulation, and autonomous study habits was the key to successful completion of the goals of the tasks. Many felt lost and disconnected. Overall learning was more explicitly stated.

In Version 2 students worked with three PBL tasks and they too were challenged but several found themselves engaging with the characters of the problem tasks a few came to realize that different ways of looking at an task could be helpful in finding the appropriate solution and that they typically were not used to taking this approach. Both success and failure at identifying and recognizing the most appropriate information for the problem-based tasks made students consider alternate ways of understanding. Several used experiences and strategies from their everyday life to find effective strategies and find solutions. Those students who realized the benefit of using a systematic approach were rewarded for their efforts as they succeeded in moving on in both the game and problem solving tasks. They were able to formulate defensible solutions and experience some degree of success working within their groups.

In Version 3 students engaged with an Alternate Reality Game and its fictional characters finding solutions to ill-structured tasks that were in context to the events taking place in the ongoing narrative. To move forward and be successful understanding context was necessary. A more implicit kind of learning was required. Students were required to collaborate at a much higher level, which was a challenge for many. Most students faced frustration and were uncomfortable learning in ways that did not match their expectations. Many students found themselves compelled to think in ways quite different from what they were used to. They found themselves stretching their abilities and moving away from locating just the one right answer and having to rely on creative solutions beyond what was visibly obvious. Those who engaged with the fictional characters came to recognize the importance of understanding client needs and tailored their responses accordingly: a key business skill. They came to understand the meaning of purposeful play and, despite the many challenges, found themselves changing their views about learning through game. Further students in this group took what they learned from their experiences of playing an alternate reality game and applied those skills in a different context towards the design and development of an AltRG game of their own. In sum, students engaged with and were motivated by the problem based tasks, the narrative of the game, and the challenges of thinking and learning in ways beyond ones comfort level.

Students in Version 1 and Version 2 represented fairly low for engagement and motivation while Version 3 students represented high. These differences are evident in the P/C Mean percent of text of each version (5.82%, 6.43%, & 25.86%). This can be attributed to the game and students situating their learning to different contexts as they engaged with its narrative during game play, and moved towards designing their own AltRG game. While, authentic learning tasks support the transferability of skills as students are active participants and learn the skills important to the discipline (Cognition and Technology Group, 1991; 1993). " Researchers noted "increased meta-cognition in Problem-based learning stimulates transfer of knowledge to new contexts and settings

(Barrow, 1996; Lin, Hmelo & Kinzer, 1999)." The findings of this study support this view.

Self-regulation, acquisition-model-learning, teacher facilitator

Meta-cognition is 'thinking about thinking' (Flavell 1999; Brown, 1987). Self-regulation is the ability to control and monitor ones learning and includes planning, organizing, monitoring, and evaluating ones learning processes (Flavell, 1979). The three different learning environments with their varying degrees of engagement and complexity required students practice different levels of self-regulation. While student practices of self-regulated learning were not much different between course versions the extent of practices varied greatly.

In Version 1 weekly CBI modules and one problem task the least complex of all versions student self-regulated learning practices represented moderate 67.07%. Students struggled with time-management and focused on designating enough time to the weekly CBI modules and meeting deadlines. Their emphasis was on the mechanics or structure of learning. Not many students saw the need to move beyond this initial level. Many students reflected in great detail about organizing, planning, goal setting however how they implemented these constructs was different from their perceptions. In general, students relied mainly on prescriptive methods for studying. Working in groups was challenging as one student commented, "not all students share the same work ethics." few reached out successfully to their peers. One student expressed his resistance to the idea of group work and reflected outright that he did not like working in groups. Most found it hard to rely on their peers. Trust was a major issue especially with grades. Though this was an online class that by its very nature required independent thinking few students demonstrated independent work habits.

Self-monitoring and Self-consequating were represented fairly low. Web log reflections revealed students did not truly understand what the constructs entailed and failed to see the need to have concrete measures in their daily routine to address them. Self-reflection was well represented they engaged in meta-cognitive reflection and evaluation of their course activity in their blogs at different levels. Many found the weekly reflections to be bothersome and responded accordingly with limited terms and phrases. Over all student response to self-reflection and self-evaluation was favorable.

Acquisition-model-learning was a category that emerged from the analysis many of its constructs reflected elements that students believed important for learning. Prior-knowledge was referred to repeatedly as a way of relating to content and concepts. Students indicated the need for scaffolding by the instructor leading and showing them how. Grades were of high importance and seen as a sign of success and motivation was more extrinsically initiated influenced by external factors of the environment such as better job. In Version 1 students were challenged working with weekly CBI modules and one problem-based task but faced the least cognitive stress when it came to beliefs about learning. They represented moderate for acquisition-model-learning although they relied the most on such forms of learning.

Students in Version 2 working with weekly CBI modules and three problem-solving tasks faced similar challenges with respect to time-management and keeping up with deadlines. Goal-based Interpersonal skills both individual and group were other areas of difficulty. Those with good interpersonal skills realized early on that things were not working well for them and they looked towards practices in their everyday life to find ways to resolve them. Most of their struggles remained focused on the requirements of each skill-based practice task and the working of the SAMS CBI platform. They struggled with what they believed true of learning and the alternate strategies they had to consider in order to be successful in it. Though they demonstrated slightly more independent thinking than their peers in Version 1. They looked equally to the instructor to be shown what to do. These students also were extrinsically motivated as they equated success by grades, and perceived school as a way to better their career and life. The complexity of the learning activities did not require too much change students faced moderate levels of cognitive stress and represented medium for acquisition-model-learning. The challenge in learning for both students in Version 1 and Version 2 was more about “I don't know what to do? What is the next step?” Like their peers in Version 1 students in Version 2 represented moderate for self-regulated learning practices as evident by the P/C Mean percent of text of 67.40%.

In contrast students in Version 3 tasked with playing the game (AltRG) and the ill-structured problem tasks found they were challenged the most. The focus was about managing and understanding the narrative and different game elements. It required students to estimate their own skills at navigating the learning space, use interpersonal skills (individual and group), communicate effectively with peers, and accomplish the goals of the task. Many of the traditional forms of learning proved ineffective and students were compelled to stretch their thinking, manage information, and collaborate with peers at levels higher than their peers in the other course versions. Most of the alternate strategies that were effective conflicted greatly with what they believed true about learning. They faced the highest levels of cognitive stress as they struggled with their beliefs about learning they represented medium on the practice of acquisition-model-learning. Version 3 students were challenged with questions like “I don't know what to do? What does it mean?” They faced the most complex level as they played the game and worked with ill-structured problems throughout. They also were more engaged and intrinsically motivated on account of playing the game (AltRG) and designing and developing a game (AltRG) of their own. This group represented low for self-regulated learning practice with a P/C Mean percent of text of 63.36%.

Life-world, identity, understanding worldview

A major influence that shaped students’ approach to learning and beliefs was Life-world. Student life beyond school: family and work were key influences numerous students detailed their family obligations and work schedules in their reflections. Along side family and job commitments several students carried a heavy class load for the semester, which they expressed in their blog as 15-16 credit hours and even up to19 credit hours. Personal beliefs and convictions shaped their attitudes about learning. Several students reflected about their priorities and listed faith as being number one. They expressed that “some things remain true because you have always been taught they will.” Identity was another most students related easily with the cultural symbols and values of their environment perceiving them as representations of prestige and recognizing the power to conform. Six epistemic belief profiles emerged from the analysis. Of those, Objectivist-Positivist and Information-Processing were represented the largest, followed by Behaviorist-Subjectivist, Relativist, while Constructivist/Contextualist was represented the least. Students with different epistemic views were found in all versions. Again, Version 1 and Version 2 represented moderate with a P/C Mean percent of text (10.03% & 12:30%) while Version 3 represented low with a P/C Mean percent of text of 1.58%. Epistemic beliefs influenced and shaped student attitudes and how they perceived teaching and learning.

Technology, learners, situating social presence

Technology was viewed as a convenience and all students were comfortable using text messaging, email, and Facebook. In particular students in Version 1 who liked the flexibility if afforded them to work at there own pace. In Version 2 several students commented on how easy it made it to communicate and all accepted technology as important to daily life; however, some expressed dislike about its intrusiveness however few acknowledged its productivity qualities. Overall, the technology skills of most students was low mostly surface level skimming, based on quick access and retrieval but little evaluation. Google was everyone's best friend. This level of interaction reflected student habits and the technology tools they were most familiar with i.e., text-messages, Facebook and other social media. All students showed preference for face-to-face interaction over online, especially those in Version 3. The need for social presence was paramount. All students indicated the need for connecting and relating one-on-one with their peers and the instructor, some more than others. Technology alone was isolating and could not meet the demand for social needs. Students in Version 1 and Version 2 represented moderate while students in Version 3 represented low indicating a strong preference for face-to-face learning. P/C Mean percent of text reveals the differences

(9.91%, 9.76% & 8.05%).

In conclusion how students choose to self-regulate is based on personal beliefs and values. In turn beliefs are formed through regulated learning processes. Knowledge of cognition and regulation of cognition are two distinct but inter-related strands and not easily separated (Flavell, 1979). Experts contend that students with more sophisticated belief systems are able to learn and apply their knowledge more than students with simpler belief systems (Schommer, 1990; Jacob & Spiro, 1995). The findings of this study indicated little difference in the practice of self-regulated learning skills between the course versions however self-regulated learning was inversely influenced by student beliefs and values about learning. With epistemic dissonance influencing and shaping how students learn impacting their ability to practice self-regulated learning.

In Version 1 students possessed simpler belief systems than students in Version 2 and Version 3. These students lacked skills to adequately navigate their learning environment and placed greater emphasis on the mechanics and structural components of the course materials (CBI modules & problem tasks). They faced the least amount of cognitive stress when compared with students in the other course versions, but are more likely to be swayed by influences in their environment. They did not represent well for engagement and motivation (intrinsic). Their blog entries reflected many of these attitudes.

In Version 2 students were the most balanced as they represented moderate in self-regulated learning as well as in many of the attributes across all themes with the exception of engagement and motivation. The front end assessment given to students at the beginning of the course is attributed to this shift as students made their choice of selecting the instructional approach based primarily on pre-test scores and so were placed by default into tracks. They faced moderate amounts of cognitive stress as they worked with the CBI modules and three problem tasks. These, students are simpler in their epistemic beliefs, which exerted sufficient influence on their learning attitudes and how they chose to self-regulate learning. They represented fairly strongly in technology skills though their focus remained task-oriented.

Finally, in Version 3 student practice of self-regulated learning was low when compared to other course versions. Students faced the greatest amount of cognitive stress and struggled the most with their beliefs about learning and what it should be i.e., acquisition-model-learning. This suggests this group may have more sophisticated epistemic beliefs and therefore are able to apply their knowledge and skills better than their counterparts in Version 1 and Version 2. They are slightly more adept in using technology for communicating and learning. Their beliefs about learning are flexible even though they remain influenced by traditional practices of learning. The four themes revealed these influences where lower representation of a construct resulted in higher practice, while higher representation indicated lower practice with a direct co-relation with the student's epistemic beliefs and value system.

Implications

The qualitative findings of this study provide insight on the impact on how post-secondary learner's self-regulate learning when motivated through problem-based learning (PBL), game play, or computer-based instruction. It brings to light the challenges and successes students faced as they navigated the components of the online learning environment that they enrolled in i.e., PBL, Game play, or CBI.

Self-regulated learning is a multi-dimensional construct that integrates cognitive, motivational, and behavioral components to help understand learning (Pintrich, 2000). Students in this study struggled with implementing self-regulated learning skills needed to be successful for learning online and in college. They lacked the technology skills needed to navigate and communicate effectively in a distributed learning environment. They experienced epistemic dissonance as they struggled with what they believed to be true about learning and what the environment required them to practice. As a result they found it difficult to think at higher levels of abstraction. Skills such as applying what they knew to real world issues, thinking critically through problem solving and game were counterintuitive to what students found they were familiar and comfortable with. The strategies students applied were ineffective for learning with the multi-modal affordances that technology affords.

As technology advances and institutions continue to put more courses online the challenge for learning, teaching, and the design and development of instruction becomes two-fold. How to design good instruction and balance all the elements so that learning and teaching remain successful? The design of the learning environment and the role of the learner becomes center stage. The findings of this study point to the importance of the student-centered component for the design of a learning environment. The socio-cultural values of the learner gains precedence and effective instructional design must take this into account as it represents the conceptual and cultural knowledge that each learner holds. These understandings are what each learner brings to the table (learning process) and are the stimulus for further discourse, conceptual understanding, and knowledge construction.

As more students make their way to college the importance of knowing how to learn and preparing for college becomes essential. Institutions must provide greater support and training opportunities for undergraduates for skills in self-regulated learning, learning how to learn, expectations for learning online, and training with technology tools. So students are adept at not just navigating through the different levels of a system but can communicate effectively to overcome their need for social presence as technology alone is insufficient in meeting the learner's social needs. Subsequently instruction online must move away from traditional forms of deliverance to include learning from multiple aspects, collaboration, discourse, problem solving, reasoning, and critical thinking. So, students remain engaged and motivated to learn. Such measures can help improve student retention, student satisfaction, student achievement, and long-term employability as these measures support the development of better learners.

Whereas, the Boyer Commission advocated for a more active and inclusive role for undergraduates in their own education, one of inquiry, participation, and mentorship. The problem of college readiness points to issues at a much deeper level, and requires change to be introduced at the systemic level in the perceptions of teaching and learning. A paradigmatic shift to move away from a culture of high stakes testing in which students must recall information and regurgitate facts to pass exit exams, to a more pragmatic real world application approach where courses are geared to the application of knowledge and skills.

Dewey approximately 100 years ago argued for change that would move schools away from authoritarian classrooms and abstract notions to environments in, which learning is achieved through inquiry, problem-solving, and real world application of skills. A practical approach integrated with technology and its affordances can help us achieve just that. Only then can we begin to respond to the needs of the 21st Century learner.

Future Research

The findings from this study provide a wealth of data related to student practice of self-regulated learning with problem-based learning, game play, and computer-based instruction in a distributed learning environment. Though these results provide insights into the impact of self-regulated practices and learning experiences across the three different versions of the course and qualitative findings along with increased posttest scores in student achievement scores for the treatment group are promising. The full impact of these efforts on student learning and instructor teaching are yet to be fully understood.

Further avenues of exploration are in problem-based learning and the use of game play in future iterations of the course both in hybrid and fully online courses. To continue to examine self-regulated learning constructs especially time-management and goal-based interpersonal skills, as well as the design of instructional interventions to help students improve existing self-regulatory skills. Along with these constructs the theory of Learning and Teaching as Communicative Action should continue to be explored in order to understand knowledge construction and to support the development of instructional design.

Other potential directions of research include examining instructor practices of self-regulated learning, and their epistemic beliefs about teaching and learning. Epistemic beliefs and values systems of both students and instructors can provide further insights into socio-cultural practices of learning. This could help shed further light in to understanding students and their self-regulated learning practices.

APPENDIX A

RUBRIC FOR ASSIGNMENTS

REPORT 1

Included group and personal information (2)	This information is required per the instructions for all reports.	
What do I know, found think is going on? Found anything strange? (narrative, graphical, chart) (2)	You are on the right track. Find other ways to uncover information.	
What progress am I making on learning about a solution? (narrative) (2)	You need to find connections, who are the associates, what are their research areas, who else is part of the picture	
Spreadsheet with ALL related and disease related links, emails and other info annotated with notes (2)	That is a good idea, dig deeper and become more specific.	
Spreadsheet is well organized. (2)	Please submit a copy of your spreadsheet with next report	
TOTAL		

Rubric for Final Report: Global Disease Solution

TEAM:

Criteria:	***Comments:***	***Points:***
Group/Individual identification information		
Identifies possible sources of global plague/preventable disease agents		
Provides explanation of these possible sources of plague/preventable disease agents		
Provides possible (sensible) solution on global plague/preventable disease		
Provides appropriate support of solution based on supporting evidence (resources)		
Supplies list or link(s) or embedded evidence used to develop solution(s)		

APPENDIX B

PEER GROUP EVALUATION FORM

THESE EVALUATIONS WILL NOT BE SEEN BY YOUR GROUP MEMBERS!

Don't base your evaluations on friendship or personality conflicts. Your input can be a valuable indicator to help assess contributions in a fair manner.

Instructor/s_________________________ Course____________ Semester ________

Your Name ____ Section _________

I. Type in the names of your group members. (The letter corresponds to the student's name.)

a.____

b.____

c.____

d.____

e.____

f. ____

g. ____

Performance in the Learning Community

II. Rank each member (a,b,c,d,e) with a 4,3,2,1,0 (4=highest,0=lowest)

1. Reliable for meetings

a._________ b.__________ c.__________ d.__________ e. ___________

2. Reliable with meeting deadlines for work in progress and final project

a._________ b.__________ c.__________ d.__________ e. ___________

3. Contributes ideas to the group

a.__________ b.__________ c._________ d. __________ e. ___________

4. Respects each group member's opinions

a.__________ b.__________ c._________ d.___________ e ___________

5. Contributes his/her share to discussions

a.__________ b.__________ c._________ d.__________ e. ____________

6. Knowledgeable about assignments and her/his role and fulfills that role

a.__________ b.__________ c._________ d.__________ e._____________

7. Gives input for work-in-progress promptly and with a good faith effort

a.____________ b.___________ c.__________ d.___________ e._____________

III. *If given the opportunity, would you want to work with this team member again?*

("Yes"= 4 points; "Maybe"= 2 points; "No"= 0 points)

a.____________ b.___________ c.__________ d.___________ e.___________

IV. In one sentence, what is your overall impression of each member's performance?

a) ____

b)____

c) ____

d) ____

e) ____

APPENDIX C

PBL TASKS FOR VERSIONS 1 AND 2

PBL tasks for Version 1 & Version 2 (CBI)

Word Processor - PBL Task 1

Up in Detroit, where the LTEC 1100 coordinator is from, there is a problem. A couple of friends of his, Mike and Kenjji, are considering lawsuits against one another.

Mike is building a corporate tower and thinks his building should be as tall as he wants it to be. However if he builds the building more than 5 stories tall, the shadow of the building will be on Kenjji's greenhouse 22 hours a day.

Mike says that his clients need an office building that can house up to 2,000 people. It also needs to be pretty to attract tenants, since Detroit is largely a wasteland right now. Doc Warren can say that because he's from there.

Doc would prefer this doesn't come to a nasty lawsuit. They have all been friends for a long time and he doesn't want this to divide them. Further, an outside arbitrator assigned by the course told them they need to seek some other solution before going to court. However, they are too angry to do that right now and Doc is too close to both of them. As with all things in the real world, things roll downhill and he is asking you to use your joined mental prowess to generate good possible solutions to the problem.

<u>Your problem is this:</u>

In your small group, come up with a solution to their problem. The solution needs to be presented in a professional-looking letter that can be given to the arbitrator and judge. According to the court clerk, we need the following:

A professional, printable letter that includes a solution to the problem that would be acceptable to both parties involved. Any graphics you can include to illustrate your solution are a good idea as well, especially if it is complex.

Doc, Kenjji, and Mike will be evaluating your solutions separately and each will contribute to your overall score. You must receive a rating of "Acceptable" based on your point totals or your group will be required to revise your solution until it receives this rating.

APPENDIX D

RUBRIC FOR TASK 1

Rubric for Doc's First Task:

	Kenjii	Mike	Doc	*Total*
Includes an appropriate and feasible solution to the problem (25)				
Conforms to the conventions of professional business letter writing (25)				
Includes effective illustrations (charts, photos, etc) where necessary and/or appropriate (25)				
Letter is clearly written and takes the problem seriously; is something that a judge would be able to accept as a professional document (25)				
Feedback				

Total points possible: 100

APPENDIX E

PBL TASK 2 (VERSION 2 ONLY)

Spreadsheet - PBL Task 2

Ray is an eighth grade social studies teacher and football coach at a middle school in Houston is having trouble with his assistant principal named Diana. She is looking for an excuse to have him fired.

While Diana was looking for problems in his grade spreadsheets over the course of the last year she noted a large number of inconsistencies and problems. The spreadsheets do not calculate properly. She had previously e-mailed him directions she found on the web for setting up a proper grade book in a spreadsheet, but he doesn't really know how to check e-mail and isn't really willing to learn.

Doc Warren used to be the technology specialist for Ray at another school and they have been friends for years, so he has agreed to help Ray out with his problem.

Your problem is this:

Doc doesn't really have time to help Ray out with this problem as he is a professor already responsible for too many things to get it done in this amount of time. Therefore, your instructor has agreed to have your groups complete this task.

Again, the best group's solution to the problem will be the one Ray uses with his principal and you will receive a small reward from your instructor in addition to your grade for completing the task. All others will receive their grade for completing the task as graded.

To begin, locate Ray's spreadsheets in Blackboard.

He needs them fixed as soon as possible so that they calculate grades properly and are easily readable so he can hunt and peck the scores into the grade submission system by next Friday. Names of students have been coded and changed to protect the innocent in the spreadsheet and Doc will convert them back once the best solution is accepted.

He also needs a one to two page printable Word explanation (saved as .doc) for how to construct his spreadsheets properly in the future.

Ray, Doc, and your instructor will evaluate the quality of your spreadsheet calculations and ease of reading as well as your directions for how to set up the grade book.

Even if you do not have the winning presentation, you must receive a rating of "Acceptable" based on your point totals or your group will be required to revise your solution until it receives this rating.

APPENDIX F

PBL TASK 2 RUBRIC

Rubric for Doc's Second Task:

	Ray	**Doc**	**Instructor**	*Total*
Effectively organizes the data so that it is easy to understand				/25
Presents the data in an easy to read format using shading, colors, text.				/25
Includes working formulas that make accurate calculations				/25
Includes a graphic (chart or graph) that shows the grade distribution of at least 2 classes				/25
TOTAL				**/100**
General Feedback				

Total points possible 100

APPENDIX G

PBL TASK 3 (VERSION 2 ONLY)

Presentation - PBL Task 3

Our good friend Jill just got a message from her client asking for help she had promised him a month a go with repairing and beautifying and clarifying a Power Point presentation for his company, Bronze Armory.

He has a limited time to get it done for a large conference, which is only about a week from now. Jill had thought this conference was next month, not the end of next week.

Your problem is:

We have volunteered you all to do this for her. The best presentation is the one that the client will use for the conference.

Take the awful looking Power Point in Blackboard and make it look like something you wouldn't mind having 750 people look at in public.

Look for images and other legal, non-copyrighted resources you can use to improve the presentation. Also, include web links and references for any images you take from elsewhere to give credit in the presentation.

Jill, Danny (the client), and your instructor will evaluate the quality of your presentation. Even if you do not have the winning presentation, you must receive a rating of "Acceptable" based on your point totals or your group will be required to revise your solution until it receives this rating.

APPENDIX H

RUBRIC FOR TASK 3

Rubric for Presentation PPT First Task:

	Jill	**Danny**	**Arbiter**	*Total*
Content of presentation meets client's purpose (25)				
Content is accurate and clearly conveyed (25)				
Layout is appealing and professional (25)				
Graphics and animation enhance consent rather than distract from it (25)				
General Feedback				
				Total points:

Total points possible 100

APPENDIX I

MEANING FIELD DEVELOPMENT

RECONSTRUCTIVE HORIZON ANALYSIS FOR GROUP 3

Puppetmaster

1) V3_Abby **(power)**

I've never really done anything like this before, so I think that it will be really interesting to make a whole scenario where I can basically control everything."

"I'm kind of nervous and I feel behind right now, but I'm excited to see where my ARG goes with me as the puppetmaster!"

Reconstructive Horizon Analysis

Foregrounded Validity Claims

Possible Objective Validity Claims

- "It is interesting to play a Puppetmaster"
- "It is interesting to make and control an AltRG."
- "It is the first time to play a Puppetmaster and control an AltRG"
- "It is worrying to play a Puppetmaster."
- "It is exciting to see where the Puppetmaster takes an AltRG?"

Possible Subjective Validity Claims

- "The Puppetmaster creates an AltRG."
- "The Puppetmaster controls an AltRG"
- "The Puppetmaster shapes an AltRG"
- "The Puppetmaster drives an AltRG"
- "The Puppetmaster leads an AltRG"

Possible Normative Validity Claims

- “The Puppetmaster should control an AltRG.”
- “The Puppetmaster should make and lead an AltRG.”
- “The Puppetmaster should drive an AltRG.”
- "Where should the Puppetmaster take an AltRG?"

Possible Identity Validity Claims

- "I am the Puppetmaster I make and control an AltRG."
- "I am the Puppetmaster it is interesting to control an AltRG."
- "I am a Puppetmaster for the first time."
- "I am the Puppetmaster I am nervous to lead an AltRG."
- "I am the Puppetmaster I am excited to see where I take the AltRG?"

<u>Near Backgrounded Validity Claims</u>

Possible Objective Validity Claims

- "The Puppetmaster will create an AltRG."
- "The Puppetmaster will control an AltRG."
- "It is the first time the Puppetmaster will make and control an AltRG."
- "The Puppetmaster will lead an AltRG."
- "It is exciting to see where the Puppetmaster will take an AltRG?"

Possible Subjective Claims

- "The Puppetmaster can make the AltRG."
- "The Puppetmaster can control and lead an AltRG."
- "The first time the Puppetmaster can create an AltRG."
- "It is interesting how the Puppetmaster can control an AltRG."
- "It is exciting to see where the Puppetmaster can take an AltRG?"

Possible Normative Validity Claims

- "The first time the Puppetmaster should make an AltRG."
- "The Puppetmaster should control an AltRG."
- "The Puppetmaster should lead an AltRG."
- "It is exciting to see where the Puppetmaster should take an AltRG."

Possible Identity Claims

- "I am interested in playing a Puppetmaster."
- "I am interested in controlling an AltRG."
- "For the first time I am a Puppetmaster."
- "I am nervous and excited to see how I lead and control an AltRG"

Remote Validity Claims

Possible Objective Validity Claims

- "It’s okay to play a Puppetmaster."
- "It's interesting to create and control an AltRG."
- "It's okay to be a Puppetmaster for the first time."
- 'It's okay to be nervous about playing a Puppetmaster."
- "It's exciting to see where the Puppetmaster will take an AltRG."

Possible Subjective Validity Claim

- "It is interesting to play a Puppetmaster."
- "It's interesting to make and control an AltRG."
- "It's my first time to play a Puppetmaster."
- "I am nervous and excited to be a Puppetmaster."
- "How will I do as a Puppetmaster?"
- "Where will I take the AltRG as a Puppetmaster?"

Possible Normative Validity Claims

- "It is the first time to play a Puppetmaster."

- "The Puppetmaster makes and controls the AltRG."
- "To play a Puppetmaster is interesting."
- "To play a Puppetmaster and control an AltRG is worrying and exciting."
- "Where will the Puppetmaster take the AltRG?"

Possible Identity Validity Claims

- "I am a Puppetmaster I make and control an AltRG."
- "I am a Puppetmaster it is interesting to control an AltRG."
- "I am a Puppetmaster for the first time."
- "I am nervous to plsy s Puppetmaster and lead an AltRG."
- "I am excited to play a Puppetmaster and see where I take the AltRG."

APPENDIX J

MEANING FIELD DEVELOPMENT

RECONSTRUCTIVE HORIZON ANALYSIS FOR GROUP 1

Identity

6) V1_Peggy

The Nike Swoosh is important because it is a well-known symbol, some consider it status, and portrays in peoples minds quality and a long-standing business. Of course, if you don't like Nike, the Swoosh might keep you from even looking at a web page displaying it.

Reconstructive Horizon Analysis

Foregrounded Validity Claims

Possible Objective Validity Claims

- "The NIKE symbol is well known."
- "The NIKE sign is recognized by most people as a symbol of quality."
- "The NIKE symbol denotes high level."
- "The NIKE symbol represents products that have been around for a long time."
- "The NIKE symbol represents high ranking products."
- "The NIKE symbol may keep people who do not like it away."

Possible Subjective Validity Claims

- "NIKE is a well known sign to me."
- "The NIKE symbol is important to me because it is represents high level products."
- "NIKE is well known to me so it is important."
- "The NIKE sign represents high quality products."

- "NIKE is well liked by me because of its high quality products."
- "Most people perceive NIKE to have quality products."
- "People who do not like NIKE may stay away from the symbol."

Possible Normative Validity Claims

- “NIKE is a well known sign.”
- “The NIKE sign represents quality products.”
- "Owning NIKE is owning a high level product."
- "Quality is important for NIKE."
- "People have a good perception of the NIKE symbol."
- "NIKE and good quality are synonymous."
- "Those who do not like NIKE will stay away from the NIKE symbol."

Possible Identity Validity Claims

- "I feel the NIKE symbol represents high quality."
- "I feel the NIKE symbol is important."
- "I feel the NIKE sign is well known."
- "Almost everyone is familiar with the NIKE symbol."
- "The NIKE symbol gives me positive vibes."
- "Owning a NIKE product is owning a high level product."
- "The NIKE sign stands for a long standing business product."
- "Not everyone likes NIKE those who dislike NIKE products will not want to be near the NIKE symbol."

Near Backgrounded Validity Claims

Possible Objective Validity Claims

- "The NIKE sign represents quality products."
- "The NIKE symbol means high level products."
- "The NIKE symbol is recognized by most everyone."
- "For some people the NIKE symbol is a status symbol."

- "The NIKE symbol means a business that is strong and has been around for a long time."
- "People who do not like NIKE products will stay away from the sign."

Possible Subjective Claims

- "The NIKE symbol mean high quality to me."
- "To own a NIKE product is prestigious."
- "The NIKE sign represents high level products."
- "The NIKE sign is important to me."
- "The NIKE sign is well recognized."
- "NIKE is a business that has been around for a long time."
- "Anyone who does not like NIKE does not like the NIKE sign."

Possible Normative Validity Claims

- "The NIKE sign is well recognized to mean quality."
- "People know NIKE products are high level products."
- "When you have a NIKE product it is a sign of wealth."
- "NIKE is a long standing business."
- "NIKE products are in high demand."
- "The NIKE sign is ignored by those who do not like NIKE."
- "The NIKE sign represents capitalism."

Possible Identity Claims

- "I feel NIKE is a well liked product."
- "The NIKE sign is important to me and represents quality."
- "The NIKE sign is about high quality products."
- "NIKE products make me popular."
- "If I don't like NIKE I will not want to have the NIKE symbol on any of my things."
- "The NIKE sign is about capitalistic values."

Remote Validity Claims

Possible Objective Validity Claims

- "The NIKE sign is popular."
- "The NIKE sign represents quality products."
- "The NIKE sign holds a lot of value."
- "The NIKE sign is recognized by most people."
- "The NIKE sign has cultural implications."
- "Not everyone likes the NIKE sign."
- "The NIKE sign represents trade."

Possible Subjective Validity Claim

- "The NIKE symbol is popular and well known."
- "The NIKE sign represents long standing values."
- "The NIKE sign is about quality and prestige."
- "People view the NIKE sign as increasing their importance with friends."
- "The NIKE sign is seen as a negative to those who do not like NIKE."

Possible Normative Validity Claims

- "The NIKE symbol is well known."
- "The NIKE sign is considered of great value."
- "The NIKE sign represents quality products."
- "Most people want to own NIKE products."
- "The NIKE sign means good business."
- "NIKE represents commercialism."
- "A few people may dislike the NIKE sign."
- "People who dislike capitalism may dislike the NIKE sign."

Possible Identity Validity Claims

- "The NIKE sign is well known and much sought after."
- "I feel the NIKE sign represents good quality."

- "I like quality."
- "I feel the NIKE sign is valued by most people."
- "It's okay not to like the NIKE sign."
- "The NIKE sign represents today's culture."
- "The NIKE sign represents strong business."
- "I feel many people like the NIKE sign and it has become a status symbol."
- "If you own a NIKE product you own a high quality product."
- "Some people feel the NIKE sign stands for commercialism."
- "Those who dislike capitalism will stay away from the NIKE sign."

APPENDIX K

MEANING FIELD DEVELOPMENT

RECONSTRUCTIVE HORIZON ANALYSIS FOR GROUP 2

Trust

6) V2_Jimmy

I learned that when you work in groups or teams that it takes a group effort to get the desired grade. That was the toughest part for me, relying on others for your own grade.

Reconstructive Horizon Analysis

Foregrounded Validity Claims

Possible Objective Validity Claims

- "When you work in a group it takes everyone to earn a good grade."
- "Relying on a group to make a good grade is challenging."
- "Depending on group members is tough for your grade."

Possible Subjective Validity Claims

- "When working in a group getting a good grade is a team effort."
- "Depending on your group for a good grade is tricky."
- "When others are responsible for your grade it is hard."
- "Making a good grade in group work is tough."

Possible Normative Validity Claims

- “Members of a group must work together to make a good grade.”
- “Making a good grade in group work is not easy.”
- "Members of a group are not always reliable."

Possible Identity Validity Claims

- "I feel earning a good grade in a group is hard."

- "I feel relying on your group for your grade is challenging."
- "I do not feel comfortable depending on group members for my grade."

Near Backgrounded Validity Claims

Possible Objective Validity Claims

- "Group members are unreliable when it comes to earning a good grade."
- "It is tough depending on a group to make a good grade."
- "Good grades are hard to get when working in a group."

Possible Subjective Claims

- "It is hard making a good grade when working with a group."
- "Group members do not care as much about others grade."
- "It is difficult to depend on your peers for your grade."

Possible Normative Validity Claims

- "Group members care differently about the project grade."
- "It is hard making a good grade when working in a group."
- "It is not a good idea to depend upon group members for making a good grade."

Possible Identity Claims

- "I feel members in a group do not feel the same way about making a good grade."
- "I feel getting a good grade for a group project is difficult."
- "I do not like depending on other groups members for my grade."
- "I like to be responsible for my own grade."

Remote Validity Claims

Possible Objective Validity Claims

- "It’s okay to research an issue to start finding a solution."
- "It's okay to brainstorm ideas to start finding a solution."
- "It's okay to work with different solutions to find the best solution."
- "The client must know why this is the solution and how it will be successful."

Possible Subjective Validity Claim

- "Research of an issue can find a solution."
- "Brainstorming for ideas helps find a solution."
- "Working through different solutions helps find a solution."
- "The client must know why this is the solution and how it will be successful."

Possible Normative Validity Claims

- "Research helps to find a solution."
- "Brainstorming helps find a solution."
- "Working with different scenarios helps find a solution."
- "Clients must know why this is the best solution and how it will work."

Possible Identity Validity Claims

- "I feel exploring and investigation an issue helps to find a solution."
- "Sharing ideas in a group about an issue helps find a solution."
- "Evaluating different solutions helps identify the best solution."
- "Working through each solution helps find the best solution."
- "Informing the client about the best solution and how it will be successful is essential."

APPENDIX L

WEEKLY BLOG PROMPTS FOR STUDENT REFLECTION

Week Two:

You had a choice of formats for this course based on your test score and personal preference. Think about how you came to your decision about which version to take. Be as detailed as possible.

Week Three:

How does your own learning process compare to a computer's input, processing, output, and storage functions? How is it different? Do computers learn? What do you think learning is?

Week Four:

Do humans function in networks? If so, how? If not, why not? How is working with other humans for learning be different from learning independently?

Week Five:

How do you organize your world? Your time? Your priorities? How do you do it? Do you set personal goals to complete your work on time? How do you do it? Do you set consequences for failing to complete it?

Week Six:

What are your preferred ways of communicating? Do you notice changes in your own forms of communication, depending on the technology type or face-to-face vs. technology?

Week Seven:

How do visual components like pictures and art impact the message you are trying to convey in a presentation? How do you know if your message is being effective? What do you do when it is not effective?

Week Eight:

What ways might a spreadsheet be effective at communicating information to others? Give an example from your personal life either about 1.) a time when you were effective at using a spreadsheet to communicate or be communicated with or 2. how you think it would be helpful in a past, present, or possible future situation.

Week Nine: Spring Break; no blog

Week Ten:

In what ways is information retrieval from a database similar and different from learning and knowing? What does it mean to know? How can you know if something is real or true? How is your view of what is real or true different today from what it was five years ago?

Week Eleven:

Is learning easier when it is related to a particular situation that you already have some familiarity with? Is it easier when it relates to concepts you already know? How might what you know to be true shaped by the situation and your past experience? How? Are there some things that are always true? In what way?

Week Twelve:

How do you evaluate what is real or true? What is knowledge in a world where anyone can publish? Is this true?: http://www.dhmo.org/ Why or why not?

Week Thirteen:

How does the design of a website or a symbol matter when it comes to communicating with others? How important is it? Why? Is the Nike Swoosh important?(http://en.wikipedia.org/wiki/Swoosh) Do symbols and the presentation of information on a web site impact what we learn and how? Why or why not?

Week Fourteen:

How has technology changed society? How has it changed you? How has it changed how you learn and think? How does it change your communication? How will it influence the way you work in the future outside of college?

Week Fifteen:

Dead Week - No post

Week Sixteen:

For your final blog, answer the following questions and be expansive in your answers:

1. What did you think was most difficult about the course?

2. What do you think was easiest?
3. What did you learn about working in teams with peers?
4. What was most challenging about working with peers at a distance?
5. What was helpful about working with a team?
6. What was most challenging about working for a client?
7. What did you learn about communication using technology tools?
8. What were your favorite technology tools to use? Least favorite? Why?
9. What do you feel you learned in this course about solving problems?
10. What would you do differently if you could take the course again?

APPENDIX M

SEMI-STRUCTURED INTERVIEW QUESTIONS OR PROMPTS

Tell me about your experience with learning this way.

Instructional:

1. Tell me about a time when you were successful in learning in this class.
2. Tell me about a time when you struggled to learn in this class.
3. Tell me about a time when you worked well with your peers to complete a class assignment.
4. Tell me about a time when you struggled to work with your peers to complete a class assignment.
5. Tell me about the support you received in moving through the various stages of the course.
6. Tell me about using technology to learn and it worked well.
7. Tell me about using technology to learn and it was a challenge.

Attitudinal:

1. How do you feel about learning in this way?
2. How do you feel about finding solutions through problem solving?
3. How do you feel about working with other classmates to complete assignments?
4. How did working in teams contribute to your learning and knowledge construction?
5. As a group how did you decide if you had the right information?
6. Tell me about learning through a game?
    a. *Tell me about a time you were frustrated in the game.*
    b. *Tell me about something you enjoyed in the game.*
    c. *Tell me about one major thing you learned from the game.*
    d. *Tell me what helped you learn that.*
7. How did the narrative engage you with learning the course content?
8. As a student what knowledge and skills did you have to use for learning in this way?
9. As a student how did you manage your learning?
10. Has taking this class changed how you feel about learning in any way? If so how? If not, why not?
11. How do you feel about using technology for class work?

12. How do you feel about finding information on the Internet? What were the challenges?
13. How did you determine the usefulness of the information that you encountered?
14. What did you do if you encountered information that was in conflict with your own or each other's point of view?
15. Tell me how technology has supported your learning of course content? What were the challenges?
16. What did you learn about using technology as a tool for communication? What were the challenges?
17. Would you want to take a class set up like this again? Why or why not?

APPENDIX N

DEFINITION OF SELF-REGULATED LEARNING CONSTRUCTS

Goal-setting	Setting time-targeted personal goals of achievement
Organization-transforming-instruction	To arrange or prepare usually requires time and effort To cause to change, make teaching different
Planning	A deliberate and organized approach
Keeping-record	To record information
Seeking-information	To locate or discover
Rehearsing-memorizing	Practice and repetition to improve and remember
Time-management	Systematic structuring of time often priority based
Seeking-assistance	Effort to get help and support
Environmental-structuring	Changing and restructuring surroundings to improve performance
Self-monitoring	To assess progress during a task, to check for effectiveness, test, evaluate and revise strategies.
Self-consequating	Assessing the outcome of an act
Self-reflection	Careful thought about own behavior and beliefs
Self-evaluation	Looking at ones progress to determine what areas can be improved

APPENDIX O

STUDENT CLASS ROSTER WITH CODE NAMES

Version 3			
1	Abby	Sophomore	A
2	Sonya	Freshman	A
3	Liz	-	A
4	Tory	Junior	C
5	Sally	Sophomore	B
6	Dan	Sophomore	F
7	Amelia	Junior	B
8	Becky	Junior	A
9	Tanya	Junior	A
10	Karen	Senior	B
11	Ben	Sophmore	B
12	Jerry	-	D
13	Tami	Sophomore	F

Version 1			
1	Brad	Junior	B
2	Eddie	Senior	F
3	Ana	Senior	B
4	Steve	Sophomore	C
5	Kayla	Junior	A
6	Peggy	Senior	A
7	Marie	Junior	A
8	Shane	Senior	C
9	Amber	Junior	A
10	Ken	Junior	B
11	Jeff	Freshman	F

Version 2			
1	Sharon	Sophomore	B
2	Dee	Sophomore	A
3	Jack	Sophomore	A
4	Jon	Senior	B
5	Ally	Junior	A
6	Rachel	Sophomore	F
7	Robin	Junior	B
8	Jake	Sophomore	B
9	Stella	Senior	B
10	Jo	Junior	C

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