EXPLORING CRITICAL THINKING AND NEGOTIATION OF MEANING

THROUGH *MINECRAFTEDU:* A CASE STUDY OF ELEMENTARY LANGUAGE

LEARNERS

by

Sarah Rich

A dissertation

submitted in partial fulfillment

of the requirements for the degree of

Doctor of Education in Educational Technology

Boise State University

May 2016

BOISE STATE UNIVERSITY GRADUATE COLLEGE

DEFENSE COMMITTEE AND FINAL READING APPROVALS

of the dissertation submitted by

Sarah Rich

Dissertation Title: Exploring Critical Thinking and Negotiation of Meaning through *MinecraftEDU*: A Case Study of Elementary Language Learners

Date of Final Oral Examination: 5 May 2016

The following individuals read and discussed the dissertation submitted by student Sarah Rich, and they evaluated her presentation and response to questions during the final oral examination. They found that the student passed the final oral examination.

Ross Perkins, Ph.D.   Co-Chair, Supervisory Committee

Chareen Snelson, Ed.D.   Co-Chair, Supervisory Committee

Youngkyun Baek, Ph.D.   Member, Supervisory Committee

The final reading approval of the dissertation was granted by Ross Perkins, Ph.D., Co-Chair of the Supervisory Committee, and Chareen Snelson, Ed.D., Co-Chair of the Supervisory Committee. The dissertation was approved for the Graduate College by John R. Pelton, Ph.D., Dean of the Graduate College.

ABSTRACT

Critical thinking and problem solving are identified as 21st century skills crucial to the process of foreign language acquisition, and include negotiating and co-constructing meaning in order to effectively communicate with others (Committee for Economic Development, 2006). The purpose of this study was to replicate earlier research in which university-aged French language learners participated in task-based activities within the social game environment of *SecondLife* to produce discourse representing critical thinking and negotiation of meaning. Through purposeful modifications, this replication study investigated the collective discourse produced by a group of elementary-aged English Language Learners (ELLs) engaged in task-based activities within the social gaming environment of *MinecraftEDU* in order to determine if patterns of critical thinking, problem solving, and negotiation and co-construction of meaning were present. This qualitative study employed a case study methodology, utilizing Hull and Saxon's (2009) Coding Table for Social Constructivist Interactions to determine levels and occurrences of critical thinking, problem solving, and negotiation and co-construction of meaning. Through the course of the nine-day intervention, patterns of negotiation and con-construction of meaning were not identified. Students overwhelmingly engaged in conversations containing simple observations and opinions, as well as clarifying questions that reflected lower-order thinking skills. Additionally, the researcher used qualitative content analysis to identify emergent themes indicating the ways in which the students communicated with one another in the target language. From this analysis, three

themes emerged that are classified as *Independent Game Play*, *Importance of Objectives*, and *Deviant Behavior*. Implications from this study include social game design and use within foreign language instruction, identity exploration within an online environment, and reduced fear of failure when participating in a social game. Recommendations for future research are suggested.

Key words: foreign language instruction, social constructivism, replication, social gaming, MinecraftEDU, elementary language learners, CALL, digital gaming, instructional gaming

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CALL   Computer Assisted Language Learning

EAL   English as an Additional Language

ELL   English Language Learner

ILP   Independent Learning Plan

JIS   Jakarta Intercultural School

L2   Second language

PEL   Pattimura Elementary Campus

CHAPTER ONE: INTRODUCTION

Statement of the Problem

Over the past twenty years the ideological culture surrounding second language learning and second language instruction has shifted dramatically. The emphasis on standards-based teaching, testing, and accountability that began in the 1990's has come to dominate instructional practices and overshadow the importance of language learning, despite the changing demographics of the American classroom and an increasing emphasis on globalization (Committee for Economic Development [CED], 2006). Along with a steady increase in the number of English Language Learners (ELLs) in today's classroom, there is also a growing urgency for native English speakers to learn foreign languages. The American Council on the Teaching of Foreign Languages [ACTFL] (2011) emphasizes the importance that foreign language learning holds for students today, stating "…language education is critical to our students' success in the world of the future: a world that will insist upon their need to interact effectively with others…" (p. 2).

Two aspects crucial to effective second language (L2) acquisition include critical thinking and problem solving, both of which are identified as 21st Century Skills (CED, 2006). This includes the ability to analyze and synthesize information, negotiate meaning, and effectively communicate ideas and theories to others. Integrating these 21st Century Skills into second language education demands a shift in foreign language instruction. The ACTFL (2011) states:

> Unlike the classroom of yesteryear that required students to know a great deal of information *about* the language but did not have an expectation of language use, today's classroom is about teaching languages so that students use them to communicate with native speakers of the language (p. 4, emphasis in original).

Although there have been dramatic changes in second language instruction over the past several decades, there is still much work to be done in the area of implementing critical thinking and problem solving skills. Instructors now rely less on textbooks and drill-and-practice exercises, and instead use instructional models that employ strategies to facilitate conversation and c*ommunication competence* between language learners (Chen, 2005). It is precisely this communication and these conversations that warrant further investigation. Students who are asked to converse about subjects or topics that hold little personal meaning show less engagement and overall motivation, whereas those students who are engaged in critical thinking activities and are thereby challenged to discuss ideas, argue and defend theories, synthesize data, and explain themselves to others show marked improvement in specific language learning skills (Berns, Gonzalez-Pardo, & Camacho, 2013; Dourda, Bratitsis, Griva, & Papadopoulou, 2014). Klimovienė, Urbonienė, and Barzdžiukienė (2006) note that while it is common for other disciplines to incorporate critical thinking activities into their curriculum, foreign language classrooms are noticeably lacking in this type of instruction.

A growing trend in the area of L2 acquisition is the implementation of technology in an effort to provide activities that go beyond the traditional drill and practice exercises of the past. This includes a range of computer-assisted language learning (CALL) activities that have taken many forms and have been met with varying degrees of success. A relatively recent area of interest is that of digital gaming and the potential it holds in affording language learners authentic modes of communicating. Chen (2005) notes that

games provide ways for language learners to negotiate and persuade their way to reach the objective(s) or goal(s) of the game. Games that provide meaningful, purposeful objectives tend to hold the interest of learners and create higher levels of engagement as well (Berns et al., 2013; Dourda et al., 2014).

Despite the success that gaming has had within second language learning, there remains a noticeable lack of research that examines the specific factors of gaming environments, and how these factors might impact second language learning. Lieberman (2006) states that more research is necessary in order to identify the kind of learning that interactive games support, as well as the types of learning that are not supported in these environments. Thorne, Fischer, and Lu (2012) also argue that while there is substantial research on the potential that games hold for L2 learning, there is a distinct need for empirical research that evaluates gaming environments.

Purpose of the Study

A recent study conducted by Aurora Mroz (2012) aimed to investigate the types of communication that occur between L2 learners within a digital game environment. The purpose of her study was to identify if patterns of discourse representing critical thinking and problem solving were present in a group of French language learners who were collaboratively engaged in a task-based activity within the online environment of *SecondLife*. The findings from her research revealed that patterns of critical thinking, including negotiation and co-construction of meaning, do exist between learners engaged in a collaborative activity in the game environment. The author noted several limitations to her study, however, and suggested continued research in this area in order to generalize or transfer findings, as well as to add further validity to the results.

The purpose of this study, therefore, was to continue upon Mroz's (2012) research and further investigate the conversations that L2 learners have with one another while immersed in a digital gaming environment. Specifically, the discourse under analysis was collected from collaborative, task-based activities in an effort to identify how learners use critical thinking and problem solving skills to negotiate and co-construct meaning with one another in order to reach their collective goals. This study used a case study approach and focused on the discourse between 4th and 5th grade students engaged in a variety of task-based activities within *MinecraftEdu.* The research question that guided this study was as follows:

> RQ#1: Do patterns of L2 negotiation and co-construction of meaning exist in the discourse produced collectively by a group of elementary English language learners working collaboratively to solve a complex problem as they are immersed in a social gaming environment? If so, what is the nature of these patterns and what does it reveal in terms of these learners' L2 critical thinking and problem solving skills?

As this research was a replication study that aimed to add depth and transferability to Mroz's (2012) earlier work, certain aspects of the study remained the same, while other parts were purposely modified. These are discussed in detail within the Methods chapter, while a brief explanation of the importance of replication studies is reviewed here.

Replication Studies

Makel and Plucker (2014) define replication studies as, "…the purposeful repetition of previous research to corroborate or disconfirm the previous results" (p. 305). While replication studies aim to verify the findings of previous studies and determine their accuracy, they can also control for sampling error, generalize findings to larger or different populations, identify bias, or assess the hypothesis from a previous study.

Unfortunately, there are a lack of replication studies currently underway within the field of education (Makel & Plucker). In a recent analysis of the top 100 education journals, the authors examined articles from a five-year period in order to identify the number of replication studies. Only six of the 100 journals had replication rates above 1%; a rate that is dramatically lower than that of other disciplines. It should be noted that 67% of these replication studies were successful, although replications conducted by researchers outside the original studies were found to be substantially less successful. The authors note, "We cannot know with sufficient confidence that an intervention works or that an effect exists until it has been directly replicated, preferably by independent researchers" (p. 311).

Spector, Johnson, and Young (2015) argue that there is currently a disconnect between what researchers want to explore and what studies are needed in order to improve instructional practices and student learning. The authors posit that there is a lack of willingness to replicate another's study, and instead, researchers aspire to create unique studies that cater to their specific interests. Due to this lack of replication studies, large-scale changes and improvements in education are not occurring. Spector et al. urge researchers "…to conduct such studies so as to make educational technology research more scientific and provide a firm and convincing foundation for large-scale implementations and impact studies" (p. 2).

Chun (2012) describes the added difficulty that surrounds replication studies within second language learning. The author notes that research in these environments can include multiple disciplines and methodologies, as well as an overall increase in the number of variables. For example, differences might include the learners' language

backgrounds, individual levels of proficiency, and/or cultural differences. Chun argues that conceptual studies are a more realistic approach to replicating second language research in that they purposely alter certain aspects of the study in order to make the findings more generalizable, or transferable, and to increase external validity. Similarly, conceptual replication studies aim to determine whether or not the initial findings will hold true for different populations or in different settings.

Mackey (2012) similarly notes that, while conceptual replication studies contain certain challenges, they can be useful in identifying whether the original findings of a study can be carried over to speakers of other languages, in different settings, or to learners of different ages. Mackey argues that there is a growing pool of second language studies that necessitate replication and suggests that researchers look for gaps in current findings that need to be investigated further.

This current study aimed to build upon the previous work by Mroz (2012) and confirm or disconfirm her findings. In order to maintain objectivity and to adhere to the conceptual style of replicating (Chun, 2012; Mackey, 2012), certain aspects of this study were purposely altered. This includes slight variations in the sampling procedures, as well as the use of a case study model, rather than a mixed methods approach. Additionally, the participants in Mroz's study were native English speaking university students enrolled in an intermediate French class. This research focused on the discourse between elementary aged students who come from a variety of language backgrounds and who are immersed in an English language based curriculum at an international school. These modifications are explained in further detail within the Methods section. If confirmed, the findings from both studies could provide increased validity and wider generalizability, or

transferability, about the nature of second language discourse within digital gaming environments in regards to critical thinking and problem solving.

Key Terms and Definitions

With the proliferation of digital games, social games, virtual environments, and virtual worlds there remains an inconsistency regarding terms and their intended meanings (Girvan, 2013), thereby necessitating working definitions for use in this study. The following list of key terms and definitions intends to provide guidance and clarity for both what is meant by this researcher, as well as by other research cited within this paper.

- *Digital Games* – a broad term that includes any game played on a electronic device, be it online or offline, including desktop computers, laptops, game consoles, mobile phones, handheld devices, etc. (Whitton, 2009)

- *Instructional Games* – games designed and used primarily for instructional purposes, allowing students to practice, imitate, and eventually learn specific skills and behaviors (Rieber, 1996); games that include the essential elements of *challenge, fantasy, feedback,* and *control* (Dickey, 2007; Gee, 2005; Gee, 2008; Kapp, 2013; Malone, 1980; Malone & Lepper, 1987; Rieber, 1996; Wilson et al., 2009)

- *Social Games* - online games that provide environments in which multiple players can interact; these games include the traditional elements of instructional games (i.e., *challenge, fantasy, feedback,* and *control*), as well as the additional elements of *collaboration* and *competition* (Baek & Choi, 2014; Dickey, 2005; Dickey, 2007; Gee, 2008; Lee, Lee, & Choi, 2012; Malone & Lepper, 1987; Susaeta et al., 2010)

- *Virtual Environments* – any online environment in which the user has the perception of being somewhere other than where he/she is; these environments allow users to interact with the environment, as well as with other players (Schroeder, 2008)

- *Virtual Worlds* – similar to *virtual environments*, *virtual worlds* incorporate the elements of gaming, including the attainment of a clear goal, collaboration, competition, and feedback (Bell, 2008; Girvan & Savage, 2010; Schroeder, 2008)

It is important to note that the terms *virtual environment* and *virtual world* are often used interchangeably, but contain distinct elements that require explanation (Schroeder, 2008). Essentially, *virtual environments* are online spaces in which an individual has the perception of being somewhere other than where he or she actually is and include the ability to interact both with the environment, as well as with others who are present in that environment (Schroeder, 2008). Schroeder argues that *virtual environments* are distinct from *virtual worlds* in that they are first and foremost social spaces, in which individuals engage with one another for a variety of reasons. *Virtual environments* comprise such online spaces as Facebook and SecondLife and have been used extensively in a variety of learning contexts.

Schroeder (2008) contends that *virtual worlds,* on the other hand, contain the same social elements as *virtual environments*, but incorporate elements associated with gaming, such as competition, collaboration, and the acquisition of a goal or objective. Girvan and Savage (2010) describe a *virtual world* as "…a three-dimensional online environment populated by multiple users who are represented through the use of avatars and can communicate with each other" (p. 342). Bell (2008) offers a similar definition of

virtual worlds as, "a synchronous, persistent network of people, represented as avatars, facilitated by networked computers" (p. 2). Bell has identified several additional elements that distinguish *virtual worlds* from other online realities:

- Synchronous – all interactions take place in real time

- Distance/Space – individuals have an awareness of how near or far things are in relation to one another

- Persistence – the world (or game) does not pause or stop when an individual leaves the environment; this persistence affords players the feeling of a dynamic and evolving community

- Networks of individuals – people are an integral aspect to the environments, but interactions between them are not necessarily required. Individuals can form short or long term relationships, or they may choose to interact only with the environment

- Avatars – individuals are represented by a digital form within the space

- Facilitated by networked computers – all data and communication are facilitated through networked computers, adding extreme levels of complexity to the environment that would not be possible with paper-and-pencil games

Despite Bell's (2008) specific characteristics of *virtual worlds,* and Schroeder's (2008) evaluation of *virtual* environments, researchers continue to use these terms ambiguously and interchangeably (Girvin, 2013), and, therefore, neither term will be applied to *MinecraftEDU* in this study. *MinecraftEDU* advertises itself as simply a "game," (*MinecraftEDU* website, 2015); however, it also fits both the descriptions of a *virtual world* as described here, as well as the previously described category of *social*

games. As *MinecraftEDU* is a teacher-created game intended for instructional use in which users collaborate and compete to reach clear objectives, *MinecraftEDU* will be referred to as a *social game* throughout this study. All other gaming environments cited throughout this paper are referred to in the manner in which they were originally reported.

A more complete discussion of effective games, along with the essential elements involved in instructional gaming and social gaming, is included within the literature review. Similarly, the Methods section includes a thorough description of the specific games that were used in the *MinecraftEDU* environment.

21st Century Language Learning Skills and 'Communicative Competence'

The ACTFL (2011) states that today's language learning should focus on five main components: communication, culture, connections, comparison, and communities. The first component of 'communication' encompasses three modes: interpersonal communication, or the discourse that takes places back and forth between two individuals; interpretive, which includes the ability to interpret and understand written and/or aural communication; and presentational, in which a person is able to effectively present ideas and communicate through oral or written forms. The ACTFL refers to these three components as "*communicative competence*" and recommends a long sequence of foreign language learning that begins in elementary school.

Warschauer (2004) describes how one of the main goals of 21st Century language learning, along with fluency and accuracy is 'agency,' or the ability for an individual to take some type of meaningful action and see the results of that particular action. The ACTFL (2011) describes this same action as 'community' and includes opportunities for

students to extend their language skills beyond the classroom in meaningful, purposeful ways. Examples of this include learners debating and collaborating to make decisions and actions within a digital environment that lead to the completion of a (common) goal. Warschauer argues, "The purpose of studying English thus becomes not just to acquire it as an internal system, but to be able to use English to have a real impact on the world" (p. 12).

In order to attain these goals, foreign language instruction must be learner-centered and heavily emphasize the three modes of '*communication*' as previously described (ACTFL, 2011). Similarly, technology must be integrated into instruction in such a way that the target language is used to teach academic content through collaborative tasks that are authentic and relevant to the learner. The ACTFL argues, "With today's communication technologies, language classrooms can bring the world to the students, as teachers provide opportunities for students to use the language beyond the confines of their classroom walls" (p. 3).

Computer Assisted Language Learning (CALL)

Formal language instruction has continued to change over the past 40 years and now focuses on communicative abilities, rather than the teaching of discrete grammatical structures (Sørensen & Meyer, 2007). This evolution includes the increasing integration of CALL programs, activities, and lessons and has enabled communication and negotiation to become priorities over drill and practice and structural exercises. This section provides an overview of the ways in which CALL has changed over the past several decades, including a description of its most current form.

Structural CALL

Warschauer (2004) describes *Structural CALL* as the first iteration in a series of computer-assisted technologies in which language learning was traditionally taught and learned through the use of drill and practice exercises. *Structural CALL* was largely based upon structural linguistics and was employed throughout the 1960's and 1970's. Thorne, Black, and Sykes (2009) point out that these traditional language-learning classrooms may have supported learning *about* language, but not necessarily supported learning how to socialize and speak the language effectively. Yang (2010) notes that CALL programs at this time were based upon the theory that language learning should include highly structured activities in which accuracy was the main objective.

Communicative CALL

This iteration of CALL focused more on "the meaning of language in use rather than on its form" (Warschauer, 2004, p. 10). This included activities that promoted interaction between students and supported the development of language as an internal mental system. Through this method, the content of what was communicated was not necessarily important, but rather the idea of interaction between students was thought to further the development of these internal systems. This was based on the cognitive view of language learning and was most popular immediately after the Structural CALL era of the 1960's and 70's.

Olivares (2002) argues that the communicative approach to language learning emphasizes the meaningful interactions that learners have with one another over the structural content of the exchanges. The functional form of the language is supported, rather than mastery of grammatical structures, and learners are encouraged to continue in

discourse with one another without stopping to correct errors. This is accomplished

through one-on-one conversations students have with one another that are casual and

informal in nature.

<u>Integrative CALL</u>

Currently, a socio-cognitive approach is used in L2 instruction and is referred to

as *Integrative CALL*. Warshauer (2004) describes how interactions continue to play a key

role with an increased emphasis on the content of the interactions under this theory.

Language is thought to develop not just as a mental system (as in *Communicative CALL*),

but also through meaningful social interactions with others. The interactions language

learners have allow them to enter new 'discourse communities' (Warshauer, p. 10). Not

only are the interactions extremely important, but the community itself is as well. These

discourse communities can include academic content areas, for example. Yang (2010)

reiterates the importance of meaningful discourse that takes place between learners

through *Integrative CALL* programs and activities. Similarly, the use of computers and

technology in language learning is no longer limited to sporadic integration, but rather as

an integral role in the facilitation of meaningful communication.

Digital Game Environments and Integrative CALL

Digital game environments represent a potentially powerful tool in second

language learning in that they can provide spaces in which authentic interactions can

occur among communities of learners. Digital games often incorporate scaffolded game

play that allow learners repeated opportunities to practice and master content before

moving on to more challenging material or objectives (Lieberman, 2006). Additionally,

students are given almost immediate feedback throughout the gaming experience and are

often able to customize their experience to fit their specific level (Berns et al., 2013; Gee, 2009). In collaborative gaming environments students must work together using communicative tools that can include critical thinking and problem solving. When used in a language-learning classroom, this provides opportunities to analyze and synthesize information in an effort to reach a common goal. It is this specific discourse that is thought to enable deeper thinking and learning, both of the content and of the target language. Dourda et al. (2014) note that digital games provide a fun, alternative means to language learning that contextualizes and provides immersive experiences for learners.

Conclusion

While there has been an abundance of research involving gaming in general, and a recent surge in language learning and gaming in particular, studies have predominantly centered upon older students (i.e., high school and university level). Blumberg and Fisch (2013) note that while digital game play has become an integral part of children's lives, there is limited research on how it may impact learning. Thorne et al. (2009) state:

> Indeed, there is a great need to more substantively explore the educational potential of social virtualities in ways that move beyond text-based CALL paradigms to examine other possible effects, dynamics, and uses associated with visually rendered and avatar-based virtual worlds. (p. 809)

Squire and Jenkins (2003) note that there isn't necessarily one best approach to implementing games into education, but instead suggest that games hold a diverse range of possibilities as an educational medium that warrant further exploration. Unfortunately, the potential that digital games hold for language learning runs counter to contemporary trends in education. Godwin-Jones (2014) furthers this stating, "The dismissive attitude towards such forms of communication is likely related to the negative social views of online gaming, widely seen as an isolating, unproductive, and dangerously addictive

activity" (p. 12). Continued research into the application of games within specific domains of learning is essential in order to identify the ways in which they will best benefit learners.

Overview of Chapters

The remaining chapters provide a review of the literature regarding gaming, language learning, and the social constructivist framework that guided this study. Included in this review are arguments both for and against the use of gaming within this specific discipline. Following the literature review is an overview of the methods employed for the study. This includes a description of case study methodology, along with the rationale for choosing this particular model. The final two chapters include the analysis of data and a discussion of the results, respectively.

CHAPTER TWO: LITERATURE REVIEW

The processes of critical thinking, negotiation, and co-construction of meaning, which are part of a social constructivist framework, play an integral part in the development of second language learning. This literature review defines and examines several key concepts related to these processes. Specifically discussed is social constructivism as a learning theory and a framework, both in general terms, as well as within the context of the language-learning environment. Additionally, a synthesis of recent research on critical thinking, negotiation, and co-construction of meaning is examined within the scope of second language acquisition. This chapter also provides an overview of instructional games, followed by a more thorough investigation of social games, including digital games and virtual environments. Included in this section are descriptions of the essential elements of gaming and the potential these components hold within a social constructivist learning environment. Finally, the chapter concludes with a brief summary of the major criticisms currently surrounding digital games.

Social Constructivism as a Framework and Learning Theory

Social constructivism has been described as a pedagogical theory, a theory of learning, and even as a theory of knowledge (Mvududu & Thiel-Burgess, 2012). For this study, social constructivism is defined and discussed as a learning theory and a framework through which individuals acquire knowledge and learn. Lev Vygotsky (1978) is overwhelming credited as the father of social constructivism (Hausfather, 1996; Liu & Matthews, 2005; Mvududu & Thiel-Burgess, 2012; Powell & Kalina, 2009;

Simina & Hamel, 2005; Wood & Bennett, 1998; Yang & Wilson, 2006), and argued that learning is a social process that involves the cultural, historical, and personal interactions that take place between and among individuals (Mvududu & Thiel-Burgess, 2012). Vygotsky's theory emphasizes the role that language and culture play in the cognitive development of learners by providing frameworks in which students can experience, communicate, and make sense of their reality. Ultimately, the formation of new knowledge and new learning is a shared, collaborative experience that cannot happen for an individual in isolation (Adams, 2006; Hirtle, 1996; Mondahl & Razmerita, 2014; Simina & Hamel, 2005; Yang & Wilson, 2006).

Simina and Hamel (2005) also define social constructivism as the process of learning through one's interactions with the physical and cultural environment; however, the authors extend the definition to also include both the act of reflecting on those experiences, as well as integrating new information with previous knowledge (p. 223). The context in which these interactions occur cannot be underestimated. Vygotsky (1978) stressed the importance of both historical and cultural conditions within a given context, elements that are innate in a language-learning environment, as being vital to the process of learning. Yang and Wilson (2006) agree, noting, "What we learn and how we make sense of knowledge depends on where and when, such as in what social context, we are learning" (p. 365). Mondahl and Razmerita (2014) similarly note that social constructivism is the process through which an individual interacts, collaborates, and communicates with others to construct meaning. This process occurs in communities, and as a result, the learning that takes place integrates the cultural and communicative aspects of those environments.

Social Constructivism in the Language-Learning Classroom

Social constructivist teaching methodologies are a relatively new addition to the foreign language classroom (Villacañas de Castro, 2013). Traditional instruction in these environments largely consists of rote memorization in which learners are passive receivers of information (Thomas, 2012; Yang & Wilson, 2006) and which focuses on the linguistics of language rather than the ways in which students best learn the language (Villacañas de Castro, 2013). Social constructivism, on the other hand, supports the active participation and involvement of learners engaged in target-language tasks. Learners become actively involved in their learning environment, constructing meaning based on the context and the interactions they have with others.

Hirtle (1996) asserts that, regardless of subject or classroom type, the primary role of language between individuals is communication. Learners take this language, in the form of written and spoken words, and attempt to mediate understanding through the lens of the social context in which the words are communicated. This process leads to the mobilization of new understandings and, ultimately, learning. Hirtle argues that this process of inquiring and exploring new ideas through collaboration with others may be more important than the content of what is actually learned.

Vygotsky (1978) also argued that learning takes place through dialogue, specifically, verbal or written communication between the learner and other sources of knowledge or ideas in his or her learning environment. Vygotsky termed this 'intermental' dialogue, which is then followed with 'intramental' dialogue, in which the learner reflects on what has taken place, processes the information and ultimately restructures this into new knowledge. Adams (2006) further explains this as a two-step

process in which knowledge formation begins between individuals on an inter-psychological level, based upon verbal language and other forms of communication (i.e., cultural cues), before finally being internalized as part of the intra-psychological level.

The Importance of Scaffolding

Building upon prior knowledge and scaffolding are major aspects of social constructivism and involve Vygotsky's (1978) *Zone of Proximal Development* (ZPD) (Bednar, Cunningham, Duffy, & Perry, 1992; Hirtle, 1996; Mondahl & Razmerita, 2014; Mvududu & Thiel-Burgess, 2012; Olivares, 2002; Simina & Hamel, 2005; Shen & Suwanthep, 2013; Yang & Wilson, 2006). Vygotsky (1978) described his ZPD theory as, "…the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 83). Mondahl and Razmerita (2014) describe learning as a constructive process during which learners attempt to assimilate incoming information with what was previously known. Olivares (2002) argues that when English Language Learners (ELLs) are able to use prior knowledge about a particular content area, they communicate *about* the subject, and not simply *of* the subject. The author argues that because the student actively communicates *about* the subject, he or she engages in higher levels of thinking and more authentic learning occurs.

Mvududu and Thiel-Burgess (2012) also describe learning as an active process in which students bring prior knowledge to a new context and negotiate incoming information to form new understandings and knowledge. The authors argue that collaborative activities that encourage group chat or talk between language learners of

different abilities can provide deeper insight into the comprehension levels for the instructor. This informal dialogue, especially between students of different cultural and linguistic backgrounds and those who are at different levels of target language proficiency, can provide substantial support for individual learners as well. The authors speculate that this may contribute to more advanced exposure and development of complex vocabulary and grammar.

The Role of Teacher as Facilitator

Simina and Hamel (2005) note that a social constructivist learning environment is student-centered, in which the instructor's role is that of facilitator and guide. The classroom teacher should support and encourage collaboration, negotiation, and socialization, as well as provide opportunities for learners to draw on prior knowledge and make connections with these experiences. Teachers facilitate these acts of negotiation, collaboration, and socialization by providing scaffolding opportunities that stretch and challenge students, while providing just the right amount of support along the way. This scaffolded, guided instruction correlates to Vygotsky's (1978) ZPD, in which students are pushed past their independent level of learning, but can be successful through the assistance of a teacher or more experienced peers.

Adams (2006) explains how teachers facilitate learning by guiding students to construct new knowledge and understanding. Scaffolding becomes the principal task for the teacher in that he or she must be aware of each learner's individual level, and therefore able to provide tasks and activities that correlate to each student's ability. This might appear to be a difficult task for instructors, as students - regardless of age or class grouping - inevitably hold unique prior knowledge and will come to understand a concept

in a multitude of ways. Vygotsky (1978) asserts that instructors and teachers are not solely responsible for ensuring that scaffolding occurs. Parents and/or other students at higher levels of learning are able to partake in this process as well (Adams, 2006; Shen & Suwanthep, 2013; Yang & Wilson; 2006). It is precisely these different cultural and educational backgrounds that can provide a natural support system within the learning environment. According to Vygotsky (as cited in Hirtle, 1996), "…with assistance, every child can do more than he can by himself – though only within the limits set by his development" (p. 91).

<u>Learner-Constructed Meaning</u>

Yang and Wilson (2006) note that students must be exposed to materials that are relevant, meaningful, and purposeful. In other words, learners must connect to the learning activity in some manner that holds meaning for them personally. If instructors fail to provide these types of activities and lesson, students become removed onlookers, rather than engaged learners aiming to make meaning from what they are studying. Olivares (2002) argues that social constructivist learning environments must be student-centered to contain activities that promote spontaneous, authentic interactions between participants. Instructors must integrate topics and conversations about everyday, relevant issues, concerns, and problems, rather than discussions generated by a textbook or program (Doghonadze & Gorgiladze, 2008; Shen & Suwanthep, 2013).

Increased test scores, retention, and overall class participation are associated with this student-centered approach to instruction and learning (Karaduman & Gültekin, 2007; Khalid & Azeem, 2012; Mvududu & Thiel-Burgess, 2012). Mvududu and Thiel-Burgess (2012) argue that students in a social constructivist learning environment are more likely

to stay on task, make connections to previous work, and ultimately retain pertinent information for longer periods of time. Students in their study expressed an improved ability to focus on the curricular material, attributing their increase in attention to a lack of prescribed class goals and a freedom to pursue personally meaningful topics.

In Khalid and Azeem's (2012) study of university English language learners, pre- and post-test scores were compared between students in a constructivist-based classroom to those in a traditional foreign language classroom. Although pre-test scores were nearly identical for the two groups, the experimental group showed significant gains in English language acquisition by the end of the study, including notable increases in reading, grammar, and writing. Bednar et al. (1992) repeatedly emphasize the importance of relevant, real-world contexts for effective learning. This does not necessarily mean that the task or problem is meaningful on its own, but that it is logical within the learning context and that there is a legitimate reason to impel the learner to solve it.

Technology as a Social Constructivist Tool

Ideal Computer Assisted Language Learning (CALL) activities provide opportunities for "collaborative construction of knowledge through social negotiation" (Simina & Hamel, 2005, p. 223). Learners share multiple perspectives and engage in constant restructuring and reassessing of these perspectives into new knowledge. Bednar et al. (1992) describe social constructivist activities as those that take place within a relevant context that allow learners to connect prior knowledge with new information and ideas. The authors argue that true knowledge cannot be formed in isolation, and that meaningful construction of knowledge cannot take place if all perspectives to a task are

predetermined. While a central task or objective must be specified, the boundaries in which that task is ultimately completed should not be stipulated.

Digital games hold the potential to provide this exact context, complete with multiple perspectives that allow learners to continually negotiate meaning within their environment. Thorne et al. (2009) describe how these collaborative spaces contain goal-oriented tasks that increase in difficulty as players move through the game. This scaffolding is an inherent design component of many digital games and can, therefore, provide complex environments that are optimal for learning. Students often spend hundreds of hours working through similar, repetitive, yet increasingly difficult problems in order to advance through a game. Gee (2008) also argues that these game features form to provide learning environments that fuse pleasure and learning through the lens of scaffolded, engaging, goal-directed activities that naturally align with a social constructivist framework.

Squire and Jenkins (2003) argue that social games are a natural fit in the educational environment, especially when used in conjunction with relevant, real-world tasks that hold meaning for the learner. More experienced players are able to guide less experienced learners by offering advice and suggestions, thereby providing a natural scaffolding process that allows learners of multiple abilities to work together. Social games can also provide immersive environments in which students collaborate to solve a complex problem or task. Individually, learners gather information and then compare notes with peers, form hypotheses, and argue and defend their positions, all in order to achieve the immediate goal.

Although each digital game is unique and must be considered individually, it is important to note that the aspects of collaboration, communication, and scaffolding are intentionally woven into the structures of many of these spaces (Berns et al., 2013; Gee, 2003; Kapp, 2013; Lieberman, 2006; Malone & Lepper, 1987; Thorne et al., 2009; Thorne et al., 2012). Players often form groups of players, or guilds, in order to accomplish certain objectives that might otherwise be impossible if attempted independently. These guilds can provide peer-scaffolding opportunities for veteran players to engage and share information with less experienced players (Godwin-Jones, 2014; Thorne et al., 2009). This includes explanations and information that are meaningful and pertinent to the immediate environment and objective. Because of the shared goals that many digital games provide, players tend to use language freely and make appropriate linguistic choices when interacting with others (Godwin-Jones, 2014; Thorne et al., 2009). Often, the main objective is not the acquisition of the target language, but the completion of the goal or the winning of the game in general. As Godwin-Jones remarks:

> The hope is that players will go beyond seeing gameplay as a course assignment and will gain enough interest to explore and experiment. Self-generated and self-directed discovery can further the kind of intrinsic motivation that commits users to learning more. (p. 13)

Baek and Choi (2014) also discuss the collaborative qualities contained within many social games, including synchronous and asynchronous interactions that occur both within and outside the game. Interaction outside the game might include players sharing their experiences with one another, showing off rewards obtained through game play, or maintaining previously established relationships. The authors argue that social games

have the ability to provide real-world based opportunities for interaction, sociality, and collaboration.

Godwin-Jones (2014) emphasizes, however, that games are not a cure-all for language learning. The author points out that with such a wide variety of games available, one must be careful about choosing which ones to implement in a language learning environment. Blake (2013) also argues that technology use in general should be carefully guided by theory and the experience and recommendations of others who have used it.

Critical Thinking

Scriven and Paul (2015) describe critical thinking as an intellectual process that includes analyzing, questioning, defining, synthesizing, and evaluating input into reasonable, logical structures that correspond to the particular context in which the information is encountered. The authors argue that while critical thinking is a highly individualized process, certain core elements exist that include self-guided, self-disciplined thinking that aim to reason at the very highest levels.

Brookfield (1997) offers his own definition, asserting that critical thinking is a fundamentally social process that can only truly occur when others are enlisted. The author argues that assumptions and ideas cannot be tested, debated, or reevaluated in isolation, and that it is the interactions with others that allow individuals to step outside their own reasoning to entertain new or different concepts. In this social process of critical thinking, peers and instructors become essential elements in commenting, reflecting and, ultimately, forming new perspectives.

Critical Thinking: Bloom's Taxonomy

Bloom's taxonomic model of the processes that occur within the cognitive domain provides a way to formally classify and measure learning behaviors (Klimovienė et al., 2006). This seminal work supplies a method for educational researchers to structure and define the processes in which individuals think and learn by classifying levels of thinking, ranging from lower order skills to higher order skills.

Within this model of higher order skills, we find the concept of critical thinking. Brookfield (1987) explains the numerous ways in which critical thinking, as both a concept and a process, is described, emphasizing both its complex nature and the variety of manifestations it can take. For example, critical thinking in the elementary classroom may look substantially different from critical thinking within an adult counseling session. Despite this, Brookfield maintains there are four fundamental elements that represent the processes, activities, and attributes that critical thinkers employ and display: identifying and challenging assumptions, challenging the importance of context, imagining and exploring alternatives, and engaging in reflective skepticism.

Similarly, Klimovienė et al. (2006) define critical thinking as the process through which an individual considers multiple perspectives, analyzes positions based on deductive or inductive validity, defends arguments with evidence, and formulates reasonable conclusions that are likewise defendable. The authors state, "…the development of critical thinking becomes a promising strategy helping to increase learning effectiveness while teaching any subject matter, including foreign languages" (p. 77).

Bloom's Digital Taxonomy in the Foreign Language Classroom

After several decades of revision and debate, Bloom's Taxonomy now includes
the digital processes, activities, and actions in which individuals participate and which are
often implemented within today's classrooms. This revised taxonomy is known as
Bloom's Digital Taxonomy (Churches, 2011) and depicts the change from using nouns to
verbs in order to describe the thinking process (Table 2.1). Additionally, the process of
creating was determined to be of a higher level of thinking than *evaluating*.

Table 2.1   Bloom's Taxonomy (left) and Bloom's Digital Taxonomy (right)

Higher Order Thinking Skills	Higher Order Thinking Skills
Evaluation	Creating
Synthesis	Evaluating
Analysis	Analyzing
Application	Applying
Comprehension	Understanding
Knowledge	Remembering
Lower Order Thinking Skills	**Lower Order Thinking Skills**

Note. Adapted from *Educational Origami: Bloom's Digital Taxonomy* by A. Churches
(2011).

Bloom's Digital Taxonomy emphasizes the importance of learning content
through the use of scaffolding activities in which prior knowledge is used as a basis
(Churches, 2011). For example, the lower order thinking skill of *remembering* is vital for
language learners, in that vocabulary must be memorized first by the learner before it can
later be applied in more complex ways. As the student becomes increasingly proficient in
remembering vocabulary, he or she may begin to implement this knowledge through the
use of meaningful conversations and interactions with others.

Table 2.2   Communication Spectrum: Examples of Thinking Skills in Relation to Bloom's Digital Taxonomy

Bloom's Digital Taxonomy	Thinking Skills (Examples)
Creating	Designing, constructing, planning, producing, inventing, devising, making, programming, filming, animating, blogging, mixing, publishing, podcasting, directing, broadcasting
Evaluating	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, commenting, reviewing, posting, moderating, collaborating, networking
Analyzing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, linking, validating
Applying	Implementing, carrying out, using, executing, running, loading, playing, operating, hacking, uploading, sharing, editing
Understanding	Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying, searching, journaling, twittering, categorizing, tagging, commenting, annotating
Remembering	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, bullet pointing, highlighting, bookmarking, social networking, googling

Note. Adapted from *Educational Origami: Bloom's Digital Taxonomy* by A. Churches (2011).

The revised taxonomy has serious implications regarding the teaching and learning of foreign languages. The traditional methods of rote memorization and drill and practice exercises fall into the lower order category of thinking skills, whereas the processes that encompass and embrace the social constructivist framework are found in the *evaluating* and *creating* levels that occur within the higher order thinking skills. Table 2.2 (Churches, 2011) provides a Communication Spectrum that further describes the correlation between Bloom's Digital Taxonomy by providing specific methods of communication. It is worthwhile to mention that, according to this model, *collaborating*

and *moderating* are not only found to correlate to the higher levels of the digital

taxonomy, but are also integral aspects of the social constructivist framework.

Significance of Critical Thinking in the Foreign Language Classroom

Shirkhani and Fahim (2011) discuss the significance of critical thinking in the

foreign language classroom, arguing that a strong correlation exists between critical

thinking skills and learner achievements. They assert that students who exhibit well-

developed critical thinking skills show an increased ability to complete complex tasks

over their peers with less developed critical thinking skills. Dourda et al.'s (2014) study

involving ELL's using critical thinking skills in a game-based geography project showed,

without exception, significant gains in students' knowledge of geography content, while

also exhibiting a 45% increase in use of new vocabulary.

Liaw (2007) asserts that critical thinking skills are vital for language learners to

gain proficiency in the target language. This involves students demonstrating their

understanding through a variety of ways, including the use of inferences, problem

solving, and asking pertinent questions. Adams (2006) emphasizes the use of open-ended

tasks that promote critical thinking and complex problem solving in a context that is

applicable and meaningful to the language learner. The author states, "The mutually

reinforcing nature of open-ended, exploratory talk provides mechanisms and

opportunities for individual reflexivity within a context that actively desires and operates

to mediate knowledge construction into the social space" (p. 249).

Similarly, the use of critical thinking skills in foreign language instruction

provides opportunities for students to design unique, original ideas and solutions to

problems, while also being able to explain their thinking, argue their positions, and

defend their ideas (ACTFL, 2011; Kabilan, 2000; Rezaei, Derakhshan, & Bagherkazemi, 2011). Doghonadze and Gorgiladze (2008) note:

> …the main - practical - goal and the communicative approach towards teaching foreign languages mean that learners need not only to acquire a certain amount of linguistic material but also to be able to use this material in permanently arising new situations. (p. 102)

In order to foster the development of critical thinking skills in the foreign language classroom, students must identify and formulate rules about grammar and vocabulary as they interact with one another, rather than having information ready-made and presented from the teacher (Gaskaree, Mashhady, & Dousti, 2010). Shirkhani and Fahim (2011) suggest specific materials that can enhance and promote critical thinking, including activities that require learners to synthesize, argue, debate, discuss, and classify. Kabilan (2000) notes that these activities should be embedded within the curriculum in order to provide an authentic context that is both meaningful and engaging for students. Lessons might include using the target language in creative ways to express oneself, adapting and revising the manner in which the target language is used, identifying patterns in the target language, incorporating these patterns into future language use, and using an existing understanding and knowledge of the target language to infer new vocabulary and grammatical structures (Gaskaree et al., 2010; Shirkhani & Fahim, 2011).

Although there is growing interest regarding the implementation of critical thinking activities within the foreign language classroom, instruction does not yet consistently include these types of activities, lessons, or materials (Doghonadze & Gorgiladze, 2008; Gaskaree et al., 2010; Rezaei et al., 2011; Shirkhani & Fahim, 2011). In many cases, instruction continues to employ outdated teaching methodologies that

promote students learning about the language, rather than learning how to use it effectively in meaningful discourse. Changes in pedagogy are paramount in affording students opportunities to practice critical thinking skills through the use of their target language (Kabilan, 2000; Rezaei et al., 2011). Traditional language teachers often spoon feed information to their students by providing immediate answers to students' questions (Gaskaree et al., 2010). Instead, teachers must ask questions in various ways in order to enhance cognitive development, thereby stimulating critical and creative thinking within the language-learning environment. Shirkhani and Fahim (2011) argue that language learners who use critical thinking skills can examine existing theories, devise questions about these theories, and ultimately identify new and novel approaches to solving problems. Similarly, language learners should utilize the target language to defend their ideas and explain the rationale behind their own theories (Doghonadze & Gorgiladze, 2008). Throughout this process, students should be able to identify and correct errors, reflect on their interactions with others and, ultimately, integrate new information into pre-existing knowledge (Gaskaree et al., 2010; Rezaei et al., 2011).

Brookfield (1987) argues that critical thinking skills cannot be supported or fostered in an individual without at least some level of consent. Trying to coerce or force a learner to analyze information and reflect on experiences will likely only result in intimidation and disinterest. Instead, instructors should try to nurture, awaken, and support the processes of critical thinking in ways that are non-threatening and encouraging. This aligns with the social constructivist viewpoint of providing learners with engaging materials that are relevant and meaningful, not just to them personally, but in the context of learning the target language in general.

<u>Conclusion</u>

There is an abundance of research indicating that student-centered learning that is both meaningful and engaging, and which integrates activities that promote critical thinking skills, is most beneficial for second language learners (Doghonadze & Gorgiladze, 2008; Gaskaree et al., 2010; Kabilan, 2000; Liaw, 2007; Rezaei et al., 2011; Shirkhani & Fahim, 2011). The aforementioned instructional strategies naturally align with a social constructivist framework that supports the interactions between learners, including scaffolding and peer-to-peer teaching, discussions, and debates that encourage higher order thinking skills. Technology, and specifically digital gaming, holds a great deal of potential in providing environments where meaningful exchanges can occur through collaborative task-based activities involving critical thinking and problem solving. This includes the social interactions that take place in which students form ideas, argue theories, and ultimately acquire new understanding.

Assessing the effectiveness of these instructional strategies can be troublesome, however. Liaw (2007) argues that an in depth analysis of language learners is necessary in order to accurately assess critical thinking skills in the language classroom. In the researcher's study, quantitative data reflecting changes in critical thinking skills showed no significant changes, even though qualitative data analysis revealed a significant increase in the same skills. Similarly, Shen and Suwanthep's (2013) study of a social constructivist-based reading program for English Language Learners (ELLs) revealed no significant gains in reading skills, despite the fact that many students reported an increased enthusiasm toward the subject in general. These inconsistencies in data indicate a need for further studies in the areas of critical thinking and language learning.

Instructional Games

Although games have long been associated with leisure, fun, and pleasure,, their role in education and learning has yet to be fully explored. Rieber (1996) states, "…games and play are prone to unfortunate misconceptions that reduce their potential use within learning environments with both children and adults" (p. 53). Squire and Jenkins (2003) agree that the potential games hold for experiential, immersive learning tends to run counter to popular trends within the field of education. With the recent proliferation of video games, "edutainment," and digital gaming, instructional games are currently garnering increased attention. Blumberg and Fisch (2013) argue that while digital game play is an integral part of children's lives outside of school, it has a growing role inside school as well, and can provide opportunities to study cognitive development.

This section examines the roles that instructional and digital games play in supporting social constructivist teaching strategies, both in general terms, as well as in the context of second language learning. To begin, the notion of 'instructional game' is defined in order to further understand the essential elements they contain that can contribute to learning. Following this is a discussion of social games, as previously described, with the purpose of exploring the potential they hold within a social constructivist, second language learning environment.

Instructional Games Defined

In general, instructional games provide an intersection of the learning and teaching associated with traditional instruction, alongside the entertainment features normally attached to gaming. Rieber (1996) provides a general definition, stating that games provide a way for learners to practice, imitate, and eventually learn the skills and

behaviors they will later need. Kapp (2013) more specifically defines games as "…a system in which players engage in an abstract challenge, defined by rules, interactivity and feedback, that results in a quantifiable outcome often eliciting an emotional response" (p. 101). The terms *edutainment, educational gaming*, *role playing games,* and *virtual games,* are often used interchangeably with the term *instructional game*. While there are certainly differences that distinguish these games from one another, for the purposes of this study, *instructional game* is an all-encompassing term that includes games designed and used primarily for instructional purposes. *Social games are* further defined and discussed in the following section; specifically in regard to the features they contain that support critical thinking, negotiation, and co-construction of meaning within second language learning.

<u>Essential Elements and Their Effects</u>

Instructional game designers face the burden of implementing features that make a game enjoyable and fun, while simultaneously engaging students to acts of problem solving, communicating, and collaborating in order to reach specific curricular objectives. A review of the literature yields a number of elements associated with successful instructional games that are grouped here into the following four categories, including: *challenge, fantasy, feedback,* and *control* (Dickey, 2007; Gee, 2005; Gee, 2008; Kapp, 2013; Malone, 1980; Malone & Lepper, 1987; Rieber, 1996; Wilson et al., 2009). It is important to note that these concepts are occasionally identified by slightly different terms (i.e. *narrative* instead of *fantasy*), but are most often referred to in the literature by the ones listed here. Additionally, it is important to recognize the complex relationships that all four elements hold with one another.

Challenge. The element of *challenge* appears in all quality games, whether there is a primarily educational or entertainment purpose. There are specific characteristics of this element that contribute to a game's instructional effectiveness, including goals and objectives, motivation, and engagement (Dickey, 2007; Gee, 2005; Gee, 2008; Kapp, 2013; Malone, 1980; Malone & Lepper, 1987; Phillips, Horstman, Vye, & Bransford, 2014; Rieber, 1996; Wilson et al., 2009). Maintaining an appropriate level of challenge is crucial to designing quality instructional gaming; there is a fine line between appropriately engaging students and overwhelming players with objectives that are too difficult. In order to accomplish this, game design generally includes the use of graduated levels. Gee (2005) explains that good instructional games will present problems of increasing difficulty, allowing players ample opportunities to practice their growing skills before being presented with a new task or objective. This new challenge often provides contradictory or conflicting information and requires the learner to reevaluate and make modifications to his or her current understanding. Each step of increasing difficulty, coupled with new information, incorporates elements of a social constructivist learning space that includes scaffolded learning and uses prior knowledge as a foundation for new knowledge construction.

Additionally, good instructional games should contain an element of uncertainty attached to the acquisition of the goal (Dickey, 2007; Gee, 2005; Kapp, 2013; Malone, 1980; Malone & Lepper, 1987; Wilson et al., 2009). This ambiguity is accomplished in several ways: varying the difficulty level, implementing multiple level goals (i.e., scoring and speed), selectively revealing information throughout the game, and incorporating random and unexpected events (Gee, 2005). Dickey (2007) and Malone (1980) both

independently note that intermittent surprises tend to pique cognitive curiosity, contributing to a student's overall level of engagement. This aspect of instructional game design closely aligns to scaffolding strategies employed through social constructivist teaching practices, in which instructors chunk information into parts that are easier for learners to process. This includes the use of graduated exercises similar to levels in a game, as well as questioning techniques that introduce unexpected or random information.

Motivation and engagement. The notion of *challenge* on its own is not necessarily indicative of learning, but rather strongly associated with higher levels of engagement and intrinsic motivation, which are thought to hold the most potential for increased learning gains (Dickey, 2007; Gee, 2008; Phillips et al., 2014). Wilson et al. (2009) describe effective instructional games as, "When informational content combines with the appropriate gaming characteristics, the combination of the two elicits a motivated learner" (p. 234). Players are more likely to develop intrinsic, endogenous motivation and will continue playing games that pique their interest, contain unexpected surprises, and maintain levels of optimal complexity (Malone & Lepper, 1987; Phillips et al., 2014). Intrinsic, endogenous motivation is most often associated with deeper learning of the content, whereas games lacking in complexity fail to keep learners engaged and provide limited learning opportunities (Egenfeldt-Nielsen, 2007; Malone & Lepper, 1987).

In order to effectively engage students for sustained periods of time, instructional games must provide a balance between boredom and frustration, an emotional state that Csikszentmihalyi refers to as "flow" (as cited in Kapp, 2013, p. 569). Rieber (1996) also

references Csikszentmihalyi's theory when describing motivated, engaged learners who are so absorbed in a task that they are often unaware of their surroundings, they are free from personal stress, and they do not notice the passing of time. As Rieber notes, "Flow is only possible as long as a person avoids boredom and anxiety simultaneously" (p. 48).

Other researchers note the balance of emotions that appear critical in keeping players engaged in gaming. Phillips et al.'s (2014) study revealed that many participants reported simultaneous feelings of enjoyment alongside frustration and aggravation, noting that this combination was precisely what encouraged them to continue playing. Gee (2008) also emphasizes the idea that good instructional games contain elements that engage the emotional side of the player, stating, "Emotion appears to be a key source of motivation for driving thinking, learning, and problem solving" (p. 35).

Girard, Ecalle, and Magnan (2013) argue against claims that these increases in motivation consistently lead to gains in learning. In their meta-analysis of nine studies involving the educational effectiveness of instructional games, the authors point out that studies showing increases in motivation and engagement do not always have correlating increases in test scores. The authors similarly argue against the theory of Csikszentmihalyi's (1978) Flow theory, stating that there is a lack of empirical evidence showing that students engaged in this particular state show any significant increases in skill levels.

Fantasy. The element of *fantasy* is another essential component in the creation of good instructional games (Baek & Choi, 2014; Dickey, 2007; Egenfeldt-Nielsen, 2007; Gee, 2008; Kapp, 2013; Lee et al., 2012; Malone, 1980; Malone & Lepper, 1987; Phillips et al., 2014; Rieber, 1996; Susaeta et al., 2010; Wilson et al., 2009). This element

involves the use of a story or narrative within an imaginary world that supplies the context for the game. Rieber refers to this element as a *microworld,* or "…a small, but complete version of some domain of interest" (p. 45). Squire and Jenkins (2003) argue that instructional games can provide *microworlds* in which students practice social processes and learn how to collaborate with one another to solve an immediate task or goal. An important facet of a *microworld* is its ability to match the learner's cognitive and affective abilities so that the player needs little to no training or preparation in order to engage. Baek and Choi (2014) point out that many social games are designed in this manner, with such an ease of use that virtually anyone can learn to play and immediately become engaged. Rieber explains that because players become emotionally attached to these microworlds, they are not only more absorbed within the game environment, but are also better able to self-regulate their learning.

These make-believe worlds have the potential to re-create very lifelike models of topics or subject areas. Multiple studies discuss the importance of situated-learning, or placing the learner within a meaningful context in which he/she can experiment, explore, and directly apply new understandings (Dickey, 2007; Egenfeldt-Nielsen, 2007; Gee, 2005; Gee, 2008; Lieberman, 2006; Rieber, 1996; Wilson et al., 2009). The fantasy worlds of instructional gaming have the potential to provide rich, immersive contexts that enable learners to engage in meaningful, relevant learning experiences. Wilson et al. emphasize the importance of fantasy worlds, especially when students are asked to use the same cognitive processes to complete a task within the game environment as they would in the real world. This ability to transfer new learning from the game world into the real world holds significance for learning. Not only does the game provide a relevant

task or objective for the learner, but also a way in which the student can realize its real-world application outside the game.

Malone (1980) discusses intrinsic and extrinsic fantasies, noting that intrinsic fantasies often supply players with avenues for using their game skills in the real world. He states, "More importantly, when the fantasy in a game is intimately related to the material being learned, the players are able to exploit analogies between their existing knowledge about the fantasy world and the unfamiliar things they are learning" (p. 164). Malone further asserts that instructional games that employ endogenous fantasy elements are able to weave curricular content into the game in such a way that instructional content and gaming content are seamlessly integrated.

Identity. The element of *fantasy* also includes the sub-element of *identity,* in which the player either creates or adopts a new identity that will enable him or her to reach the desired goal (Dickey, 2005; Dickey, 2007; Gee, 2005; Gee, 2008; Lee et al., 2012; Suh, Kim, & Kim, 2010; Susaeta et al., 2010). Gee (2005) argues that this new identity formation is similar to a student adopting a math identity or science identity when entering a classroom. Learners identify with the subject or task they are assigned to and adjust their thinking and perspectives accordingly. Susaeta et al.'s study revealed that students strongly identified with their new identity and spent a great deal of time individualizing this new persona. The act of role-playing allowed students to escape their true identities and take on that of the character within the game, possibly leading to other behaviors not typically exhibited within the traditional classroom. Baek and Choi (2014) and Dickey (2007) note that social game identities offer students alternative ways to express their thinking, often resulting in increased risk taking behaviors.

Feedback. As in any type of instruction, *feedback* is an essential aspect of student learning and, therefore, a critical element of effective instructional games (Gee, 2005; Gee, 2008; Kapp, 2013; Malone, 1980; Rieber, 1996; Wilson et al., 2009). Wilson et al. describe three ways in which feedback typically occurs within an instructional game: players may receive immediate feedback at the end of a task, intermittently throughout the game, or from a source outside the game (i.e., their teacher and/or peers). Gee (2005) explains how players learn from feedback, adjusting their actions in order to be more successful in the future. Feedback is processed and integrated with players' prior knowledge, including information learned through playing the game, in order to help them achieve objectives.

Gee (2005) further describes how good games provide scaffolding by teaching increasingly difficult lessons that build upon one another, as well as providing ongoing, continuous feedback. The information gained from one event is embedded into future problems, so that leaners are able to apply new knowledge in increasingly difficult problem scenarios. Malone (1980) notes that while feedback should be consistent, it should also contain surprising information that forces learners to question what they already know and make sense of the new information. This aspect of feedback is strongly linked to a social constructivist framework that employs continuous scaffolding, ongoing opportunities for reflection, and construction of new knowledge.

Control. The fourth and final element of good instructional games is *control*, or the level of personal ownership, influence, and power that an individual is able to exert while playing a game (Dickey, 2007; Gee, 2005; Gee, 2008; Malone, 1980; Malone & Lepper, 1987; Phillips et al., 2014; Rieber, 1996; Wilson et al., 2009). This not only

applies to the decisions made by a player's game-identity, but also the choices about the identity itself. Customization can include the rate at which a player progresses through a game, the number of levels played, and the physical appearance of the game-identity or avatar.

The element of *control* is tightly linked to the other main components of good instructional games in several ways. For example, players often exhibit different behaviors within gameplay than they would in a traditional classroom (Baek & Choi, 2014; Dickey, 2005; Dickey, 2007). When the game-design includes appropriate, progressive levels of challenge and incorporates interesting and intriguing contexts that provide strategically placed feedback, learners often take more risks, explore more, and communicate in ways beyond what is usually observed within a traditional classroom. One reason for this is that feedback is often presented positively, and the negative consequences for failing are kept to a minimum (Gee, 2005); again, stressing that the game should not be too simple or too confusing. Maintaining an engaging level of challenge keeps learner curiosity high, which contributes to further motivation to continue playing the game.

Conclusion

Reinders (2012) asserts, "Successful games mirror successful teaching insofar as they create environments that balance user/learner control with clear expectations, exploration with feedback, and ample opportunities for genuine interaction" (p. 2). Instructional games can offer rich, immersive environments in which learners interact, collaborate, and work toward a common goal or objective. These learning spaces adhere to social constructivist principles by incorporating content-driven activities that are

scaffolded and slowly increase in complexity. Learning is student-centered and students participate in meaningful discourse as they explore and experiment with new ideas and understandings. Similarly, instructional games can provide learning experiences that employ critical thinking skills that incorporate the gathering of information and the subsequent questioning and evaluating of this information to solve a problem.

Research in this area is far from complete, however, and contains inconsistencies that warrant further investigation. Phillips et al. (2014) report that in-game assessments from their study did not adequately show student learning, and semi-structured individual interviews revealed conflicting information. The authors argue that multiple qualitative aspects of analysis must be employed, and researchers must have an understanding about students' prior feelings, beliefs, and attitudes not only towards games in general, but also toward the specific subject-context in which the game is situated. Donmus (2010) agrees, noting that research specifically targeting gaming through the use of social media is especially needed. The author argues that while adding instructional games to platforms such as Facebook holds a great deal of potential, instructors must also be prepared to adopt new pedagogies and teaching strategies.

Social Gaming as an Instructional Medium

This section reviews the current literature surrounding social games, as previously defined, and discusses the potential these spaces have as an instructional medium for learners. Specifically discussed are the main features of social gaming that make them desirable and effective for both learners and instructors, as well as a review of how these features fit with the previously examined components of successful instructional games.

Social games are set apart from more independently played games in that they occur in an online environment and generally require contact between players in some manner. These games take the previously discussed components of *control, fantasy, challenge,* and *feedback* and incorporate the additional elements of *collaboration* and *competition* as well. Because of these added components, there is an argument that social games are better suited as instructional tools than independently played games. As Gee (2008) notes:

> Good learning requires participation—however vicarious—in some social group that helps learners understand and make sense of their experience in certain ways. It helps them understand the nature and purpose of the goals, interpretations, practices, explanations, debriefing, and feedback that are integral to learning. (p. 23)

Social Games and Situated Meaning

Gee (2003) argues that meaning (i.e., sense or significance) is embodied within the nature of playing a game. Players must continually use information gained from interactions, artifacts, images, and materials and "…fit them into the emerging plot and virtual world you are discovering and helping to build" (p. 85). Gee refers to this as *situated meaning* in that the objects encountered throughout a game are assigned meaning that is specific to the particular situation the player is in, or that fit into the larger, overarching narrative of the game in some way. The meanings of these artifacts can and often do change during the course of the game, requiring learners to continuously analyze, reassess, and reevaluate their decisions and behaviors.

Gee (2009) also defines *situated meaning* as the appropriate use of a word or concept in a variety of contexts; essentially, customizing the use to fit the specific scenario or context in which it is being used. This implies an understanding of the

vocabulary that surpasses the verbal meaning, or the general understanding of a word or concept, without the ability to apply it to new scenarios. Gee argues that good video games actively encourage *situated meaning* in ways that traditional classroom instruction generally fails. This includes "thinking inside of and with simulations in a situated and embodied way" (p. 323) that customizes concepts for specific situations.

Lieberman (2006) states, "Players actively participate in a game – applying knowledge, devising strategies, making decisions, using skills, and reviewing the outcomes" (p. 382). The author argues that situated learning within social games can motivate deep cognitive engagement. Learners quickly identify what they need to know and apply a variety of problem-solving strategies to progress in the game as quickly as possible. Lieberman argues that this deep and close attention to the necessary skills and knowledge required for success leads to a deeper, more meaningful learning of the content of the game.

Collaborative Game Play

The collaborative nature of social games makes them unique in that interactions between players are intentionally integrated into gameplay. Susaeta et al. (2010) describe social games as constructivist learning tools that provide students with authentic learning opportunities. These games often require players to interact with one another in order to examine, discuss, collaborate, and negotiate new information, reinforcing both the social constructivist framework of learning, as well as employing activities that encourage critical thinking skills. Baek and Choi (2014) echo these sentiments, arguing that social games provide real-world based opportunities for interaction, socialization, and collaboration.

Due to the collaborative nature of social games, there are potentially numerous opportunities for players to engage with one another, discuss information, and negotiate new understandings. Baek and Choi's (2014) study revealed that players use social games to develop and maintain relationships, noting that players find the interactive element of social games the most desirable aspect. The authors point out that social games provide chat features, voice options, and opportunities to communicate both within the game, as well as outside the game. Gee (2008) emphasizes the increased interpretation and reflection opportunities that social games provide, while Dickey (2007) notes that social games can provide players with multiple opportunities to use critical thinking and problem-solving strategies to collaboratively reach objectives.

Competition

The challenges that instructional games contain also exist in social games. In order to succeed peers must collaborate with their peers or other players within the game in some manner. Due to this requirement of working together in order to achieve objectives or win the game, competition and collaboration become strongly linked in social games (Gee, 2008). Multiple studies reveal that one of the most compelling reasons for players to choose social games is the collaborative/competitive aspect (Baek & Choi, 2014; Dickey, 2005; Dickey, 2007; Gee, 2008; Lee et al., 2012; Malone & Lepper, 1987; Susaeta et al., 2010). Teachers also find the collaborative/competitive aspect of social games has the potential to push student learning further by providing realistic contexts in which to practice skills, enabling students to visualize consequences and offering increased opportunities for learners to describe their reasoning (Susaeta et al., 2010).

<u>Quests</u>

Another aspect of social gaming that provides considerable potential for instruction is the use of quests, missions, or some other group goal that guides gameplay (Baek & Choi, 2014; Dickey, 2005; Dickey, 2007; Gee, 2005; Gee, 2008; Lee et al., 2012; Susaeta et al., 2010). While individual games also contain a task or objective, the noticeable difference in social games is that collaboration with peers is often necessary in order to successfully complete quests. Baek and Choi note that quests hold high potential for containing content that can be tailored to meet a particular topic or subject area. Thiagarajan's (1971) early research emphasized that instructional games are especially adept at teaching certain processes, such as problem solving and alternative methods of analyzing and resolving conflict. Greitemeyer and Osswald (2010) also argue that games have the potential to teach whatever content is practiced and rehearsed within a game. This combination of content and process, delivered within the context of a quest or group objective, offers the prospect of a very powerful teaching tool.

Gee (2008) and Peterson (2012) discuss the aspect of *distributed knowledge* in social games, in which each individual has a specialization in one particular area of expertise, but also a strong understanding of at least some, if not all, of the other members' roles in the group. Used within the context of a quest or mission, this type of collaboration and competition requires individuals to form small, cross-functional teams in order to accomplish tasks. Gee states, "Such games hold out the potential for the discovery of new forms of social organization, new ways of solving social problems…and new ways of researching and testing collaborative learning, knowledge building, and performance" (p. 34). Susaeta et al. (2010) also point out the educational

benefits that social games contain, in that the narrative environment provides challenges that must be approached by the community of players. Thus, each player must determine his/her role within the community and establish the rules in which the group and the individual group members will operate in order to achieve short and long term goals.

Similar to instructional games, the context of these quests takes place within a fantasy world, where individual players take on new identities and collaborate in order to reach a common objective or goal (Peterson, 2012). The aforementioned elements of *challenge, fantasy, control,* and *feedback* all play integral roles within social games in much the same manner as more independently structured instructional games. Students enjoy the immersion within a fantasy world, as well as the creation and experimentation of different identities (Lee et al., 2012).

Additionally, the fantasy world context of these games can provide an environment in which students feel more comfortable experimenting and taking risks (Dickey, 2005; Susaeta et al., 2010). Dickey's research revealed that students exhibit different behaviors within their fantasy world and cultivate in-game relationships that might not otherwise form within the traditional learning environment. The author states, "…virtual environments support the emergence of peer role models predicated on characteristics different from those occurring in traditional classroom settings" (p. 68).

Social games provide increased opportunities for interaction, collaboration, and feedback, ultimately leading to what Mondahl and Razmerita (2014) refer to as "personal knowledge management" (p. 342). Through this personal management of learning, students are able to optimize their reflective thinking skills, increasing their own awareness of the learning strategies they employ, and fostering a deeper understanding of

both what they are learning, as well as how they are learning it. This kind of learning

describes skills associated with meta-cognitive thinking, increased problem-solving

skills, and critical thinking. Mondahl and Razmerita argue that the importance of critical

thinking skills and collaborative competencies likely outweighs the content of what is

actually studied.

Finally, social games show promise in promoting "freely chosen digital

engagement" (Thorne et al., 2009, p. 802) in which learners voluntarily engage in

discussion and debate about the game itself, but outside the game environment rather than

through game play. This can include visiting forums and websites or chatting with friends

to exchange tips and suggestions, all of which often occurs in the target language

(Godwin-Jones, 2014; Squire & Jenkins, 2003). These interactions that players have with

one another outside the game can involve core elements of social constructivism,

including peer-to-peer scaffolding, critical thinking, problem solving, and collaboration.

Similarly, these relationships are initiated and maintained by the learner, indicating

intrinsically motivated, self-directed learning.

Current Studies on Digital Games and Language Learning

This section of the literature review focuses on current studies regarding digital

gaming and foreign language acquisition, specifically noting the attributes within social

games that incorporate social constructivist learning strategies such as critical thinking,

negotiation, and co-construction of meaning.

Donmus (2010) discusses the potential that digital game environments hold for

foreign language education, arguing they can provide increased learning opportunities,

specifically by providing content that is both meaningful to learners and transferrable to

the real world. Blumberg and Fisch (2013) argue that digital games encourage problem-solving skills and can be viewed as "cognitive puzzles" (p. 4) that encourage and support a wide range of cognitive development. Similarly, these environments can provide additional opportunities for students to practice new skills and reinforce prior knowledge that they may not normally have in the traditional classroom. Godwin-Jones (2014) agrees, asserting that digital games can provide a way to connect with language learners who are normally disengaged with traditional classroom instruction.

Social games can provide meaningful contexts for language learners to interact, communicate, and acquire language (Sørensen & Meyer, 2007). Social games neither require learners to memorize language, nor is there only one correct answer while playing. The authors note that the success of a player is based upon his or her ability to perform within a specific system of thinking and acting. The player becomes less aware or concerned about practicing the language itself, but uses it to achieve an objective of the game.

One aspect of social game-world design is the ability for language learners to work and play together, collaborate, and share information, regardless of the fact that they may not be at the same level in the game, or at the same instructional level of the content (Thorne et al., 2012). The researchers state, "In combination with social, affective, and cognitive dynamics, quantity of exposure/engagement and quality of the linguistic environment are primary drivers of language development" (p. 280) and therefore argue for a restructuring of the traditional language-learning environment.

Godwin-Jones (2014) describes how social games can expose language learners to cultural and linguistic input that they likely would not encounter in a textbook. Learners

have opportunities to work through a variety of situations in which they must analyze and interpret new information and ultimately employ problem-solving skills that require negotiation and co-construction within the target language. This can include asking for help or giving help to others, collaborating with others, and sharing information.

Reduced Fear of Failure

When actively engaged in a social gaming environment, language learners focus on the objectives of the game, rather than on the correctness of the linguistic form of the target language (Berns et al., 2013; Blake, 2013; Chen, 2005; Dourda et al., 2014). This allows learners to feel more comfortable taking risks than they might normally when engaged in face-to-face interaction with other language learners or with native speakers of the target language (Blake, 2013; Godwin-Jones, 2014; Pasfield-Neofitou, 2014; Peterson, 2009). Ultimately, students feel comfortable, supported, and encouraged to continue on in the game, even if they are not successful at first. Because of the reduced anxiety and the willingness to take more risks, students often report that language learning in a social gaming environment is less stressful and more enjoyable. In Berns et al.'s (2013) study of students learning German within a social gaming environment, students overwhelmingly enjoyed the game and felt it made learning fun and more efficient. Specifically, they commented on the interactions with others within the game world, noting there was less fear of failure, and that new vocabulary was easier to remember and understand precisely because it was used in a meaningful context. Similarly, in a study of Greek elementary school students playing an online geography game that supports critical thinking and problem-solving skills, researchers found that

students were much more likely to take chances and experiment with new vocabulary, even if they weren't entirely sure how to use it (Dourda et al., 2014).

<u>Collaboration and Competition</u>

Chen (2005) describes how the element of competition appears to be a driving force for many language learners. Students find creative ways to express themselves, simply because they are so focused on winning the game or achieving the objective. Competition also promotes collaboration with other players on the same team or with similar goals. The game itself provides a meaningful context that makes use of the target language in ways that make sense to the students, rather than simply drill and practice exercises or activities in which students have little connection.

Students in Dourda et al.'s (2014) social game study also noted their preference for the collaborative aspect of working with their peers. This included asking one another questions, teaching each other new words, or correcting one another in order to achieve the objectives of the game. Remarkably, every student in this particular study engaged in the collaborative aspect of the game, assigning themselves roles to play and reporting afterwards that the collaborative aspect was one of the most positive features overall. Also of notable importance, most students displayed a preference for solving in-game problems with one another, rather than asking for help from the researcher or instructor. These examples of student-driven learning offer further argument of how social constructivism provides a natural framework that can successfully integrate social games and language learning.

Second Language Negotiation and Co-construction of Meaning

        Social games can provide the real-life contexts that are necessary for negotiation and co-construction of meaning to take place, especially those that involve real-time interactions with other language learners (Peterson, 2009). An essential component of the psycholinguistic research on second language acquisition includes the process of *negotiation*, which involves repeated comprehension checks and the use of communication strategies (Foster, 1998; Nakaham, Tyler, & Van Lier, 2001; Peterson, 2009). Students will negotiate meaning; that is to say that they will ask clarifying questions, ask for phrases to be repeated, or will execute a number of other strategies in order to confirm comprehension (Pasfield-Neofitou, 2014). Nakaham et al. explain that negotiation of meaning occurs when a language learner encounters unknown material in the target language, which then provokes some type of request for clarification. Foster notes that negotiation also includes modifications and manipulations to the target language. This concept of negotiation was developed in conjunction with traditional classroom instruction in Second Language Acquisition (SLA), and there is wide speculation that it can be applied to CALL instruction, as well as play a pivotal role in social gaming environments.

        Pasfield-Neofitou (2014) argues that it is these specific elements of social gaming worlds that make them so effective for second language learning. These online spaces provide ample opportunities for interactions between players, regardless of language ability or experience playing the game. Players must continuously negotiate meaning within these environments in order to progress through the game, reach objectives, and win. The interactions players have in order to do this are considered authentic in the sense

that they deal directly with the objective at hand and employ relevant, meaningful

discourse. The input provided by the learner results in immediate feedback, higher levels

of engagement, and a generally more enjoyable experience. Similarly, because of the

anonymity of social games, there tends to be lower levels of anxiety and apprehension

toward taking risks than are experienced in the traditional classroom environment

(Pasfield-Neofitou, 2014; Peterson, 2009).

Nakaham et al. (2001) propose that this cycle of negotiating meaning provides an

optimal linguistic environment for foreign learning language. Additionally, they note that

these scenarios of negotiation between language learners are more likely to occur in

situations that contain a convergent goal, rather than casual conversations that have open-

ended outcomes. Unstructured, open-ended conversations, such as casual conversations

between learners, provide opportunities for non-native speakers to avoid tricky topics or

areas that may present more difficulty for them. Task-based conversations, such as those

that take place in social gaming environments, encourage participants to work toward a

common goal or objective and, in return, require more complex, challenging exchanges

in order to be successful (Peterson, 2012). These gaming environments "…encourage

attitudes like exploration, experimentation and risk taking in problem solving" (Berns et

al., 2013, p. 211). This holds true not just for solving the objective of the game, but in the

act of negotiating the communication that takes place between players within the game.

Shekary and Tahririan (2006) discuss studies in which students who were

engaged in text-based chat showed an increase in negotiation of meaning, as well as

noticing. This includes pointing out errors and identifying grammatical irregularities in

other's speech and text. The authors attribute this to the fact that students

overwhelmingly reported they had time to reflect on what was being communicated and were able to identify the gaps within their interactions with others. Wu, Chen, and Huang (2014) report similar findings of Taiwanese students using a social game to improve English language learning. Their study revealed that students playing the game achieved significantly higher communication skills than their peers who did not. The authors attribute this increase in communication skills to a rise in motivation to engage with the game and an increase in relevant language materials.

The sociocultural aspect of SLA includes social constructivist ideologies, including Vygotsky's (1978) *ZPD*. Through the use of mediation and collaboration with peers who have stronger second language knowledge bases, students are able to use their target language to achieve greater results than through independent work. Peterson's (2009) meta-analysis examined seven longitudinal studies involving gaming and second language learning that took place between 2001 and 2008. Although some of the games used in the study may now be outdated, the data ultimately support the hypothesis that social games can lead to an enriched language-learning context that promotes higher levels of engagement and overall learning. This reinforces the correlation between meaningful dialogue exchanges and higher levels of second language comprehension. Additionally, these studies support the idea that it is easier to recreate real-life scenarios in a computerized setting rather than in the traditional classroom.

Criticisms of Digital Gaming

While there are a growing number of success stories regarding gaming and education, there are also noteworthy criticisms to consider. Van Eck (2015) describes how proponents often oversell digital games by focusing on the collaborative aspects and

the potential in promoting critical thinking and problem solving skills they may contain. The author argues, however, that it is still unclear how the specific design characteristics of each digital game interact to support problem solving and critical thinking, and stresses the importance of further investigation into the particular game mechanisms that align best with instructional objectives. Similarly, in Girard et al.'s (2013) meta-analysis on instructional games in education, the authors determined it was nearly impossible to form any generalizable conclusions regarding the games' educational effectiveness due to the vast differences each game contains. The authors repeatedly note a lack of empirical studies in the field of instructional gaming and education and argue that there is no substantial evidence correlating learning gains to the use of instructional games in the classroom.

Baek (2008) describes several factors inhibiting teachers from implementing games into the classroom, reporting that teachers find the inflexibility of school curriculum the most difficult challenge to overcome. Not only do instructors struggle to find relevant, appropriate games, they find it difficult to accordingly restructure their teaching strategies. This includes matching learning objectives with game objectives, while also taking into account individual student ability levels and technology skills. Blake (2013) also refers to an absence of a set curricular framework in which to implement instructional games, making classroom implementation both challenging and inconsistent.

Teachers and parents also share concerns regarding the violence often associated with digital games (Baek, 2008; Chik, 2011; Van Eck, 2015). The *Empowering Parents* website contains articles contending that aggressive behavior stems not only from digital

games containing violence, but from any type of digital game, and that the long term

effects of playing digital games remain uncertain (Wilkinson, 2015). Participants in

Chik's (2011) study of teacher perceptions regarding social games felt that digital games

were either time-wasting or violent. The teachers in this study were highly reluctant to

promote social game use for their students, reporting considerable concern about the

questionable types of online relationships their students might form. Ultimately, the

teachers in this study struggled to relinquish their moral obligations of protecting students

in order to explore the potential educational benefits of online social games.

Squire and Jenkins (2003) and Heineman (2015) also argue that many of the

pervasive ideologies surrounding video games from the 1980's and 90's still exist today,

maintaining a mentality in which digital games are thought of as playthings, often

containing violent material, and are for amusement only. Similarly, digital games are

often considered appropriate only for entertaining the young and, therefore, lack a

legitimacy and credibility from both teachers and parents alike. Van Eck (2015), a

notable proponent of digital gaming, agrees in part, noting that there is still limited data

on the experiences players have while engaged in digital games, specifically in the areas

of attitude and aggression.

Despite the controversies surrounding digital games, it is difficult to dispute their

prevalence in today's society. A better point to argue is how to effectively recognize the

potential digital games, and more specifically, social games, have and identify the ways

in which to best utilize them within the classroom. When discussing digital game-based

learning (DGBL), Van Eck (2015) states, "The truth is that DGBL is simply not

appropriate for all outcomes, all learners, all the time" (p. 26). Blake (2013) agrees,

noting that there is no single best technological tool, but rather that certain tools are better suited to certain tasks. As the gaming industry continues to expand, it is now the responsibility of game designers, educators, and researchers to identify the unique potential digital games can provide, along with an understanding of how to use them appropriately in order to enhance student learning.

Conclusion

This literature review has defined social constructivism as a learning theory and a framework and examined how this ideology can facilitate second language learning. Specifically examined were the social constructivist processes of critical thinking, negotiation, and co-construction of meaning, along with the ways in which social games can provide a meaningful context to support these processes within a language learning environment.

In general, effective instructional games and social games share many of the same design principles as traditional language-learning environments. They provide the learner with appropriate challenges and control, they contain a context in which the learner alters or creates an identity, and they deliver continuous feedback that the learner can integrate into his or her prior knowledge. Social games hold a great deal of potential in that they build upon the foundation of good instructional games by providing new and unique contexts that are otherwise impossible to create in the traditional language classroom. These learning contexts support situated-learning in which players are engaged with real world problems, rather than studying abstract concepts in isolation. Social games support lateral thinking and encourage learners to creatively solve problems through collaboration with their peers. Social games allow players to co-design games through their individual

actions, as well as the social interactions they have with other players (Gee, 2008). There are lowered consequences for failing, which encourages players to take more risks, experiment more, and then go back and try again if they are not immediately successful (Berns et al., 2013).

Squire and Jenkins (2003) describe how games provide contexts in which students learn how social processes and practices work together. Learners are encouraged and supported to take cues from the environment and apply new information to solve an immediate task or goal. As Gee (2008) eloquently argues, "…game design is not accidentally related to learning, but rather that learning is integral to it" (p. 24). Instructional game design is complex and requires extensive teacher input, as well as a shift in teaching methodologies (Blake, 2013; Egenfeldt-Nielsen, 2007; Thomas, 2012; Thorne et al., 2012). Thomas argues that games are not effective on their own as a language-learning tool, and that their use must be based upon a wider ranger of language teaching methodologies. While there have been an increasing number of studies regarding instructional games, there continues to be a noticeable lack of research concerning social gaming and second language acquisition (Blumberg & Fisch, 2013; Peterson, 2012; Phillips et al., 2014; Thomas, 2012; Thorne et al., 2009). Blumberg and Fisch note that this holds true even more so for young learners, regardless of subject matter. With this in mind, it is clear that additional research is warranted that can further examine the specific components of social games, and the social interactions that take place within them, that make them most effective as language-learning tools.

CHAPTER THREE: METHODOLOGY

Introduction

As the demographics in today's public schools evolve to include an increasing

number of non-native English speaking students, there is a growing need for programs

and pedagogies that promote authentic interactions between learners. This qualitative

case study focused on the conversations that took place within a social game

environment, specifically investigating the discourse between English Language Learners

(ELLs), in an attempt to identify patterns of negotiation and co-construction of meaning.

The research question was largely unchanged from Mroz's (2012) original research.

Modifications included the age of the participants and the target language. The research

question for this study was as follows:

> RQ#1: Do patterns of L2 negotiation and co-construction of meaning exist in the
> discourse produced collectively by a group of elementary English language
> learners working collaboratively to solve a complex problem as they are
> immersed in a social gaming environment? If so, what is the nature of these
> patterns and what does it reveal in terms of these learners' L2 critical thinking and
> problem solving skills?

This chapter begins with an overview of Mroz's (2012) original research in order

to provide the context and structure that guided this current study, as well as a brief

review of the importance of replication studies. Following this is an explanation of the

research method chosen for this study, including the philosophy and rationale behind

conducting qualitative research, as well as the justification for implementing a case study

design. Throughout this chapter the significant distinctions between the original research

and this study are provided, along with corresponding explanations that describe the reasoning behind each modification. Also included is a description of the social gaming environment, *MinecraftEDU,* as well as an overview of the sampling procedures and the process of participant selection. An outline of each phase of the study follows and includes a full description of data collection types and procedures, as well as an overview of the data analysis process. The chapter concludes with a section addressing researcher bias, along with a final overview comparing Mroz's original study to this current one.

Description of the Original Study

Mroz's (2012) original study contains two main objectives focused on the investigation and analysis of discourse between university aged, French language learners engaged in a collaborative, task-based activity within the virtual environment of *SecondLife*. The first objective centered on the deductive identification and assessment of patterns within learner discourse that represent negotiation and co-construction of meaning. This included the social constructivist processes of critical thinking and problem solving. Mroz's second objective investigated the individual experiences of the same group of language learners within *SecondLife* in an attempt to gain a comprehensive understanding of the learners' technology skills. This included the perceived impact the social environment had on the learners' processes of negotiation and co-construction of meaning. Mroz's two research questions were well aligned with these objectives and are as follows:

> RQ#1: Do patterns of L2 negotiation and co-construction of meaning exist in the discourse produced collectively by a group of intermediate French II college-level learners working collaboratively to solve a complex problem as they are immersed in a virtual learning environment? If so, what is the nature of these patterns and what does it reveal in terms of these learners' L2 critical thinking and problem solving skills?

RQ#2: How do these learners individually perceive, experience, document, and express the impact of the specific problem-based virtual learning environment in which they were immersed on their L2 collective process of negotiation and co-construction of meaning? What does this perceived technological impact reveal in terms of these learners' L2 technology literacy skills?

Mroz implemented a mixed methods approach in her study that included five university aged French language students selected through purposeful sampling. Prior to the study, Mroz conducted two pilot studies aimed at refining the task-based activity, as well as determining the optimal levels of both the language learners and the optimal number of participants within the collaborative group. From these pilot studies, Mroz concluded that collaborative groups consisting of three students did not produce sufficiently complex discourse leading to negotiation of meaning. Instead, Mroz discovered that groups containing four to five students produced the desired volume and variety of discourse that was optimal for the study. Similarly, students at the mid-intermediate language level produced the largest volume of discourse representing negotiation and co-construction of meaning and were thus determined the optimal level of language learner.

Mroz's (2012) study included both qualitative and quantitative methods of data collection and analysis. To address the first research question, Mroz gathered the collective discourse produced by the group and initially segmented this discourse into units of meaning. These units of meaning were then coded into one of seven possible levels of critical thinking, based upon Hull and Saxon's (2009) revised Interaction Analysis model. Each unit of meaning was thereby assigned a number, one through seven, corresponding to Hull and Saxon's levels of critical thinking, and were thus transformed into quantitative data that was later statistically analyzed to determine the

existence of possible patterns of negotiation and co-construction of meaning. Mroz used

qualitative data obtained from individual interviews and observations to answer the

second research question regarding each language learner's perception of the virtual

gaming environment. This was analyzed using a case study and phenomenological

approach.

In regards to the first research question, findings from Mroz's (2012) study

revealed that students displayed a decreasing amount of lower-level critical thinking

skills as the study progressed and, similarly, employed an increasing number of more

complex and higher-level critical thinking skills as the study continued. An unexpected

result of her research was that medium levels of critical thinking skills were abundant and

remained consistent throughout the study. Additionally, Mroz noted that the complexity

of the group dynamic led to a greater variability in individual discourse patterns than the

author originally anticipated. The researcher noted several factors impeded the

generalizability, or transferability, of her findings, including the small sample size ($n =$

5), the age of language learner, and the fact that each participant is a native English

speaker. Ultimately, Mroz recommended replication of her work in order to confirm or

disconfirm the findings.

Replication Studies

In general terms, replications studies fall into one of two main categories: direct

replication and conceptual replication (Makel & Plucker, 2014). Direct replications seek

to verify the findings from a previous study by using the same methods, whereas

conceptual replications test models and theories. Researchers who conduct replication

studies hope to achieve one or more of the following objectives: control for sampling

error, control for artifacts, control for fraud, to generalize to different or larger

populations, and to assess the hypothesis from a previous study. Makel and Plucker

emphasize that only direct replications can disconfirm or corroborate findings from an

earlier study. Spector et al. (2015) note, "Replication studies add confidence in findings

and are necessary to generate a basis for generalization beyond the original project

setting" (p. 2). This becomes especially important for case study research, which is often

scrutinized for its lack of generalizability or transferability.

Mackey (2012) notes that there is a growing body of second language research

that warrants replication. The author argues that prior to replicating, a researcher must

first identify if the study is appropriate:

> To qualify as a candidate for replication, a study should address appropriate, theoretically interesting, and currently relevant research questions. Or, it should address studies that are generally accepted in the field, but might have been insufficiently investigated in the original studies. (p. 28)

Mroz's (2012) original study successfully identified patterns of discourse between

French language learners engaged in a collaborative task within a virtual game

environment; however, the number of participants ($n = 5$) was admittedly too low to

generalize, or transfer, the findings. Additionally, all learners were native English

language learners, which also limits transferability. By using young learners who have a

variety of language backgrounds, including several that employ writing systems outside

the Roman alphabet, this study aimed to determine if replication of Mroz's results was

possible.

Overview of Qualitative Research

Braun and Clarke (2013) describe qualitative research as the process of using

words as data, rather than *numbers* as data. Merriam and Tisdell (2016) define qualitative

researchers as those who are "…interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (p. 27). Braun and Clarke (2013) go on to describe qualitative research as both a method of data collection and data analysis that also contains a set of guiding epistemologies. The qualitative framework includes the assumptions, beliefs, and values shared among the research community and is referred to by Braun and Clark as a research *paradigm*. The fundamental nature of the qualitative research paradigm is the resolute belief that there is no single, correct interpretation of reality, but rather multiple versions of reality that are heavily influenced by the context in which they occur. Merriam and Tisdell also argue that qualitative researchers generally conduct their studies with an *interpretive* lens; that is, that the researcher(s) assumes knowledge is socially constructed and that there is no single interpretation that is entirely true. Instead, multiple perspectives, or interpretations, of reality exist.

The theory of social constructivism informs this interpretive ideology in that individuals develop subjective meanings of their realities, based upon the historical and contextual surroundings in which they socially occur. Creswell (2003) describes how this *knowledge claim* assumes that individuals develop their own subjective understandings of reality based on the unique experiences they have. The role of the researcher, within this framework, is to then study the complexity of each individual's view as he/she seeks to understand the interactions that occur within a particular context.

Braun and Clarke (2013) describe three common forms of qualitative research: searching for *patterns;* looking at *interactions;* and/or looking at *stories.* As this current study sought to identify the presence of certain patterns of discourse between language

learners, including the exploration of specific interactions that take place within a particular context, a qualitative study was best suited to guide this research. Additionally, as each interaction that occurred within the virtual gaming environment presented a unique experience for each individual learner, the social constructivist epistemology was a natural framework in which to explore these interactions.

Overview of Case Study Design

Case studies are currently one of the most widely employed methods of qualitative study (Kohlbacher, 2006; Yazan, 2015). Yin (2014) provides an overall scope of the methodology stating, "A case study is an empirical inquiry that investigates a contemporary phenomenon (the "case") in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 45). Essentially, this means exploring a real world case in an attempt to understand the contextual conditions that affect it. Creswell (2003) offers Stake's (1995) description of case study design:

> Case studies, in which the researcher explores in depth a program, an event, an activity, a process, or one or more individuals. The case(s) are bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time. (p. 15)

Central to case study methodology is the case itself, or the unit of analysis under study. Merriam and Tisdell (2016) describe how the case must be a bounded system that is closed or finite in some sense. Case studies are best matched with research questions that employ *how* and *why* questions, as these are generally more explanatory in nature (Merriam & Tisdell, 2016; Yin, 2014). Through these *how* and *why* questions, researchers aim to identify linked events that take place over time, rather than identifying mere frequency of events or number of occurrences.

Along with *how* and *why* questions that examine phenomenon within an authentic context, case study design is also the preferred method when the researcher has little to no control over participants' behavior (Yin, 2014). This includes the researcher's role in collecting data, such as through personal interviews and observations. Creswell (2003) notes the importance of researchers using open-ended questions and creating semi-structured interviews in order to allow participants the opportunity to fully express their views and perspectives.

Context also plays an important role within the case study design. The very nature of this methodology is the interconnectedness that the contemporary phenomenon and the context share (Yin, 2014). It is important to note that while other research methods examine phenomenon, they are investigated and examined separately from their context. Case study research relies upon the context being a part of the study itself. Creswell (2003) argues that the researcher must seek to understand the context in which interactions occur by visiting the environment and developing his or her own interpretations ahead of time. This understanding of the context, in conjunction with the case itself, provides rich, descriptive insight into the identified phenomenon.

Although the process of conducting a case study can reveal critical data about how a phenomenon occurs within a given situation, it has also been a basis for criticism. Critics of case study research argue that this aspect of the methodology limits the findings from being generalizable to situations outside the study's context (Creswell, 2003). However, Creswell also notes that this potential limitation is offset by the abundance of data gleaned during a case study. This includes multiple formats of data collection that triangulate findings and add depth and reliability.

Yin (2014) notes other criticisms of this research design, most notably those regarding the perceived lack of rigor. The author describes how critics of case studies consider the methodology a soft form of research that lacks the generalizability, reliability, and validity most often associated with quantitative studies. While these aspects of generalizability, reliability, and validity are discussed further within the next section, it is important to note that case study design requires careful explanation and thorough description at all phases. This includes substantial and varied data collection methods that triangulate findings and add to the overall trustworthiness of the study.

The Proposed Study Using a Case Study Approach

The case. For this study, the case, or unit of analysis, was the discourse that occurred between 4th and 5th grade EAL students within a social gaming environment as they collaborated toward solving a task-based problem. The bounded system in this case involved the age of the students, their level of English language proficiency, and the two-week time period they had to engage and interact within the game environment. In order for the learners to be successful in the game, they needed to work together toward a common goal. Although the tasks within the game were not exact replications of the real world, they nonetheless represented authentic problems that are similar to challenges in real life. For this reason, it can be stated that the phenomenon that was studied was embedded within the context in which it occurred.

Research questions. Within the research question resides an initial yes/no question regarding the possibility of particular patterns of discourse occurring between learners and, as such, warrants further explanation. Mroz's (2012) research revealed that patterns of second language (L2) negotiation and co-construction of meaning *do* exist in

the context of a virtual gaming environment in which language learners are assigned a collaborative task. While it was not assumed that this would also occur within the modified context of this research, the current study was nonetheless focused more toward the second aspect of the research question. This included the investigation and exploration of potential patterns of discourse in an attempt to identify and describe *how* language learners communicate, and the role in which critical thinking and problem solving skills played within their negotiation and co-construction of meaning.

Data Validation

<u>Reliability/Consistency</u>

Merriam and Tisdell (2016) describe the difficulty social science researchers have in achieving *reliability*, or the extent to which a study's findings can be replicated, due to the fact that human behavior is never static. Instead, the authors use the term *consistency* when discussing the results of qualitative studies and argue that a more important question for researchers to consider is "…whether the results are consistent with the data collected" (p. 242).

Yin (2014) discusses the importance of pilot studies when using a case study design in order to increase reliability and identify unforeseen issues. Although this specific study did not conduct a pilot study, it relied heavily on the procedures and methods used in Mroz's (2012) original research. This included not only the information gleaned from her formal study, but also crucial data she acquired during two pilot studies she conducted prior to her research. This learning is referred to throughout the methods section, with specific explanations on where and why this particular study aligns with Mroz's, as well as clarification on areas in which it deviates.

Because the context and the phenomenon are not always easily distinguishable, the features of a case study become important. This includes the notion that there will be many more variables of interest than data points, which leads to the need for several forms of data collection that must be triangulated. Yin (2014) explains four tests of validity (Table 3.1) that he argues should be employed within case study research, along with the phase in which each test should occur. Each is briefly described below:

Table 3.1   Case Study Tactics for Four Design Tests

Tests	Case Study Tactic	Phase of Research in which Tactic Occurs
Construct Validity	Use multiple sources of evidence	Data collection
	Establish chain of evidence	
	Have key informants view draft case study report	Data collection
		Composition
Internal Validity	Do pattern matching	Data analysis
	Do explanation building	Data analysis
	Address rival explanations	Data analysis
	Use logic models	Data analysis
External Validity	Use theory in single-case studies	Research design
	Use replication logic in multiple-case studies	Research design
Reliability	Use case study protocol	Data collection
	Develop case study database	Data collection

Note. Adapted from *Case study research: Design and methods,* p.76, by R. Yin, 2014, Thousand Oaks, CA: Sage Publications.

Construct validity. Construct validity includes the operational measures that match the concepts under investigation, including a well-defined set of criteria that directly relate to the objectives of the study and are described in the related literature. Yin

(2014) describes how critics often claim that case study researchers only find data that corroborate their initial assumptions, and because of this, bring bias to the study. This study intended to identify patterns of negotiation and co-construction of meaning between learners within a social gaming environment. These concepts are previously discussed and defined within the literature review and are accompanied by a descriptive set of data collection methods intended to provide an unbiased analysis.

Internal validity/credibility. Merriam and Tisdell (2016) use the term *credibility* rather than *validity* to describe how accurately a study's findings represent reality. The authors argue that qualitative researchers investigate other's interpretations of a given reality, and therefore, must strive to understand the complex relationships the participants hold within the context of the study, as well as the perspectives they hold toward the phenomenon.

Yin (2014) explains that internal validity is most often associated with experimental and quasi-experimental research that intends to explain causal relationships. Due to the inductive nature of case study research, internal validity comes into question during the data analysis phase each time a researcher makes an inference about a particular event he or she does not personally witness. For this reason, the aspects of pattern matching, developing possible explanations and explaining rival explanations become key in triangulating and verifying data.

External validity/transferability. Lincoln and Guba (1985) discuss how a central aim of scientific research is to establish prediction and control, allowing researchers to extend, or generalize, their findings to similar contexts beyond the original study. In order to establish prediction and control, the findings must be universal and

unrestricted. In other words, "…generalizations are assertions of *enduring* value that are *context-free*" (Lincoln & Guba, p. 110; emphasis in the original). Due to the subjective nature of qualitative studies, this becomes problematic in the sense of adequately establishing what Yin (2014) refers to as *external validity* and has received considerable criticism within case study research (Merriam & Tisdell, 2016; Yin, 2014).

Lincoln and Guba (1985) argue that each new research scenario presents a set of unique characteristics that prevent the possibility of any true generalization occurring. At best, any generalization can be considered a "working hypothesis" (Lincoln & Guba, p. 124). The authors assert that the term *transferability* is a term better suited to describing the applicability of one set of findings to a new context. Merriam and Tisdell (2016) contend that researchers must shift their thinking regarding *external validity* or *generalizability*, also arguing that the term *transferability* should be used instead. Using *transferability,* the burden of proving that a study's findings can be applied elsewhere is less reliant upon the original researcher and more dependent on the individual attempting to apply the findings (Merriam & Tisdell). Lincoln and Guba argue that *transferability* is determined by the degree of similarity between the original context and the new context, or the *fittingness*. In order to determine this level of *fittingness,* one must acquire a deep understanding of both contexts.

In this sense, it becomes imperative that researchers provide rich descriptions of the case study (Shelton, 2004). By providing deep, descriptive detail of the context, data collection, and data analysis, researchers are able to form judgments regarding the transferability of their findings (Zhang & Wildemuth, 2005). Zhang and Wildemuth describe how detailed accounts of the data collection and analysis processes, including

descriptions of the categories within the coding scheme, coding rules, and examples of coded data, also allow future researchers to judge the transferability of the results or to replicate the study.

As a replication study, this research remained as true to Mroz's (2012) original work as possible, with intentional modifications put in place that were considered necessary in order to increase the overall transferability of the original study. These modifications were based upon Mroz's recommendations and included participant age, participant native language, and participant target language. These purposeful modifications, combined with the original research question to guide the study, similar sampling procedures, and comparable data collection methods intended to provide a strong basis for transferability.

Description of the Study

<u>Description of Research Context</u>

The research environment for this study was the Pattimura Elementary Campus (PEL) of the Jakarta Intercultural School in Jakarta, Indonesia. Originally established in 1951 for children of United Nations delegates, the school currently accommodates approximately 2,400 students ranging from Early Childhood 1 (age 3) to Grade 12 (Jakarta Intercultural School website, 2016). The school is a private, not-for-profit institution that follows a Western style curriculum drawing from American, British and Australian curriculum and in which English is the main language of instruction.

In addition to the normal diploma program, the high school offers International Baccalaureate Diploma (IB) and Advanced Placement (AP) courses (U.S. State Department, 2015). After graduation, 97% of JIS students attend formal universities or

colleges. The school year operates on a two-semester calendar, starting in early August and ending in early June, with an average of 178 contact days per school year. Average tuition for the 2015/16 school year was approximately $25,000 USD per student, varying slightly depending on grade level (U.S. State Department, 2015).

An eleven-member Board of Trustees governs the school and is comprised of one member from each founding embassy, along with two elected parent representatives and six board-appointed representatives. The Board of Trustees is responsible for hiring the Head of School, as well as developing and enforcing the bylaws that guide the instruction and operation of the school. The school holds accreditation from the Council of International Schools (CIS) and the Western Association of Schools and Colleges (WASC).

Pattimura Elementary campus. JIS is comprised of four campuses, including two elementary campuses serving approximately 1,000 students, a middle school, and a high school. The Pattimura campus (Figure 3.1) is the smaller of the two elementary campuses and has an enrollment of approximately 400 students representing 54 countries. This campus was the site of the original school when JIS was first founded, and as the school continued to grow, additional land was purchased to accommodate the increase of students. This additional property is located approximately six kilometers south of the PEL campus and currently includes the Pondak Indah Elementary campus, the middle school, and the high school. The PEL campus is, therefore, the only campus that is geographically separate from the rest of the school.

Figure 3.1   Pattimura Campus (Jakarta International School, 2016)

Facilities at the PEL campus consist of approximately 30 classrooms for specialists and classroom teachers, a learning suite to accommodate learners with special needs, a theater, library, swimming pool, gym, cafeteria, athletic field, and an administrative office. The school day operates Monday through Friday, from 7:30am-2:00pm, and uses a six-day schedule to organize specialist classes and ensure equitable teaching time for all staff. Each day, all students in Kindergarten through 5th grade attend one 45-minute special class, such as Art, Music, P.E., or Dance, as well as one 30-minute block of Bahasa Indonesia language class.

Student body. At the Pattimura campus there are three classes at each grade level (Early Childhood – 5th grade), with a maximum class size of 20 students each. American and Australian students comprise the largest percentage of students, followed by Indonesians and several other Southeast Asian nationalities. Many students are dual passport holders with parents from two different countries. Due to its location, the PEL campus has more students whose parents are employed through their country's embassy

than the other elementary campus. This includes families who mainly work for the United States and Australian embassies, but also includes families from several smaller embassies as well. These embassies all provide funding that covers the cost of tuition. Those students whose parents are not embassy employees tend to come from families who work in relief organizations, such as the United States Agency for International Development, or large corporations in the manufacturing and energy sectors. Many of these families personally pay the tuition fees, although this varies according to the company and the position held. Because the American, British, and Australian embassies founded the school initially, students whose families work at these embassies are granted automatic enrollment in the school. In an effort to maintain an international student body population, and in order to ensure that no single nationality exceed a certain percentage of overall school enrollment, JIS maintains strict limits on the number of students from all other nationalities admitted each year.

The five students in this study come from Japan, Denmark, and France and are in the fourth and fifth grades at the PEL campus. All four students have attended the school between three to four years. The Japanese students come from families who work at the Mitsubishi Corporation in Jakarta, while the Danish/French student's family works for the Danish Ministry of Foreign Affairs. Additional information about the participants and how they were selected is addressed later in this chapter.

Teaching staff. JIS currently employs approximately 280 foreign-hire teachers and administrators (U.S. State Department, 2015), mainly from America, Australia, and Canada, as well as an equal number of local hire staff to provide support. As with most international schools, teachers are typically hired at recruiting fairs outside Indonesia.

The school requires at least three years prior teaching experience, as well as a preference for overseas experience and a master's degree (JIS website, 2016). The majority of teachers hold at least one advanced degree, and the average length of employment at JIS is approximately seven years.

The PEL campus has a combined 34 classroom teachers and specialists, along with an elementary school counselor and an administrative team that includes a principal, vice principal and learning leader. The campus also employs approximately 45 local Indonesians who work in a variety of support staff positions. There is one classroom teacher aide in each of the Early Childhood through 2nd grade classrooms, along with two teaching aides per grade level in grades three through five. Additionally, there are three Indonesians who teach Bahasa Indonesia language classes, one teaching assistant for each specialist, several technology assistants, and four secretaries.

The researcher began working at JIS in 2006 as a first grade teacher. She remained at this grade level for four years, before moving to second grade. This is currently her sixth year in that grade and her tenth year working at the school overall. For the past six years the researcher has also held the position of Team Facilitator in second grade, similar to that of a Team Lead position. Prior to working at JIS, the researcher lived and worked in Cairo, Egypt at the American International School as a first grade classroom teacher for three years. She also taught Algebra in Aley, Lebanon and early childhood in Taipei, Taiwan through short-term positions prior to Egypt.

Technology at JIS. JIS implemented a 1:1 iPad and MacAir program that began in September 2011. The school currently issues iPads to each student in second, third grade, and fourth grade and MacAir laptop computers to all students in fifth grade

through twelfth grade. Early childhood classes receive three iPads each for students to share, while both Kindergarten and first grade have ten iPads each. PEL formerly housed two computer labs with 20 laptops in each lab. In the past year one lab was remodeled to make way for a creative suite, in which a green screen and various computing equipment exist. Individual classes or students are able to reserve the room to work on a variety of projects. Each of the four campuses, including PEL, has a Technology Integration Specialist, as well as a Digital Literacy Coach who both work with each grade level to plan and implement lessons involving technology. Several additional individuals work within the technology departments on each campus; however, their interaction with teachers and students is minimal.

In general, the school has a very positive attitude toward technology integration and encourages teachers and students to experiment with programs, applications, and new software. Teachers are able to apply for a maximum of $1,800 each year in professional development funding, which is often used for travel to technology conferences. The school regularly hosts mini-workshops during professional development days in which teachers share completed projects and new ideas with one another. In December 2014 the school hosted the first Google Apps for Education Summit, and the technology teams all on campuses continue to work on new and innovative ways in which to integrate technology into the curriculum.

Literacy instruction. Aside from foreign language classes, English is the language of all instruction at JIS. The school employs the Columbia Teacher's College program of Reader's and Writer's Workshop as the main format of literacy instruction throughout grades one through five. Additionally, all students receive 30 minutes of

Bahasa Indonesia language instruction per day, as mandated by the Indonesian government. Classroom teachers administer the Developmental Reading Assessment 2 (DRA2) twice per year, in September and May, to formally assess students' reading levels, as well as engage in ongoing, informal reading assessments throughout the year. Writing units for each grade level generally align with the Teacher's College program, although there is some flexibility with this in order to maintain integration with each grade level's units of inquiry. Each grade level develops rubrics to assess student writing, while also providing ongoing feedback via conferring with students.

English as an additional language instruction. There is no formal language assessment for incoming non native-English speaking elementary students, but rather an orientation meeting in which the Director of Admissions meets with each family and incoming student. During this time, the Director of Admissions informally assesses the student's English abilities and reviews academic records from the child's previous school in order to determine appropriate campus and classroom placement. Students who have a limited understanding of English are carefully placed in an effort to provide them with the most support, not only from the classroom teacher, but also from the English as an Additional Language (EAL) specialist they will work with.

Once placed in a classroom, the EAL specialist will informally meet with the student to determine if formal testing is necessary, followed by a meeting with the classroom teacher to discuss the most effective way to provide support. If necessary, the EAL and classroom teachers will then meet with the student's parents to discuss an Individual Plan for Learning (ILP). Students with low English speaking abilities generally leave their classroom during literacy instruction and participate in either one-

on-one or small group instruction with the EAL specialist. Students with moderate

English speaking abilities generally remain in the classroom during literacy instruction,

and an EAL specialist will join the class to provide support. The number of days per

week and the amount of time the EAL teacher spends in the classroom varies, depending

on the student, the topics under study, and the schedule of the EAL specialist. The EAL

specialist provides in-class support for each one of the students in this study on a part-

time, semi-fluctuating basis, based on ongoing discussions with the classroom teachers

and the needs of the students.

Description of researcher's classroom. For this study, all research was

conducted within the researcher's elementary classroom. Participation in the study

occurred immediately after the end of the normal school day, from approximately 2:00pm

– 3:00pm each afternoon. Participants were placed at one table, consisting of four

individual desks, where they were able to easily communicate with one another verbally

(Figure 3.2).

Figure 3.2   Photograph of researcher's classroom

Description of the Social Game Environment

This study took place within the social game environment of *MinecraftEDU*. *MinecraftEDU* is similar to the traditional digital game *Minecraft,* but includes additions that make it appropriate for classroom use (MinecraftEDU.com, 2015). The original *Minecraft* serves as a digital gaming platform in which players use an avatar to navigate their surroundings and build three-dimensional structures using a variety of blocks (Minecraft.net, 2015). Players have the option to interact with the environment individually or with others through the use of different modes of play. *MinecraftEDU* takes this premise of placing and breaking blocks and incorporates educational activities and lessons, as well as an option for teachers to create their own unique activities (MinecraftEDU.com, 2015). Lessons span a wide range of ages and subjects and include activities such as measuring wind speed, constructing replicas of real-world structures, coding lessons, and quantum mechanics (MinecraftEDU.com, 2015). Similar to the original game, *MinecraftEDU* allows players to complete projects independently or collaboratively, as dictated by the teacher.

The Jakarta Intercultural School currently owns licensed *MinecraftEDU* software and has installed a server on one computer at the Pattimura campus. This server can only be accessed through the school's private network by providing the ip-address and password. Player versions of the game were downloaded for each participant onto student laptops, as well as a player version for the researcher onto her work-issued laptop. Log-in to the game required a password from the researcher for all participants. Once each participant and the researcher were in the gaming world of *MinecraftEDU*, participants chose to play as students, and the researcher chose to play as an adult. This provided the

researcher with additional controls over the participants, as well as the option to play

invisibly, if desired.

During each day of the intervention, students began with a discussion of the day's

objectives, along with the strategies they might use to achieve them. These discussions

were generally very short and lasted less than five minutes. After the discussion, students

logged into the *MinecraftEDU* world and began game play. The researcher facilitated

these initial conversations by posing a few general questions, after which, her role was

mainly that of an observer. She took field notes on the students' interactions, while also

capturing screen-shots of game play.

The choice to use the *MinecraftEDU* environment was based upon Honebein,

Duffy, and Fishman's (1993) set of consolidated criteria for designing a learning

environment that contains social constructivist instructional strategies. This includes the

following elements:

- *All learning activities have a purpose and meaning* – The purpose of the

  assignment or activity must be clear to the learner, in addition to the relevance of

  the activity in regards to the larger task.

- *Support the learner in developing ownership toward the task* – Honebein et al.

  (1993) note that, despite the learning objectives specified by instructors, the goals

  of the individual student tend to dictate what is actually learned. It is essential that

  teachers help foster meaning and value of the task so that what students take away

  is consistent with the instructional goals.

- *Design authentic learning activities/tasks* – The authors emphasize that this does not mean lessons should be exact real-life scenarios, but rather activities that "present the same type of cognitive challenges" (p. 138).

- *Design the task and learning environment to reflect the complexity of the environment students will be expected to function in at the culmination of the activity* – The task environment should not be simplified or watered-down, but rather contain complex scenarios that adequately prepare students for the real-life equivalents.

- *Allow students to develop personal ownership of the process, as well as solutions to the task(s)* – Instructors often allow students opportunities to develop solutions for learning tasks, but will dictate the process of how the solutions are developed. Honebein et al. (1993) suggest that this prevents students from being completely engaged in authentic thinking and problem solving.

- *Design the learning environment to support and challenge students' thinking* – Instructors must value and challenge student thinking, posing questions that coach students, facilitate critical thinking and guide learners toward rational conclusions. This aligns with Vygotsky's (1978) ZPD and includes appropriate scaffolding strategies that push learners to the edge of their current understanding.

- *Support the testing of theories, ideas and hypotheses on both the content learned and the learning process* – Ideas and theories must be tested, debated, argued and defended within the community of learners that constitute the learning environment. This includes the process used to arrive at conclusions, as well as the conclusions themselves.

- *Provide opportunities for reflection, both on the content and the process* – The
  authors argue that this final aspect of a social constructivist learning environment
  aides in the development of self-guided learning in which students are able to
  critique their thoughts and ideologies. This metacognitive process helps learners
  identify the processes used to reach certain understandings, and how these
  processes can be used in the future.

The unique environment of *MinecraftEDU* expands upon the motivational,
engaging aspects of the traditional game, *Minecraft*, which is based upon digging
(mining) and crafting (constructing) different types of 3-dimensional blocks within a
variety of virtual landscapes. The original game lacks some of the fundamental feature
necessary for collaborative, task-based learning. Whereas the traditional game is not
intended for academic purposes, *MinecraftEDU* is specifically designed for use within
the classroom and has a variety of resources that align to curricular standards ("Teaching
with MinecraftEDU," n.d.). Additionally, the game adheres to the fundamental elements
as outlined by the Honebein et al. (1993), including the previously discussed components
of a social constructivist framework that incorporate student-centered activities,
scaffolding, and continual time for reflection. Included in Honebein et al.'s criteria are
activities that allow students opportunities for engagement and collaboration with others,
in which ideas and hypotheses are tested, argued, and defended. The *MinecraftEDU*
environment effectively manages these components, while also incorporating the
previously discussed elements of good instructional gaming: *challenge, fantasy, feedback*
and *control.*

The pacing of this study also followed Honebein et al.'s (1993) criteria for complexity management, in which learning tasks were initially simple in nature and continued to increase in complexity as the study progressed. In this way, learning within the virtual environment was scaffolded, with each day's activities building upon tasks previously completed. In keeping with Mroz's (2012) original study, the role of the researcher was limited to explaining the objectives of each session and to providing technical support, as needed.

Description of MinecraftEDU Games

There were two activities, or games, involved in this study, as well as a one-day tutorial that introduced participants to the environment of *MinecraftEDU*. The two games required participants to collaborate to solve a variety of task-based activities. Each game is listed on the *MinecraftEDU* World Library (2015) website and corresponds to the age range of the participants involved. While playing in any *MinecraftEDU* world, players are represented by avatars and assign themselves names. Participants in this study assigned themselves one name for use during all games throughout the study. These names do not correlate to the pseudonyms created by the researcher for this report, as the student-created names were too similar to their real names.

Both *MinecraftEDU* games used in the study involved tasks that aligned with the social constructivist framework, in that they allowed peer scaffolding and collaboration, as well as tasks that steadily increased in complexity as the study continued. This is addressed in further detail within the description of each game later in this chapter. Also, the researcher played a minimal role in that she provided assistance only in terms of technical support, when necessary. Additionally, both games contained the essential

elements of good instructional games, as previously described within the literature review. This included the elements of *fantasy* (the digital world of the game), *challenge* (the purpose or objective(s) of each game), *feedback* (received from other participants as well as feedback from the game) and *control* (the ways in which the participant/player is able to make choices throughout the game). These elements are also described in further detail within the discussion of both games.

Tutorial world. The *Tutorial World* of *MinecraftEDU* is the company's official tutorial and is comprised of six individual zones aimed at helping players become familiar with the game's basic operational features (MinecraftEDU World Library, 2015). Each zone has a specific set of objectives that increase in complexity as the players continue through the world. These objectives include: basic movement and navigation, more complex movement (i.e., swimming, jumping, and climbing), individual exploration of the world, the basics of digging and building structures, experimentation with different building materials and tools, and opportunities to practice the use all of the previously learned objectives together at one time.

The tutorial world allowed players to gain a general understanding of how to interact within the *MinecraftEDU* environment, while also providing several tasks that required collaboration between players. Participants worked their way through the *Tutorial World* during the first day of the study, allowing for experimentation and familiarization, as well as providing a time for the researcher to troubleshoot any potential technical issues.

Escape from Everest. *Escape from Everest* was the first game and began on the second day of the study. This premise of the game is that players have been asleep for

approximately 200 years and, upon awakening, find themselves in a bunker within Mount

Everest (MinecraftEDU World Library, 2015). Prior to their awakening, the polar ice

caps have melted, devastating all life on Earth and leaving only this specific area of the

planet above sea level (Figure 3.3).

Figure 3.3   Screenshot of *MinecraftEDU's* Escape from Everest game

Within this game, the participants had two main goals. First, players must plant

trees to grow specific materials necessary for survival. Secondly, participants must learn

how to produce iron in order to create a rocket that can be used to contact other humans

now living off the planet. However, because there is no coal to smelt the iron, players

must use some of the preciously cultivated trees to burn as fuel. The activity purposely

pins these two objectives in conflict with one another to create a complex dilemma in

which participants must carefully balance resources to reach their objectives. Aside from

these two main goals, there were smaller side objectives that existed within the game,

such as discovering hidden chests with gold.

The game is designed so that players have individual jobs that can ultimately

contribute to the larger, collaborative goals. Players must communicate with one another

to determine who will work on which job, as well as to identify and regulate how the resources are used throughout the game. These processes incorporate the social constructivist notions of peer scaffolding and collaboration through the use of problem solving and critical thinking.

Escape from Everest also incorporates the essential elements of good games by providing clear objectives within a fantasy world, allowing participants to continually give and receive feedback and assistance to one another, and allowing players to independently control their behaviors and actions within the game.

Extinction Challenge. The second game was the most complex of the study and built upon the collaborative experiences of the tutorial world and first game, incorporating the fundamental elements of social constructivism, as well as good gaming. This fantasy environment takes place on a version of Earth in which nearly all life has become extinct, aside from a few species of animals and the monsters that exist within the *MinecraftEDU* world (Figure 3.4). The main objective of this activity was to recreate a civilized society, and in order to do so, players must lure and capture a range of different animals. The design of the games requires players to build pens to keep the animals, regulate how many animals can be killed and used for personal consumption to stay alive, as well as how many need to be bred to continue the species. Additionally, the monsters that exist within the world do not get along with all animals. In order to be successful, players must identify ways in which to keep the animals safe, not only from the monsters, but also from their natural predators.

Figure 3.4   Screenshot of *MinecraftEDU's* Extinction Challenge game

Unlike the previous game, there are time limits within this game that require participants to work together quickly. Players must initially overcome their own hunger by using available animals for food without depleting any species. In order to do so, players must use critical thinking and problem-solving skills to learn how to build weapons for both hunting and defense, to erect structures for personal protection, and to build pens to contain and protect captured animals. This requires collaboration and communication throughout the game, as players need to determine and designate tasks, help one another ward off monsters that exist within the game, and learn which animals are safe to keep and breed.

Both games incorporated essential elements of gaming, as well as the fundamental aspects of social constructivist learning. The researcher acted as a facilitator throughout each game, providing only instructional guidance at the onset of each game, as well as technical support, if necessary. Players were required to communicate and work together in order to achieve the objectives of each game, while providing feedback to one another and incorporating new information to guide future behaviors and decisions. Throughout each game participants communicated in the target language to determine and assign tasks, identify objectives, and prioritize individual jobs. As each game progressed, new

information was presented which had to be negotiated individually and then incorporated

into the collaborative understanding of the group.

<u>Potential for Language Learning</u>

Several studies argue that collaborative activities, specifically those that

encourage critical thinking and problem solving strategies, are most conducive to foreign

language learning (Doghonadze & Gorgiladze, 2008; Gaskaree et al., 2010; Kabilan,

2000; Liaw, 2007; Rezaei et al., 2011; Shirkhani & Fahim, 2011). These same studies

note that social constructivist environments that provide opportunities for peer

scaffolding through relevant, meaningful tasks enable learners to negotiate meaning from

and with one another. The fantasy world of *MinecraftEDU* can provide opportunities for

players to engage with others in ways they might not normally, as well as expose students

to linguistic input they may not have exposure to from traditional textbooks (Godwin-

Jones, 2014). Additionally, because the focus of the game is on the objective(s), rather

than linguistic correctness, players often display more comfort and confidence in

communicating with others than they normally would when engaged in face-to-face

interaction within the traditional language classroom (Blake, 2013; Godwin-Jones, 2014;

Pasfield-Neofitou, 2014; Peterson, 2009). Students report less anxiety and an increased

willingness to participate and interact within a gaming environment, noting that the

experiences in a gaming world are less stressful and more fun.

Data Collection

Case study research is one of ambiguity on many levels and requires several

different forms of data collection in order to ensure credibility and transferability.

Creswell (2003) argues, "The aim of case study research is to dig deep, look for

explanations and gain understanding of the phenomenon through multiple data sources,
and through this understanding extend or test theory" (p. 8). In addition to multiple data
sources, an in-depth description regarding the types of data collected and the way in
which it is collected is necessary (Yin, 2014). In this study, that includes a clear schedule
of how and when data was collected that describes both the timing and the purpose
(Table 3.2).

Although data are collected from individuals within the case itself, the
conclusions are based upon the analysis of the collective group of data obtained from all
participants. For this study that entailed the collection of voice-chat from all participants
during each of the ten days of the study, along with one-on-one interviews that occurred
before, during, and after the study. Observations took place during each session
throughout the ten days to provide additional context and meaning to the other forms of
data collected, as well as to triangulate data. It is important to note that data collection
and data analysis are simultaneous within qualitative studies. This is discussed in further
detail in the subsequent Data Analysis section of this chapter. The remainder of this
section explains each phase of data collection within the study.

Phase 1: Participant Selection

Sampling procedure. As Creswell (2003) argues, a case study design is ideal for
investigating research questions that are tightly linked with their context and that require
an in-depth exploration of a specific case. For this study, purposeful sampling was
employed "…based on the assumption that the investigator wants to discover,
understand, and gain insight and therefore must select a sample from which the most can
be learned" (Merriam & Tisdell, 2016, p. 105). The purpose was to identify patterns of

negotiation and co-construction of meaning within the discourse generated by a group of elementary aged students engaged in a task-based activity within a social game environment.

Criteria and rationale. A critical aspect of this study was to utilize Mroz's (2012) original research question in a modified form, in an attempt to confirm her findings and provide additional evidence from a separate sub-set of individuals within a larger population of language learning individuals. Mroz's study focused on university-aged students studying at the intermediate-mid and intermediate-high level of French language proficiency. The current study focused on 4th and 5th grade students, ranging in age from nine to eleven**,** who come from a variety of native language backgrounds and whose reading and writing proficiency falls within the intermediate range or above. Students are enrolled and studying in an international school in which English is the primary language of instruction. These criteria were used in the initial call for participants at the PEL campus of Jakarta Intercultural School (JIS).

Process of choosing the sample. Pattimura Elementary has three classes each of 4th and 5th grade students, totaling six classes and approximately 120 students. An email was sent to all six teachers and included the Special Services Team (SST) Team Facilitator as well as the English as an Additional Language (EAL) supervisor for upper elementary. The email provided a brief description of the study and asked for names of students who, based on their language proficiency, would qualify as participants. During Mroz's (2012) two pilot studies, she discovered that students of intermediate-mid French proficiency were preferable because they were best challenged by task-based problems.

Table 3.2   Data Collection Schedule

Phase	Format	Timing	Length	Purpose
Phase 1: Participant Selection: (Dates: Nov. 23-Jan. 15)	Classroom/EAL teachers: informal assessments evaluating English proficiency	One month prior to study	One week	Identify levels of English proficiency and language background
	Interviews (Individual)– audio recorded and transcribed	One week prior to study	One session for each participant (approximately 10-15 minutes)	To identify: Foreign language background, prior knowledge
Phase 2: Intervention – 2 weeks (Dates: Jan. 18-Jan. 29)	Observations – field notes	9 days of study	Days 2-10	Supplementary data set: To identify types and frequencies of social interactions between students
	In-game screen captures (Observations)	9 days of study	Days 2-10	Supplementary data set: To accompany voice-chat data (provide context); ensure reliability
	In-game audio chat	9 days of study	Days 2-10	Primary data set – used to answer RQ#1
	Interviews (Individual) – audio recorded and transcribed	End of first week of game play (Days 4 & 5)	One session for each participant (15-20 minutes each approximately)	Identify participants' impressions of the game, how they feel about their role within the game, and how that contributes to their target language use
Phase 3: Post Intervention – 1 week (Dates: Feb. 1-Feb. 5)	Interviews (Individual) – audio recorded and transcribed	Within one week of conclusion of study	One session for each participant (approximately 10-15 minutes each)	To gain reflective and retrospective impressions of how negotiation and co-construction of meaning took place within the game environment; to identify personal feelings about group collaboration, to identify personal feelings about usefulness of the game as an English language learning tool

Additionally, Mroz noted that while four students were sufficient for collaborative game play, groups of five students produced the optimal volume and complexity of discourse necessary for the study. Pilot studies also revealed that three students did not constitute a large enough group to create the amount of discourse necessary, nor did they produce conversations that were considered complex enough to employ negotiation and/or co-construction of meaning strategies.

At present, the elementary campuses at JIS do not administer a formal English language assessment, and instead proficiency levels are based upon EAL teacher evaluations and observations, diagnostic reading tests administered by the classroom teacher, and any accompanying documentation that might belong in the student's cumulative file. Of approximately 120 students in the six combined classrooms, nine students were identified as qualifying English language learners, based upon diagnostic reading scores, classroom teacher evaluations, and input from the EAL specialist. An initial information meeting was scheduled in which all nine students attended, and where the nature and design of the study were briefly explained. This was conducted mainly to identify how many students might be interested. At the end of the meeting, four students expressed a sincere interest in participating and were given consent forms to take home. These four students range in age between 9-11 years and are currently placed at the intermediate level or above of English language proficiency. Additionally, native languages spoken by the participants include Japanese, Danish, and French.

The nature of this sampling process differed slightly from Mroz's (2012) techniques. In one of the pilot studies Mroz used a focus group interview as part of selection process; however, she found the data from these interviews to be contradictory

to data obtained later in one-on-one interviews, and therefore, decided to forego the focus

group interview process during the formal study. Instead, Mroz based her selection on

pre-observations and an initial semi-structured interview in which she inquired into each

student's language background, learning preferences, and prior knowledge.

In an attempt to stay as true to the original style and intent of Mroz's (2012)

study, the same semi-structured interviews were conducted with the elementary aged

students one week prior to the study, although the questions were modified to

accommodate the difference in target language and education level (Appendix A). These

individual interviews occurred in person and were recorded and later transcribed. As only

four students expressed an interest in the study, the collaborative group consisted of all

participants, therefore denying the need of pre-observations.

Phase 2: Intervention

This study mirrored the length of Mroz's (2012) research, spanning a total of ten

days in which students worked together to solve various task-based problems within the

social game environment of *MinecraftEDU*. Multiple forms of data were collected during

this phase, including: researcher observations (field notes), in-game voice-chat, in-game

screen captures, and individual interviews. Each form of data is further described below.

Observations. Each of the ten gaming sessions took place within the researcher's

classroom, as previously described, for one hour each day at the culmination of the

normal school. All researcher observations also occurred within this environment. Mroz

(2012) observed students prior to selection in order to monitor their interactions with

others and to form collaborative groups that seemed most conducive to problem solving

and task completion. Since there were only four participants in this study, they

automatically constituted the collaborative group. During the first session, students were

introduced to the tutorial to familiarize themselves with the format and to identify how it

differs from traditional *Minecraft*. This included the creation of an avatar, after which the

participants were free to explore the environment.

Daily observations continued throughout the duration of the study, beginning on

Day 2 and continuing through Day 10. These observations took two forms; specifically,

screen captures and written observations. As with Mroz's (2012) study, the purpose of

the screen captures was to fully conceptualize the social discourse that occurred within

each collaborative group. Both forms of observations were used as supplementary data

sets that aimed to complement the in-game audio chat in order to provide context and

meaning to the communication between participants.

Voice-chat data. The primary data set for this study was the voice-chat that

occurred while participants were engaged in the game environment. All verbal

conversations were recorded using a voice-recording device on the researcher's personal

phone. The purpose of this primary data collection set aligns with the research question

regarding the identification of patterns of discourse that involve negotiation and co-

construction of meaning. All discourse among the participants was recorded, transcribed,

and ultimately coded in order to identify if such patterns exist, as well as to identify any

additional emerging themes that may contribute to an understanding of how the

participants communicated.

Interviews. In addition to the initial individual interviews (Appendix A) that were

conducted with each participant, a second round of semi-structured, individual interviews

took place during Days 4 and 5 of the intervention (Appendix B). The objective of the

second interview was to gain feedback regarding the participants' perceptions of the

game environment, including their perceptions of the experience in regards to target

language use. Additionally, follow-up interviews were conducted with each student

during the week following the completion of the study in an effort to identify

participants' perceptions of target language use within *MinecraftEDU* (Appendix C). As

much as possible, the original interview questions asked by Mroz (2012) (Appendices D,

E, & F) were also used with the elementary students, with modifications made in regards

to age of participant and target language. These interviews were all conducted in person,

recorded, and then later transcribed.

Data Analysis

The main objective of this study was to identify whether or not patterns of

negotiation and co-construction of meaning occurred between elementary ELL's while

collaborating on task-based activities within a social gaming environment. This included

the exploration of said potential patterns and emerging themes in an attempt to identify

how language learners communicated and the role in which critical thinking skills and

problem solving may have played within this discourse. To review, the research question

that guided this study is as follows:

> RQ#1: Do patterns of L2 negotiation and co-construction of meaning exist in the
> discourse produced collectively by a group of elementary English language
> learners working collaboratively to solve a complex problem as they are
> immersed in a social gaming environment? If so, what is the nature of these
> patterns and what does it reveal in terms of these learners' L2 critical thinking and
> problem solving skills?

As discussed earlier, data analysis within qualitative studies is simultaneous with

data collection, providing the researcher with opportunities to gain insight, form hunches

and consequently refine and guide subsequent phases of collection (Merriam & Tisdell,

2016). The primary data set for this study consisted of all discourse between students during game play; specifically, voice-chat that was recorded and later transcribed for coding. Supplemental data sets included in-game screenshots and researcher field notes, along with three sessions of individual interviews that took place with each participant. These supplemental data sets, combined with the primary voice-chat data, were used in conjunction with one another to provide a deeper context and to add consistency and credibility. Additionally, all forms of data contributed to a set of emerging themes that provide insight into how the group communicated with one another during the study.

Qualitative Content Analysis

Qualitative content analysis entails a systematic set of procedures aimed at reducing the amount of data into analytic units that ultimately reveals themes and patterns within the discourse (Mayring, 2000; Schreier, 2012; Zhang & Wildemuth, 2005). The first step in this process is the identification of categories and the development of a coding frame. Typically the development of the coding frame occurs at the outset of the study and is then tested on a partial sampling of each form of collected data. The coding frame is then evaluated and modified, as necessary, after which the formal analysis of all data takes place. Schreier describes how qualitative content analysis includes double-coding, in which two researchers simultaneously code the data, or in which one researcher conducts an initial coding and then returns 10-14 days later to re-code the material again.

As this is a replication study, the process of identifying categories and creating a coding frame took place in a modified form. Zhang and Wildemuth (2005) note that coding frames or schemes can be derived from current data, existing theories, or previous

studies. Miles and Huberman (1994) contend that preliminary models can be used that are

then revised and modified, as necessary, to fit new data. This study used Hull and

Saxon's (2009) coding table (Table 3.3), previously created and used by both Hull and

Saxon, as well as Mroz (2012), for identifying and coding levels of critical thinking and

negotiation of meaning occurring in online discourse. Although this current study relied

upon Hull and Saxon's categories, the study also followed the prescribed set of steps that

are integral to qualitative content analysis. This included an initial, albeit modified,

period of trial coding. A sample of the first day's discourse was used to ensure that the

categories identified by Hull and Saxon (2009) accurately matched the segmented

material. As Zhang and Wildemuth (2005) note, "Because coding will proceed while new

data continue to be collected, it's possible (even quite likely) that new themes and

concepts will emerge and will need to be added to the coding manual" (p. 4).

The researcher then conducted an initial round of coding of all data, using Hull

and Saxon's (2009) coding table to identify patterns of discourse that indicated critical

thinking and problem-solving skills. Specifically, those segments of discourse that

corresponded to Levels 4 and above on the coding table were considered consistent with

negotiation and co-construction of meaning, as these statements reflect problem solving

and critical thinking skills. As new data were collected, they were assigned to categories

and compared with existing data to check for consistency and pattern matching

(Kohlbacher, 2006; Yin, 2014).

Additionally, a second coding of data occurred approximately seven to ten days

after the initial coding, in order to ensure accuracy and quality of analysis. This involved

a re-coding of 50% of the original material (Mayring, 2000), or half of each day's

discourse. The iterative process of continually comparing and pattern matching segments of discourse is a natural part of case study analysis, in which both old and new data are repeatedly analyzed and re-checked for meaning. Saldana (2008) describes coding as a cyclic process of exploration that ultimately links data to a larger idea or concept. Along with a second round of coding, the researcher also reviewed the entirety of discourse multiple times, making field notes, comparing previous patterns, and resolving inconsistencies. Each subsequent cycle of coding revealed additional insights, generated further themes and categories, and ultimately lead to an in-depth analysis of the data.

Data analysis involved both primary and secondary data sets, including all voice-chat data, daily screenshot observations, field notes, and individual interviews. Although three sets of semi-structured interview questions were already developed (Appendices A, B & C), incoming data helped to inform and guide each interview. With this in mind, there was a level of flexibility in both data collection and analysis, with both occurring simultaneously and informing the other.

Table 3.3   Coding Table for Social Constructivist Interactions

Code	Definitions	Indicators
1. Direct instruction	Initiating new activity	a. Statements that lead to a conversation on a new topic b. Statements that provide clarity
2. Sharing new information	Information is provided that has not been previously discussed	a. Statement of observation or opinion b. Simple response to a question or instruction c. Definition, description, or identification of a problem
3. Situated definition	Information is validated through a socially-shared, distributed consciousness	a. Statements of agreement b. Realization of agreement c. Providing corroborating examples d. Providing encouragement e. Basic clarifying questions
4. Intersubjectivity/dissonance	Inconsistency is discovered between a new observation and the learner's existing framework of knowledge	a. Identifying or stating areas of disagreement b. Asking and answering questions c. Restating someone else's position d. Clarifying one's own position (without substantial changes to that position)
5. Negotiation/co-construction (semiotic mediation)	Higher mental functioning that attempts to bridge differences to situated definitions	a. Clarifying someone else's position b. re-proposing an idea previously provided to the group c. Statements that appear new but that may contain elements from others
6. Testing tentative constructions	Testing new ideas developed through the course group	a. "What-if" questions/statements b. Proposed behaviors that incorporate newly constructed ideas
7. Reporting application of newly constructed knowledge	Behavior is provoked by course discussions resulting in reports about activities in which a participant engaged	a. Statements that new ideas are being tried b. Reports (successful or unsuccessful) of attempts to implement a new concept

Note: From "Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online interaction" by D. Hull and T. Saxon, 2009, *Computers and Education,* 52, p. 632.

Data Management

Saldana (2008) recommends the following strategies in order to keep data secure and organized throughout the duration of the study:

- *Naming system* – all students are referred to by pseudonyms, and all data referring to said students is labeled accordingly

- *Filing system* – all data was filed using the following folder system: Date/Data Type/Student ID

- *Storage* – all data was stored in two spaces; namely, a Google Drive account that is cloud-based and can be accessed anywhere, as well as an external hard-drive in which data was backed-up and saved daily

- *Color coding* – color coding was used to identify emerging themes

- *Code book* - to keep track of categories as they emerged and evolved, including a description of the code and a data example

- *Reflective journal* – this included notes taken throughout the study and was used in conjunction with all other data

The researcher used the aforementioned strategies to keep all data safe, organized, and private throughout the study.

Researcher Bias and Assumptions

This study held personal relevance for me, as I am a teacher at the Pattimura Elementary campus of the Jakarta Intercultural School. In my current position I teach 2nd grade, and I have previously taught one of the participants in the study. Although I have not personally instructed any other participants, we all know one other informally due to the relatively small number of students enrolled at the campus. While I hoped to create a

climate in which participants felt safe expressing themselves, I also realized the importance of *bracketing* (Creswell, 2014) and keeping my own expectations, opinions, and ideas out of the study as much as possible. I understand this is a delicate balance and endeavored to build an atmosphere of trust and openness that would facilitate the deep understandings this study intended to uncover.

In any case study, there is a level of uncertainty that cannot be avoided due to the lack of control the researcher has with both the participants and the context. To maintain the highest degree of integrity, this study followed Yin's (2014) guidelines and standards by which to operate that include:

- Asking good questions, as well as interpreting the answers fairly

- Setting aside personal ideologies and feelings and actively listening

- Remaining adaptive so that new or conflicting data was not seen as a threat, but rather an opportunity to explore further

- Avoiding bias by adhering to ethical research practices and remaining sensitive to any contrary evidence

Yin (2014) explains that qualitative researchers seeking specific results from a study tend to avoid addressing contrary evidence. The author argues that researchers must be aware of this and suggests formulating alternate explanations for conflicting data. As this is a replication study, it was important for me to maintain unbiased expectations in regards to the results. With this in mind, and in order to ensure I maintained a "rigorously ethical" (Saldana, 2008, p. 29) approach to analysis, all data was considered, including difficult data that did not initially appear to fit, or did not ultimately fit at all. This also

included Yin's recommendations to develop alternative explanations and explore alternate hypotheses.

Shelton (2004) recommends that researchers engage in member checks with participants in order to prevent against bias and to ensure accurate interpretations. As much as possible, I checked with the participants of this study to seek clarification and confirm interpretations. This included both informal member checks, during interviews or observations, and more formal checks, in which I returned to the participant at a later time to gain clarity. It should be noted that as the participants are students, there was a strong possibility that one or more of them may have attempted to provide "pleasing" responses. For this reason, it was very important that I refrain from asking leading questions, and that each participant understood there were no wrong answers. Similarly, since I personally know at least one of the participants, I made every effort to refrain from making assumptions about the participants' behaviors and responses.

Notable Distinctions

This final section provides an overview of the notable distinctions between Mroz's (2012) original research and this current study. Exact duplication within replication studies is rare, if not impossible, and is generally not the goal of the researcher (Makel & Plucker, 2014). One notable reason for this is that exact duplications will likely contain the same type(s) of bias as the original study, rather than uncovering any partiality. As much as the current study aimed to replicate Mroz's earlier work, there were distinct differences that have been noted throughout this section. The following table (Table 4) briefly outlines these modifications. Additionally, Appendices D, E and F provide the original sets of interview questions administered by Mroz in her study.

Table 3.4   Notable Distinctions Between the Two Studies

	Original Study	Replication Study
Method(s)	Mixed Methods	Qualitative – Case Study
Sampling Procedures	Purposeful Sampling (near homogeneity in language abilities) Focus Groups Interviews	Purposeful Sampling (range of abilities from intermediate-Mid to fluent)
Data Collection Methods	Pre-observations (to determine groups) Individual Interviews Documents – *Detective Log* Screenshots	Interview questions are modified No pre-observations No *Detective Log* (in game) documents; rather, the researcher will take daily screenshots of game play
Data Analysis	Discourse transformed; statistically analyzed	Qualitative content analysis using the Interaction Analysis Model; triangulated with other data collection

CHAPTER FOUR: RESULTS

Introduction

The primary purpose of this study was to determine if patterns of negotiation and co-construction of meaning exist within a group of elementary aged English language learners engaged in task-based activities within the social game environment of *MinecraftEDU*. The study intended to replicate Mroz's (2012) earlier research, in which university aged, French language learners demonstrated patterns of negotiation and co-construction of meaning while engaged in task-based activities within the social game *SecondLife*. This current study was conducted to determine if Mroz's findings could be successfully replicated using a different sample that involved elementary-aged English language learners from a variety of language backgrounds. This current study was guided by the same research question as the original study, with slight modifications regarding target language, social game, and age of participant. The research question for this study was:

> *Do patterns of L2 negotiation and co-construction of meaning exist in the discourse produced collectively by a group of elementary English language learners working collaboratively to solve a complex problem as they are immersed in a social gaming environment? If so, what is the nature of these patterns and what does it reveal in terms of these learners' L2 critical thinking and problem solving skills?*

The researcher collected data through three phases of the study that included three sets of individual interviews, daily screen shots of game play, researcher field notes and observations, and verbal recordings of daily discourse. To answer the first part of the

research question, daily discourse was analyzed and coded according to Hull and Saxon's (2009) coding table (Table A.1) to determine if patterns of negotiation and co-construction of meaning occurred among the participants. Data from individual interviews, along with screen shots and daily observations were used to triangulate data and to identify additional themes. Through an iterative process of analysis, the researcher was unable to identify patterns of negotiation and co-construction of meaning between the learners as they were engaged in task-based activities within *MinecraftEDU*.

The remainder of this chapter presents the findings of this study in a phase-by-phase format. Prior to the presentation of findings is a review of the data collection and analysis process, including an overview of qualitative content analysis, checks for consistency, and triangulation of data. Following this are the results from all three phases of the study, along with a discussion regarding a set of themes that emerged as the study progressed.

Review of Analysis

This case study employed a qualitative content analysis process for coding and analyzing the collective group discourse. This type of analysis involved a systematic set of procedures that ultimately reduced large volumes of data into analytic units that revealed patterns and themes within the discourse (Mayring, 2000; Schreier, 2012; Zhang & Wildemuth, 2005). Critical to this process was the use of a coding frame that allowed the categorization of statements and questions. Rather than developing a new coding frame, this study relied upon the same coding table used in Mroz's (2012) study, namely Hull and Saxon's (2009) Coding Table for Social Constructivist Interactions (Table A.1).

Coding Procedures

 As there was only one researcher in the study, and in order to maintain consistency, the analysis process involved double-coding, in which the researcher analyzed and coded all discourse during an initial round, and then re-coded half of each day's discourse a second time, approximately seven to ten days later (Mayring, 2000). This process allowed for continual comparing and pattern matching of segments of discourse and for the identification of emerging themes during the initial round, followed with consistency checks for coding and validation of themes during the second round.

 The initial round of coding began concurrently with the onset of the intervention, as the daily discourse was transcribed. During this round, the researcher compiled observational notes during each day's gaming session, along with comments, questions, and other noteworthy observations taken while coding. Along with the coded discourse, these observations and notes revealed a set of emerging themes that illustrate the ways in which the group communicated with one another. While these themes do not directly relate to the research question, they do reveal patterns regarding the participants' communication in the target language in general. These themes are explained later in this chapter and discussed further in Chapter V.

 During the second round of coding, the researcher re-coded a random sampling of half of each daily transcript. Consistency rates were based upon Schreier's (2012) *percentage of agreement* using the following calculation:

$$\text{Percentage of agreement} = \frac{\text{Number of units of coding on which the codes agree}}{\text{Total number of units of coding}} \times 100$$

 Coding consistency averaged 93.44% overall. Inconsistencies were resolved using two main strategies; namely, the constant comparison method and member checking.

Through both rounds of coding, the researcher continually checked newly coded discourse with previously coded discourse. When discrepancies were discovered, the researcher used additional forms of data, such as individual interviews and daily observations, to provide clarity and resolve inconsistencies. The researcher also conducted member checks with participants to verify that discourse had been accurately coded and, when necessary, to ask for further clarification on unclear statements.

Triangulation of Data

In order to triangulate data, the researcher conducted three sets of individual interviews that were recorded and later transcribed. Additional forms of data collection include daily observations and screen shots. It should be noted that although there were two formal rounds of coding, all collected data were reviewed in their entirety multiple times in order to establish consistency, gain accuracy, and obtain a complete understanding of the communication that occurred. Used in conjunction with one another, each form of data helped clarify inconsistencies, reinforce and support emerging themes, and provide a clear context that allowed for deeper analysis (Creswell & Miller, 2000; Yin, 2014).

Phase 1: Initial Interview

The first phase of the study took place one week prior to the intervention and involved individual interviews with each participant (Appendix A). These interviews aimed to gather background data regarding each student's native language, perceptions of learning English, as well as personal attitudes and uses of technology. In total, four students participated in the study, including two girls, Alice and Sharon, and two boys, Michael and Justin. Alice, Sharon, and Michael speak Japanese as their native language,

while Justin speaks both Danish and French. The participants were classified at the

intermediate level of English language acquisition, although their individual experiences

of learning English range from three years to seven years (Table 4.1). Each of the four

participants is individually introduced below.

Table 4.1   Matrix of Participants and English Language Experience

	Alice	**Justin**	**Michael**	**Sharon**
Age English Instruction Began	4	7	8	5
Years Experience Speaking English	6	4	4	5
Native Language (Language Spoken at Home)	Japanese	French and Danish	Japanese	Japanese

Alice

Alice is currently in 4th grade at JIS and was the youngest participant in the study.

Originally from Japan, she began informal English language instruction around the age of

three. Alice credited an alphabet game as initially sparking her interest in learning

English and claimed that she has been the driving force behind her own English language

learning ever since, rather than her parents. The only child of two working professionals,

Alice and her parents relocated to Malaysia when she was four years old. At that time she

began attending a British school in which British English was the language of instruction.

In 2013, after spending three years in Malaysia, Alice moved to Jakarta and began 2nd

grade at the Jakarta Intercultural School (JIS). When asked if her parents chose to enroll

her at JIS because they wanted her to learn English, Alice explained that it was her choice

to attend the school because *she* was most interested in learning English. Alice

commented on how much easier English is to learn than Japanese and how she thinks in

both Japanese and English, depending on the language used within her conversations.
During her first interview, Alice described a story in which her mother told her she had
been dreaming in English, although Alice did not appear to know if that was completely
true.

> *Interviewer*: '...When you're at school or at home…do you think in
> English more, or do you think in Japanese?'
> *Alice*: 'I think more on English because…I don't know, but my mom said I
> was dreaming in English.'
> *Interviewer*: 'Oh yeah?'
> *Alice*: 'I was saying it, and my mom was like…'
> *Interviewer*: 'So you were talking while you were sleeping? And you were
> speaking English?'
> *Alice*: 'Yeah.'
> *Interviewer*: 'Ah-ha, cuz that's just what I was going to ask you when you
> dream. Do you dream in English or in Japanese?'
> *Alice*: 'But I don't know.'
> *Interviewer*: 'You don't know? You don't remember? That makes sense.'
> *Alice*: 'Dreams doesn't make sense.'

When asked about her technology use, Alice explained that she is not allowed to
use any technology at home; however, she is able to occasionally steal her father's iPad
to play video games. At school, Alice has a school-issued iPad that she uses for writing
activities, as well as her digital portfolio to showcase work from throughout the school
year. Overall, she exhibited positive feelings toward technology use, although she did not
seem to associate any technological device with language instruction.

<u>Sharon</u>

Sharon is currently in 5th grade at JIS, along with Michael and Justin. Sharon
moved from Japan to Jakarta and began attending JIS at the end of her Kindergarten year,
when she was five years old. She explained how she only spoke Japanese at the time, and
that another Japanese girl in her class helped her learn her first words in English. During

her year in 1st grade at JIS, Sharon's parents hired an English tutor to help her after

school. Her English tutoring ended at the completion of her year in 1st grade, and the

remainder of Sharon's English language instruction was facilitated entirely through the

school. Like Alice, Sharon described English as easier to learn than Japanese; however,

she also spoke of the frustration she experiences when encountering new and unfamiliar

words. Sharon reported that she tends to think in English when she's around her English-

speaking friends, but switches back to thinking in Japanese when with her family. Sharon

explained how the choice to attend JIS was mainly influenced by her parents' desire for

Sharon to learn English. She relayed a story of how her mother described the prevalence

of English use throughout the world and how necessary it was for Sharon to learn it:

> *Researcher*: 'So why did you first start learning English? Did you have to because you were in this school?'
> *Sharon*: 'Yeah, like when we came to Indonesia, um, my mom didn't really want me to go to a Japanese school because it's like, because my mom wanted me to learn English.'
> *Researcher*: 'Okay.'
> *Sharon*: 'So I came and then my mom also told me that you almost speak English in, like, every country, so you had to learn it, so…'

Sharon had positive responses about her overall technology use, explaining that

she uses her school-issued MacBook at school mainly for writing activities. This results

in approximately four to five hours per week of use. At home she uses a variety of

devices, such as her personal iPad and iPhone. She claimed to use these devices more for

personal entertainment than educational purposes, citing YouTube as her favorite

website.

<u>Michael</u>

Michael shared a similar story of moving to Jakarta from Tokyo in 2012 without any prior English instruction. He explained how his parents wanted him to learn English and initially enrolled him at the Australian Independent School (AIS) in Jakarta. He attended AIS for one year while working with an English language tutor after school, before transferring to JIS in 2014. He described the difficulty he had during his time at AIS, as his lack of English prevented him from understanding his teacher, the school materials, and his peers. During that year, he came to rely upon a small group of AIS Japanese students to translate for him. Like both Alice and Sharon, he finds learning English easier than learning Japanese due to the simplicity of the alphabet and the way letters represent sounds. During his initial interview he revealed specific aspects of English that he finds more difficult and also easier than his native language:

> *Researcher*: 'So how do you feel about English? Can you tell me something you like about it, and maybe something you don't like? Something that's hard?'
> *Michael*: 'Umm…I sort of hate the pro-nounc-iation.'
> *Researcher*: 'Okay.'
> *Michael*: 'Of the 'r' and 'l'…it's like, different.'
> *Researcher*: 'Is it hard to make those sounds?'
> *Michael*: 'Yeah.'
> *Researcher*: 'Yeah? Because Japanese uses different sounds?'
> *Michael*: 'Yeah.'
> *Researcher*: 'Is there anything you like about English?'
> *Michael*: 'I like English cuz…every time in Japanese, if you write your name, they can just skipped it and then write it. But in here, you just have to make the one word in each sentence. They can just skip words. It's more easier than doing it in Japanese.'
> *Researcher*: 'Is it easier to write the letters?'
> *Michael*: 'Yeah, easier to write the letters.'

Of the four participants, only Michael stated that his thoughts and dreams are primarily in his native language of Japanese. He stated that he occasionally attempts to

think in English when speaking with certain friends, but that this has been challenging for him. He also mentioned that there are certain Japanese students with whom he always speaks English.

When asked about his uses and attitudes regarding technology, Michael stated that he uses some type of device at home approximately four days during the school week and less on the weekends. Michael explained that for each hour at home that he studies, he is allowed to use the iPad for one hour, resulting in approximately four hours of gaming per week. Michael is also the only participant who uses an iPad specifically to study English. He has a private tutor who comes to his house twice each week and stays for two hours each time. He uses a Japanese application that is designed to teach English vocabulary and grammar. At school, Michael uses a school-issued MacBook, mainly for writing and looking up information. For these activities, he estimated his use at approximately three to four days a week, for about an hour each time. Although Michael is also in 5th grade, he is a full year older than his 10 year-old peers.

Justin

Justin lived in Europe and Laos before moving to Jakarta at the age of seven. A child of a Danish father and a French mother, Justin grew up speaking both languages at home, but said that French is the language in which he feels most comfortable conversing. Justin's formal English language instruction began when he moved to Laos in 2012 and entered 2nd grade at an international school there. The following year, in 2013, his family moved to Jakarta and enrolled him in JIS, where he is currently in 5th grade. Unlike the other individuals in the group, Justin seemed indifferent about his English language learning, only commenting on specific subjects in which he uses

English. Also unlike the other participants, Justin did not mention that learning English

was important to his family, or that his enrollment at JIS was associated with his

acquisition of the language.

Justin initially stated that his thoughts are all in English, but later retracted this

when asked how he thinks when speaking to either of his parents. Ultimately, he seemed

to realize that his thoughts were contextually based, and the language of conversation that

he engages in generally dictates the language of his thoughts. Interestingly, he noted that

his dreams are usually a combination of both French and English, but not Danish.

Overall, Justin's answers regarding his use of English and his feelings about learning the

language were difficult to interpret. Although his English speaking abilities appeared to

be the highest of the four participants in the study, Justin's answers seem to convey some

confusion as to what was being asked.

> *Interviewer*: 'So when you think about learning English, when you started in second grade, and even now, how do you feel about learning that language?'
> *Justin*: 'Good.'
> *Interviewer*: 'Is there anything about it that you particularly like or dislike?'
> *Justin*: 'Some of the math was easy.'
> *Interviewer*: 'Okay. Maybe anything you've found easy or fun, or maybe something that you've found difficult?'
> *Justin*: 'We do reading groups. It's pretty easy also.'
> *Interviewer*: 'What's easy about the reading groups?'
> *Justin*: 'We read easy books. But we get harder and harder every time.'
> *Interviewer*: 'Has there been anything that's been a little tricky or a little hard about English?'
> *Justin*: 'Math. When we do fractions and geometry, I thought it was hard.'
> *Interviewer*: 'Was the hardest part the math part, or did you find some of the vocabulary hard, like some of the words you were using. Was that hard?'
> *Justin*: 'Not really.'
> *Interviewer*: 'Which part?'
> *Justin*: 'The reading group and the writing…like typing.'

When describing his use of technology, Justin exhibited a positive attitude and stated that he does not feel he uses much technology, despite an acknowledgement of watching approximately five hours of television per day at home. Similar to Sharon and Michael, Justin described how his use of technology at school was generally for looking up information on the Internet and composing various written pieces on his school-issued MacBook.

Phase 2: Intervention and Second Interview

The second phase of the study involved the intervention, as well as a second interview (Appendix B). All four students participated in nine, one-hour *MinecraftEDU* sessions that were audio recorded and later transcribed. During this time, they collaborated to solve task-based activities within two specific worlds within the social game environment, including *Escape from Everest* and *Extinction Challenge* (Table A.2). The intervention took place in the researcher's classroom at the Jakarta Intercultural School, for one hour each day, after the end of the normal school day. A thorough description of both *MinecraftEDU* worlds, as well as the setting of the study, can be found in Chapter III.

Overview of Game Play

During the first day of game play, the researcher used observations of the group dynamic to identify any potential issues, while also troubleshooting any potential technical issues. Also during this session the students participated in a tutorial world (Table A.2) in order to familiarize themselves with the new environment and identify ways in which it differed from the traditional *Minecraft* game (each had previous experience with it). On days two through five, participants played *Escape from Everest*,

and on days six through nine they played *Extinction Challenge*. These two worlds, along with the tutorial world, were specifically chosen based upon their levels of difficulty. In this sense, the activities were scaffolded and offered the participants increasing levels of difficulty as they progressed through the study.

Figure 4.1   Spaceship station at *Escape from Everest*

The main objective in the *Escape from Everest* game was to gather substantial amounts of iron, wood, and glowstone in order to fuel a rocket (Figure 4.1). This game required a significant time to search for the materials, as well as careful resource management. The main objective within *Extinction Challenge* was more challenging and required the participants to capture and pen animals in an effort to repopulate various species, as well as provide a food source for the players and other carnivores (Figure 4.2).

Figure 4.2   Screenshot of *Extinction Challenge*

Each session began with either an introduction of the new game or a review of the current game's objectives, specifically focusing on what the group would be working toward that particular day. It was during this time that the participants prioritized what needed to take place and identified roles for themselves and/or each other. These discussions were generally short and lasted approximately two to three minutes. Similarly, each day concluded with a review of what had been accomplished, a discussion on what had worked well, and possible changes the group might want to implement during future sessions. Despite these daily collaborative sessions, the group was unable to achieve either of the final objectives of the two games.

Findings

The process of second language (L2) negotiation of meaning occurs when a language learner encounters new or unfamiliar words and/or phrases and uses one or more strategies to gain an understanding of the material (Foster, 1998; Nakaham et al. 2001; Peterson, 2009). This includes repeated comprehension checks and the use of communication strategies, such as asking for words to be repeated or explanations as to

what something means. When this process occurs with one or more individuals, the new

knowledge is co-constructed through the group's interactions.

This study has one research question that contains two parts. Each part is

presented here separately, beginning with the first part:

> Do patterns of L2 negotiation and co-construction of meaning exist in the
> discourse produced collectively by a group of elementary English language
> learners working collaboratively to solve a complex problem as they are
> immersed in a social gaming environment?

Each day's discourse was analyzed using Hull and Saxon's (2009) Coding Table for

Social Constructivist Interactions (Table A.1) in order to categorize statements and

identify the occurrence and types of thinking represented by all four participants. Each

main category on Hull and Saxon's table contains two to four sub-categories that

correlate to specific types of statements or questions. The categories range in increasing

complexity from simple statements that reflect lower-order thinking in Level 1 to

statements that reflect high levels of critical thinking and problem solving in Level 7. As

discussed in Chapter III, interactions categorized at Levels 4 through 7 are indicative of

negotiation and co-construction of meaning, problem solving, and critical thinking. Based

on the low occurrence of discourse at these upper levels, it was determined that patterns

of L2 negotiation and co-construction of meaning did not occur between the participants

of this study.
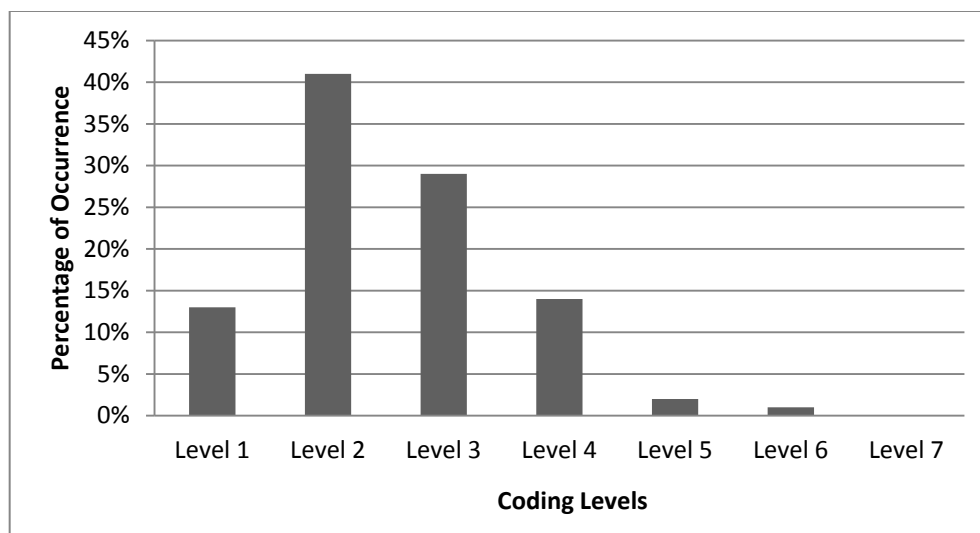
Figure 4.3   Occurrence of categorized discourse for all days of intervention

The results of the current study are displayed in Figure 4.3 and show the

percentage of discourse for each category over the course of the entire nine days. In

general terms, the majority of discourse was coded at Levels 2 and 3, which correspond

to the Sharing New Information and Situated Definition categories, respectively. Sharing

New Information comprised 41% of the total discourse produced by the group, while

Situated Definition represented 29%. The category of Intersubjectivity and Dissonance,

or Level 4, has the greatest occurrence of higher-order thinking and represents 14% of the

overall daily discourse. Discourse at Level 7, Reporting Application, was present in the

study, but represented less than one percent of the discourse on any given day. A review

of each category follows, including supporting examples from the discourse.

Coding at Level 1. Level 1 of Hull and Saxon's (2009) coding table (Table A.1)

represents statements indicating direct instruction. This includes simple statements that

initiate conversation on a new topic (1a), as well as statements that provide clarity to a

topic already under discussion (1b). Table 6 provides examples from the discourse

showing the types of statements categorized as 1a and 1b.

Table 4.2   Level 1: Examples from Discourse

Level 1: Direct Instruction (Initiating a new activity)	
1a: Statements that lead to a conversation on a new topic	1a. 'Let's go up the ladder.'
1b: Statements that provide clarity	1b. 'I'm taking all the chicken.'

Over the course of nine days of collected discourse, statements at Level 1 represent 13% of the overall discourse (Figure 4.3). Both sub-categories 1a and 1b were highest on the first day of game play (Figure 4.4). Following this, rates for 1a dropped to 5% or less, while statements categorized at 1b declined during Days 2 through 4, before rising and remaining relatively consistent for Days 5 through 9.
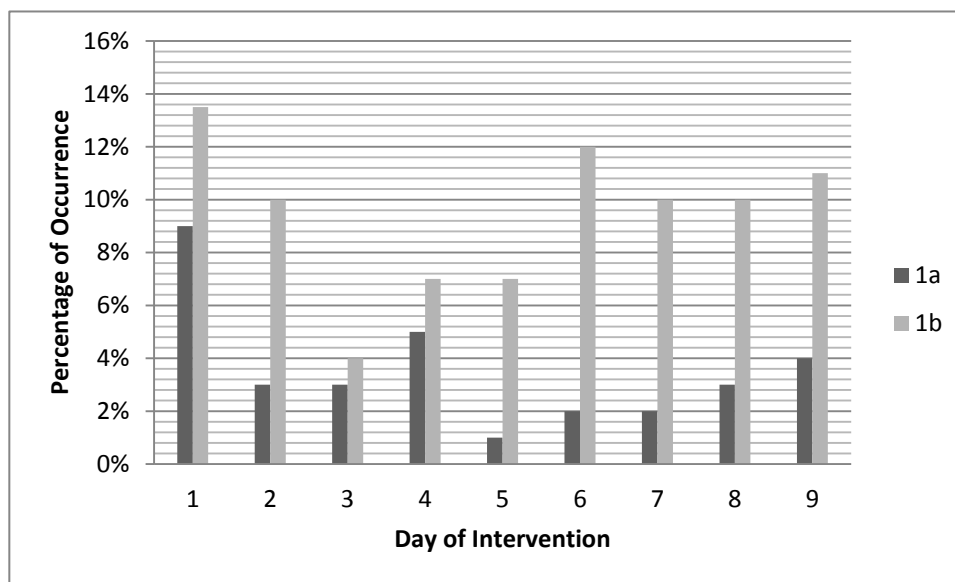
Figure 4.4.   Occurrence of discourse at Level 1

Coding at Level 2. Hull and Saxon's (2009) category of Sharing New Information (Table 4.3) is defined as the introduction of new information that has not been previously discussed. This category is divided into three sub-categories, including

2a: statements of observation or opinion; 2b: simple responses to questions or instructions; and 2c: the defining, description, or identification of a problem. This category represented the largest amount of overall discourse produced by the group, with an average daily occurrence of 41% (Figure 4.3).

Table 4.3   Level 2: Examples from Discourse

Level 2: Sharing New Information (New information is provided)	
2a: Statement of observation or opinion 2b: Simple response to a question or instruction 2c: Definition, description, or identification of a problem	2a. 'I got a pickaxe, man.' 2b. 'I don't know' and simple yes/no/ maybe responses 2c. 'I'm stuck again.'

Within Level 2, participants specifically engaged most often in discourse categorized as *2a:* statements of observation or opinion, ranging from 21% on the fourth day to 35% on the sixth day, with an average daily occurrence of 26.72% (Figure 4.5).
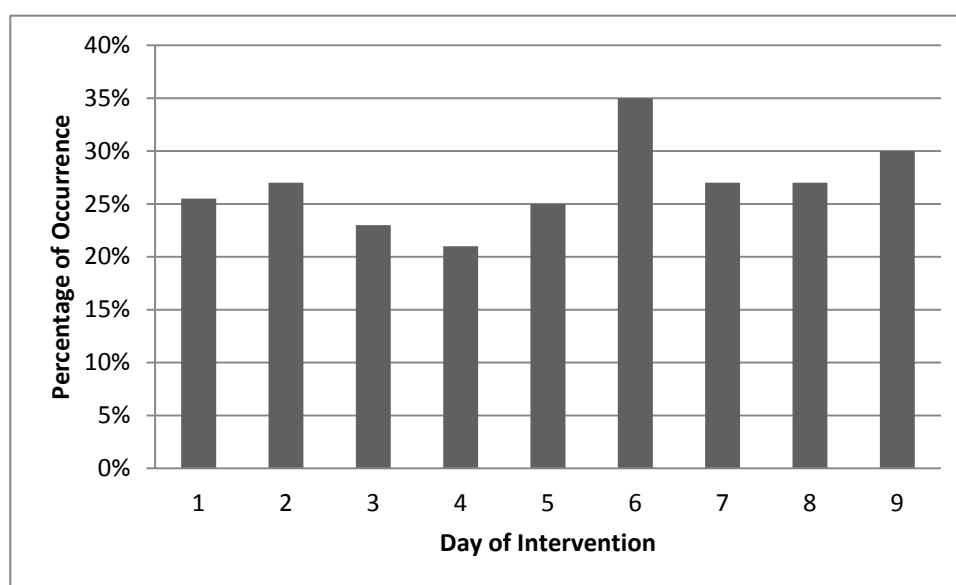
Figure 4.5.   Daily occurrence of responses categorized as *2a*

Students mainly employed this type of discourse by describing what they were seeing or doing during the game. Often, these remarks were made independently and did not lead to further conversation. The excerpt below is taken from Day 5 when students were playing *Escape from Everest* and provides a typical example of the interactions that occurred.

Michael: 'Dude, I'm just front of you.'
Justin: 'No you're not. Ugh. Run! Get away from me.'
Michael: 'I'm just in front of you.'
Justin: 'No!'
Michael: 'I'm just behind you.'
Justin: 'Whoa, whoa.'
Sharon: 'I found irons!'
Michael: 'Same.'
Sharon: 'I found it faster than you.'
Justin: 'I don't care. Michael, can you leave me alone please?'
Michael: 'I'm not even in front of you.'
Justin: 'What do you mean?'
Michael: 'It's just because…I don't know.'

Coding at Level 3. The category of Situated Definition includes five sub-categories that involve the validation of information through a socially distributed consciousness. This category represented 29.48% of the total discourse produced by the participants (Figure 4.3). Sub-categories in this group include 3a: statements of agreement; 3b: realizations of agreement; 3c: providing corroborating examples; 3d: providing encouragement; and 3e: basic clarifying questions (Table 4.4).

Table 4.4   Level 3: Examples from Discourse

Level 3: Situated Definition (Information is validated through a socially shared, distributed consciousness)	
3a. Statements of agreement	3a. 'Yeah, I know.'
3b. Realization of agreement	3b. 'That is actually pretty amazing.'
3c. Providing corroborating examples	3c. 'It's in the chest…it's like the thing you burn stuff in.'

| 3d. Providing encouragement | 3d. 'Wait Sharon, I'm gonna give some to you, okay?' |
| 3e. Basic clarifying questions | 3e. 'Am I in water?' |

It should be noted that sub-categories 3b and 3d are not present in the group's

discourse on all days (Figure 4.6). Sub-category 3b represents 1% of all discourse

produced through the duration of the study, and sub-category 3d represents less than 1%.

The sub-category 3e: basic clarifying questions had the highest rate of occurrence at

Level 3 and represented the second highest rate of occurrence overall, after sub-category

2a. The average daily rate of occurrence for sub-category 3e was 19% and ranged from

13% on Day 9 to 25% on Day 4.
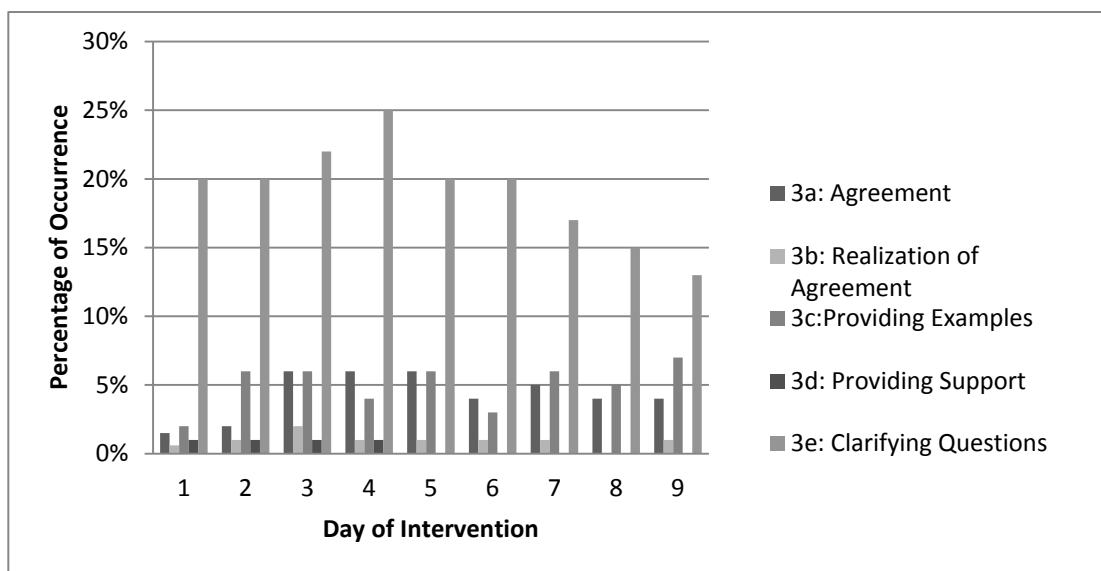
Figure 4.6. Daily occurrence of level 3 discourse

Throughout the study, participants asked one another basic clarifying questions

that were often associated with locating one another or clarifying where certain objects

were located, as well as whether or not specific actions were possible. The below excerpt

is taken from Day 4 and provides examples of the types of clarifying questions the

participants used.

> *Sharon*: 'What is this? Is this an underwater house or something?'
> *Alice*: 'You know, no one can see us.'
> *Justin*: 'Ohh…there's so much iron here! Dude, Michael…'
> *Alice*: 'Where are you?'
> *Justin*: 'Have you been here?'
> *Michael*: 'What? Dude, there's an underwater place.'
> *Sharon*: 'And I found it.'
> *Alice*: 'Where are you? Under water?'
> *Michael*: 'No, I just went under water and there was…'
> *Justin*: 'Dude, what was that? Dude, Michael look!'

Coding at Level 4. Level 4 of Hull and Saxon's (2009) coding table represents

the first level involving higher-order thinking skills associated with critical thinking,

negotiation and co-construction of meaning, and problem solving. This level involves the

realization and acknowledgement of inconsistencies between an individual's current

knowledge base and new information that has been presented.

Sub-categories within level 4 include 4a: identifying or stating areas of

disagreement; 4b: asking or answering questions; 4c: restating someone else's position;

and 4d: clarifying one's own position, without substantial changes to that position (Table

4.5). Overall, this level comprised 14% of the total discourse produced by the group

(Figure 4.3).

Table 4.5   Level 4: Examples from Discourse

Level 4: Intersubjectivity/Dissonance (Inconsistency is discovered between a new observation and the learner's existing framework)	
4a. Identifying or stating areas of disagreement	4a. 'That's crouching, that's not bowing.'
4b. Asking and answering questions	4b. 'How to make it blast off?'
4c. Restating someone else's position	4c. 'You just said, "Dude, I got an iron sword."'
4d. Clarifying one's own position (without substantial changes to that position)	4d. 'Oh….I have to go back to the house thing.'

Sub-category 4b, asking and answering questions, had the highest rate of occurrence, ranging from 5% to 10% each of the nine days (Figure 4.7). Unlike sub-category 3e that consisted of clarifying questions, the questions and responses in Level 4 were largely focused on the process of completing certain tasks, along with requests for explanations.
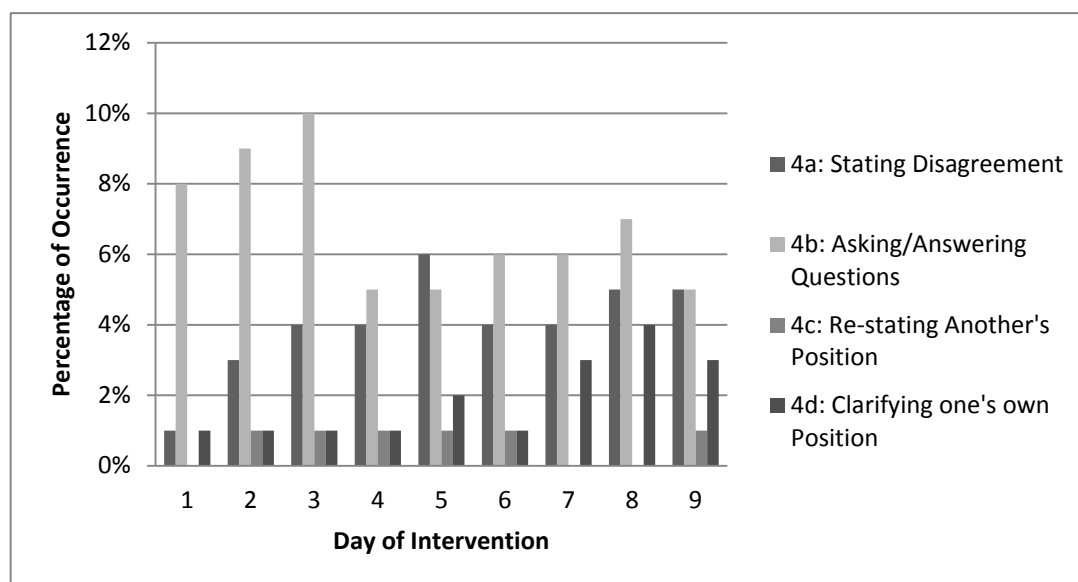
Figure 4.7.   Rate of occurrence for Level 4 discourse

The below excerpt provides examples of how the participants engaged in asking and answering these types of questions. It should be noted that it was common for the participants to pose *how* and *why* questions, but not necessarily receive any type of response from the group.

> *Sharon*: 'How do you make an armor though?'
> *Justin*: 'I don't know. Ask Michael. How did you get armor yourself?'
> *Sharon*: 'Umm, I got it from a chest.'
> *Alice*: 'Where did I get these stuff? Do you have these?'
> *Justin*: 'Wait. Iron helmet?'

Coding at Level 5. Statements at Level 5 represent negotiation and co-construction of meaning in which individuals employ higher mental functioning that attempts to make connections using prior knowledge and applying this prior knowledge to situated definitions. This level includes the following three sub-categories: 5a: clarifying someone else's position; 5b: re-proposing an idea previously provided to the group; and 5c: statements that appear new, but that may contain elements of others (Table 4.6). Overall, Level 5 statements represent 2% of the total discourse produced over the nine days (Figure 4.3). Sub-categories 5a and 5b both represent 1% each of the collected discourse, while 5c statements represent less than 1% overall.

Table 4.6   Level 5: Examples from Discourse

Level 5: Negotiation/Co-construction (semiotic mediation)	
(Higher mental functioning that attempts to bridge differences to situated definitions)	
5a. Clarifying someone else's position	5a. 'It's 'cuz you're not high enough. You gotta get up there."
5b. Re-proposing an idea previously provided to the group	5b. 'Break the leaves. You might get seeds that way.'
5c. Statements that appear new, but that may contain elements from others	5c. '…I think this map doesn't, this world doesn't fit on one map.'

Coding at Level 6. Statements at this level demonstrate that newly developed ideas are being tested through the group's discussion. This includes sub-categories 6a, representing *what if* questions and statements, along with 6b, representing proposed behaviors that use newly constructed ideas (Table 4.7). Overall, Level 6 statements represent 1% of the total discourse produced by the participants (Figure 4.3).

Table 4.7   Level 6: Examples from Discourse

Level 6: Testing Tentative Constructions (Testing new ideas developed through the course group)	
6a. 'What if' questions/statements 6b. Proposed behaviors that incorporate newly constructed ideas	6a. 'Wait, what if I pull this?' 6b. 'How about digging down? Does that work?'

The following excerpt from Day 7 shows examples of Levels 5, 6, and 7 as the participants try to construct an understanding of how the maps work within the game. For this example, the coding for each statement is present.

Alice: 'Where did you get those maps from guys?'	3e
Justin: 'The chests!'	2b
Alice: 'All of them were blank.'	2c
Justin: 'No, you get it and then you wait, and then it comes up.'	5a
Michael: 'I think we have to combine the maps.'	6b
Justin: 'Ugh. My map is not even working right now.'	2c
Alice: 'See? It doesn't work. Empty.'	2c, 3c
Justin: 'That's 'cuz you have 14 maps! You need one only.'	5a
Alice: 'Oh.'	2b
Michael: 'You need more than one. I think everybody's maps are different.'	4a, 7a
Alice: 'I don't need mushrooms.'	2a
Justin: 'You only need one. Like this, see?'	5b
Michael: 'I think you need more than one.'	5b
Justin: 'Or you have to take from a different chest.'	6b
Michael: 'I think this map…I think this map doesn't, this world doesn't fit on one map.'	6b
Justin: 'Dude, my map is not um…moving, like I'm moving so much.'	2c

Coding at Level 7. Level 7 represents the highest levels of thinking on Hull and

Saxon's (2009) coding table (Table A.1). Statements at this level demonstrate that new

ideas are being tried, along with reports of successful or unsuccessful attempts at trying

new ideas (Table 4.8). Throughout the study, participants seldom engaged in discussions

that demonstrated attempts at employing new ideas. This correlates with the lack of

statements in Level 6, which show the generation and discussion of new ideas. The

participants produced discourse representing Level 7 less than 1% of the time (Figure

4.3).

Table 4.8   Level 7: Examples from Discourse

Level 7: Reporting Application of Newly Constructed Knowledge (Behavior is provoked by course discussions resulting in reports about activities in which a participant engaged)	
7a. Statements that new ideas are being tried	7a. 'I click 'M.' I'm clicking 'M.''
7b. Reports (successful or unsuccessful) of attempts to implement a new concept	7b. 'I was trying to following you.'

Second Interview

Approximately halfway through the intervention, all four students were

individually interviewed for the second time. The purpose of the second interview was to

collect data regarding the overall attitudes and perceptions of playing *MinecraftEDU*.

This included their feelings toward the game overall, as well as their perceptions

regarding group collaboration.

Attitudes and perceptions of playing *MinecraftEDU*. Michael initially stated

that the *Escape from Everest* game was too challenging for the group, and suggested that

perhaps more people could join, or we could enlist the assistance of some older students.

Alice commented on the lack of collaboration, stating, "Like, it's just weird because you don't have any idea, like, what they're doing, and if we ask, they just don't tell us, and…" This was in reference to her asking where others were located in the game, to which other students often did not reply, or told Alice that they did not want to tell her their location. Sharon also commented on this, stating, "I don't like how people trap people, like in houses, because we don't get a lot of things done. And also I don't want the mission to be, like, too hard because it's gonna take a lot of time, and, like, we're not gonna have much time." Justin reported that he found the game to be boring and not challenging enough, explaining, "…cuz we could only go looking for iron, stuff like that, couldn't really build much or fight zombies. I like it when you can die in the game, and then re-spawn without your stuff, and then you start all over again."

Both Sharon and Michael commented specifically on the aspect of having a mission and how that made *MinecraftEDU* more enjoyable than the traditional game. Sharon also mentioned that she often felt ignored by the group and as though the others did not listen to her. Justin described how he enjoyed being able to play with his best friend, Michael, but also noted that he felt the game was sometimes too hard, and also sometimes too boring.

Roles within the game. Michael, Sharon, and Alice all identified Justin as the leader of the group, as he had the most experience playing the traditional *Minecraft* game and was able to help the other three. Michael and Sharon also noted that each participant's role changed from day to day, depending on the specific objectives they were working toward. Although Sharon described Justin as the leader of their group, she

noted that this differed from his usual role in the classroom, in which he often gets into trouble.

Phase 3: Final Interview

Approximately one week following the culmination of the intervention, all four students were interviewed for the third and final time (Appendix C). The purpose of this final interview was to collect data regarding the participants' perceptions of using English to complete the tasks within the *MinecraftEDU* game. This also included their beliefs on how useful the game might be for learning and practicing English, along with their feelings toward speaking English with other ELL's.

MinecraftEDU as a Tool for Using English

Michael described *MinecraftEDU* as a good place to practice his English, stating, "It's almost like something, like living here, on Earth. It's like the same thing." Alice, Michael, and Sharon noted that the game had specific vocabulary that differed from real life. Sharon also pointed out that others in the group would occasionally employ grammatically incorrect sentences, but that she would not correct them:

> *Researcher*: 'What about listening to other people, when they're speaking in English? Was there ever, were there ever times when you were, like, not sure what they were saying?'
> *Sharon*: 'Sometimes they're like, they're…they go like…it has to be a past sentence, but they don't make it, but I still know what they're saying, like…'
> *Researcher*: 'Can you give me an example?'
> *Sharon*: 'Like if they fell from a cliff, then like Michael says it like, 'I fall from the cliff.' I know what he's saying, but like…'
> *Researcher*: 'But he's not saying it correctly?'
> *Sharon*: 'Yeah.'
> *Researcher*: 'Would you ever correct him if he said it like that?'
> *Sharon*: 'Not really.'
> *Researcher*: 'Why wouldn't you correct him?'
> *Sharon*: 'Because I feel sorry.'

When asked if *MinecraftEDU* might be a good tool for using and practicing English in general, Justin, Sharon, and Alice were largely indifferent. Alice felt that the group aspect of the game was helpful, but that it would have been better to work on something in real life, so that the others wouldn't have the capability of shutting her out or ignoring her as much. Sharon described how she often could not think of the English word she needed while playing the game, and would instead try to use a word with a similar meaning. Overall, she did not feel that *MinecraftEDU* helped her learn or practice English any differently, although she did explain that, while she feels that she normally thinks in English during the school day, she found herself thinking in Japanese and then translating to English while playing *MinecraftEDU*.

Michael had the most positive response to using the game as a tool for using and practicing English, stating, "I think if we use English, sometimes there's the word we don't know, but I think we discovered a lot of things in *Minecraft*, a lot of words." He also commented on the collaborative aspect of the game, emphasizing that he felt the partner and group work facilitated more conversation and overall learning.

Interactions with Other English Language Learners

All three Japanese students remarked on their use of English outside of school with other Japanese students. Instead of conversing in their native language, the Japanese students often choose to speak in English with one another, switching back to Japanese only when another's English abilities are not developed enough to participate in the conversation. While Michael and Sharon independently relayed similar accounts of these interactions, Alice specifically commented on her dislike for speaking English around other Japanese students, aside from Sharon who is a good friend.

Alice: 'I don't like speaking, like, English with, like, Japanese because it's just like weird, and they judge us.'
Interviewer: 'Oh you mean you speaking English to other Japanese speakers? Like Sharon and Michael?'
Alice: 'Yeah, but I'm used to Sharon because she's, like, my friend, and she lives in the same apartment and also we speak in English with, like, in Japanese school, so I'm used it, but I hate it when I speak with others, like umm…Michael.'
Interviewer: 'Like Michael? Are there any Japanese kids in your class?'
Alice: 'No.'
Interviewer: 'Have you had other Japanese kids in your class before?'
Alice: 'No.'
Interviewer: 'Never?'
Alice: 'Well I had it like once in the other school, and they're like judging us. They just judge me even though they're, like, badder than me. They're like 'I'm better than you,' and I was like…'

Beliefs about Learning English

Ultimately, the four students all independently felt that working with native English speakers was the best way for them to improve their target language skills. Alice stated that different areas of the world speak different types of English, and because of that, she felt that group projects were the most beneficial to learning English.

Interviewer: 'So, if you, let's just pretend for a minute that you were going to move to America next year and go to an American school. What do you think would be most helpful for your English?'
Alice: 'Like if you cooperate like in a project, like you get to know like different country words, like because everyone comes from different countries.'
Interviewer: 'Oh that's true.'
Alice: 'And like in America you say 'soccer,' but in Britain you say 'football.' And we get to learn different ways of saying stuff.'
Interviewer: 'So you think working in like group projects and stuff like that would be helpful?'
Alice: (nods) 'Kind of like, I wish we could do it in real life. Not in computers so he can shut me off and then kill me. Because in real life we don't get to have swords. There's no like zombies, and there's like animals, like birds flying there.'

> *Interviewer*: 'Is there any part of Minecraft that could be like that? Like a group project where you think you could improve English? Do think there was any part of that activity that would work like that, or was it just fun hanging out?'
> *Alice*: 'Fun hanging out.'

Alice's comments about working with others on group projects do not seem to extend to interacting within a game environment, such as *MinecraftEDU*. Michael initially stated that having an English tutor, or receiving help from his father, would be the best way for him to advance his English language skills. However, toward the end of that same conversation, when asked if he thought traditional instruction (i.e., books and a tutor) was better than practicing online, he immediately changed his answer and stated that he felt *MinecraftEDU* was the best way for him to practice.

Interestingly, Michael noted in his third interview that the collaborative aspect of the game differed from how he normally works in his classroom, stating that this helped him learn more words. Considering Michael's English ability as the lowest of the group, this perception has interesting implications. More experienced language learners, such as Sharon and Alice, may not benefit as much in terms of being exposed to new vocabulary, although they may help to facilitate more language learning for someone of a lower ability.

Themes

The second part of the research question in this study was: *What is the nature of these patterns and what does it reveal in terms of these learners' L2 critical thinking and problem solving skills?* Although patterns of negotiation and co-construction of meaning were not identified through the collected discourse in this study, the data did reveal a set of emerging themes that indicate how these language learners used English to

communicate, collaborate, and share with one another within the social gaming environment. These themes include *Independent Game Play*, involving cooperation and collaboration with one another, *Importance of Objectives*, and *Deviant Behavior,* which included teasing, mimicking, and flirtatious statements.

Although each theme contains distinguishing elements, they overlap with one another in various ways as well. For example, episodes of teasing and/or flirting are often associated with tasks and activities that have little to do with the objectives, thus overlapping the *Deviant Behavior* theme with the *Importance of Objectives* theme. While these themes do not directly address the research question in terms of critical thinking and negotiation of meaning, they do provide insight into how the participants of this study communicated with one another, as well as present possible explanations for the unsuccessful replication of Mroz's earlier research.

Independent Game Play

Both *MinecraftEDU* games in this study, including *Escape from Everest* and *Extinction Challenge*, required the participants to work together to achieve the overall objectives of the games. Despite daily discussions regarding the goals and individual roles for the day, it appeared difficult for the group to collaborate toward accomplishing any of the objectives. The students appeared motivated to participate each day, but they did not seem motivated to play the games in the way they were designed. Rather, they appeared to prefer playing independently, exploring various areas of the worlds, and only occasionally checking in with one another to find out what they were supposed to be doing. By the end of the nine-day study, the group was unable to achieve either objective from the two games.

Although the participants seemed to prefer this independent play mode, this did not diminish the occurrence of discourse between them, and conversation was constant throughout the duration of the study. Their conversations largely reflected each participant's individual experiences of the game, rather than a collective, collaborative experience as a group.

The theme of *Independent Game Play* is largely associated with statements representing the second level of Hull and Saxon's (2009) coding table (Table A.1). This includes category 2a: statements of observation or opinion; 2b: simple responses to questions or instructions; and 2c: the defining, description or identification of a problem. The percentage of statements representing the sub-category 2a of statements of observation or opinion represented the largest part of the overall discourse and occurred regularly between individuals throughout the course of the study. Although the participants continually spoke with one another throughout each session, their statements often consisted of simple observations about what they were seeing, items they wanted to acquire, actions they wanted to exert, or exclamations toward one another. Additionally, students often posed rhetorical questions that they either answered immediately after asking, or to which no response was necessary or given.

The below excerpt is taken from Day 4 and shows how the students seem to be reading off items they have found, rather than sharing information, collaborating, or devising strategies to complete the objectives of the game.

> *Alice*: 'Do you have any idea where I am?'
> *Justin*: 'Bats! That's such a long…ugh. So much lava though man.'
> *Sharon*: 'I can't see anybody.'
> *Michael*: 'I found a chest.'
> *Justin*: 'I see sand. Is sand usable?'
> *Michael*: 'Oh, I found a bone.'

>*Justin*: 'Should we use sand for anything?'
>*Michael*: 'Three steak.'
>*Justin*: 'Cuz I found sand. Do we need sand?'
>*Sharon*: 'Pickaxe.'
>*Alice*: 'No.'
>*Michael*: 'Who wants some water?'
>*Justin*: 'Just open your mouth. You'll get some water.'
>*Michael*: 'That's so weird.'
>*Alice*: 'Can you get a bucket?'
>*Justin*: 'I have a bucket.'
>*Alice*: 'Justin.'
>*Justin*: 'You gave it to me. You shouldn't have.'

Interactions such as this were ongoing and numerous throughout the study, regardless of the world the participants were in or how much experience each individual had in that particular world. On most days, players would log in to the game and immediately venture off on their own, regardless of the discussions held at the start of each session. This behavior did not seem to be purposely against the mission or daily objectives, but simply what each participant wanted to do.

Justin often provided an ongoing monologue of his actions and thoughts each day, seemingly talking to himself at many points. Below are two examples of this discourse taken from two different days while playing *Escape from Everest*.

Day 2 – Escape from Everest:

>*Justin*: (singing) 'I don't care…I love it.' (stops singing) 'No, I'm gonna get stuck in that dumb trap again. Such a dumb trap. Oh yeah, it's good to throw stuff that you don't need. Out you go. Out you go.'

Day 4 – Escape from Everest:

>*Justin*: 'What is going on? Even if you press 'S' at the same time, it will help you get up. Oh look! There's glowstone right…Sharon, you missed it! There's glowstone right on top. Oh, you can't break that. What the? I see why she didn't get it. Smart. I'm gonna build another platform to get some more, some more things…okay?'

Although it may appear that Justin is speaking to the group in these scenarios, there was generally no preceding conversation that led to these statements, nor was there any response from the group afterwards. Justin's statements appear to be simply an oral narration of the thoughts he had at the exact moment he was playing the game.

Sub-category 3e, asking clarifying questions, is also largely represented within the *Independent Game Play* theme, as the participants regularly asked one another about the importance of certain tools, where items or other participants were located, and whether or not certain actions were possible. In the following two examples, players pose a series of clarifying questions to one another. The second excerpt shows the combination of clarifying questions from sub-category 3e, along with a series of observations representing sub-category 2a.

Excerpt from Day 3 – Escape from Everest:

Alice: 'Did you get it? Michael, where are you?' 3e, 3e
*Sharo*n: 'I don't need a map…wait, what?' 2a, 3e
Alice: 'Did you need a map?' 3e
Sharon: 'No…' 2b
Alice: 'I have like 7 maps.' 2a
Sharon: 'I don't need clay.' 2a
Alice: 'What is a diamond?' 4b
Michael: 'You don't need diamonds.' 5a
Justin: 'Look at the map. It's so bad. It's so tiny. 1a, 2a, 2a, 3e
 Do you have any glowstone?'

Excerpt from Day 7 – Extinction Challenge:

Justin: 'It's daytime. Oh, I don't like the nighttime. Oh, I 2a, 2a, 2a
see someone down there.'
Michael: 'Do we need wood?' 3e
Alice: 'Oh, Miss Rich is flying.' 2a
Justin: 'What's my skin?' 3e
Michael: 'It's so night again.' 2a
Justin: 'I see you. You're…you're under me. I see you.' 2a, 3c
Alice: 'What?' 3e
Justin: 'Yeah, I'm on top of you, 'cuz I climbed up.' 4c, 3c
Michael: 'I can't see anything.' 2c

Justin: 'It's dark.'   2a
Alice: 'Can you turn it off?'   3e
Justin: 'Can you turn it to day?'   3e
Sharon: 'I don't think she can.'   2b
Alice/Justin: 'Yes she can.'   2b
Justin: 'See, it's day.' (pause) 'Ha, I'm going way faster than you.   3c, 2a
See, I'm sprinting on land. I'm on top of the world!'   3c, 2a
Michael: 'I have so many fence.'   2a
Justin: 'Oh right. I have a pickaxe. I can break the clay.'   2a, 2a

It is worth noting that statements within sub-categories 3b and 3d, representing

realization of agreement and providing encouragement, respectively, were not present on

all days and comprised a mere 1% of the total discourse produced by the group. The lack

of statements in these two sub-categories reinforces the idea that the participants rarely

collaborated with one another, nor did they provide support or encouragement to one

another. Additionally, there were times that one player would suddenly realize that

another player was correct about something, but would not admit that the other player

had that knowledge first.

Interestingly, all four participants remarked on how they enjoyed the collaborative

aspects of the game, specifically commenting about the roles each person had and how

the group was able to disperse the workload. However, at the culmination of the study,

most of the participants contradicted these statements in some manner. Below is an

excerpt from Sharon's third interview as she described one aspect of playing in the group:

> *Sometimes I felt ignored because, like, when I said, like, 'You can go to that place*
> *and you can collect things,' they don't like to listen. And then, like, they get lost*
> *and, like, I'm like, 'I told you to go there,' but they didn't follow. So…'*

Michael also noted that some of the participants wasted precious materials or spent too

much time on tasks that did not relate to the mission. Alice's comments during her third

interview describe a similar perception of group collaboration:

> *Researcher*: 'So how hard or how easy was it to agree on things as a group when you were working?'
> *Alice*: 'It was pretty hard because, like, even though you just agree, they just do it, whatever they want.'
> *Researcher*: 'When you say 'they,' who are you talking about?'
> *Alice*: 'Like Justin and Michael.'
> *Researcher*: 'Right. How hard or easy was it when you were talking? Did you feel like the other people heard you or were listening to you?'
> *Alice*: 'Sometimes, yes. But I think sometimes, you know how we ignore each other? And, like, doing it on purpose, and I do too, so it's…'

Importance of Objectives

The second emergent theme is closely linked with *Independent Game Play*, but focuses on the specific lack of attention to the game's objectives. At the start of each session, the four participants reviewed the overall mission of the game they were currently playing, while also identifying the specific jobs they would each have that day. During the *Escape from Everest* game, the students showed a higher awareness of both the overall mission and daily objectives, as compared to statements made during the *Extinction Challenge* game. Regardless, the students often participated in activities or tasks that were either not necessary or were in direct contradiction to the game's objectives. The first example here is taken from Day 2 during the *Escape from Everest* game. Justin and Michael had used much of their time that day to build a house, which was not a necessary task or part of the daily objectives. Alice and Sharon decided to try and break the house down, which was very upsetting to Justin.

> *Justin*: 'I have seven crafting tables. HEY! Why are you breaking...!'
> *Alice*: (laughs)
> *Justin*: 'Hey…you rude girl.'
> *Alice*: 'Hey, go somewhere else.'
> *Justin*: (laughs) 'Dude I broke it already. Whoa. Couldn't you just get out of the exit? Look!'
> *Alice*: 'No.'
> *Justin*: 'It's wide open!!'

Sharon: (laughs)
Justin: 'Please?? C'mon, I said please.'
Alice: 'Please doesn't work.'
Justin: 'Heeey. What the? Hey, stop breaking our house! Get out of here! Oh my god!'
Alice: 'I'm just gonna break one more stone.'
Justin: 'No!! Hey no!! I'm in front of it – you're going to have to punch me.'
Alice: 'Okay. Should I make an island?'
Justin: 'See when I'm crouching, I'm mad. I'm crouching. I'm mad.'
Alice: 'Okay, just get mad.'
Alice: 'What are you doing?'
Justin: 'I'm crouching because I'm mad. Alright, get out of there. Stop breaking it!'
Alice: 'The whole point is not making house.'

Through this interaction, Alice damaged much of Justin's house. He repaired most of it afterwards, only to find that Alice returned later in the session to try and break it again. It was unclear during these episodes if Alice was simply trying to keep the group on task, or if she enjoyed the interactions with Justin and was seeking attention in a flirtatious manner.

This following excerpt is taken from Day 5 of *Escape from Everest* during a point in the conversation when Michael realized that Sharon had a set of armor. Armor was not necessary within this game, and in fact, used precious materials that the participants needed in order to complete their objective. Not only did the group show a lack of concern regarding the game's objectives, but they also seemed indifferent to the idea that producing armor would be counter-productive to reaching their goals.

Michael: 'My God…Sharon has armor already.'
Justin: (mimicking) 'Arm-er.'
Michael: 'Armor.'
Sharon: 'Me?'
Justin: 'Yeah, you have armor. You have diamond boots. I mean, diamond leggings. I only have boots.'

Michael: 'I only have helmet and pants.'
Alice: 'What is this place?'
Justin: 'We don't even need…we don't need armor, you know. We can't die. We don't need armor.'
Michael: 'It looks cool for us.'
Alice: 'What is this place?'
Justin: 'I wish I could change back to…'
Michael: 'Do we need gold?'
Justin: 'No. Maybe. I don't know.'
Michael: 'I think we need it.'
Justin: 'No, we don't.'
Michael: 'I wish we do.'
Alice: 'Don't wish.'

While playing in *Extinction Challenge* the participants often appeared unsure of their objectives, despite the fact that these were discussed at the start of each day's session. Part of the goal of this game was to capture and pen as many animals as possible, in order to build a food supply for themselves, as well as repopulate the various species.

Figure 4.8.   Screenshot of Day 9: *Extinction Challenge*

This objective was not achieved, in part due to the participants' tendency to participate in tasks that were counter productive. For example, on the last day of the study, Justin found a horse that he should have lured into a pen for safety. Instead, he spent time riding it around, before eventually killing it (Figure 4.8).

>*Justin*: 'That's a really cool horse. That's actually a really cool horse, I have to admit.'
>*Alice*: 'Like you.'
>*Michael*: 'I think you're gonna die.'
>*Justin*: "Hiii-ya! Sorry horsey!'
>*Michael*: 'You, like, you like, gonna kill him? So weird.'
>*Justin*: 'Can I ride you? He's kicking me'
>*Michael*: 'He hate you.'
>*Justin*: 'I killed it. I killed a horse everybody. I'm a criminal.'

Although the group occasionally reviewed an objective during game play, there was often a level of confusion reflected in these conversations. The below excerpt from Day 5, the last day of playing *Escape from Everest*, describes a typical conversation regarding the number of glowstones the group needed to make. Considering that this was the last day playing this particular game, it was surprising that there was any confusion.

>*Alice*: 'What are we supposed to do again?'
>*Researcher*: 'Yeah, what are you guys trying to do today?'
>*Alice*: 'How many glowstones do we have now?'
>*Justin*: 'Like 300 something…I forgot.'
>*Sharon*: 'We need 300 more?'
>*Justin*: 'No, we need 200-something more.'
>*Alice*: 'About 400.'
>*Michael*: 'Oh, so we need 400? I thought we need 500.'
>*Justin*: 'Yeah, we need 500.'
>*Alice*: 'Yeah, we have about 350.'
>*Justin*: 'No, 318. 316 or 318.'

During personal interviews, each participant commented on the importance of objectives in some manner, although this was not consistently reflected in their in-game behaviors and conversations. Michael remarked on how often the others wasted materials or participated in activities unrelated to the objectives, such as building houses. In the below excerpts, taken from their final interviews after the study had concluded, both

Sharon and Alice independently admitted that they weren't always aware of what they

were supposed to be doing:

> Interview #3: Sharon
>
> *Researcher*: 'Did you feel like you knew what the missions were, like you were aware of what the missions were when you were playing the whole time, or did you find that part to be confusing at all?'
> *Sharon*: 'In the Mt. Everest, escaping from the Mt. Everest, like finding the glowstones and then making them into blocks, but like in the other one, I didn't really, like, really know what to do. I just collected pigs and put them in pens.'
>
> Interview #3: Alice
>
> *Alice*: 'Like, sometimes we forget what we're supposed to do, and we just, like, explore things.'

Deviant Behaviors

Another possible explanation for the lack of collaboration and apparent disregard

of the game's objectives may stem from the abundance of interactions that are classified

here as *Deviant Behaviors*. These behaviors include teasing and mimicking one another,

as well as flirtatious and attention-seeking behaviors. The majority of interactions

involving these behaviors were short and, at times, difficult to discern from one another,

as the teasing was not necessarily malicious or mean, but rather playful and possibly

flirtatious. Generally speaking, many of these behaviors appear to be part of a identity

exploration process that is typical of pre- and early-adolescents, in which individuals

experiment with different facets of their personalities in order to investigate how others

respond, overcome shyness, and form friendships or relationships (Valkenburg,

Schouten, & Peter, 2005).

Flirtatious behaviors. Behaviors categorized as flirtatious began to emerge on

the second day of game play and increased in frequency as the study progressed.

Overwhelmingly, these behaviors were initiated by Alice and directed toward Justin,

although both Michael and Sharon participated intermittently as well. Because of the

difficulty discerning between playful teasing and flirting, there is some overlap in the two

sub-categories of teasing and flirtatious behaviors.

The first example is from Day 3 and involves Alice, Justin, and Sharon. This

particular episode follows the typical pattern of discourse displayed by the group in that

the flirting, and possible teasing, takes place quickly, and then the group moves on to a

new topic.

Day 3 – Escape from Everest

Sharon: 'Oh, there's my glowstone dust!'
Justin: (mimicking) 'There's my glowstone dust!'
Alice: (baby voice) 'Is it your baby?'
Justin: 'Eww. What are you talking about?'
Alice: 'Sharon.' (pause) 'Okay, where are you Justin? For real.'
Justin: (singing) 'None of your business!' (normal voice) 'I'm getting some
glowstone. Are you happy? I told you.'

During several days of the study, Justin purposely chose an avatar that appeared

to not have any pants on. Each day he would make an exclamation of his state of undress,

seemingly in an effort to provoke some type of reaction from the group. The following

excerpt from Day 3 is the first time he brings this topic up.

Justin: 'Wait, what if I pull this? Wha-?! I don't have any pants on! Don't
look at me! It's not my fault – it's the skin. I forgot to wear pants this
morning.'
Alice: 'Gross.'
Justin: 'What gross? It's not my fault. I slept too late.'

Alice often appeared to employ certain strategies in order to get Justin's attention,

especially if he was speaking to Sharon. Alice would make remarks such as, 'That's sad,'

to which Justin would demand an explanation. As with most of the flirtatious behavior,

these interactions were brief, but common. The below excerpt is taken from Day 3,

Escape from Everest:

> *Sharon*: 'Oh there!'
> *Justin*: (mimicking) 'Oh there!' (normal voice) 'About time you find it.'
> (mimicking) 'I'm stuck.'
> *Alice*: 'That's sweet.'
> *Justin*: 'How's that sweet?'
> *Alice*: 'It's a good thing.'
> *Justin*: 'It's not a good thing. It's a waste of my pickaxe.'
> *Alice*: 'That's sad.'
> *Justin*: 'How?' (pause, no response from Alice) 'Ow. It hurts to break glass
> with a hand.'

As the study progressed, and the frequency of Alice's flirtatious/teasing

statements toward Justin increased, Michael began commenting on Justin and Alice's

banter, making remarks such as, 'Oh, you guys are in love. They fall together.' Neither

Justin nor Alice would respond to these comments, and conversation would generally

continue onto another topic. On Day 5, Michael began making statements about Justin

and Alice being a good match. Justin and Alice didn't necessarily argue with Michael,

but it may have been a factor that inhibited future collaboration between the two of them.

The below passages are examples of Michael's teasing, including the initial conversation

that took place, along with a subsequent example of teasing.

> Excerpt from Day 5: Escape from Everest

> *Michael:* 'Do you like, you like fighting each other?'
> *Alice:* 'Hey, are you saying to us…like me and you?'
> *Michael:* 'The thing is that you guys always talk together.'
> *Justin:* 'No – she's just talking about me in the bathroom.'
> (Alice laughs)
> *Michael:* 'See? Alice's the only one who laughed.'
> *Alice*: 'What the heck?'
> *Justin:* 'Yeah, see, you're the only one who laughed. You laugh at things that
> aren't funny.'

Alice: 'Thank you.'
Michael: 'You guys might be match because you're both weirdo.'
Justin: 'How about you and _____' (another girl in their class)? 'Or you and Sharon?'
Michael: 'What? Why? Where's the match? I see no match. Sorry.'
Justin: 'There is, there is. There's a big match.'
Michael: 'Where?'
Justin: 'Giant match.'
Michael: 'Where?'
Alice: 'Between your brains.'
Michael: 'I'm not smart. She's smart.'
Justin: 'Doesn't really matter about smartness.'
Michael: 'But you guys are both weird.'

Later, during Day 7, Michael again noticed the interactions between Justin and Alice, although his comments were subtle. Neither Justin nor Alice responded to his remark below:

Justin: 'I'm dragging some chickens. Alice, can you help me?'
Alice: 'Yeah, how do you do it?'
Justin: 'Break these...these leaves everywhere, and get seeds and keep them on your hand and they'll follow you. The chickens will follow you.'
Michael: 'You guys are working together?' (under his breath) 'Woo-hoo.'

At times the conversation included teasing or flirtatious remarks that were directed at students outside the group. The following example is taken from Day 5 and shows a conversation about another 4th grade girl, who is in the same class as Alice. Without any apparent prompting, Justin initiated the conversation, possibly to elicit a reaction from Alice.

Justin: 'And I don't like Maria. She is so ugly.'
Alice: 'Who?'
Justin: 'Maria. Have you seen her teeth? It's like…' (makes vomiting sound). (Silly voice) '"I'm a retard."'
Alice: (laughs)
Sharon: 'Who's Maria?'
Alice: 'I'm so gonna tell Maria that.'

Michael: 'Oh, the girl that Justin likes?'

Justin: 'What the? You're so mean! It's the girl *you* stare at!'

Alice: 'Yeah.'

Michael: 'Actually Chris started it.' (another boy in Justin's class)

Alice: 'Yeah, I know.'

Justin: 'Chris and me, but mostly Chris.'

Alice: 'No, mostly you.'

Justin: 'No, mostly you. You're a 'les-bon.''

Teasing and mimicking. The group exhibited various forms of teasing and mimicking one another throughout the study. The majority of language-related teasing and mimicking took place against Michael, whose Japanese accent was the strongest of the three Japanese speakers. During his initial interview, Michael described the difficulty he has with certain letter sounds in English, most notably with the /r/ and /l/ sounds. This became evident during the study, and the other three participants often mimicked his pronunciation of words containing these sounds. These mimicking episodes were generally very short. Also notable was Michael's lack of involvement when teased or mimicked. He rarely contributed to the conversation at that point, either to clarify the word and say it correctly, or to defend his position in any way.

Day 4 – Escape from Everest

Michael: 'Dude, does anyone have crafting table?' (pronounced 'clafting')

Alice: (mimicking Masa) 'Clafting.'

Justin: 'Clafting.'

Alice: (laughs)

Justin: 'Claft. Who needs a clafting table?'

Alice: I do. Sharon, do you need it?

Michael: I need it now.

Justin: (mimic) Sharon, do you need it? Ugh…dude I can't find that cave I went in.

Day 4 – Escape from Everest

> *Michael*: 'Is it me? It's a gold.' (pronounced 'goad')
> *Justin*: 'What's a goad?'
> *Sharon*: 'Goad? What's a goad?'
> *Justin*: 'A goat? You.'
> *Michael*: 'Gold.' (pronounced 'goad')
> *Alice*: (laughs)
> *Justin*: 'I don't like goats. Goats smell.'

Michael's lack of response to these interactions may have been due to embarrassment, although he never exhibited any outward signs of this. Alternatively, it may have stemmed from his involvement in the game and his overall lack of interest in correct pronunciation. This aligns with earlier research asserting that language learners in social gaming environments are less afraid of failing due to their focus on the game, rather than on the linguistic accuracy of the target language (Berns et al., 2013; Blake, 2013; Chen, 2005; Dourda et al., 2014).

Other types of teasing and mimicking generally involved re-stating something in an altered voice. Sharon was the only participant in the group who did not participate in this, although she would often laugh in response to others' remarks. Alice directed a substantial amount of teasing and provoking toward Justin throughout the study, although this was generally delivered in a small, understated voice. The below excerpt from Day 5 between Alice, Justin, and Michael is an example of this type of interaction, in which Justin had recently returned from the bathroom and Alice appears to intentionally provoke Justin.

> *Justin*: 'Talking about what? Me and the bathroom?'
> *Alice*: 'Yeah.'
> *Justin*: 'Thanks a lot.'
> *Alice*: 'I know.'
> *Justin*: 'You're so mean. Why do you need to talk about me?'
> *Alice*: 'What?' (laughs) 'Okay, what Michael?'

Justin: 'You're a strange girl.'

Alice: 'I know.'

Sharon: 'You are.'

Justin: '…and why would you…what the? I saw iron in the…I just…'

Alice: 'I know.'

Justin: 'You know nothing about me! You don't even know my age.'

Michael: 'I know. It's ten.'

Justin: 'Hey! You *should* know.' (to Alice) 'You don't even know when I'm born. You don't even know where I live.'

Michael: '2003.'

Sharon: '2003?' (Incredulous)

Justin: 'No!'

Michael: 'I mean, 2005. January 21st.'

Justin: 'Dude! Shut up! Dude, you're so dumb! It's not even…dude!'

Michael: 'Wait. Correct? Or?'

Justin: 'No, wrong. That's not when my birthday…'

Alice: 'It is.'

Justin: 'It's not my birthday! It's February 21st.'

Alice: (baby voice) 'Aww.'

Michael: 'That's what I said.'

Justin: 'No, you said January.'

Sharon: 'Yeah, you said January.'

Alice: (sarcastic) 'Sorry.'

Justin: 'Are you guys teaming up against me cuz you're all Japanese?'

This exchange lasted longer than usual and shows how Alice's statements often provoked strong reactions from Justin. Although she generally made short remarks and comments, her statements appeared to intentionally elicit some type of reaction from Justin. Generally speaking, it was difficult to discern if Alice used this strategy to tease Justin, or rather to get his attention in a flirtatious manner.

Episodes that involved deviant behaviors are especially noteworthy in that these behaviors do not necessarily coincide with the usual behaviors exhibited by these individuals in their normal classroom environments. Alice's behaviors in the game environment appeared most different from her typical classroom behaviors. She

repeatedly made comments and remarks in what appeared to be attempts at flirting with Justin, getting attention from Justin, or teasing Michael in order to get a reaction from the rest of the group. This differs from the quiet, studious personality normally observed at school.

Sharon revealed that Justin is generally thought of as a troublemaker in his normal classroom, but in the *MinecraftEDU* environment the other three participants independently designated him as the leader. Although he was involved in nearly all interactions involving deviant behavior, he rarely initiated these conversations, and instead seemed more reactive, often in self-defense. Michael was often teased and mimicked for his mispronunciation of English words, to which he rarely reacted outwardly. Not only did he seemed indifferent to this mimicking, he reported very positive feelings about working in the group overall. Sharon was not a victim of teasing or mimicking, nor did she initiate any deviant behaviors. Instead, during conversations containing deviant elements, she either remained silent or responded by laughing.

Conclusion

The goal of this replication study was to duplicate Mroz's (2012) earlier research using a sample of language learners who differed from the original study in age, native language, and target language. Mroz's research successfully identified patterns of negotiation and co-construction of meaning among a group of university-aged French language learners engaged in a series of task-based activities within the social world of *SecondLife*. Through the course of this current study involving a nine-day intervention, three sets of individual interviews, and daily observations, patterns of negotiation and con-construction of meaning were not identified. Students overwhelmingly engaged in

conversations containing simple observations and opinions, as well as clarifying questions that reflect lower-order thinking skills.

Through an iterative process of qualitative content analysis, three themes emerged that are classified as *Independent Game Play*, *Importance of Objectives*, and *Deviant Behavior*. These themes offer insight into how this particular group of language learners used English to communicate with one another. A discussion of this study's findings, including the possible implications the emerging themes may have, and are further examined in the following chapter.

CHAPTER FIVE: DISCUSSION

This study investigated the collective discourse produced by a group of

elementary-aged English Language Learners (ELLs) engaged in task-based activities

within the social gaming environment of *MinecraftEDU* in order to determine if patterns

of critical thinking, problem solving, and negotiation and co-construction of meaning

were present. This purpose of this study was to replicate earlier research, conducted by

Dr. Aurora Mroz (2012), in which university-aged French language learners participated

in task-based activities within the social game environment of *SecondLife*. The current

study purposely modified specific aspects of Mroz's original work; namely, the age of the

participants, the social game, and the target language. Modifications were also made to

the data analysis method. Mroz's study used a mixed methods approach that employed

statistical analysis of the coded discourse, along with a case study methodology. The

current study used a case study approach that included qualitative discourse analysis to

analyze the daily discourse. The research question for this study was as follows:

> Do patterns of L2 negotiation and co-construction of meaning exist in the
> discourse produced collectively by a group of elementary English language
> learners working collaboratively to solve a complex problem as they are
> immersed in a social gaming environment? If so, what is the nature of these
> patterns and what does it reveal in terms of these learners' L2 critical thinking and
> problem solving skills?

The results from Mroz's (2012) study revealed that increased levels of critical

thinking, negotiation, and co-construction of meaning occurred at Levels 1, 2, 5, and 6.

Unlike Mroz's research, the analysis of discourse in the current study did not reveal

patterns of critical thinking, negotiation, and co-construction of meaning. Instead, a set of themes emerged that help describe the nature in which this particular group of language learners communicated with one another. While this does not directly relate to the participants' critical thinking and problem solving skills, it does reveal patterns regarding their communication in the target language in general. This chapter begins with a comparison of the results of the two studies, highlighting the similarities and differences. Following this is a discussion of the results and how they relate to the current literature regarding gaming and language learning. The chapter concludes with a discussion regarding implications and recommendations for future research, along with the limitations of this study.

<div align="center">**Comparison of Results**</div>

Both Mroz's (2012) research and this current study employed Hull and Saxon's (2009) Coding Table for Social Constructivist Interactions (Table A.1) to analyze daily discourse in order to determine if patterns of negotiation and co-construction of meaning occurred between language learners engaged in task-based activities within social gaming environments. As discussed in Chapter III, discourse coded at Levels 4 through 7 is considered indicative of the types of higher level thinking that include critical thinking and problem solving. The results of this study did not show patterns of discourse at Levels 4 through 7, but instead revealed that the majority of statements and questions occurred at Levels 1 through 3.

Mroz (2012) used a statistical analysis of the coded discourse to determine if the intervention had a significant impact on the critical thinking skills of the five participants. She used a nonparametric test of variance (Friedman's test) which revealed that the

discourse was affected at four out of the seven levels of critical thinking as described by

Hull and Saxon (2009), including Levels 1, 2, 5, and 6. Levels, 3, 4, and 7 were not

impacted one way or another by the intervention. Mroz conducted descriptive statistics in

place of a reliable post-hoc test. Included in the statistical analysis are both the means of

the collective discourse and the standard deviations, both collected per day and per level

of critical thinking.

<u>Discourse at Levels 1-3 (Lower Level Thinking)</u>

Level 1 discourse included statements that involved the initiation of a new activity

or task, along with clarifying remarks. In Mroz's (2012) study, the intervention was

found to have affected discourse at Level 1, revealing slight increases during the first two

days of the intervention. This corresponds to her group's activities during those days in

which new tasks were undertaken. This is similar to the current study, in which the first

two days also showed higher occurrences of discourse at Level 1, after which occurrences

at this level dropped until Day 5. On Day 5 during the current study, the second game

was introduced, and occurrences at Level 1 again increased and remained relatively

constant for the remainder of the study.

Mroz's discourse at Level 2 followed similar patterns to her Level 1 discourse.

There were slight increases in occurrence at Level 2 during the first two days of her

study, after which levels decreased. In the current study, however, discourse at Level 2,

specifically within subcategory of 'Statements of Observation or Opinion,' comprised the

highest percentage of the total discourse collected, averaging 26% per day. One possible

explanation for the elevated rates in the current study is the high degree to which each

participant took part in individual tasks and exploration, rather than collaborative group tasks.

Discourse at Level 3 had the highest daily means of the intervention in Mroz's (2012) study, although she determined that Level 3 discourse was not significantly impacted by the intervention itself due to the consistent levels of occurrence throughout the study. Mroz describes how interactions at Level 3, while not considered 'high level critical thinking' by Hull and Saxon (2009), are nevertheless noteworthy:

> These results are important, notably at Level 3 (situated definitions), as they tend to corroborate results on *positive* negotiation of meaning and *grounding* (emphasis in original)....as discourse in episodes of negotiation of meaning among L2 learners primarily develops on the establishment of common ground among the interlocutors. (p. 173)

In the current study, discourse at Level 3 comprised the second highest level of daily occurrence at 29.48% overall and averaged 19% per day. Of the five sub-categories within Level 3, sub-category 3e, 'Basic Clarifying Questions,' had the highest occurrence. Peterson (2009) describes these exact types of clarifying questions, along with requests for information to be repeated, as fundamental aspects of negotiation of meaning. Requests for clarification, along with modifications and manipulations of the target language, are also considered critical components of negotiation of meaning (Foster, 1998; Nakaham et al., 2001). While the discourse at Level 3 does not correlate with levels of critical thinking that represent higher-level thinking, it does represent a beginning stage of negotiating meaning and seeking clarification between the participants (Peterson, 2009).

Discourse at Levels 4-7 (Higher Level Thinking)

Discourse at Level 4 is considered the first formal step in the process of a collective negotiation and co-construction of meaning within a group. In Mroz's (2012) research, discourse at this level was constant and highly present throughout her study. The standard deviations at Level 4 were also the highest of all categories in Mroz's study, indicating that not all of her five participants contributed to this level of discourse equally. In the current study, statements and questions at Level 4 comprised only 14% of the overall discourse, with varied daily occurrences. The first three days of the intervention showed the highest levels, ranging from 8-10%, specifically at sub-category 4b, 'Asking and Answering Questions.' After the third day of the current study, levels at this sub-category dropped to between 4-6% for the remainder of the study.

Discourse that took place at Level 5 in Mroz's (2012) study grew throughout the duration of the intervention and reached a peak during the second half of the study. Discourse at this level represents attempts at bridging new information to situated definitions. As the discourse at level 5 increased during Mroz's study, so did the types and volume of contributions from each member. Essentially, some participants contributed much more at this particular level than others. Also, as the study progressed and the participants engaged in increased amounts of discourse at Level 5, they conversed less at Level 2 (Shared Information). Approximately 2% of the total discourse produced in the current study represented conversations at Level 5, indicating that the participants were not attempting to bridge prior information to new and unfamiliar situations. Although these levels increased slightly during the last three days of the study, the rate of overall occurrence is considered minimal.

Level 6 discourse was minimal during the first six days of Mroz's (2012) intervention and increased only slightly during the last two days. This indicates that her group did not spend any notable amount of time generating and testing new hypotheses. This is very similar to the findings from the current study, in which only 1% of the daily discourse represented Level 6. As very little discourse was produced at Levels 4 or 5, it is understandable that there is an overall lack of discourse at this particular level.

In both Mroz's (2012) study and the current study, discourse at Level 7 was considered low and unaffected by the intervention. Discourse at this level represents the application and testing of new ideas, including feedback on the rates of success for each new attempt. Due to the low occurrence of discourse at Levels 4, 5, and 6 in the current study, it was expected that Level 7 discourse rates would be similarly low. The low occurrence of Level 7 discourse in Mroz's study was somewhat unexpected, as the students in her study generated new ideas and theories (Level 5), but did not necessarily test these ideas in new situations.

Overall, the group discourse produced in Mroz's (2012) study revealed a significant increase in the amount of higher-level thinking as the study progressed, alongside a simultaneous decrease in the discourse representing lower level thinking. This indicates that, as the study progressed, students relied less and less upon lower level thinking skills and more upon higher level thinking skills. Medium level thinking skills (Level 3) remained relatively constant in Mroz's study, indicating that participants consistently engaged in this type of discourse.

<u>Occurrences of Higher Level Thinking</u>

While there was very little discourse in the current study representing Levels 5 through 7, 14% of the total discourse represented thinking at Level 4. This level is considered the first step in the process of higher-order thinking skills and includes the expressions of disagreement, the asking and answering of questions, restating one's own position, and clarifying someone else's position. Asking and answering questions had the highest occurrence of discourse within this level, consisting of 7% of the total discourse produced. Within this sub-category, participants most often asked and answered questions regarding how to perform certain actions (i.e., making specific gear or equipment, eating, crouching) and how to get out of problematic situations. Typical problems, such as one's avatar falling or being unable to move, occurred on a daily basis and were usually resolved by the participant eliciting help from someone else in the group. These requests for assistance often had to be repeated several times before being answered.

The below passage from Day 8 highlights a situation in which the girls do not know how to eat and are about to "die" in the game. The girls make multiple attempts to find out how their avatars can eat food, repeating their requests several times before receiving an answer. It is interesting to note that although the discourse here contains certain statements from Level 4, there is a distinct lack of collaboration. Eventually, the girls receive the help they need, but the prevalence of the *Independent Game Play* theme is also highly present.

> *Sharon*: 'Wait, how do you eat?'
> *Michael*: 'Dude, Enderman is staring at me.'
> *Justin*: 'I'm inside the house.'
> *Michael*: 'No, no! He's attacking me now!'

Alice: 'How do you eat stuff? How do you eat stuff?'
Sharon: 'How do you eat stuff?'
Justin: 'Can we turn to day? This is way too hard.'
Alice: 'Dude, how do you eat stuff?'
Justin: Dude, there are so many zombies out here.'
Sharon: 'Well, it's not very hard for me.'
Alice: 'How do you eat stuff?'
Justin: 'Ooh, there's so many zombies after me.'
Alice: 'Sharon, do you know how to eat stuff?'
Sharon: 'No.'
Justin: 'Ow, ow! I'm trying to help you!'
Michael: 'No! No!'
Justin: 'They're after me now! No! Skeletons!'
Alice: 'Justin!'
Justin: 'What?'
Sharon / Alice: 'How do you eat stuff?'
Justin: 'Umm, put them here first.'
Michael: 'I can go to your house.'
Justin: 'Oh my god. Spider.'
Sharon: 'Oh, I'm eating it!'

Discussion

While the four students displayed minimal occurrences of higher level thinking throughout the current study, they were nonetheless engaged in ongoing discourse with one another in the target language. In general, their conversations appeared typical of upper elementary-aged students and tended to consist of simplistic statements of observations or opinion with intermittent episodes of teasing, mimicking, and flirting. The types of discourse observed in this study revealed spontaneous, authentic interactions between the students that coincide with the types of discourse associated with social constructivist language learning environments (Doghonadze & Gorgiladze, 2008; Olivares, 2002; Shen & Suwanthep, 2013; Yang & Wilson, 2006). This includes topics of discussion that are student-generated and personally relevant, as opposed to scripted,

drill-and-practice exercises from a foreign language textbook. Despite this alignment

with certain social constructivist teaching methodologies, the majority of discourse

produced in this study represented lower levels of thinking with minimal levels of critical

thinking and negotiation and co-construction of meaning. The remainder of this section

reviews several factors that may have contributed to the group's inability to achieve the

objectives of the game, as well as impact the types of corresponding discourse that the

group produced.

Teacher Interaction

Throughout the nine days of the current study's intervention, researcher input was

purposely minimal, and scaffolding was provided purely through the participants'

interactions with one another. Typically, the role of the language instructor as a facilitator

is considered a critical factor in a social constructivist language-learning environment, in

that s/he must ensure that there are ongoing opportunities for learners to draw upon prior

knowledge and construct new understandings (Adams, 2006; Simina & Hamel, 2005).

Honebein et al. (1993) also argue that a critical role of the instructor is to foster meaning

and value in the activity, so that student learning remains consistent with instructional

goals. In order to facilitate critical thinking, the instructor must pose questions and coach

students as they progress through a task. Although other factors were present, the lack of

teacher/researcher interaction in this study may have contributed to the group's lack of

interest in the objectives and ultimately their failure to complete both games. This

includes staying focused on the daily objectives and ultimately engaging in higher-level

thinking that employed critical thinking and problem solving.

It is important to note that the level of teacher interaction necessary in an instructional environment will likely differ, depending on the age of the students. For example, the discourse produced by Mroz's (2012) university-aged participants did not seem to be negatively affected by the limited interaction she had with them. Her participants may have been more intrinsically motivated to collaborate and complete the game, due to a number of age-related factors, including maturity level, interest in learning the target language, and their letter grade in the class. Younger learners, such as the participants in the current study, likely need higher levels of support and guidance that include ongoing feedback and redirection, when necessary.

Game Design

In addition to the lack of teacher involvement, the overall game design of *MinecraftEDU*, and specifically the two worlds in which the participants were engaged, may have impacted the group's interest levels and their failure to achieve the objectives of the games. *Escape from Everest* and *Extinction Challenge* were chosen for this study based on their alignment with the previously described essential elements of good game design. Additionally, both games included attributes that align with Honebein et al.'s (1993) criteria for designing a learning environment containing social constructivist instructional strategies. Multiple studies argue that in order for social constructivist learning tasks to be successful, they must be relevant, purposeful, and meaningful, allowing students to personally connect to the learning activity (Bednar et al., 1992; Olivares, 2002; Yang & Wilson, 2006). Despite *MinecraftEDU's* alignment with Honebein et al.'s criteria, the group only minimally attempted to achieve the goals of

both games, indicating that the learning tasks may not have been meaningful or relevant enough for the participants to fully pursue them to completion.

The absence of a competitive element may have been another factor that contributed to the group's inability to collaboratively prioritize and complete the objectives of the two games. Gee (2008) notes that the elements of collaboration and competition are tightly linked in social games. Vandercruysse, Vandewaetere, Cornillie, and Clarebout (2013) argue that those students engaged in competitive environments report higher levels of perceived competence and higher levels of task completion. With this in mind, it can certainly be suggested that the lack of a competitive element could have been a contributing factor in the group's lack of collaboration and overall task completion.

Student Perceptions

Another possible factor in the participants' lack of interest in the objectives may relate to their perceptions of the activity in general. Honebein et al.'s (1993) first set of criteria suggests that each learning activity have a clear purpose and meaning for the student. Considering that this study occurred after the normal school day finished, there is the possibility that the students did not associate the activities with learning or a specific purpose, but as a social activity instead. Therefore, the students may have taken the gaming sessions as opportunities to relax and engage in social discourse, rather than focus solely on the objectives of the game. This idea of group socialization is further supported by the fact that at least some of the participants have extremely full academic schedules outside of school. The following excerpt, taken from Day 8, is a brief

discussion regarding an upcoming weekend and reveals certain insights into Sharon and

Alice's study habits:

> *Sharon*: (whisper) 'I hate Thursday.'
> *Justin*: 'Thursday? You don't like Thursday? Why?'
> *Alice*: 'I love Friday.'
> *Sharon*: 'I hate Friday.'
> *Alice*: 'How?'
> *Michael*: 'I love Friday.'
> *Alice*: 'It's fun in the bus.'
> *Michael*: 'Why?'
> *Alice*: 'Not you.'
> *Michael*: 'What you do in bus?'
> *Alice*: 'It's not…'
> *Justin*: 'Sometimes I like Fridays, sometimes I don't.'
> *Alice*: 'Yeah, me too.'
> *Justin*: 'Because my weekend is like so boring. I only stay home.'
> *Sharon*: 'What? My weekend is so busy.'
> *Michael*: 'What do you do?'
> *Sharon*: 'I do tests…I do violin…'
> *Alice*: 'Wait, study class?'
> *Sharon*: 'What?'
> *Justin*: 'Math tests?'
> *Sharon*: 'Yeah…'
> *Alice*: 'And grammar.'

Deviance and Identity Exploration

This overall lack of interest in the objectives may have also contributed to the

levels of deviant behavior that were observed in this study. Flirting, mimicking, and

teasing were common in this study, but also represent the type of identify-exploration

discourse one might expect of this age of participant (Code & Zaparyniuk, 2010;

Valkenburg et al., 2005). Code and Zaparyniuk note, "The anonymity of online

interactions facilitates the perception of safety of an individual's nominal identity,

allowing users to experiment with multiple virtual identities" (p. 1349). This was most

noticeable in Alice and Justin's discourse, as both students displayed behaviors that were substantially different than their normal classroom behaviors. During an individual interview, Sharon described Justin as a troublemaker in class, even though the entire group independently designated him as the leader of the *MinecraftEDU* sessions. Similarly, during his last interview, Michael expressed his increased collaboration during the intervention, remarking that this was something he rarely participated in when in his homeroom classroom.

Alice's behavior was also not typical of her usual quiet demeanor within the traditional classroom. Not only did she instigate a substantial amount of the "deviant" discourse during the study, but she also expressed a dislike for speaking English with other Japanese students, stating that she felt she was constantly being judged. This perception of others judging her English abilities may have contributed to her deviant behaviors in some way. Interestingly, this did not seem to negatively influence her level of participation, as Alice was one of the most vocal students throughout the study.

Reduced Fear of Failure

Alice's level of participation may have stemmed from feelings of safety, or reduced fear of failure, while interacting in the target language within the social game environment, even though this contradicts her earlier statements about being judged. Previous studies note that language learners often report increased levels of comfort and decreased levels of anxiety when interacting with other language learners in social gaming environments (Blake, 2013; Dourda et al., 2014; Godwin-Jones, 2014; Pasfield-Neofitou, 2014; Peterson, 2009). This includes more risk-taking behaviors, such as

experimenting with vocabulary and grammar, than the students would normally exhibit within a traditional face-to-face environment.

Baek and Choi (2014) and Dickey (2005) also note that students often display different behaviors within gaming environments than in the traditional classroom, including behaviors that can lead to in-game relationships and friendships that otherwise may not have occurred. This certainly appears to apply to this group of participants, whose discourse represented casual, everyday talk about people, events, and ideas that were important to them. Similarly, their conversations and behaviors were not necessarily typical of their usual habits outside the game environment.

This study did not seek to determine the overall feelings of safety and security these students had in regards to speaking in the target language with one another, although Michael repeatedly took risks using game-specific vocabulary throughout the study. His English language skills were the lowest of the group overall, and he was often teased or mimicked for his mispronunciations and misuse of English grammar. This did not seem to dissuade him from interacting with the group, as he maintained a consistent level of participation throughout the study. It is difficult to determine if this teasing or mimicking negatively affected him, although his level of continuous participation correlates with the notion that social games often provide contexts in which language learners of varying abilities feel comfortable interacting, collaborating, and sharing with one another (Pasfield-Neofitou, 2014; Thorne et al., 2012).

Recommendations

Throughout this study, a number of factors emerged that may have impacted the results and should, therefore, be considered in future research. First, this study lacked an

element of 'competition,' a component that is theorized to be vital to both collaboration

and motivation within gaming (Gee, 2008). The prior experience that each participant had

with the traditional game *Minecraft* may have also contributed to the current study's

findings, in that each participant had preconceived ideas regarding the nature of game

play within this specific game. Other noteworthy factors include the context of the study,

the role of the researcher, student groupings, and cultural considerations. While the extent

to which any of these factors may have contributed to this study's results cannot be fully

determined, it is highly recommended that future studies take them under consideration.

<u>Lack of Competition</u>

One possible explanation for the lack of cohesion and collaboration observed

during this study could be attributed, at least in part, to a general lack of competition.

There is abundant research linking the relationship between collaboration and

competition within social games (Baek & Choi, 2014; Dickey, 2005; Dickey, 2007; Gee,

2008; Lee et al., 2012; Malone & Lepper, 1987; Susaeta et al., 2010), making it

reasonable to suggest that if one of these elements is missing, it can negatively impact the

occurrence of the other. Given the absence of a competitive component within the context

of this study, it is not entirely surprising to see a similar absence of collaboration amongst

the participants. Although the group discussed the overall mission, as well as their

specific daily objectives, there was no formal motivating factor for the group to follow

through and complete these objectives, or to work with one another in any manner.

Not all research supports this theory that competition is a necessary element,

however. Kohn (2003) argues that competition makes self-esteem conditional in that

one's value is contingent upon how many people one has beaten. The idea of competition

also contributes to the notion that one can only be successful when others lose in some capacity. Similarly, Shindler (2009) contends that competition in the classroom produces feelings of heightened anxiety and reduces risk-taking behaviors. The author argues that the element of competition is associated with decreases in reflective thinking, placing an increased emphasis on the end product, rather than the process the team, or individual, took to get there. Shindler states that in order for healthy competition to occur, the primary goal should be associated with fun, the duration of the activity should be short, and each participant should feel that s/he has a reasonable chance of winning.

Mroz's (2012) study included an entire class of French language learners, with a focus on one particular group. The members of each group collaborated with one another to reach the game's objectives, while each group competed against the other groups in an effort to finish the game first. This allowed the groups to participate in a consensus-building stage, in which the players of each group had to formulate and test theories to ultimately reach agreement. Mroz credits this specific stage of the game as producing the highest levels of discourse representing negotiation and co-construction of meaning. The current study had the same element of consensus building, but the group did not have any direct competition that might motivate them to reach this phase. In this study, had there been multiple groups competing against one another while engaged in the same *MinecraftEDU* games, there may have been an increase in collaboration and, ultimately, different results.

Previous Experience with *Minecraft*

All four participants reported having varying degrees of prior experience playing the traditional game *Minecraft.* Justin had the most experience, while Alice had the least.

They all exhibited an understanding of how to navigate the environments, as well as how to build and break blocks. When asked about playing the traditional *Minecraft* game with others, each participant stated that s/he played alone and simply explored the various worlds, while occasionally constructing something. This prior association of *Minecraft* being a single-player game within an exploratory world that does not contain concrete objectives could have impacted the interactions the four participants had with one another. Even though they were aware of the objectives within the *MinecraftEDU* version, their prior association may have prevented them from considering these objectives as important or necessary.

Context of Study (Location and Time of Day)

This study took place immediately after school, from 2:00-3:00pm each day. Normally at this time, a variety of after school activities take place that include sports, arts and crafts classes, and music lessons. Generally speaking, after school activities at JIS are not academically based, and the atmosphere in the classroom is relaxed and fun. This may have impacted the way the participants approached playing the game. Despite the fact that the group was aware of the nature of the study, they may have associated the *MinecraftEDU* game with their usual perceptions of after school activities. This may have led to a more relaxed attitude toward completing the goals as compared to Mroz's (2012) group of learners, who engaged in their game during their usual French class, during normal school hours.

Additionally, had the current study taken place in a traditional classroom with typical instruction during normal school hours, the participants may have been more motivated or inclined to achieve the objectives, or at the very least, they may have

associated the activity with being educational in nature. Since the students are in different grades and classrooms from one another, as well as in different grades from what the researcher teaches, the study had to take place after normal school hours.

Ultimately, the participants knew there were no repercussions if they failed to complete their daily objective, or if they failed to complete the objectives overall. This may have contributed to a lack of motivation, as well as a perception that the activities were social in nature, rather than academic.

Role of Researcher and Age of Participant

During each gaming session, the role of the researcher was primarily to observe and provide technical support, when needed. Additionally, the researcher facilitated short discussions amongst the participants at the start and end of each session to review daily objectives, identify roles, and reflect on the day's proceedings. While this limited amount of interaction was appropriate in Mroz's (2012) study, it may not have been enough for this young group of elementary-aged participants. Generally speaking, students at this age are less independent and tend to have a higher degree of teacher interaction. In a social constructivist learning environment, it is the role of the teacher to facilitate acts of negotiation, collaboration, and socialization (Simina & Hamel, 2005). The group may have been more inclined to focus on the objectives and collaborate with one another if the researcher had a stronger presence that included asking pertinent questions, providing feedback, and redirecting participants when they engaged in non-productive tasks.

Heterogeneous Groups

Both Mroz's study and this current study used small groups (4-5 students) of language learners at the mid-intermediate range, although there was a slightly wider

range in target language variability within this study's group. Although all four of the participants in this study were designated at the mid-intermediate range of English language skills, Michael's speaking skills were noticeably lower than the rest of the group. Many times Michael's mispronunciations of words elicited mimicking from others in the group. At other times it initiated checks for clarification or provoked a correction. It is recommended that future studies involving social games and language instruction contain heterogeneous groups consisting of different levels of language learners, thereby providing a natural scaffolding process that not only supports certain learners, but can also contribute to increased exposure and development of more complex grammar and vocabulary (Mvududu & Thiel-Burgess, 2012; Squire & Jenkins, 2003).

Cultural Background

This study purposely used English language learners from different linguistic backgrounds, as suggested by Mroz (2012) in her original study. Three of the four participants in this group were Japanese, and one student was Danish/French. Throughout the study, two distinct cultural norms emerged from the group of Japanese speakers. These included feelings of being judged by other Japanese language leaners, as well as the concept of 'saving face' (Jung, Kudo, & Choi, 2012). This concept of 'saving face' was most noticeable in Sharon, who stated she would not correct Michael's grammatical or pronunciation errors in an effort to prevent him from embarrassment. Jung et al. argue that Japanese students in particular may be overly concerned with others' opinions and feelings and find collaborating in an online language-learning environment stressful. It does not appear that this negatively impacted the rates of participation in this study, as all four students were continuously engaged in discourse for the entirety of each session.

However, it most certainly impacted the process of students correcting one another when encountering incorrect pronunciation, vocabulary, and/or grammar. Future studies using groups of students from similar cultural backgrounds should be aware of any existing cultural norms that might impact the discourse.

Implications

This study has several contributions to the area of social gaming within foreign language instruction. Most notable is the aspect of critical thinking and problem solving that can occur through the collaboration of language learners within a social gaming environment. While there is a growing body of research arguing the potential that social games hold in providing opportunities for higher levels of thinking, the findings from this study reveal that there are multiple factors to consider when implementing a social game within a language learning environment. The findings in this study also revealed that students appeared to exhibit a reduced fear of failure when using the target language to communicate. This topic is examined and followed with the implications regarding identity exploration of pre- and early-adolescents within social and online gaming environments.

<u>Social Gaming in a Foreign Language Instruction</u>

Van Eck (2015) points out the high level of uncertainty in understanding which specific gaming elements directly contribute to increases in problem solving and critical thinking in language learners. Mroz (2012) concluded that language instructors should choose games that contain a problem-based activity that requires group collaboration and a consensus building stage. She deemed this stage the most important part of her study, due to the abundance of critical thinking, problem solving, and negotiation and co-

construction of meaning that took place during that time. This current study lacked a competitive element, which may have contributed to an overall lack of collaboration and a specific lack of discourse representing higher-level thinking. While this study does not purport that the absence of this factor necessarily prevents critical thinking and problem solving from occurring, it does support the idea that these factors can greatly impact the occurrence and levels of thinking in general (Chen, 2005).

Despite the fact that this study was unable to replicate Mroz's (2012) earlier findings, the results contribute to a growing body of research centered upon gaming and foreign language learning. Specifically, the results reinforce the argument that instructors must consider a multitude of factors before implementing games into the curriculum (Van Eck, 2015). This includes choosing appropriately leveled games containing elements that are considered essential within instructional games, such as *fantasy, control, feedback, and challenge* (Dickey, 2007; Gee, 2005; Gee, 2008; Kapp, 2013; Malone, 1980; Malone & Lepper, 1987; Rieber, 1996; Wilson et al., 2009). Social factors, such as age and emotional development (Code & Zaparyniuk, 2010; Valkenburg et al., 2005) must also be considered when implementing social games into a language-learning curriculum.

Reduced Fear of Failure

While there were no notable occurrences of critical thinking and problem solving observed in this study, the interactions between the participants revealed an overall lack of inhibition or fear of using the target language incorrectly. This corroborates several previous studies that argue that social games can provide contexts in which the learner is more focused on the game and objectives than on correctly speaking the target language (Berns et al., 2013; Blake, 2013; Chen, 2005; Dourda et al., 2014). Although the

participants in this study were not entirely focused on the objectives, they were also not focused on their use of the target language. This apparent lack of inhibition allowed the group to engage in ongoing conversations with one another, regardless of grammatical errors or mispronunciations. This included Michael's willingness to engage in conversation, even though he was often mimicked or teased for his grammar and pronunciation. The reduced fear of failure further supports the notion that social games can provide contexts in which language learners can practice using the target language through natural, spontaneous discourse with one another (Blake, 2013; Godwin-Jones, 2014; Pasfield-Neofitou, 2014; Peterson, 2009).

<u>Identity Exploration</u>

The results of this study also add to a growing body of research regarding identity exploration of pre- and early-adolescence through experimentation in social and online gaming environments (Code & Zaparyniuk, 2010; Valkenburg et al., 2005). This includes the deviant behaviors seen in this study, such as mimicking, teasing, and flirting. These behaviors corroborate earlier studies that theorize that individuals at the pre- and early-adolescent stage of physical, emotional, and cognitive development use online environments, such as social games, to experiment with behaviors and attitudes that they normally would not exhibit in real-life (Code & Zaparyniuk).

Limitations

The sample size ($n = 4$) was small, limiting the transferability of the results. A larger group of participants, or multiple groups of participants, may have yielded different results. The duration of the intervention was nine days, which also limits the amount of data that could be collected. A longer study may have revealed different

results in one or more areas. Additionally, this study employed two games within the online social game *MinecraftEDU*. The results obtained from this study cannot necessarily be transferred to learning activities employing different social games. And finally, this study had a single coder responsible for all data analysis. Although multiple forms of data were collected and used in conjunction with one another, it is nevertheless considered a limitation to have a single coder in a qualitative study such as this. Additional researchers may have contributed different interpretations of the data.

Conclusion

This replication of Mroz's (2012) research was unable to corroborate earlier findings indicating higher levels of critical thinking, problem solving, and negotiation and co-construction of meaning amongst language learners engaged in task-based activities within the social game environment of *MinecraftEDU*. Instead, students were observed participating in discourse representing relatively low levels of thinking, often employing statements of observation and opinion, as well as clarifying questions.

Specific themes emerged throughout the study, including *Independent Game Play, Importance of Objectives,* and *Deviant Behaviors.* These themes present a picture of how the four participants used the target language to communicate with one another and revealed interesting implications for future studies. This includes the concept of identity exploration within social game environments, in which pre- and early-adolescents experiment with their personalities, often exhibiting different behaviors than in the real world. Additionally is the notion of a reduced fear of failure when interacting in an online environment that may contribute to increased levels of participation amongst language learners that may not occur within a traditional classroom environment (Berns

et al., 2013; Blake, 2013; Chen, 2005; Dourda, et al., 2014). Finally, these themes provide insight into the importance of certain gaming elements, most notably collaboration and competition, and the relationship they may have upon language learners' critical thinking and problem solving skills.

The participants in this study engaged in continuous, self-directed conversations containing topics relevant and meaningful to them. While these student-centered discussions align with social constructivist pedagogies, it has also been argued that is precisely these casual, open-ended conversations that allow language learners to avoid tricky topics and areas of difficulty in the target language (Nakaham et al., 2001). Students must be engaged in the task and content of the activity or game in order to engage in higher levels of thinking (Olivares, 2002). The participants in this study did not appear to view the game's objectives as high priorities, and therefore, were not engaged in discourse that involved problem solving and critical thinking. Conversations were centered on the game, including simple observations, but this would be considered communicating *of* a subject matter, rather than communicating *about* a subject (Olivares). This type of communication does not allow for the processes of accessing prior knowledge and applying it to new situations.

In order to capitalize on the potential benefits of social games, changes in foreign language instructional strategies must occur. This includes careful consideration of the variety of factors involved in a language-learning environment when implementing social games (Godwin-Jones, 2014). Foreign language instructors should choose social games containing task-based activities that are scaffolded in ways that allow students opportunities to draw on prior knowledge to construct and test new ideas and theories.

These learning contexts can provide opportunities for language learners to employ critical thinking and problem solving skills, thereby allowing for a deeper and more authentic learning of the target language (Mondahl & Razmerita, 2014; Olivares, 2002; Villacañas de Castro, 2013). These activities should be monitored and facilitated through an instructor who is able to provide ongoing support and feedback. This is considered a vital element of social constructivist learning (Simina & Hamel, 2005) in which language learners have the ability to independently explore and experiment, but are also guided throughout this process by a teacher and/or more experienced peers.

Ultimately, it is difficult to discern the potential impact that social games, such as *MinecraftEDU,* might have on language-learners critical thinking and problem solving skills. Social games do seem to provide contexts in which language learners can freely converse about topics of their choice without necessarily focusing on the linguistic accuracy of their statements (Sørensen & Meyer, 2007). These environments also appear to present alternative contexts for pre- and early-adolescents to explore their identities and experiment with their personalities (Code & Zaparyniuk, 2010). The results from this study, however, underscore the need for continued research in this particular area of gaming and foreign language learning in order to identify the specific gaming elements and teaching pedagogies that contribute to discourse representing higher levels of thinking.

REFERENCES

Adams, P. (2006). Exploring social constructivism: Theories and practicalities. *Education, 3 34*, 243-257. doi: 10.1080/03004270600898893.

American Council on the Teaching of Foreign Languages [ACTFL]. (2011). 21st century skills map. Retrieved from http://www.actfl.org/files/21stCenturySkillsMap/p21_worldlanguagesmap.pdf

Baek, Y. K. (2008). What hinders teachers in using computer and video games in the classroom? Exploring factors inhibiting the uptake of computer and video games. *Cyberpsychology & Behavior*, *11*, 665-671.

Baek, Y., & Choi, B. (2014). Educational implications of social network games. In Y. Baek, R. Ko, & T. Marsh (Eds.), *Trends and applications of serious gaming and social media* (pp. 111-127). Singapore: Springer.

Bednar, A. K., Cunningham, D., Duffy, T. M., & Perry, J. D. (1992). Theory and practice: How do we link? In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 17-34). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Bell, M. (2008). Toward a definition of "virtual worlds." *Journal of Virtual Worlds, 1*(1), 1-5.

Berns, A., Gonzalez-Pardo, P., & Camacho, D. (2013). Game-like language learning in 3-D virtual environments. *Computers & Education, 60*, 210-220.

Blake, R. (2013). *Brave new digital classroom*. Washington, D.C.: Georgetown University Press.

Blumberg, F. C., & Fisch, S. M. (2013). Introduction: Digital games as a context for cognitive development, learning, and developmental research. In F. C. Blumberg

& S. M. Fisch (Eds.), *Digital games: A context for cognitive development* (pp. 1-9). New York, NY: Wiley.

Braun, V. & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. London: Sage.

Brookfield, S. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting*. San Francisco: Jossey-Bass.

Brookfield, S. (1997). Assessing critical thinking. *New Directions for Adult and Continuing Education, 75,* 17-29.

Chen, I. (2005). Using games to promote communicative skills in language learning. *The Internet TESL Journal, 11*(2). Retrieved from http://iteslj.org/

Chun, D. (2012). Review article: Replication studies in CALL research. *CALICO Journal, 29*(4), 1-10.

Chik, A. (2011). Digital gaming and social networking: English teachers' perceptions, attitudes and experiences. *Pedagogies: An International Journal, 6*, 154-166.

Churches, A. (2011). *Educational origami: Bloom's digital taxonomy.* Retrieved from http://edorigami.wikispaces.com/Bloom%27s+Digital+Taxonomy

Code, J., & Zaparyniuk, N. (2010). Social identities, group formation, and analysis of online communities. In S. Dasgupta (Ed.), *Social Computing: Concepts, Methodologies, Tools, and Applications* (pp. 1346-1361). New York, NY: IGI Publishing.

Committee for Economic Development [CED]. (2006). *Education for Global Leadership: The Importance of International Studies and Foreign Language*. Washington, D.C.: Committee for Economic Development.

Creswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2014). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks CA: Sage Publications.

Creswell, J., & Miller, D. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124-130.

Dickey, M. (2005). Engaging by design: How engagement strategies in popular computer and video games can inform instructional design. *Educational Technology, Research and Development, 53*(2), 67-83.

Dickey, M. (2007). Game design and learning: A conjectural analysis of how massively multiple online role-playing games (MMORPG's) foster intrinsic motivation. *Educational Technology, Research and Development, 55*, 253-273.

Doghonadze, N., & Gorgiladze, G. (2008). Problem solving in teaching foreign languages to students of pedagogical department. *IBSU Scientific Journal, 2*, 101-114.

Donmus, V. (2010). The use of social networks in educational computer-game based foreign language learning. *Procedia Social and Behavioral Sciences, 9*, 1497–1503.

Dourda, K., Bratitsis, T., Griva, E., & Papadopoulou, P. (2014). Content and language integrated learning through an online game in primary school: A case study. *The Electronic Journal of e-Learning, 12*, 243-258.

Egenfeldt-Nielsen, S. (2007). Third generation educational use of computer games. *Journal of Educational Multimedia and Hypermedia, 16*, 263-281.

Foster, P. (1998). A classroom perspective on negotiation of meaning. *Applied Linguistics, 19*(1), 1-23.

Gaskaree, B., Mashhady, H., & Dousti, M. (2010). Using critical thinking activities as tools to integrate language skills. *Sino-US English Teaching, 7*(4), 33-45.

Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.

Gee, J. P. (2005). *Good video games and good learning*. New York, NY: Peter Lang.

Gee, J. P. (2008). Learning and games. In K. Salen (Ed.), *The ecology of games: Connecting youth, games, and learning* (pp. 21-40). Cambridge, MA: The MIT Press. doi: 10.1162/dmal.9780262693646.021

Gee, J. P. (2009). Literacy, video games, and popular culture. In: R. Olson & N. Torrance (Eds.), *The Cambridge handbook of literacy* (pp. 313-326). Cambridge, MA: Cambridge University Press.

Girard, C., Ecalle, J., & Magnan, A. (2013). Serious games as new educational tools: How effective are they? A meta-analysis of recent studies. *Journal of Computer Assisted Learning, 29*, 207-219.

Girvan, C. (2013). *What is a Virtual World? Definition and Classification.* Retrieved from https://www.scss.tcd.ie/publications/tech-reports/reports.13/TCD-CS-2013-10.pdf

Girvan, C., & Savage, T. (2010). Identifying an appropriate pedagogy for virtual worlds: A communal constructivism case study. *Computers and Education, 55*, 342-349.

Godwin-Jones, R. (2014). Games in language learning: Opportunities and challenges. *Language Learning & Technology, 18*(2), 9-19.

Greitemeyer, T., & Osswald, S. (2010). Effects of prosocial video games on prosocial behavior. *Journal of Personality and Social Psychology, 98*, 211-221.

Hausfather, S. (1996). Vygotsky and schooling: Creating a social context for learning. *Action in Teacher Education, 18*(2), 1-10.

Heineman, D. (2015). *Thinking about video games: Interviews with the experts.* Bloomington, IN: Indiana University Press.

Hirtle, J. (1996). Coming to terms: Social Constructivism. *English Journal, 85*(1), 91-92.

Honebein, P., Duffy, T.M., & Fishman, B. (1993). Constructivism and the design of learning environments. In T.M. Duffy, J. Lowyck, & D. Jonassen (Eds.), *Designing environments for constructivist learning* (pp. 87-108). Heidelberg: Springer-Verlag.

Hull, D.M., & Saxon, T.F. (2009). Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online instruction. *Computers and Education, 52*, 624-639.

Jakarta Intercultural School [JIS]. (2016). Retrieved from http://www.jisedu.or.id/

Jung, I., Kudo, M., & Choi, S. (2012). Stress in Japanese learners engaged in online collaborative learning in English. *British Journal of Educational Technology, 43*, 1016-1029.

Kabilan, K. (2000). Creative and critical thinking in language classrooms. *The Internet TESL Journal, VI*(6). Retrieved from http://iteslj.org/Techniques/Kabilan-CriticalThinking.html

Kapp, K. (2013). *The gamification of learning and instruction fieldbook: Ideas into practice*. Hoboken, NJ: Wiley.

Karaduman, H., & Gültekin, M. (2007). The effect of constructivist learning principles based learning materials to students' attitudes, success and retention in social studies. *The Turkish Online Journal of Educational Technology, 6*(3), 98- 112.

Khalid, A., & Azeem, M. (2012). Constructivist vs. traditional: Effective instructional approach in teacher education. *International Journal of Humanities and Social Science, 2*(5), 170-177.

Klimovienė, G., Urbonienė, J., & Barzdžiukienė, R. (2006). Developing critical thinking through cooperative learning. *Studies about About Language, 9,* 77-84.

Kohlbacher, F. (2006). The use of qualitative content analysis in case study research. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 7*(1). Retrieved from http://www.qualitativeresearch.net/index.php/fqs/article/view/75/153

Kohn, A. (2003). Is competition ever appropriate in a cooperative classroom? *Cooperative Learning Magazine, 13*(3). Retrieved from http://www.alfiekohn.org/article/competition-ever-appropriate-cooperative-classroom/

Lee, J., Lee, M., & Choi, H. (2012). Social network games uncovered: Motivations and their attitudinal and behavioral outcomes. *Cyberpsychology, Behavior & Social Networking*, *15*, 643-648.

Liaw, M. (2007). Content-based reading and writing for critical thinking skills in an EFL context. *English Teaching and Learning 31*(2), 45-87.

Lieberman, D. A. (2006). What can we learn from playing interactive games? In P. Vorderer & J. Bryant (Eds.), *Playing video games. Motives, responses, and consequences* (pp. 379–397). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Liu, C., & Matthews, R. (2005). Vygotsky's philosophy: Constructivism and its criticisms examined. *International Education Journal, 6*, 386-399.

Mackey, A. (2012). Why (or why not), when, and how to replicate research. In G. Porte (Ed.), *Replication Research in Applied Linguistics* (pp. 21-30). New York, NY: Cambridge University Press.

Makel, M., & Plucker, J. (2014). Facts are more important than novelty: Replication in the education sciences. *Educational Researcher, 4*3, 304-316.

Malone, T. (1980). What makes things fun to learn? Heuristics for designing instructional computer games. Proceedings of *SIGSMALL '80 Proceedings of the 3rd ACM SIGSMALL symposium and the first SIGPC symposium on Small systems,* 162-169.

Malone, T.W., & Lepper, T.W. (1987). Making learning fun: a taxonomic model of intrinsic motivations for learning. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning, and instruction: Cognitive and affective process analysis, Vol. 3* (pp. 223–253). Hillsdale, NJ: Erlbaum Associates.

Mayring, P. (2000). Qualitative methods in various disciplines I: Psychology. *Forum: Qualitative Social Research, 1*(2). Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/1089/2386

Merriam, S., & Tisdell, E. (2016). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage Publications.

Minecraft. (2015). Retrieved from https://minecraft.net/game

MinecraftEdu. (2015). Retrieved from http://minecraftedu.com

MinecraftEdu World Library. (2015). Retrieved from http://services.minecraftedu.com/worlds/browse?&&&sort_by=created&sort_order=DESC&page=2

Mondahl, M., & Razmerita, L. (2014). Social media, collaboration and social learning – a case study of foreign language learning. *The Electronic Journal of e-Learning, 12*, 339-352.

Mroz, A. (2012). *Nature of L2 negotiation and co-construction of meaning in a problem-based virtual learning environment: A mixed methods study* (Doctoral dissertation). Retrieved from Iowa Research Online: http://ir.uiowa.edu/etd/2951

Mvududu, N. & Thiel-Burgess, J. (2012). Constructivism in practice: The case for English language learners. *International Journal of Education, 4*(3), 108-118.

Nakaham, Y., Tyler, A., & Van Lier, L. (2001). Negotiation of meaning in conversational and information gap activities: A comparative discourse analysis. *TESOL Quarterly, 35*, 377-405.

Olivares, R. (2002). Communication, constructivism and transfer of knowledge in the education of bilingual learners. *International Journal of Bilingual Education and Bilingualism, 5*, 4-19. doi: 10.1080/13670050208667743

Pasfield-Neofitou, S. (2014). Language learning and socialization opportunities in game worlds: Trends in first and second language research. *Language and Linguistics Compass, 8*, 271-284.

Peterson, M. (2009). Computerized games and simulations in computer-assisted language learning: A meta-analysis of research. *Simulation & Gaming*, *41*, 72–93. doi:10.1177/1046878109355684.

Peterson, M. (2012). Language learner interaction in a massively multiplayer online role-playing game. In H. Reinders (Ed.), *Digital games in language learning and teaching.* Palgrave Macmillan: Great Britain.

Philips, R., Horstman, T., Vye, N., & Bransford, J. (2014). Engagement and games for learning: Expanding definitions and methodologies. *Simulation and Gaming, 45*, 548-568.

Powell, K. & Kalina, C. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. *Education 130*, 241-249.

Reinders, H. (Ed.). (2012). *Digital games in language learning and teaching*. Palgrave Macmillan: Great Britain.

Rezaei, S., Derakhshan, A., & Bagherkazemi, M. (2011). Critical thinking in language education. *Journal of Language Teaching and Research, 2*, 769-777.

Rieber, L. P. (1996). Seriously considering play: Designing interactive learning environments based on the blending of microworlds, simulations, and games. *Educational Technology, Research & Development, 44*(2), 43-58.

Saldana, J. (2008). *Coding manual for qualitative researchers*. Los Angeles, CA: Sage Publications.

Schreier, M. (2012). *Qualitative content analysis in practice.* Thousand Oaks, CA: Sage Publications.

Schroeder, R. (2008). Defining virtual worlds and virtual environments. *Virtual Worlds Research, 1*(1), 1-3.

Scriven, M., & Paul, R. (2015). *Defining critical thinking*. Retrieved from http://www.criticalthinking.org/pages/defining-critical-thinking/410

Shekary, M., & Tahririan, M. (2006). Negotiating of meaning and noticing in text-based online chat. *The Modern Language Journal, 90*, 557-573.

Shelton, A. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*, 63-75.

Shen, S., & Suwanthep, J. (2013). Proceedings from the International Graduate Research Conference 2013: *A Social Constructivist Instructional Approach to Reading: A Blog-based Class*. Chiang Mai University: Thailand.

Shindler, J. (2009). Examining the use of competition in the classroom. *Transformative Classroom Management.* Retrieved from http://web.calstatela.edu/faculty/jshindl/cm/Chapter18competition-final.htm

Shirkhani, S., & Fahim, M. (2011). Enhancing critical thinking in foreign language learners. *Procedia - Social and Behavioral Sciences, 29*, 1091-1095.

Simina, V., & Hamel, M. (2005). CASLA through a social constructivist perspective: WebQuest in project-driven language learning. *ReCALL 17*(2), 217-228.

Sørensen, B.H., & Meyer, B. (Eds.). (2007). Proceedings of DiGRA 2007 Conference: Situated play: *Serious games in language learning and teaching – a theoretical perspective* (pp. 559-566). Tokyo, Japan.

Spector, J., Johnson, T., & Young, P. (2015). An editorial on replication studies and scaling up efforts. *Educational Technology Research and Development, 63*(1), 1-4. doi: 10.1007/s11423-014-9364-3.

Squire, K., & Jenkins, H. (2003). Harnessing the power of games in education. *Insight, 3*, 5-29.

Stake, R. (1995). *The art of case study research.* Thousand Oaks, CA: Sage Publications.

Suh, S., Kim, S., & Kim, N. (2010). Effectiveness of MMORPG-based instruction in elementary English education in Korea. *Journal of Computer Assisted Learning, 26,* 370-378.

Susaeta, H., Jimenez, F., Nussbaum, M., Gajardo, I., Andreu, J. J., & Villalta, M. (2010). From MMORPG to a Classroom multiplayer presential role playing game. *Educational Technology & Society, 13*, 257–269.

Teaching with MinecraftEdu. (n.d.). Retrieved from
http://services.minecraftedu.com/wiki/Teaching_with_MinecraftEdu

Thiagarajan, S. (1971). Design, development and validation of instructional games. *NSPI Journal, 10*(10), 2-14.

Thomas. M. (2012). Contextualizing digital game-based language learning: Transformational paradigm shift or business as usual? In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. 11-31). Palgrave Macmillan: Great Britain.

Thorne, S., Black, R., & Sykes, J. (2009). Second language use, socialization, and learning in Internet interest communities and online gaming. *The Modern Language Journal, 93,* 802-821.

Thorne, S., Fischer, I., & Lu, X. (2012). The semiotic ecology and linguistic complexity of an online game world. *ReCALL, 24*, 279-301.

United States Department of State. (2015). *Jakarta Intercultural School: 2015-2016 Fact Sheet*. Retrieved from http://www.state.gov/m/a/os/219652.htm

Valkenburg, P., Schouten, A., & Peter, J. (2005). Adolescents' identity experiments on the internet. *New Media and Society, 7*, 383–402. doi: 10.1177/1461444805052282.

Van Eck, R. (2015). *Digital game-based learning: Still restless, after all these years*. Retrieved from http://er.educause.edu/articles/2015/10/digital-game-based-learning-still-restless-after-all-these-years

Vandercruysse, S., Vandewaetere, M., Cornillie, F., & Clarebout, G. (2013). Competition and students' perceptions in a game-based, language learning environment. *Educational Technology Research and Development, 61*, 927-950.

Villacañas de Castro, L. (2013). Teaching English as a foreign language in accordance with Social-constructivist pedagogy. *Tejuelo, 17,* 97-114.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, Massachusetts: Harvard University Press.

Warschauer, M. (2004). Technological change and the future of CALL. In S. Fotos & C. Brown (Eds.), *New perspectives on CALL for second and foreign language classrooms* (pp. 15-25). Mahwah, NJ: Lawrence Erlbaum Associates.

Whitton, N. (2009). *Learning with digital games: A practical guide to engaging students in higher education*. Retrieved from http://www.myilibrary.com?id=228416.

Wilkinson, E. (2015). *Video games and violence: What every parent should know*. Retrieved from http://www.cfgcenter.org/Video%20games%20article.pdf

Wilson, K., Bedwell, W., Lazzara, E., Salas, E., Burke, C., Estock, J., Orvis, K., & Conkey, C. (2009). Relationships between game attributes and learning outcomes. *Simulation & Gaming, 40*, 217-266.

Wood, E., & Bennett, N. (1998). Teachers' theories of play: Constructivist or social constructivist? *Early Child Development and Care, 140*(1), 17-30, doi: 10.1080/0300443981400103

Wu, C., Chen, G., & Huang, C. (2014). Using digital board games for genuine communication in EFL classrooms. *Education, Technology, Research & Development, 62,* 209-226. doi: 10.1007/s11423-013-9329-y.

Yang, L., & Wilson, K. (2006). Second language classroom reading: A social constructivist approach. *The Reading Matrix, 6*, 364-372.

Yang, Y. (2010). Computer-assisted foreign language teaching: Theory and Practice. *Journal of Language Teaching and Research, 1*, 909-912.

Yazan, B. (2015). Three approaches to case study methods in education. *The Qualitative Report, 20*, 134-152.

Yin, R. K. (2014). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Publications.

Zhang, Y., & Wildemuth, B. (2005). Qualitative analysis of content. *Analysis, 1*(2), 1-12. doi: 10.1002/hbm.20661

APPENDIX A

Interview Protocol for Semi-Structured Interview #1

Foreign language background, prior knowledge, and learning preferences

1. Is English the only foreign language you have learned so far?
    a. If not, what other foreign language(s) have you learned? For how long?
2. How long have you been learning English? When did you start?
3. Why did you choose to learn English as a foreign language?
4. What are your personal learning goals with English? What would you like to be able to do with English?
5. How do you like learning English?
    a. What do you like about it?
    b. What don't you like about it?
6. How do you feel about working with other students?
7. Have you ever felt that you could think in English?
    a. If so, can you tell me how it works for you? Can you give me an example of a situation when you felt you were thinking in English?
    b. If not, how do you imagine it works? Is it something you would like to be able to do?

Attitude towards the use of technology in life and for learning purposes

8. Do you usually use a lot of technology in your life?
    a. If not, why is that?
    b. If so, can you give me examples of the type of technology that you use and how often you use them?
9. Have you ever used technology to learn or practice English?
    a. If so, when and how did you use it?
10. How do you feel about using technology for learning?
11. Have you ever used a virtual learning environment?
    a. If so, which one? What did you think about it?
    b. If not, how do you imagine it is?

APPENDIX B

Interview Protocol for Semi-Structured Interview #2

First impressions and experiences about the virtual learning environment

1. What are your first impressions about the technology we have been using for the activity so far?
2. How do you like using it?
      a. What do you like about it so far?
      b. What don't you like about it so far?
3. Tell me about using an avatar.
4. How does it feel to interact with other avatars rather than real human beings?
5. How would you compare being in your usual classroom and being in this virtual environment when it comes to using English?
6. (**If applicable) When I observed the interactions of all the avatars with the virtual environment, I noticed that you directly call yourself by the name of your character (1st person) rather than talking about your character in 3rd person. Can you tell me more about that?

First impressions and experiences about the process of negotiation of meaning

7. How would you compare working alone with working with others on the activity?
      a. What did you think was the same? Different?
8. What would you say your role has been in your group so far?
9. Do you feel that your team agrees a lot? Can you remember an episode when you all agreed? Can you tell me more about it?
10. What happens when you disagree or when someone in the group disagrees? Can you remember an episode when that happened? Can you tell me more about it?
11. How hard or how easy has it been to work with the other characters? Why is that?
12. How do you feel that your understanding of the activity has changed so far? What would you say made it change?

APPENDIX C

Interview Protocol for Semi-Structured Interview #3

Overall conclusions, impressions, and appreciations of the activity

1. Overall, how did you like the *MinecraftEdu* activity?
    a. What did you like about it?
    b. What didn't you like about it?
2. Compared with activities that you usually do in the classroom, do you feel that you used English any differently? If so, can you explain how?

Conclusions on the collective process of negotiation of meaning

3. How hard or how easy was it to work as a team in English?
    a. In your interactions with your teammates, what helped you in your understanding of the activity?
    b. What did not help you?
4. How hard or how easy was it to reach agreement as a group? Why was it hard/easy?
5. How hard or how easy was it to make yourself heard by your teammates when trying to reach an agreement? Why was it hard/easy?
6. How hard or how easy was it to try to solve a complicated problem in English?
    a. What would you say helped you the most?
    b. What would you say was the hardest?
7. How did you go about understanding certain words or sentences you did not know?
8. Did you ever get frustrated during the activity?
Why were your frustrated? How did you overcome your frustration?
9. Did you feel that there were moments when you were thinking in English? If so, can you tell me how it worked and how it felt?
10. Looking back at the 10 days of activity, what role(s) would you say you played in your group? (You can choose one or several words among the following list of propositions, or you can use a completely different word to define your role in the group – leader, follower, helper, negotiator, diplomat, active, passive)
    a. Why do you feel that way?
    b. Do you feel that your role has grown or changed? How so? When?
11. Would you say that's the role you usually play in your real life? How was it to play that role in English?
12. What role(s) do you feel that your teammates had in your team?
Conclusions on the impact of the virtual learning environment on the process of negotiation of meaning

13. How do you feel that being in this virtual environment helped you make sense of the activity? Did not help you make sense of the activity?
14. What do you feel you learned in English or about English by being in this virtual environment?
15. How did it feel to work through an avatar? With other avatars?
    a. If so, when? And where did you feel you were?
16. Imagine that you're going to America to study abroad next school year. What do you think would help you most so that you can speak and interact with other Americans?

a. Was there anything in the activities in *MinecraftEdu* that helped in this same way?

APPENDIX D

Interview Protocol for Mroz's Semi-Structured Interview #1

Foreign language background, prior knowledge, and learning style

1. Is French the only foreign language you have learned so far?
a. If not, what other foreign language(s) have you learned? For how long?
2. How long have you been learning French? When did you start?
3. Why did you choose to learn French as a foreign language?
4. What are your personal learning goals with French? What would you like to be able to do with French?
5. How do you like learning French?
      a. What do you like about it?
      b. What don't you like about it?
6. How do you feel about small group work in general? In the French class?
7. Have you ever felt that you could think in French?
      a. If so, can you tell me how it works for you? Can you give me an example of a situation when you felt you were thinking in French?
      b. If not, how do you imagine it works? Is it something you would like to be able to do?

Attitude towards the use of technology in life and for learning purposes

8. What do you consider 'technology' is?
9. Do you usually use a lot of technology in your life?
      a. If not, why is that?
      b. If so, can you give me examples of the type of technology that you use and the frequency at which you use them?
10. Have you ever used technology to learn French?
      a. If so, when and how did you use it?
11. How do you feel about using technology for learning purposes?
12. Have you ever used a virtual learning environment?
      a. If so, which one? What did you think about it?
      b. If not, how do you imagine it is?

APPENDIX E

Interview Protocol for Mroz's Semi-Structured Interview #2

First impressions and experiences about the virtual learning environment

1. What are your first impressions about the technology we have been using for the activity so far?
2. How do you like using it?
      a. What do you like about it so far?
      b. What don't you like about it so far?
3. Tell me about using an avatar.
4. How does it feel to interact with other avatars rather than real human beings?
5. How would you compare being in your usual classroom and being in this virtual environment when it comes to learning French?
6. When I observed the interactions of all the avatars with the virtual environment, I noticed that you directly call yourself by the name of your character (1st person) rather than talking about your character in 3rd person. Can you tell me more about that?

  First impressions and experiences about the process of negotiation of meaning

7. How would you compare working alone with working with others on the story?
      a. What did you think was the same? Different?
8. What would you say your role has been in your group so far?
9. Do you feel that your team agrees a lot? Can you remember an episode when you all agreed? Can you tell me more about it?
10. What happens when you disagree or when someone in the group disagrees? Can you remember an episode when that happened? Can you tell me more about it?
11. How hard or how easy has it been to interview in French other characters that are not in your team? Why is that?
12. How hard or how easy has it been to be interviewed by other characters that are not in your team in French? Why is that?
13. How do you feel that your understanding of the story has evolved so far? What would you say made it evolve that way?

APPENDIX F

Interview Protocol for Mroz's Semi-Structured Interview #3

Overall conclusions, impressions, and appreciations of the activity

1. Overall, how did you like the Cinet activity?
      a. What did you like about it?
      b. What didn't you like about it?
2. Overall, and compared with more traditional activities that you usually do in the French class, what do you feel that you gained for your learning of French (if anything)?

Conclusions on the collective process of negotiation of meaning

3. How hard or how easy was it to work as a team in French?
      a. In your interactions with your teammates, what helped you in your understanding of the story?
      b. What did not help you?
4. How hard or how easy was it to reach a consensus as a group? Why was it hard/easy?
5. How hard or how easy was it to make yourself heard by your teammates when deciding on this consensus? Why was it hard/easy?
6. How did you feel personally about the viability of the scenario your group presented?
7. How hard or how easy was it to try to solve a complex problem in French?
      a. What would you say helped you the most?
      b. What would you say was the hardest?
8. How did you go about understanding certain words, sentences, paragraphs, or ideas, when there were words, expressions, or structures you did not know and that were not in the Vocab section that I provided you?
9. Can you remember specific moments of frustration you had during the activity? Why were your frustrated? How did you overcome your frustration?
10. Did you feel that there were moments when you were thinking in French? If so, can you tell me how it worked and how it felt?
11. Looking back at the 10 days of activity, what role(s) would you say you played in your group? (You can choose one or several words among the following list of propositions, or you can use a completely different word to define your role in the group – leader, follower, helper, negotiator, diplomat, active, passive)
      a. Why do you feel that way?
      b. Do you feel that your role has evolved? How so? When?
12. Would you say it's a role that you usually play in your real life? How was it to play that role in French?
13. What role(s) do you feel that your teammates had in your team?

Conclusions on the impact of the virtual learning environment on the process of negotiation of meaning

14. How do you feel that being in this virtual environment helped you make sense of the story? Did not help you make sense of the story?
15. What do you feel you learned in French or about French by being in this virtual environment?
16. How did it feel to work through an avatar? With other avatars?

17. Would you say there were moments when you would forget that you were in a French class?

       a. If so, when? And where did you feel you were?

18. Imagine that you're going to France for a study abroad next semester. What would you say, in what we did during this activity, can help you with being immersed in the target language when you interact with French people in France.

Table A.1   Coding Table for Social Constructivist Interactions

Code	Definitions	Indicators
1. Direct instruction	Initiating new activity	a. Statements that lead to a conversation on a new topic b. Statements that provide clarity
2. Sharing new information	Information is provided that has not been previously discussed	a. Statement of observation or opinion b. Simple response to a question or instruction c. Definition, description, or identification of a problem
3. Situated definition	Information is validated through a socially-shared, distributed consciousness	a. Statements of agreement b. Realization of agreement c. Providing corroborating examples d. Providing encouragement e. Basic clarifying questions
4. Intersubjectivity/dissonance	Inconsistency is discovered between a new observation and the learner's existing framework of knowledge	a. Identifying or stating areas of disagreement b. Asking and answering questions c. Restating someone else's position d. Clarifying one's own position (without substantial changes to that position)
5. Negotiation/co-construction (semiotic mediation)	Higher mental functioning that attempts to bridge differences to situated definitions	a. Clarifying someone else's position b. re-proposing an idea previously provided to the group c. Statements that appear new but that may contain elements from others
6. Testing tentative constructions	Testing new ideas developed through the course group	a. "What-if" questions/statements b. Proposed behaviors that incorporate newly constructed ideas
7. Reporting application of newly constructed knowledge	Behavior is provoked by course discussions resulting in reports about activities in which a participant engaged	a. Statements that new ideas are being tried b. Reports (successful or unsuccessful) of attempts to implement a new concept

Note: Adapted from "Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online interaction" by D. Hull and T. Saxon, 2009, *Computers and Education,* 52, p. 632.

Table A.2   *MinecraftEDU* **Worlds**

MinecraftEDU 'World'	Description	Screenshot
Tutorial World (first day)	**Premise:** To familiarize players • Basic operational features • Navigation & movements • Digging & building • Materials & tools • Exploration • Opportunities to practice • Increasing levels of difficulty	
Escape from Everest (Days 2-5)	**Premise:** The last humans on Earth awake after a 200-year sleep and find themselves on Mt. Everest. With limited resources, players must work together to build and fuel a spacecraft in order to leave Earth and save humanity. Tasks include: • Mining for iron • Finding bone meal to plant trees • Cooking iron to make iron blocks • Collecting glowstone • Cooking glowstone to make blocks	
Extinction Challenge (Days 6-9)	**Premise:** To build a civilized society from a nearly extinct version of Earth. Tasks include: • Building pens and luring animals • Regulating animals that can be consumed for food with animals needed to repopulate their species • Keeping themselves safe from monsters • Keeping animals safe from monsters and natural predators	