

ABSTRACT

Title of Document: THE DESIGN AND IMPLEMENTATION OF
AN EDUCATIONAL COMPUTER GAME
AND ITS STUDY AS A MOTIVATIONAL
TOOL FOR MIDDLE SCHOOL ESOL
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Over the past three years, Team ILL has designed, created and tested a multiplayer computer game intended to complement middle school English Speakers of Other Languages (ESOL) curriculum. Reflecting upon our own language classroom experiences, we wanted to create a game whose entertainment value equaled its educational value, thereby helping us answer our research question “How effective is our interactive multiplayer computer game as a motivational tool for

students?” In June 2009, we tested the game in Bates and Annapolis Middle Schools, the two schools in the Anne Arundel County Public School system with the largest ESOL populations. For further understanding of the game’s potential as an educational tool, we performed a follow-up focus group with ESOL teachers and teachers with an interest in ESOL teaching techniques. Overall, the game was well received by both students and educators and shows potential as a motivating factor in middle school ESOL classrooms.

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Chapter 1: Introduction

The ability to master the English language is an essential tool for lifelong success in the United States, especially for non-native English speakers. Regardless of where immigrants live, what level of schooling they attain, or how long they have lived in this country, no factor contributes more to their advancement in American society than fluency in English. Immigrants can raise their earnings by well over 20% if their ability to speak English is raised from “not well” to “very well,” and improving English language skills dramatically narrows the wage gap between recent immigrants and native-born Americans by 16-18% for males and 6-10% for females. Among language-minority 18- to 24-year-olds, those who speak English “very well” are nearly three times more likely to have completed high school than those who do not, and are far more likely to be enrolled in college (Soifer, 2006). In September 1996, the Center for Equal Opportunity polled a random sample of 600 Hispanic parents in five major cities and found that almost two-thirds (63%) want their children taught in English as soon as possible. More than 80% reported that they believe that academic courses should be taught to their children primarily in English (LaVelle, 1996).

Living in a complex and educationally competitive world, effective formal schooling is a critical component for success in adult life in the 21st century (Thomas & Collier, 1997). “Language minority” or “English-language learner” students, students born in the United States or in other countries from homes where the primary language spoken is not English, may have limits in their understanding, speaking, reading, and writing of English. As the population of language-minority students

grows and literacy expectations for all students rise, more action must be taken to help English learners achieve educational parity with native English speakers (Grant & Wong, 2003).

It is estimated that 30-40% of school-age English-language learners fail to reach acceptable levels of English reading by the end of their elementary schooling. For older language-minority students, failure to attain grade-level competence in reading persists well beyond high school (Thomas & Collier, 1997). In recent years, due to state-mandated testing and new educational standards, there has been a growing demand for higher performance levels for all students. Children at every level, even kindergarten, are now expected to meet benchmarks to demonstrate basic skills in reading and content areas. Students unfamiliar with the English language are required to complete the same assessments as their English-speaking peers. Thus, when scores for both English-naïve and English-proficient students are summed together, the overall test average is lowered. It is unfortunate that those who advocate for higher standards and more testing of school-age children have failed to consider what this discrepancy in standards will mean for many language-minority students (August & Hakuta, 1997). As Grant & Wong point out, if economic, political, and social pressures deflect attention from underserved English-language learners and place these students “on the back burner,” the prospect for long-term educational parity between English learners and native-English speakers is at best questionable.

Many roadblocks can derail efforts for English-language learners to attain higher levels of literacy. Some of the factors that restrict access to full literacy for language-minority students have traditionally included: 1) xenophobic English-only

movements (Donahue, 1995); 2) limited resources and personnel within English as a Second Language (ESL) (August & Hakuta, 1997); 3) controversy about bilingual education (Faltis & Hudelson, 1998; Krashen, 1996); 4) differences about the duration and type of language services children should receive (Collier, 1987); and 5) cultural and linguistic deficit models (Luke, 1986).

Recently, there has been a dramatic increase in the number of students enrolled in English for Speakers of Other Languages (ESOL) classes (Kindler, 2002). However, due to time limitations, ESOL classes can only cover certain material. The curriculum typically places emphasis solely on the necessary skills to succeed in school rather than basic, functional language. In order for students to learn the maximum amount of English possible in the time given and help fight the aforementioned roadblocks, more educational tools are needed to further expose students to the English language. One such tool is educational software, a technology that is becoming more prevalent in language education with proven success (Wood, 2001).

As Marc Prensky notes in his article (2008), “The role of technology in teaching and the classroom,” the pedagogy with which students should be taught in 21st century curricula, needs to move away from the “old” pedagogy of teachers “telling” students to the “new” pedagogy of students teaching themselves with teacher’s guidance. This change can be called a move from teachers as a “Sage on Stage” to a “Guide on the Side.” Prensky expands by saying that the role of technology in the 21st century classroom is to support this new “Guide on the Side” teaching paradigm, stating:

Today's technology, though, offers students all kinds of new, highly effective tools they can use to learn on their own—from the Internet with almost all the information, to search and research tools to sort out what is true and relevant, to analysis tools to help make sense of it, to creation tools to present one's findings in a variety of media, to social tools to network and collaborate with people around the world. And while the teacher can and should be a guide, most of these tools are best used by students, not teachers (Prensky, 2008).

With this in mind, we have set out to develop an online, interactive computer game that will function as a teaching aid in ESOL classrooms.

In another article (2008), "Students as designers and creators of educational computer games: Who else?," Prensky writes about the benefits of students creating educational computer games for other students. As Prensky notes, the next generation of computer games, games that will be most likely to entertain and engage students in the classroom, is likely to come from other students rather than from teachers. The success of educational student-generated computer games has already been shown with games such as the MIT-built game "mod" *Revolution* for US History (www.educationarcade.org/revolution), the Hong Kong Polytech-built game *Eyewitness* for Chinese history (www.mic.polyu.edu.hk/nanjing/index.asp), and the award-winning Carnegie-Mellon-built *PeaceMaker* game about the Israeli-Palestinian conflict (www.peacemaker.org).

From 2003-2007, Speak Up, an educational nonprofit organization, collected survey data from over 1.2 million K-12 students, teachers, administrators and parents from over 14,000 schools in all 50 states. When grades 6-12 students were asked about the value of gaming technologies within learning, 51% said that games would make it easier to understand difficult concepts, 50% said they would be more engaged in the subject if a gaming technology was coupled with learning, 46% said they would learn more about the subject, and 44% said it would be more interesting to practice problems. Similarly, 65% of teachers surveyed indicated that they are becoming interested in the use of games to increase student engagement and to address different learning styles, 47% indicated that games would help focus on student-centered learning, and 40% believed games would help develop problem solving and critical thinking skills. Over 50% of teachers said they would be interested in learning more about integrating gaming technologies into teaching strategies and 46% would be interested in professional development on this topic. However, only 11% of teachers said that they were currently incorporating some gaming into their instruction (Speak Up, 2007).

Description of the Project

To address these needs, our project sought to develop an interactive multiplayer computer game and to assess its effectiveness as an educational tool to complement existing ESOL curricula. As we pursued this project, we considered the following sub-problems: how to teach the material effectively, how to engage our students, and how to create a game that adapts to students' individual needs.

In order to create our game and carry out our research, we investigated educational, design and technical areas. In terms of pedagogy, we explored the following:

- Information relevant to our target audience: personality, social and other characteristics as well as preferences of middle school students;
- Issues important for understanding the current curriculum according to Teachers of English to Speakers of Other Languages (TESOL): the creation of state standards ordered by the No Child Left Behind Act and specific TESOL standards;
- Factors related to learning: motivation, learning styles, individual student needs;

In addition, we looked into the following topics as they related to designing and creating a successful online game:

- Aspects essential to understand online learning: online interaction and game development;
- Engagement with the material: focus on the game's entertainment value (Forman, 2003);
- Technical aspects that enable the game to function as a language-learning aid: parsers.

In order to carry out our research, we developed a role-playing game aimed at aiding students in learning and practicing English through a series of activities in which the student has to complete various missions to reach the overall goal of beating the

game's nemesis. We tested our game in middle school ESOL classes in the Anne Arundel County Public Schools (AACPS) system.

In testing our game, we chose not to compare its effectiveness to other existing language software, such as the non-gaming software Rosetta Stone®. Our research question asks whether our game is effective as an educational tool to complement existing ESOL curricula. As such, our game was designed to target the same material covered in the classroom at the time of testing. Other types of existing language software are designed to be standalone programs, meaning they are designed without regard to other possible forms of concurrent teaching. As a result, the comparison of our game to other types of software creates a difficult problem in research. How would we reconcile differences in the material covered by each language software and still have a standard of comparison to control as many variables as possible? In addition to time and resource constraints, this consideration led us to our specific research question.

Thesis Outline

The remaining chapters are organized as follows: Chapter 2 offers a complete review of relevant field literature, Chapter 3 outlines our game design process, Chapter 4 describes the procedure for contacting our school system of choice and testing in the schools, Chapter 5 discusses our testing results, Chapter 6 highlights the conclusions drawn from our project, and Chapter 7 describes the limitations and future directions of our project.

Chapter 2: Literature Review

This chapter will provide insight into the potential coexistence of gaming and education and its potential to motivate students in a middle school ESOL classroom. By presenting the findings of experts in these relevant fields, the literature review will provide a solid foundation for addressing our overarching research question, “How effective is our computer game as a motivational tool in an ESOL classroom?”

This chapter will provide useful background information for answering this question by first reviewing and analyzing information found in the literature concerning the social and academic habits of middle school aged students in both general and second language academic settings. Next, literature pertaining to student motivation and learning styles will be reviewed, followed by literature reviewing the needs of both teachers and students in the ESOL classroom, the academic standards employed in the ESOL classroom and more specifically, those used by the Anne Arundel County Public School system (AACPS). The final portion of this chapter will review the literature about the theory and process of game design and the application of gaming in academic settings.

Middle School Students

Our interactive computer game was created to serve as a motivational complement to middle school ESOL classes; therefore, an important facet of our research has been achieving a better understanding of middle school aged learners. We are most interested in drawing connections between students’ psychological and

personal development and their ability to absorb and retain general classroom information as well as second language skills.

Middle school years have come to be generally associated with the rapid and dramatic changes experienced by young adolescents during puberty. These physical and psychological changes often have the consequential effect of lowered self-confidence in both social situations and academic achievement (Meece, 2003), which can lead to a general sense of personal unease. While this sense of discomfort can lead certain middle school students to isolate themselves from their peers, many middle school aged students respond in just the opposite manner, coping with their changing bodies and minds through an obsessive search for their peers' approval (Bidjerano, 2009).

Logically, this fixation with being accepted has an impact on students' lives in an everyday sense; however, this can likewise have implications for their academic success. Indeed, as Irvin (1997) notes, students' cognitive abilities and academic development are very closely linked with their drastically shifted self-perceptions and new emphasis upon the necessity of having an active social life. As students become increasingly aware of the changes their bodies and minds undergo during puberty, they form new ideas regarding the world around them. This development forces middle school aged students to reevaluate and redefine their understanding of how the world around them ought to function (Meece, 2003). During this stage of self-discovery, students develop an increased sense of curiosity towards their surroundings and often explore this heightened sense of inquisitiveness through comprehensive debate and discussion. Often this new taste for debate, when coupled

with young adolescents' pursuit of independence, leads students to question and even challenge their parents' authority. In turn, this questioning nature leads students to become more reliant on their own intuition (Freeman, 2000). Bearing this in mind, it seems no wonder that, at this stage, friends and teachers tend to have a greater influence upon students' decisions and behavior than do parents.

A related observation to students' heightened dependence on friends is students' tendency to relate to and associate with students who show similar achievement and motivational goals. This point indicates the significance of an atmosphere founded upon shared values as a basis for academic success (Louis et al., 1996). This may likewise indicate the positive potential of implementing interactive computer games in an academic setting. Indeed, if students' success in school is closely linked with their tendency to look to peers for feedback, an interactive computer game that requires players to work together may serve as an important catalyst in achieving heightened levels of student motivation.

As has been suggested previously, aside from being a stage of self-consciousness and hormonal changes, middle school years are also recognized as a stage of increased student egocentricity; that is to say that students are largely preoccupied with their own lives and interests (Freeman, 2000). Because such a large portion of students' focus is placed upon themselves, middle school teachers often find it challenging to persuade students to show any interest in the materials that are covered in class. Indeed, as Irvin notes (1997), middle school students place a notably greater importance on their personal appearance and their interactions with peers than they do on school activities. Young adolescents' confidence in their physical

appearance and social reputation is often a useful predictor of self-esteem, which can manifest itself as both enthusiasm for or disinterest in school work and can be reflected in levels of information retention and grades.

Despite middle school students' capacity for comprehensive thought and analysis and complicated problem solving skills, students are chiefly interested in applying these skills to information that they find to be personally relevant. In other words, students are chiefly interested in finding the relevance of materials covered in academic classes to their lives outside of school (Freeman, 2000). Logically, this can present a number of challenges to teachers when trying to engage students in materials mandated by the school system (Jackson & Davis, 2000).

In the classroom, decisions made by the teacher affect students' attitudes towards classroom materials and ability to absorb and retain information. Teachers' relationships with their students likewise have an impact on student maturation and social interaction (Stone & Sullivan, 2004). Indeed, positive student-teacher relationships lead to higher academic achievement and more socially adept and cooperative students.

According to Stone and Sullivan (2004), a "positive relationship" is formed by "(a) democratic communication styles and interest in student input, (b) respect for individual differences in setting goals and expectations, (c) caring and patience in interpersonal interaction, and (d) providing constructive criticism" (p. 31). Such relationships combat and often mitigate the negative effects of classmates' sometimes vicious behavior.

These interactions and relationship characteristics can be instrumental in the development of interactive multiplayer games. Students' desire for independence and freedom to make their own choices indicates that a successful educational game should consist of several different paths a player can take. Questions should require answers that are more in-depth than a simple "yes" or "no," thereby giving students another outlet to explore and express their changing selves.

Regarding second language education, middle school students represent an ideal testing population for our study. It is generally assumed that the younger one is when beginning to study a new language, the more successful one will be at acquiring that language. This belief holds true if one defines successful acquisition in terms of ultimate attainment; that is, children who are exposed to a new language at a younger age are more likely to retain that language in the long term. However, research has shown that, in the short term, older children are perhaps more successful at learning a new language, because they are able to absorb the material more quickly (Krashen et al., 1979). In a study performed by Catherine Snow and Marian Hoefnagel-Hohle (1979) to compare the second language abilities of English speakers learning Dutch over a year-long period, it was observed that older children (ages 12-15) compared to their younger fellow learners (ages 8-10) had acquired a higher level of language in terms of syntax and morphology, implying that, initially, older children are able to learn a second language at faster rates than younger children. In terms of our study, which has been performed under much tighter time constraints than that of Snow and Hoenfnagel-Hohle, this research further emphasizes why middle school students

represent an ideal study population for this project. Middle school students are old enough to quickly absorb the material and young enough to retain much of it.

Motivation

As the literature regarding the general temperament and psychology of middle school students suggests, ensuring student interest and progress in academic activities is fundamentally linked to motivation (Meece, 2003). Indeed, it follows suit that if students' academic progress is contingent upon a general sense of enthusiasm for classroom materials, then an important feature of a computer game intended to complement an educational curriculum is its ability to capture and retain students' interest, while adhering to academic standards. Therefore, student motivation is one of the most critical foci of our research. To motivate students as fully as possible, methods of encouraging both self-motivation—or “intrinsic motivation”—and outside motivation—or “extrinsic motivation,” must be employed. As Hirschfeld, Thomas and McNatt (2008) state, both intrinsic and extrinsic motivations are beneficial to the learning process.

According to File and Stewart (2007), instructing students by exposing them to a series of small portions of information, rather than forcing students to endure long, drawn-out sessions devoted to one piece of information can more effectively maintain student motivation while building students' confidence during the learning process. Kelsay, Reeder, and Swerdlik (1985) echo the importance of building student confidence, indicating that academic progress is aided by maintaining elevated student morale as new materials are covered.

Regarding the manner in which this concept can be applied to the emerging field of edutainment—the hybrid approach to education through traditionally recreational computer games—Yip and Kwan (2006) indicate the credibility of File and Stewart’s observations (2007), noting that simple programs, whose goals and guidelines are clearly presented and explained, build students’ confidence more rapidly than overly complicated programs. Given this finding, it is therefore inferred that games that require significant mechanical skill or time management distract players, lower players’ attention levels and ultimately reduce their retention of material. Based on this assumption, a successful game would be one designed to provide players with a series of small and easily followed goals. In this way, games are able to keep students focused as they learn.

As the literature relating to middle school students indicates, social relationships can be a powerful influence in all areas of life. As Nelson and DeBacker show in their 2008 study, students’ academic performance can be heavily influenced by classmates and peers; social relationships and pressures especially affect middle school students’ achievement in the classroom. This study shows that a group of middle school students will collectively make a greater effort to complete an academic task to the best of their ability if they see their peers doing the same. It can therefore be deduced that if one student plays an entertaining educational game, his peers will be inclined to do the same. By further incorporating a multi-player component into a game, the positive educational effects of group work can be magnified substantially.

Social motivation is not limited to influence by one's peers. Cultural influences also contribute significantly to social motivation. Anderman and Kaplan (2008) note that interpersonal relationships must be viewed in the context of culture. An immersive computer game can simulate a culture in which students freely interact with their peers. A facet of our study is the exploration of the suggested positive correlation between group work and retention of information and whether learning in this context strengthens the educational effect of the proposed game.

One of the most effective means of motivation is the power of choice. Patall, Cooper, and Robinson (2008) say that people are more inclined to participate in something if they have volunteered to do rather than been assigned to do. Given an optimum number of choices at one time—two to four according to Patall, et al (2008)—people's intrinsic motivation becomes stronger. Additionally, Patall, Cooper, and Robinson's study shows that providing individuals with options has potential to serve as a positive force in other areas, including, "effort, task performance, perceived competence, and preference for challenge" (2008, p. 270). Further, any negative impacts of choice are negligible. Although most computer games guide players along a certain path, they usually provide players with a number of choices for how they can ultimately reach the end. The element of choice has the potential to be a positive influence on students' progress as they learn while playing computer games.

Further, in the context of this research project, it is noted that especially for students learning a new language, these motivating factors and a positive attitude are key to students' success in that language. Indeed, as Gardner (1968) noted during a series of research studies that examined the correlation between attitude and

successful second-language acquisition, although a certain amount of preexisting aptitude for second-language acquisition certainly facilitates the learning process, a “complex of attitudinal-motivational variables” are likewise key to students’ success (p. 142).

Moreover, as Anderman and Kaplan (2008) have said, cultural influences can serve as a powerful component of social motivation. Indeed, a combination of social motivation and cultural references can be a very effective approach to working with students of a second language. A truly successful student of a second language is one who is motivated through integration into the language community. Expanding upon this point and relating it to the education through computer games, Rankin, Gold and Gooch’s study evaluating the efficacy of interactive gaming as a language tool posits the translatability of learning that occurs in the virtual world to learning in the real world (2006). That is, an interactive and immersive computer game may be an appropriate additional immersive tool for students learning a second language because of its ability to simulate an environment that is conducive to language acquisition.

Computer games’ potential as a motivating educational tool has been noted, based on the overlap between reasons why people play computer games and motivational factors. These areas of overlap include mental and physical challenge and social experience (Whitton, 2007). Further, because games fall under the general category of fun, whereas learning generally is thought of as work, by somehow combining the two, it seems evident that fun work would be received more enthusiastically than would traditional work (Gee, 2005).

However, an important caveat to this apparently seamless parallel of factors is the importance of students' preexisting attitudes towards computer gaming. In other words, educators and game designers should not be so quick to assume that a computer game will be a successful motivational educational tool simply because it has been proven to offer mental and physical challenge as well as a social experience. Indeed as Whitton found in a 2007 study that explored an educational computer game's degree of success as a motivational device for students in higher education, a student is more likely to be more motivated to learn through computer games if he is motivated to play computer games. Further, Whitton also found that, although students are unlikely to forgo an opportunity to play a computer game as an alternative to traditional learning, it must be shown that the game is actually an effective educational tool from a pedagogical standpoint; that is, playing a game simply for the purposes of playing a game, under the pretext of education is not justification for incorporating gaming technology into a classroom.

In order to explore the potential for computer games as educational devices as fully as possible, Team ILL has kept in mind these principles and prerequisites of motivation during the game design process.

Learning Styles

In addition to the pivotal role that motivation plays in our research process, another important concept that played an important role in the construction of the game and organization of the research project is the concept of differing learning styles. Indeed, an important focus of the game and the project is creating an educational tool that will appeal to a wide range of learners.

“Learning styles” are defined as “the preferred or habitual patterns of mental functioning, information processing, and the formation of ideas and judgments” that influence how a student reacts to information in an academic setting (Provost & Anchors, 1987, p. 182). According to Moallem, when a student’s learning style matches the teaching style to which he is primarily exposed, the student tends to, “retain information longer, apply it more effectively, and retain [a] more positive [attitude] toward the subject of the course than [a student] who experienced clashes in teaching/ learning styles” (2007, p. 217). Though it would be ideal if teaching and learning styles always aligned, quite often in a single classroom, the range of learning styles among students can be wide enough to present a pedagogical challenge to even the most skilled teacher (Burriss et al., 2008). Therefore, a portion of our research has been directed towards finding a teaching method that meets the learning style needs of the greatest number of students.

According to Felder and Henriques (1995), student learning styles can be broken down into five separate elements. The first element is the student’s predisposition toward receiving sensory or intuitive information. The second element calls on the ease with which the student interprets visual or auditory sensory information; according to Forman (2003), learning is enhanced by sensory information garnered through experience. The third element hinges on hands-on activities and personal reflection (Felder & Henriques, 1995). According to Yip and Kwan (2006), the use of educational games gives students a sense of autonomy in the learning process, which effectively addresses the hands-on learning style. The fourth element represents students’ preferences to learn either in increments or all at once

(Felder & Henriques, 1995). Finally, the fifth element determines student's preference for either inductive or deductive learning. Educational computer games can address these elements of learning styles through images and sounds, player autonomy and organization into levels of challenge and objectives.

Another division of learning styles is the definition of field dependent and field independent learning styles regarding how a person interprets the visual environment around them (Witkin et al., 1977). Field dependent learners are more likely to desire social interaction with their peers and are more likely to require praise from others (Burriss et al., 2008). On the other hand, field independent learners are more likely to have a lack of interest in socializing and are more inclined to set goals for themselves internally (Burriss et al., 2008). This aspect of learning styles lends itself to exploration through computer games that include interactive features, such as chat features.

According to Kolb, learning is based on a cycle of four modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Students who prefer learning through concrete experience "value relationships with other people, make decisions based on intuition, and tend to be more concerned with feeling as opposed to thinking" (Burriss et al., 2008, p. 45). Instructional activities that suit this mode of learning include small group discussion, illustrative examples, simulations, games, personal stories, and role-playing (Sutliff & Baldwin, 2001). Students who identify with this mode of the learning cycle are likely to enjoy such game features as chat options as well as the option to create a character and take on that character's persona.

Students who prefer reflective observation consider different perspectives and, “conduct thorough observations when making judgments” (Burriss et al., 2008, p. 45). Students using this learning mode may learn best when confronted with exercises involving problem solving, journals, discussion groups, brainstorming, thought questions, reflective papers and observations (Sutliff & Baldwin, 2001). Students who fit into this category are likely to enjoy writing activities featured in educational games or activities for which players are given a problem and are expected to suggest an appropriate solution.

In abstract conceptualization, students use logic and defined methods to solve problems (Burriss et al., 2008). This approach to learning is encouraged through lectures, papers, analogies, model building, theory building and questioning (Sutliff & Baldwin, 2001). Finally, in active experimentation, students learn most effectively by being physically exposed to information (Burriss et al., 2008). Activities that encourage this learning style include case studies, fieldwork, projects, homework, and laboratory activities (Sutliff & Baldwin, 2001).

In another attempt to define student psychological types and their implications upon learning styles, the Myers-Briggs test defines four dimensions of psychological type. The first dimension consists of either an extroverted attitude or an introverted attitude, in which a person is outwardly focused on others or inwardly focused on ideas, respectively (Burriss et al., 2008). An extroverted person may learn best through discussion or small group work, whereas an introverted person may prefer learning information through readings or individually performed assignments (Martin, 1997). An effective educational game should be able to address each of these personality

types, by leaving it to the student's discretion whether he uses certain interactive features; students who are more extroverted may be more likely to take advantage of a game's chat feature and use it to solve problems and accomplish tasks with the help of his or her peers, while a more introverted student may choose to interact only with the computer.

The second dimension is either sensing or intuitive, characterized by a "preference for perceiving or taking in information" (Burriss et al., 2008, p. 46). Students who fall into the category of the "sensing type" may prefer tasks requiring observation or memory, while those who are considered more as the "intuitive type" may prefer tasks that require imagination and attention to general concepts (Martin, 1997). The ideal educational computer game would be able to address these personality types by basing players' success on their ability to absorb and retain certain information, while encouraging creativity.

The third dimension of psychological type defines whether a student is inclined toward logical thought and is concerned with "logical consistency," or whether the student is preoccupied with his or her feelings and is interested in "maintaining harmony in relationships" (Burriss et al., 2008, p. 47). A student of the "thinking type" may learn best when the teacher presents material in a logically organized fashion, whereas "feeling" students may learn best when they believe they have a personal connection with the teacher (Martin, 1997). Games organized into a series of activities that have been carefully arranged such that they make sense in terms of both the storyline as well as language skills would appeal to "thinking type"

of student, while appealing to the “feeling” student, by encouraging personal investment in the student’s progress through the game with a personalized avatar.

In the fourth dimension of psychological type, a person may be described as “judging” or “perceiving”. A student of the “judging type” may prefer a steadier, more orderly approach to learning while a student of the “perceiving type” may prefer a more flexible, informal approach to learning (Martin, 1997). Computer games can serve as educational tools by including activities that address teaching standards; however, due to their entertainment quality, these games provide players with a very informal alternative to traditional learning exercises. In this way, computer games can be used to address each of these psychological types.

It is assumed that a successful educational computer game would be one that gives users a variety of ways to exercise their learning abilities. In doing so, these games have the potential to accommodate as many different learning styles as possible, while still teaching students whose preferred learning style may not be directly addressed, as “most students can adapt to a variety of instructional modes, even if they are not preferred” (Doyle & Rutherford, 1984). Additionally, Moallem (2007) postulates that when designing for different learning styles, learning tasks, levels of student participation, student-student and student-teacher interaction and the social qualities of online learning play important roles in these games’ effectiveness. For this reason, our game focused on different methods of problem solving through a variety of mini-games, which we call Chapters, as well as the social interaction and collaboration that exists in a multiplayer, cooperative gaming environment.

Standards

Because the game was created in order to serve as a complement to preexisting middle school ESOL classroom curricula, an important determinant of the skills emphasized and practiced through game play was the academic standards applied to ESOL curricula.

Just as student motivation is key to the success of our research, standards for academic progress articulated both on a national and local level likewise play a pivotal role in the design of this research project. On January 8, 2002, former President George W. Bush signed the No Child Left Behind (NCLB) Act (Fact Sheet, 2002) into law. The Act was implemented as a means of holding states accountable for their students' academic achievement.

In theory, the Act "creates strong standards [for] what every child should know and learn" (Fact Sheet, 2002). These standards are created by states to articulate levels of schooling that students should reach by the end of the academic term (*Teaching to academic standards: Explanation*, 2004). Schools are expected to meet these educational standards and are responsible for closing the achievement gaps between portions of the student body, especially those comprising underprivileged students, by evaluating the progress of the individual student, the school, and the state (Fact Sheet, 2002). Academic standards and teaching objectives are intended to provide students, teachers and parents with a comprehensive understanding of what students are expected to learn and what is supposed to be taught in the classroom.

It is teachers' responsibility to ensure that standards are met and objectives are satisfied in the classroom. Teachers use these standards as a guide when designing

their classroom curricula and when preparing classroom lessons and activities (Ravitch, 1996). Despite this practical application, major criticisms of these standards are the suggestion that standardized testing promotes “teaching to the test” and the thought that if standards are set either too high or too low, students’ work may not accurately reflect student’s actual level of ability. Critics of the use of a codified set of academic standards argue that these risks cause students to feel either discouraged or, conversely, under-challenged and bored (*Teaching to academic standards: Explanation*, 2004).

Nevertheless, standards can provide a clear means of measuring schools’ or students’ progress. Additionally, standards are also used to determine both the most suitable methods for training and selecting teachers and which textbooks will be purchased for students. Textbook publishers, as well as designers of other forms of supplemental classroom materials, such as educational software, use these state standards as a basis for the products they develop (Ravitch, 1996).

Teachers of English to Speakers of Other Languages, Inc. (TESOL), a global organization of ESL and English as a Foreign Language (EFL) educators responsible for enforcing these standards, lists the following goals for students in the fourth through eighth grade: the ability to use English to communicate in social settings, the ability to use English to achieve academically in all content areas and the ability to use English in socially and culturally appropriate ways. These three goals, along with the codified TESOL standards, have served as the guidelines used by the team during the game design process, specifically when determining which language skills ought

to be emphasized. By adhering to the existing ESL educational standards, the game will be better able to serve students' English usage needs.

While these standards articulate the most basic requirements for students learning English, school systems' interpretations of these standards can vary. The Anne Arundel County Public School middle school ESOL program, whose students serve as this project's research population (personal phone conversation, October 11, 2007), follows a traditional language education standards format by dividing language skills into four categories: listening, speaking, reading, and writing (*Secondary ESOL level I (newcomer) pacing and alignment guide*, 2005). These categories allow lesson plans to be created to address specific skills. In theory, if students sufficiently master these skills, the students likewise meet TESOL's goals for language acquisition.

However, given time constraints and other limitations, Anne Arundel County ESOL teachers have found it necessary to stress English usage in academic contexts rather than use in more everyday environments. Cathy Nelson, the former ESOL coordinator for Anne Arundel County Public Schools explained that students who participate in the ESOL program are taught classroom vocabulary. However, words and phrases used in everyday situations are often learned outside the classroom (personal phone conversation, October 11, 2007). The Middle School Program of Study for the 2008-2009 school year lists information about ESOL classes, which focuses chiefly on literature analysis, writing skills, and research projects. As these skills are highly utilized in the majority of non-ESOL classes, developing these

abilities is fundamental for preparing ESOL students to succeed in school systems where their native language is not the language of instruction.

The discrepancies between the goals set forth by TESOL and those set by the AACPS ESOL classes served as a guide during the game design process; the game was designed as a means of bridging the gap between each system's goals. By simulating an English language environment, a computer game may help address the goal of teaching students how to communicate in social settings. This can be achieved by creating a setting for students' interaction with computer-controlled characters and other students. In this way, a game can help create a more comprehensive learning experience for students, while allowing them to practice their English skills in settings beyond the normal classroom environment.

By consistently turning to the academic standards applied to the middle school ESOL classroom curricula of the Anne Arundel County Public School System, we have designed a computer game with the aim of addressing educational discrepancies and providing a complement to traditional classroom activities.

Computer Game Design and Theory

Computer game design is thought of by those in the industry as a hybrid discipline of art and technology engineering. Although this discipline is often seen as highly technical and mathematical, perhaps giving it the image of being based on rigid and highly standardized procedures and approaches, Crawford (1982) calls attention to necessity of adaptability and creativity when designing a computer game and posits that because of its complexity, game design cannot be reduced to a formal procedure.

A recommended basic blueprint of game design, first and foremost, is to begin by identifying a goal. This goal should clearly establish the envisioned effect of the game upon the player and, if the game is intended to be used as an educational tool, what exactly the player is supposed to learn through game play. Crawford (1982) cites this step as the most important yet most frequently ignored phase in the procedure. Additionally, according to Crawford (1982), establishing a goal is a key opportunity for the game designer to refer to his or her intuition and personality; Crawford (1982) warns that creating a game whose goal corresponds primarily to the audience's perceived expectations or wishes and only marginally to the creator's tastes, will likely result in a forgettable product.

Once the creator selects a goal, he should choose a topic—the general setting and storyline of the game. Crawford (1982) notes that game designers often select their topics before determining their goal, thereby subordinating the game's overall goal, which, according to Crawford (1982), is a grave mistake. Crawford (1982) stresses the importance of selecting a topic based on its capacity to achieve game goals without adding “excess emotional baggage” that may ultimately counteract the intended effect of the game. Choosing a goal and a topic for a game should be a very deliberate, well thought out process, involving extensive research and reflection (Crawford, 1982).

Once a game designer has established a well thought out plan for his or her game, in terms of goals and topics, he can finally begin to think in terms of code. Crawford (1982) divides this phase of the design process into three structures: input/output (I/O) structure, game structure and program structure.

The I/O structure is, according to Crawford, the aspect of game design that imposes the most limitations on the game designer, as it is based on the “language of communication between the computer and the player,” which is manifested through sounds and graphics (1982, p. 54). The I/O structure is the factor that determines what the game can and cannot do. Although this phase in the design process can be used as an opportunity to show off one’s design prowess, Crawford (1982) emphasizes the importance of meaningful and functional sounds and graphics, citing the only exception to this point as the introduction of the game, where it is permissible to have uninformative but impressive graphics and sounds to set the tone of the game. Crawford (1982) posits the storyboard as a useful design tool, if somewhat inapplicable due to its sequential nature, which does not strictly mirror the tree-branch structure of many games.

The input structure represents the facet of game design that presents one of the greater challenges of game design. Vast options and a large degree of interactivity have already been cited as key factors for motivation in general senses; similarly, the power of choice and interaction represent pivotal factors of player motivation in gaming. However, providing players with the game features that they seek requires a large and complicated input structure. In other words, when faced with the task of creating a game that people will actually want to play, game designers are faced with a dilemma of choosing between “option richness and input cleanliness” (Crawford, 1982, p. 55). In other words, the challenge faced by many computer game designers is the question of how to provide players with a significant number of options without over-complicating the methods by which those options can be accessed. A theoretical

solution to this problem is provided by a webwork (Crawford, 1982). The webwork is based on the pairing of units. Generally, there are $N(N-1)$ pairings, wherein N is equal to the number of pieces. The rationale behind following this formula for input is that it minimizes the number of pieces that the player must manipulate without sacrificing a more than sufficient set of relationships. An important point to remain conscious of when considering input systems is the device with which the player communicates with the computer. Crawford (1982) recommends avoiding the keyboard and relying more on the mouse as the primary mode of input, as this will mitigate player confusion and frustration.

For game structure, the designer must consider his or her game goal and topic and draw out a basic element of that game that is both manipulable and quantifiable. For example, in a game centered on war, a key element might be movement. When considering the element, manipulability is crucial, especially in terms of its ability to allow the player to express himself. Nevertheless, this manipulability must be focused and concise; the player should have a generous range of options but not so many that the game loses its direction and purpose. Again, as is the case with the I/O structure, it is important to strive for cleanliness and simplicity. It is acceptable to use an intricate and complex algorithm for designing the inner workings of the game structure as long as this algorithm does not over-complicate the player's experience. Game structure and I/O structure are very closely linked, so it is not uncommon that a game designer will have to modify one for the sake of the other, in order to produce a high-quality game (Crawford, 1982).

The final structure in the design phase, program structure, is the translation of the work completed in the I/O and game structure phases into the actual game. Essentially, program structure is the organization of these previously generated ideas in terms of game technology memory and flow; that is, as a designer lays out desired game features, he will also determine how much memory will be required to carry out certain game functions, which will help determine which functions are actually featured in the game (Crawford, 1982).

Once the game designer has thoroughly mapped out the plan for a game, and after the game has been evaluated in terms of how well it adheres to the original goals and how playable it will be, if the designer decides to proceed with game creation, the process enters the programming phase. During this phase, abstract or theoretical ideas regarding the storyline, artwork and sound must be transformed into what the game designer actually wants the player to be exposed to. Once this has been done, coding can begin, which, according to Crawford (1982) is the easiest phase of the game design process.

After coding is completed, all that remains is the testing phase, which may indicate a necessity to revisit previous steps in the process, in order to improve the game (Crawford, 1982).

This approach to computer game design certainly remains valid; however, with the advent of new technology and programming capabilities, game design method and theory has evolved. Although Crawford's approach to game conceptualization remains applicable, with the continued innovation of game

development technology, the standards for game quality have been raised, rendering the process of ensuring game quality more involved and multi-stepped.

In his March 2009 presentation about his company's game design process, game producer Allen Murray emphasizes the importance of and outlines a standard approach to ensuring game quality. Murray (2009) divides the design and production process into 6 steps: the concept phase, preproduction, production, polish, release and sustain planning, the first four of which were employed during the design and creation of our game. During the concept phase, the development team should discuss the purpose of the game, while making the goal of creating a highly engaging product the utmost priority. This goal is further explored during the preproduction phase, when the team should discuss how to make ideas discussed in the previous phase playable and fun. These ideas are then actualized during the production phase, when the game elements, such as art, music, storyline and coding are created and applied. The final step in the game-building process is the polishing process, when game content is perfected (Murray, 2009).

Regarding the production phase, Murray emphasizes the importance of flexibility and patience when outlining benchmarks for game design; as we experienced and as Murray forewarns, ensuring game quality may require the development team to readjust its timeline for game development. Although Murray believes that the game design process should be approached in a structured manner, because the ultimate objective is the creation of a marketable and high-quality product, Murray likewise emphasizes that a majority of the design process is a constant iteration and testing cycle. That is, as the game is created, it undergoes a

constant creation, testing, evaluating and readjusting process, to ensure a high-quality final product (Murray, 2009).

Another important point that Murray makes that corresponds to our approach to designing our game is the value of dividing the general game development team into teams based on each member's unique skills and areas of knowledge. Rather than requiring all members to work outside of their element, Murray emphasizes that the key to an efficient and successful development process is working within smaller teams organized according to members' abilities and designing a creative process that coincides the most perfectly with those people's work styles. However, as a caveat to that idea, Murray also emphasizes the necessity of team members' ability and willingness to work outside of their comfort zones, as well as the necessity of maintaining consistent communication between teams (Murray, 2009).

Murray likewise emphasizes, in addition to the necessity of scheduling benchmarks for conceptualizing and building a new game, the importance of scheduling additional time for polishing the game, advising that each person on the development team should devote between two and four weeks to this phase in the process. Murray clarifies that a game with completed content is a finished game but not a polished game. During the polish phase, artists and engineers fine-tune their work in order to create as perfect a product as they are able to manage; however, this is not the time for new content to be added. Murray reiterates in his discussion of the polish phase that this is the phase of the development process where the main focus is iteration; that is, at this point, the development team will test the game and correct errors as many times as is deemed necessary until the game resembles the

development team's vision (2009). Once this process has been completed, the game can be considered ready for use by the public.

By incorporating elements from these approaches to game design into our own development process, we have created a product whose potential as an effective complement to traditional middle school ESOL classroom activities lies in its technical structure as well as its reflection of the game design team's holistic vision of the game's goals and objectives.

Education and Gaming

With the advent of massive multiplayer online role-playing games (MMORPGs), games have become much more accessible to larger numbers of people while ever more accurately representing "real life." Although these games are normally used in recreational contexts, they can also be effective in an educational role, particularly from a motivational standpoint. Indeed, games have the potential to motivate students by presenting academic exercises and lessons in the context of a dynamic, virtual environment explored by interesting characters and featuring multiplayer interaction. Further, these games feature a variety of coordinated sensory stimuli, a feature that, according to Yip and Kwan (2006), is a very powerful way to motivate students.

Because it affords players an enormous amount of autonomy as they exercise nearly absolute control over their characters, role-playing can be a highly influential tool for maintaining students' interest in the game (Gee, 2003). Players' ability to customize their characters adds another dimension to games' potential to capture student's interest. Indeed, when Yip and Kwan asked the students participating in

their study to cite the appealing aspects of MMORPGs, the most popular response was the choices provided by role-playing games (2006). This availability of more than one option is an inherent property of video games that has potential to contribute to students' capacity in education. Computer games additionally represent a promising approach to increasing student motivation because they allow players to interact with one another through cooperation and competition. Games that demonstrate multiplayer functions show great potential to serve as an arena for these stimulating forms of interaction. In *Living a Virtual Life: Social Dynamics of Online Gaming*, Kolo and Baur (2004) explore players' interactions with the online world and with other players in the game *Ultima Online*. Two-thirds of players interviewed by Kolo and Baur (2004) indicate that a primary motivating factor for playing the game is the ability to interact with others. Comparatively, competition and advancement in the game are only considered to be primary incentives by one-quarter of all players questioned. The importance of social interaction as a way to keep players interested in the game is demonstrated by players' significant dependence upon certain game constructs that facilitate player interaction. The importance of these game features is reflected quantitatively, showing that over eighty percent of players are members of in-game guilds, over twenty-five percent jointly own in-game property, and over seventy-three percent communicate using an instant message program outside of the game (Kolo & Baur, 2004). Students in Yip and Kwan's study believed massive multiplayer capability in role-playing games and the use of top scores to promote constant improvement are important game features (Yip & Kwan, 2006).

An illustration of games' potential as aids to students' learning is shown by Yip and Kwan's creation of a vocabulary game for Hong Kong Engineering Students. The results show an increase in students' vocabulary capacity, as well as positive feedback concerning the game's entertainment value (Yip & Kwan, 2006). Successful educational games, such as that created by Yip and Kwan, tie together the elements of entertainment and education so that students readily absorb the material presented by the game. This sort of outcome is the result of the successful blending of appropriate levels of challenge and playability with educational content. Additionally, the educational content must be seamlessly blended into the game's storyline so that students can learn the material as well as how to integrate it in the proper context (Gee, 2003).

Although MMORPGs succeed in their ability to provide many social networking opportunities, game creators still find it a challenge to produce games that believably simulate reality. In *Problems in simulating social reality: Observations on a MUD construction*, Lin and Sun created Eternal City (EC) to simulate a real world economic environment (2003). An element of real world simulation that had initially been implemented but was immediately disposed of was the use of social stratification or, specifically, the different treatment of players based on their in-game gender. While this feature was originally intended to serve as a means of achieving a high level of realism, the designers found that this particular approach thwarted player interest, by undermining the importance of player equality.

In terms of incorporating "edutainment" into an ESOL classroom, specifically, Warschauer (2002) states the use of games and technology in general

represents an extremely effective and promising approach to aiding in the development of ESOL students. Indeed, Warschauer concludes that an important goal of TESOL ought to be the push towards the continued implementation of technology in ESOL classrooms, based on the reasoning that this form of educational tool not only aids in language development but also, and possibly more importantly, in the development of the student as an individual (2002). Though it is foreseen that the process of integrating technology into ESOL classrooms will require a certain amount of restructuring in the way that ESOL teachers are trained, it appears as though this process could have very positive long-term effects. This restructuring process will be fundamentally based on teacher as well as student initiative, autonomy, reflection and innovation, which are features that literature pertaining specifically to student motivation cites as keys to students' academic success (Warschauer, 2002).

Looking to the increasing societal success of both educational and role-playing computer games for inspiration, we have created an original computer game that is a combination of these two types of games. This hybrid type of game was designed with the aim of motivating student players to use their English language skills in a safe, non-threatening environment where they can interact and work together to complete tasks.

This concludes the portion of the thesis devoted to the review of the literature found useful and pertinent to our original research project. By referring to the preexisting research performed in the fields relevant to our original research project, the literature review was intended to establish a firm grounding for the description of the game itself. This information was likewise referred to throughout game testing

with ESOL middle school students in the AACPS system and as we interpreted our research findings.

Chapter 3: Game Design

This chapter will describe our game in detail as well as the processes we employed to create it. The first chapter in the game, the introduction, familiarizes the player with the mall setting, the game controls, the game objective, and his or her character's appearance. The main goal of this section is to make sure that the player understands and can follow written directions. The player is assigned a variety of tasks that require visiting specific stores in the mall and retrieving various items. Some of the tasks are as simple as finding and talking to a computer-controlled avatar. Other tasks are more complicated and require the player to complete a series of steps, such as finding a cake recipe, purchasing the ingredients, and then baking the cake. Once all of the tasks have been completed, the player proceeds to the first official mission in the second chapter of the game.

This mission takes place in a cave where, in order to progress, the player must complete tasks based on reading and listening skills. The game begins with a simple question: "What do you want to do to [a] plant?" The player is given four options in the multiple-choice interface used throughout the game, and must decide which one is most applicable; the answer to the question is "watering the plant". Later parts of the chapter blend reading comprehension with knowledge of vocabulary, specifically colors and numbers. The player is given a color or number and must correctly identify it to answer a question or move to a new location. Only by understanding vocabulary and synthesizing what they read can players reach the end of the chapter. This game's content is not intended to be difficult for players; the main goal of these activities is to

familiarize the player with the types of question and response formats used in the game.

Following the Cave Game the player accidentally discovers Admiral Adult in the mall and proceeds to chase him into a nearby grocery store. This scene serves as a smooth transition into the third chapter: the Cart Racing Game. This game tests the player's knowledge of food vocabulary with multiple-choice questions. The player controls a shopping cart, which he drives around a track, passing by other shoppers with the goal of catching Admiral Adult's cart. Every time the player passes a shopper, he must answer a multiple-choice question asked by the shopper. Correct answers increase the player's speed while incorrect answers decrease their speed. If the player fails to catch Admiral Adult, then the game ends and the player can try again. Even if the player succeeds in catching the Admiral, he still manages to escape on a hidden rocket. The Cart Racing Game includes adaptive difficulty which increases or decreases Admiral Adult's cart speed.

In the fourth chapter the player learns that Admiral Adult has infiltrated the spy base and has taken the organization's members captive. The player challenges the Admiral to a card game to save everyone, which leads to the Memory Card Game. In this game, the player is dealt cards to memorize. Each card has a picture of an action or item. When the player types "ready" in response to a prompt, the cards are flipped over and hidden, and the player is asked which card depicted a specific action or item. To answer correctly, the player must write a complete sentence saying, "[number card] is [that action or item]." Simply writing, "The first card" or a similar entry is not sufficient. The Memory Card Game has the dual purpose of requiring the player to

use complete sentences and to associate vocabulary with pictures. The player must be able to identify the image on the card in order to answer correctly. Similarly to the card game, this game includes adaptive difficulty. The easiest difficulty level uses sets of 3 or 4 cards. The medium level uses 3, 4, and 5 cards. The hardest level uses only 4 or 5 cards. Incorrectly identifying cards does not automatically count as a loss for the player. When players choose the wrong card, it still flips but with a different image. If they cannot identify this image, then they lose one life point out of six. After the player correctly identifies 12 cards on the first attempt, he wins the game, but Admiral Adult escapes in a puff of smoke.

The player tries to follow the Admiral through the smoke, but after it clears, the player realizes that he is trapped in a maze of interconnected rooms. The player must navigate through this maze, which is uniquely generated each time it is played, to escape and save the world from Admiral Adult. In each room of the maze, spoken directions tell the player which type of window, door, or other opening he must pass through in order to move toward the exit. If the player does not follow these directions correctly and ventures too far off course, then he is returned to the point on the path just before he began to go off course. The goal of this section is to practice and/or develop listening comprehension skills and reinforce knowledge of colors and shapes. Both skills are required to maneuver through the correct path in the maze.

Once the player escapes, he finds Admiral Adult and his diabolical machine that will destroy all the fun in the world. In this final chapter, the machine presents the player with grammatically incorrect sentences. The player must correct the sentence in order to attempt to stop the machine. If successful, an illustration is

displayed and a recorded prompt is played aloud. Then the student must respond to the question by typing an answer in a complete sentence. If the player's response is correct, a password is spoken aloud, which the player must then type out in order to stop the machine's operations. This process is timed based on the current difficulty setting, determined in the Cart and Battle Card games. The player must repeat this process several times in order to fully destroy the machine. To successfully complete this chapter, the player must employ listening comprehension skills and be able to write complete sentences. Although these skills are also required for previous chapters, here they are used in a stricter manner—requiring exact correctness—to ensure that the player has a more complete understanding of English grammar and sentence structure.

Art

The artistic design of a video game plays a strong role in defining the emotional atmosphere and the overall gaming experience. The game design team aimed to present audiences with an exciting environment, complete with rich colors and entertaining elements relevant to teenagers and middle school students. Inspiration for the artistic design of the game came from reference photographs of real malls, children's television shows like *Inspector Gadget* and video games like *Wakfu*. Team artists used concept sketches and color palettes when choosing between a range of styles for the game characters and environments.

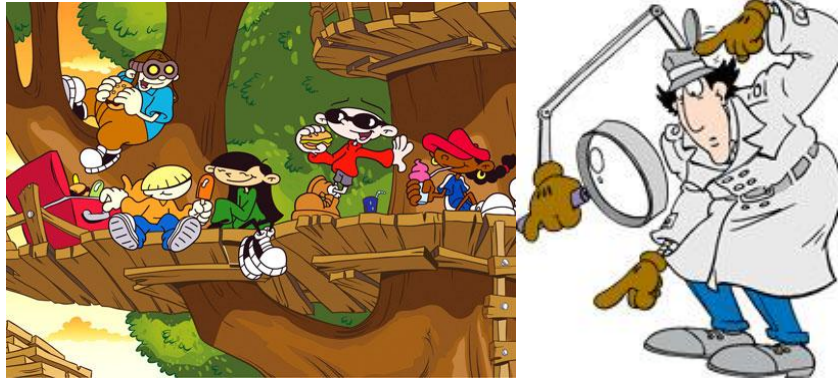


Figure 1: Artistic inspiration from Codename: Kids Next Door (left) and Inspector Gadget (right)



Figure 2: Concept sketches for Admiral Adult

Through this process we decided to use a cartoonish style for many of the environments, characters, and the animations between game chapters. Once an art style was selected, artists used tablets and Adobe® Photoshop® to create the art digitally, which could then be used by the programming team. Multiple concepts were discussed concerning the player's in-game perspective. Isometric, side-scrolling, and first person perspectives were all considered and used in the game. It was determined that we would address each game's individual needs as opposed to creating a strict rule for the whole game.



Figure 3: Side scrolling view in MapleStory

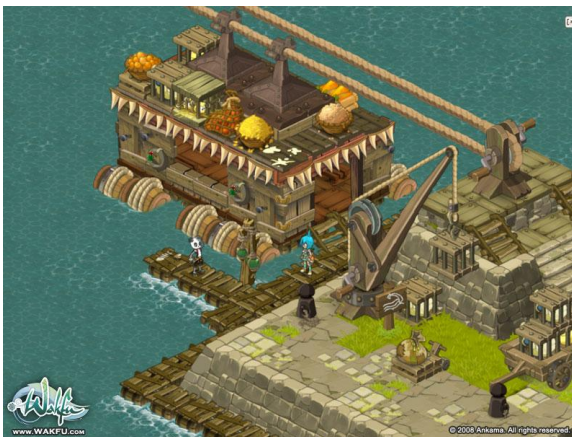


Figure 4: Isometric view in Wakfu

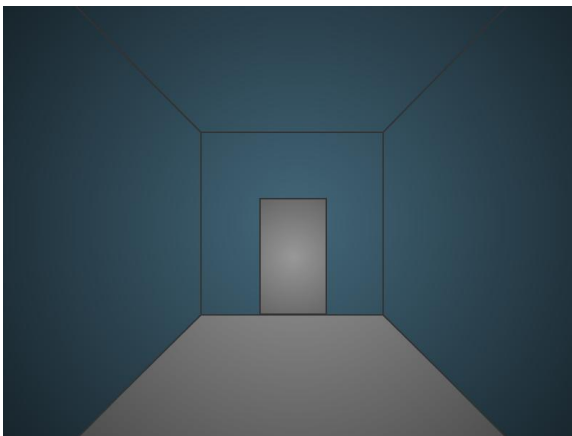


Figure 5: A first person one point perspective in our Maze Game

Transitions

The game design team decided to use animated cutscenes to transition between games and develop an engaging narrative. An animator began the cutscene

process by drawing storyboards to produce a rough outline of the animation. Once the storyboard was completed, the animator then began the animation process in Adobe® Flash® using a tablet. The animator would first sketch rough outlines of every frame to ensure that timing was appropriate for dialogue and sound effects. Then the animator would proceed filling in the frames, adding details and rendering. In some cutscenes, the animator drew each frame of the sequence by hand. This technique is a very time-intensive process, so under time constraints, some later cutscenes were changed to employ less movement and thus less work for the animator. The final cutscenes proved to serve as an important element of storytelling and visual entertainment for game players.

Sound

Sound greatly affects the emotions of the users of such forms of electronic entertainment as television, movies, and video games. Therefore, in addition to using art to provide aesthetic appeal and further the storyline, sound is also used, in the form of both sound effects and music.

Sound provides an additional way to immerse the player in the gaming environment. It has been studied that games that use sound effects are “more playable” (Coleman et al., 2005) in that the use of audio cues provides additional feedback to the player. In the game, audio takes two major forms. First, sound effects, such as a cartoon spring, sound when the character jumps and the sound of a door opening or a person walking up steps, inform the player that his or her avatar in the game is performing an action. Repetitive use of audio is important for educational activities. When the student is supposed to answer a question, a common prompt

sound effect is employed throughout the whole game so that it becomes a familiar signal to the player. Similarly, recordings of applause play when a student answers a question correctly, and sighing sounds play when the response is incorrect. This adds another layer of reinforcement to the lessons. In most situations, if a student gets a question right, there is some sort of pictorial indication that the response was correct, a written message that the student is correct, and the audio cue of cheering. This same use of multiple methods of communication is used when a student provides an incorrect response. Using multiple ways to communicate with the students, besides text, enhances the students' understanding of the game.

We determined that it would be best to use pre-recorded sound effects for the game. This was mostly because the process of finding real-life examples of sounds, creating sounds that do not exist in nature, and recording clean copies of each of these sounds would have been too time-consuming. One team member was assigned the task of finding sound effects. It was important that the sound provider grant an unlimited, royalty-free license for commercial applications. Some sound effect providers grant royalty-free licenses for nonprofit use, but at the time that sound effects were being collected, we did not know whether the finished game would be brought to market, and thus wanted to avoid possible royalty costs in the future.

Soundsnap.com is a website where professional sound designers upload their sound effects and loops. Its license agreement (Soundsnap.com License agreement, 2008) affords:

...a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the Work as stated below:

- a. To remix or transform the sounds into a Derivative Work;
- b. To copy and transmit the sounds;
- c. To use the sounds in any music, film, video game, website or similar medium whether commercial or not.

Initially, this website also allowed users to download the sounds for free, which, combined with the license agreement, made it an ideal choice as a sound-effects source. On December 7th, 2008, the website required users to pay for downloads, so the team purchased a one-month subscription that allowed one hundred sound effects to be downloaded.

The team member in charge of finding sound effects played through the entire game and compiled a list of sound effects that would be needed for both the chapters and the cutscenes. An appropriate sound effect for each item on the list was found on Soundsnap.com, downloaded, and sent to the programming team to integrate into the game.

In the specific cases of cutscene dialogue and spoken directions, audio was recorded and edited by members of the team. For example, in the Maze and Final Battle Games, spoken instructions are given to students, and in cutscenes, Admiral Adult often speaks to the students, and a member of the secret spy organization helps

train the student to use a new device. For this purpose, specific dialogue obviously needed to be recorded so as to avoid the implementation of robotic speech from existing word-by-word recordings, which would contradict our game's goal of promoting proficiency in the English language.

For background music, we decided to create our own music in order to avoid copyright issues that can arise when using someone else's music as well as to have music directly inspired by our game's storyline, activities, and mood. In order to compose the music, music composition software was needed. *Sibelius 5 First* was the software chosen for its ease of use, playback capability, and the ability to export songs as an audio file for implementation into the game. Not only did this software satisfy the team's needs, but it did so at a much lower price than other music software packages would have.

Using this software, music was created for each chapter, as well as a theme for the mall area. Each song was made in a manner that it could be repeated easily. Looping not only takes up less memory in our game, but it also allows music to play constantly throughout game play, providing "a smooth ambience" rather than jarring transitions (Collins, 2008, p. 34). In creating music for the game, composition was more "about writing to a concept or description rather than writing to anything specific" (Collins, 2008, p. 88). Each piece was composed with its respective chapter's atmosphere in mind. Charles Deenen describes sound as having "six basic audio emotions: happiness, sadness, surprise, disgust, anger, and fear, and each of these can be mapped to major scripted events (as cited in Collins, 2008, p. 91). Since we did not want players of the game to experience negative emotions that could

translate to negative emotions toward English language learning, we avoided compositions that evoke these feelings.

Such music provides an appropriate mood and allows students to become more immersed in the game. It also provides additional points of interest and stimulates a variety of senses – with each activity, not only do the art and the objectives change, but the background music changes as well.

Chapters in Detail

Applying TESOL Standards to Chapters

Teachers of English Speakers of Other Languages (TESOL) created a set of standards as proficiency guidelines to help educators and curriculum designers prepare students for English use in all areas of life. The state of Maryland modified these standards for its own use and called them The Maryland State Department of Education (MSDE) English Language Proficiency (ELP) Standards, also called the Maryland ELP Standards. These standards are used in all Maryland schools, (Maryland State Department of Education, 2008) and are used in this project. We consulted these standards (Appendix 14) to provide a strong academic basis for our game’s design. Multiple standards were selected to give a broad range of English reinforcement. Speaking standards were not addressed due to technological limitations that prevented the team from being able to analyze students’ spoken English. One particular standard was chosen to be the main focus (“primary standard”) of each chapter, and then game-play was created to address that standard. After some chapters were designed, if there was an opening to address other standards as well, their game play was altered in order to reinforce these other standards. Then,

while creating the chapter in conjunction with the Programming Team, some primary standards were changed and combined with others in order to match the Programming Team's capabilities.

Addressing Different Learning Styles

We expected to encounter a variety of different learning styles among the student population of our study. In order to make the game correspond to students' different learning styles, each chapter was designed with a specific learning style in mind. By combining this strategy with adaptive difficulty, we hoped that a large portion of students of all learning levels would encounter positive experiences that would encourage them to keep playing. Ultimately, we determined that the first chapter should mainly introduce the game, but the subsequent five chapters were designed with specific learning styles in mind. The Cave Game requires players' avatars to perform tasks like jumping, thus involving more active participation from the student. The Shopping Cart Race also requires a higher level of activity through a fast-paced race with Admiral Adult while interacting with other avatars, which bring other computer-controlled participants to the game. The Memory Card Game then allows students to play at their own pace while starting to challenge their mental skills more. Subsequently, the Maze Game introduces audible commands for students. The Final Battle Game then combines some of these game play elements along with previous content for a comprehensive review.

The chat feature was also incorporated to allow students to communicate with one another. Some students find learning to be more enjoyable when done in groups. Other students who are motivated more intrinsically can play the game without

communicating with other students, focusing more on its role-playing aspects. Giving students this group option allows autonomy over the way they learn at a moment's notice. At times they may prefer singular activity, but as soon as they want to work in groups, the option is available.

Chapter 1: Introduction

The introduction was designed to make students comfortable with the game controls and give them background information. The player's character has just joined a children's spy organization. Students are given some instructions on how to move and then create their in-game avatar. Their first mission is to bake a cake for their boss. In order to do so, players have to find the recipe and buy the necessary ingredients. TESOL standard 3.2 (Recognize, acquire, and interpret meaning of vocabulary through exposure to text) was addressed in this chapter (See Appendix 14 for TESOL standards employed throughout the game).

During most of the introduction, the theme for the mall plays. This theme has a triumphant sound, intended to inspire the player to pursue the missions to come within the game. Part of the introduction takes place in a bookstore. The bookstore's relaxing atmosphere is emphasized by theme music played by two flutes and a cello. The melody is passed between the flutes and the cello just as the player explores the bookstore in search of a cookbook for the cake.

The mall was originally designed from an isometric perspective but was later changed to a side scrolling style to simplify the art and game code. The store fronts and many other elements on the mall are collaborations of the team artists. One notable artistic flaw in the mall is in the bookstore, where players are told to find a

specific cookbook, but the game art does not define the boundaries for clicking areas. Consequently, finding the book can be difficult for many players. This difficulty could have been diminished if more depictive and realistic art had been used with more intuitive game mechanics.

Chapter 2: The Cave Game

In order to complete the Cave Game, the player needs to find a way to enter a cave in order to obtain two objects. The goal of this chapter is for the player to become comfortable with following written instructions displayed in the game's chat box and typing responses to questions. This chapter also familiarizes the player with the use of the arrow keys as the primary method of navigation. TESOL standard 3.2 was addressed in this chapter (Appendix 14).

The background music is a tune is played on vibraphones. The choice in instrumentation together with the melody itself produce a damp, mellow echoing sound similar to the atmosphere one would experience in a cave. This invites the player to explore the cave, and is intended to help players relax as they are asked to make difficult jumps in the game.

The Cave Game was first designed with primitive shapes and without background art, and it was not until later in game development that artists created the cave environment. The final machine image is actually art intended for a puzzle game that was eliminated from the final version of the game. The game design team decided instead to use this art for a variety of prompt formats.

Chapter 3: The Shopping Cart Race

The Shopping Cart Race represents the first time that the player encounters the villain Admiral Adult. The goal in this game is to catch the Admiral as he tries to escape from the player chasing him through a grocery store in the mall. The grocery store setting serves as a racetrack through which the player must maneuver in order to catch up to Admiral Adult before he exits the store.

Throughout the store the player runs into customers, who ask the player for help with their shopping needs. The shoppers ask multiple-choice questions (in the same format used originally in the Cave Game) about what type of food or other grocery item they should or should not purchase, given a specific situation. For example, a shopper may ask what to buy for Thanksgiving dinner. Questions like this were incorporated to expose players to American culture, thus providing a more immersive experience. We did not specifically address the various possible cultures of the students that would play the game so as to create the most inclusive environment. Rather than leave any particular student feeling left out if their culture was excluded, our game caters to the common denominator of all students – they are all here experiencing American culture. The answer to the aforementioned question about Thanksgiving would be turkey. The other choices available are chicken, cereal, and chocolate. Correct answers increase the player's speed while incorrect answers decrease their speed. These questions address Standard 3.2.

The music playing during this game has a Latin rhythm played on piano, with off-beats that give the melody a sense of drive. This musical drive adds to the players experience in racing with Admiral Adult. The background art is vibrant and crisp with

attention to detail to excite the player in this race to the finish. The questions in the game can be easily changed by educators to accommodate any vocabulary based lesson plan. The default is food vocabulary, but teachers may add their own questions by specifying the prompt, four answer choices, and the correct answer for each question. After the player loses or wins the race, a post-game report details which questions were answered incorrectly and lists the correct responses.

Chapter 4: The Memory Card Game

In the Memory Card Game the player is shown a hand of cards to memorize. Each card depicts an action or item. When the player types “ready” in response to a prompt, the cards are flipped. Each card has a number on its back, and the player is asked which number card depicts a specific action or item. To answer correctly, the player must write a complete sentence identifying which number card depicted the action or item in question. If the player answers incorrectly, then the card that was identified is revealed, and the player is asked to name the image displayed on that card. If the player is correct, then this round will not count against his or her score; otherwise this round is counted as incorrect, and the player loses one life point. After the player correctly answers 12 hands without incorrectly answering more than 6, he wins the game.

The music and art in this game were designed to set a dark and suspenseful tone for the tense determination of the spy base and its members. Standards 3.2, 4.1 (Use standard English structure and grammar to develop clarity in written communication), and 4.2 (Use standard American academic English language

conventions to develop clarity in written communication) were addressed in this game (Appendix 14).

Chapter 5: The Maze Game

In the Maze Game, the players find themselves trapped in Admiral Adult's labyrinth, which leads to his secret base. Players must find their way through the maze's three levels in order to exit. The goal of this game is to reinforce listening comprehension skills, following Standards 1.2 (Respond appropriately to question and prompts given orally for a variety of purposes), 1.3 (Demonstrate comprehension of vocabulary presented orally in a variety of contexts), and 1.5 (Comprehend and apply academic and non-academic information presented orally). As students move through each room of the maze, spoken instructions are given through a radio from the spy base's headquarters to guide them to the right path. Each room has four walls, and at least one wall leads to a pathway. The instructions relate to different types of objects, colors, shapes, and physical directions. For example, players may be instructed to climb up the pole or climb through the red square window. The maze is randomized, resulting in a variety of pathway options. Players may encounter three windows of the same shape but different colors, or they may come across only an elevator and a ladder.

Most rooms open to 3 paths, but because it is a maze, there are dead ends; some rooms may have only one way to enter and leave—an indication that the player has strayed from the correct path. If the player goes too far off the path, the computer automatically guides players back onto the correct path while also writing out directions as they are spoken (also addressing Standard 3.2).

The music played during the Maze Game has a melody that winds up and down and comes to a cadence, or the close of a musical phrase, only to start again, just as the player winds through the maze starting a new task as soon as they finish the last task. As players beat each level of the maze, the music accelerates to denote the player's progress and give the player more excitement. In each room, after a player chooses a path to take, sound effects are played that correspond to that choice. For example, if a player walks through a door, a door swinging sound is heard. The player then moves to the next room. The spoken directions were recorded by both a male and female member of the team as a way of providing multiple examples of spoken English.

According to Felder and Henriques (1995), students absorb information more easily when it is presented audibly. By using spoken instructions, this portion of the game intends specifically to meet the learning needs of students who are more comfortable with learning through auditory stimuli; in this way, these students will be able to retain the information longer and apply it more effectively (Moallem, 2007). These spoken instructions were also incorporated to apply specific speaking standards, such as Standards 1.2, 1.3, and 1.5. Additionally, Forman (2003) notes that learning is enhanced by sensory information garnered through experience: actively listening to directions, the main activity of this game.

This chapter was designed using a maze randomizer so that each time it is played, the maze changes (different paths, rooms, and combinations of the two). A mini-map displayed in the corner of the screen is intended to help players keep track of their location within the maze. The map reveals rooms as players enter them. When

the player enters a room, all he sees is the left wall, the middle wall and the right wall. Images were made in a two-dimensional format to create a three-dimensional perspective. Players can turn to face any wall by hitting the left and right arrow keys. To move down a specific pathway, players must face that pathway and then hit the up arrow key.

Chapter 6: The Final Battle

After exiting Admiral Adult's maze, players encounter his most diabolical creation: a machine created to destroy all the fun in the world. In order to stop the machine, the player must complete a variety of tasks. This game addresses all of the standards employed in chapters one through five. First, students are asked to correct grammatically incorrect sentences and then retype the corrected version. Then, they are asked a question regarding a common activity. For example, they may be asked to name the activity involving sliding down a snowy hill (sledding). Students must answer the question with a full sentence whose beginning is provided as a guide. After the player completes these tasks, a spoken message from another agent in the spy organization provides the player with a password that he must type in order to damage the machine. These passwords were chosen to be commonly misspelled words in the English language to assess students' spelling, an important aspect of writing. After repeating this process and greatly damaging the machine, the student wins the game.

The art for the Final Battle includes the machine, Admiral Adult, and a rooftop as the background. The machine is separate from the background, so that it may vibrate to denote when a player has successfully attacked Admiral Adult's

machine. The music played during this game has a very heroic and triumphant theme played by brass instruments, connoting the importance of this concluding game in defeating Admiral Adult. Sound effects are played here as well to cheer on the player as he destroys the machine or to let the player know when he has not completed the tasks required to defeat the Admiral and his evil machine.

Programming was straightforward for this game. All sentence corrections, activity questions, and passwords are selected from a “question bank” in sets in order to provide a unique experience each time the game is played.

Programming

Network Topography

In order for all the students to communicate and store their data at a central save point, it was necessary to integrate some measure of networking into the game. Networking is the means by which multiple computers are connected. By including networking, the computers are able to communicate and share data. We implemented a client/server setup for the network structure, since it effectively fulfills the basic requirements the program needs. In a client/server setup, one computer acts as the server while the rest act as clients (Image 1). Each of the clients establishes a Transmission Control Protocol (TCP) connection with the server but do not communicate directly with each other. This protocol specifies how the bits are organized as they are sent between computers so that all messages are received correctly. If the clients need to communicate, the message must go to the server, which then redirects it to the intended recipient.

Since all messages must go to the server, it acts as a centralized point in the network. It is this feature that makes networking ideal for the game. Each student plays on a client, while the teacher's computer acts as the server. In this way, all messages sent by students must pass through the teacher's computer where they can be viewed. In addition, this allows the teacher's computer to serve as a perfect location to store data. Each client sends all information regarding the students' save files or game scores to the server, where it is stored in files.

An additional benefit of using a client/server structure is that the connections between the clients and server use the TCP networking protocol. One feature of TCP is that messages sent over the connections are guaranteed to completely and correctly arrive at the receiving computer. As a result, TCP has a slower transfer rate than some other protocols. However, this feature is essential for the messages sent in the game; without the guarantee that all messages would arrive correctly, information being saved in the data files could be corrupted. This would mean that the data being saved would be unreadable, which would result in the loss of save files or game scores. All of these aspects of the client/server structure make it the ideal choice for the networking in the game.

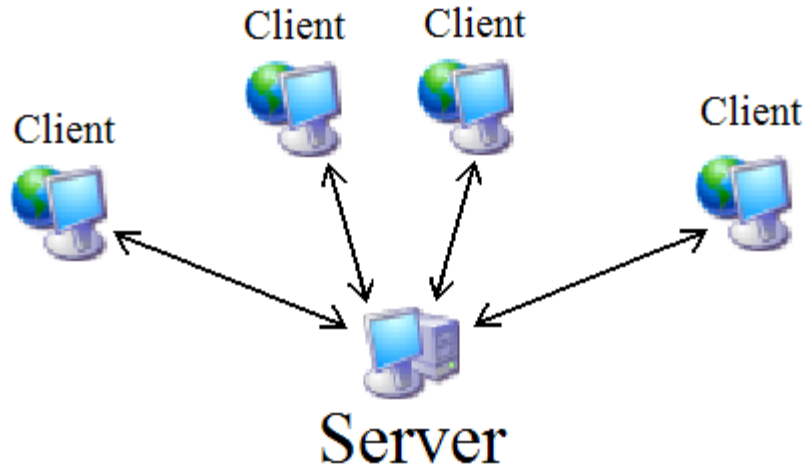


Figure 6: The Client/Server network structure. The arrows indicate the paths that messages travel within the network.

Client and Server

The client portion of the program consists of the game that the students play. As in most applications, the networking mostly runs in the background, and the students only have to specifically interact with it in a couple of situations. The first of these is the login page. The Internet Protocol (IP) address gives the client the information it needs to establish the connection with the server. The student name and password ensure that the correct save file is accessed and that the information is sent back to the client. The server uses this information to locate the file and read the text stored within. The server forwards the contents to the client, which processes the data and uses it to restore the game's state back to how it was the last time the student played. If the save data is empty, the student starts a new game.

The other situation in which students explicitly invoke the networking is when they use the chat function. Most text entered into the chat bar is taken as the input to

the section of the game that the student is playing, instead of being sent over the network. However, if the text is preceded with "C:", then it is sent as a chat message to the server. When the server receives the message, it transmits the message, along with the name of the student who sent it, to all the other clients. Clients receiving the message display the name of the student who sent it, followed by the message contents, in the chat box.

There are also two types of interactions that take place between the client and the server without any input from the user; these interactions deal with saving information. Whenever the student finishes a chapter, his or her game client sends a message to the server that includes the student's name, the student's progress in the game, and other necessary information. The server then updates the respective student's save file with this information. In this way, the next time he logs in, the student is able to continue playing from wherever he left off in the game.

Similarly, the client also sends messages to the server when the student answers a question in the game. The message contains all information relevant to the question, such as what game it is in, whether it was answered correctly, and what the correct and incorrect answers are. This information is stored in a large data file that contains the answers that each individual student has given for the questions they have encountered. The entries in the data file are arranged chronologically by when they were received by the server. They are also indexed by the student's login ID so that the progress of any specific student can be tracked.

The server portion of the program runs on the teacher's computer. All of the saving and loading is done in the background, but the teacher is able to monitor the

messages that the students send over chat. The server's interface (Image 2) consists of a large text box that displays these messages. In addition, whenever a student misspells a word and decides to ignore the corrections, the server creates an entry telling the teacher that the student sent a misspelled word.

All of the messages sent by the clients and the server share the same basic format, although there is some variation among the different types of messages. All of the messages sent by the clients and the server consist of a sequence of English characters. The first letter in the message indicates the information contained within the message. For example, if the message is a chat entry sent from one of the students, it starts with "c", while a message containing a student's request to load his or her save file would start with "l". A number of tab-separated fields follow this initial character. Each field contains information relevant to the message's type. When a message is received, the client and server parse the text to process the included data and use it to perform the action requested.

Parser

Since the goal of this project was to motivate and encourage the students to use English, the game came with a built-in chat feature. When a student uses the chat feature, a spell checker will first look through what he has typed to make sure it is in English. If any words are not English or are misspelled, the spell checker will not allow the student to send it until the error is corrected. The spell checker will also attempt to guess what the student is trying to write and will give him suggestions.

In order to do this, a statistical spelling corrector was created. First, a list of English words was compiled. Many of these words came from WordNet© and the

rest came from various lists online. Since this spelling corrector would be used by middle school students, several modifications were made to the word list.

After combining all the word lists, the main problem was that there were hundreds of nouns and adjectives that were very similar to other, more common words. This causes a problem if the student misspells a common word—such as “helo” instead of “hello”—and it happens to be an abbreviation for some organization. In order to avoid this confusion, several steps were taken in an attempt to remove uncommon nouns and adjectives. First, a list of potentially confusing words was generated for each word in the original word list. A potentially confusing word is one that has a letter added, deleted, transposed, or swapped. For example, “addax” is the name of a North African antelope. However, “add”, “adds”, and “aide” are much more common. Therefore, it is best if addax was removed from the wordlist as middle school ESOL students probably did not intend to use it. After this list was created, it was compared with words in the original word list. If any of these matched, then the potentially confusing word was compared with a list of words that are known to be correct and commonly used. If the word was not on that list, and it is a noun or an adjective, then the potentially confusing word was removed from the word list.

Finally, each word was given a number based on how many times it appeared in a test data set. For this, the test data set was a combination of online word lists and a file compiled by Peter Norvig (Norvig, n.d.). When the spelling corrector receives a misspelled word, it creates a list of possible words that the student could have meant to type.

Each word the student types is verified against a word list in the spelling corrector. The comparator converts everything to lower case and ignores punctuation and apostrophes. It separates on spaces, commas, and other characters it does not recognize. When it detects that a word is spelled incorrectly, it generates a list of potentially correct words. A potentially correct word is one that has a letter added, deleted, transposed, or swapped. These words are known as words with an edit distance of one. This process is repeated for each word in the list of potentially correct words. All of these lists are combined, and each potentially correct word is checked against the word list in the spelling corrector. The suggestions returned are three most common words with an edit distance of one and two most common words with an edit distance of two. If there are not enough words from the lists with edit distances of one or two, then additional words will be added from the list with edit distance one and then the list with edit distance two, until there are five suggestions. If there are less than five suggestions, then every suggestion will be returned. (Note: The spelling corrector also checks spelling for numbers, for example, 100th, 2nd, 23rd.)

While this method creates a large database of words and frequently suggests the correct word, there are still several drawbacks. First, since the entire process is automated, the final word list is bound to have words that are confusing to ESOL students. An example of this is the British spelling for “colour” and the American spelling of “color.” Since both are technically correct spellings, the parser will allow either and both versions will appear as suggestions, even though we only want the American version to be used. Additionally, old words in English, such as thou, which ESOL students might type by accident, may not be flagged by the spell checker as

incorrect. In order to fix these problems, the word list would have to be constructed manually.

Testing

“Testing” is the process of going through a game looking for errors. These errors may be so big that they prevent game play or so small that they are hardly noticeable. Testing is important for ensuring that the game is playable from start to finish, that it prevents players from doing the impossible, like walking in midair, and that it is polished. In order to ensure that testing proceeded smoothly and that found errors were corrected, the following procedure was used.

After a game in this project was programmed, it was passed back to a subgroup of the game design team for testing. This subgroup consisted of two groups of two people. Tasks included testing for possible programming and grammar errors, as well as checking if all possible answers to a question were included and all the questions made sense. Each chapter was checked multiple times by one team of two before being sent to the other team. After each of these teams had checked the game, the game was sent to the remainder of the team to test. Each time an error in programming was found, a description of the error, how the person created the error, and what the person thought was wrong was sent to the entire team. Single features, such as the chat box, were also tested by the entire team. When the testing for each individual part of the game was completed, the game was compiled and testing of the entire game began. This testing was also done by the entire team.

Some of the more serious errors included the inability to log into the game, the game not being able to save previous progress, the inability to use the elevator,

card images disappearing in the Memory Card Game, and a runtime error occurring while the player is creating his or her character or while looking for the book “The Patisserie’s Guide to Pastries.” Minor errors included not having the player’s name capitalized when a computer character called Jason said “Hello ‘player name,’” not having the correct face appear or having certain sections of the face appear as a black box, and having a cake floating around in midair during the introduction. Not only were the games themselves tested, but the networking system, music, and server were also tested until no problems could be found. This completed project was then given to Anne Arundel County Public Schools.

Chapter 4: Methodology

Our methodology is based upon a 2006 mixed-methods study done by professors Florence Yip and Alvin Kwan of Hong Kong University of Science and Technology and the University of Hong Kong, respectively. In their study, Yip and Kwan sought to determine whether students who played educational online computer games that incorporated English vocabulary would learn these terms more effectively and more completely than students who were exposed to the same vocabulary through more traditional classroom activities, such as diagrams or writing terms with Chinese translations. Undergraduate participants from the Hong Kong University of Science and Technology were split into two groups, an experimental group that played the online games, and a control group that was taught in a classroom.

Students were given a pretest prior to playing the game or participating in the classroom lessons and a posttest after the experiment concluded to measure how well students knew the vocabulary. Students in the experimental groups were also given surveys to review the online sites they used, and several of these students were interviewed to gather more in-depth responses. The student's instructors also partook in a group interview to evaluate the online games.

We looked to Yip and Kwan's study as a base for our own research methodology; however, we made many adjustments to better fit the study methodology to our specific project limitations. Like Yip and Kwan's study, our study is quasi-experimental in nature because the selection of student participants was not based on complete randomness and because of the classroom setting of our research, we could not control for all confounding variables. We could not test for our

students' baseline knowledge of English as Yip and Kwan did with their participants in a pre- and post-test because we did not have enough time or the appropriate knowledge to create our own standardized test. Because AACPS officials stated all participants in the study must receive the same treatment so that instructors could supervise all children at once and all students could receive the same benefits of the study, we could not remove the students in the experimental group from the classroom to test in a computer lab while control group students remained with the instructor in the classroom.

For these reasons, we shaped our study so that it would not measure English vocabulary retention but rather the students' motivation to learn English in the classroom, eliminating the need for a control group; all student participants would play the computer game at the same time. Instead of a pre- and post-test, student participants were given a pre- and post-survey asking how motivated they felt to learn English in the classroom before and after playing the computer game. Between surveys, the team wanted instructors to let students play the computer game six 30-minute intervals. (For a detailed procedure, see Appendix VIII.) Like Yip and Kwan, at the conclusion of the study, several student participants from each school were interviewed to expand upon their survey answers. Each instructor was also interviewed individually.

Participants

We conducted our research in Anne Arundel County, Maryland because the county's public school system welcomed our research and would allow the team to collect and publish any data collected. The study participants were sixth through

eighth grade students, ages 12 to 15, at either Wiley H. Bates Middle School or Annapolis Middle School. These students are non-native English speakers, many of whom are recent immigrants to the United States and were therefore enrolled in their corresponding school's English as a Second Language (ESL) class to improve their English language proficiency. Of the 485 students at Bates Middle School, 33 are enrolled in the ESL program; 10 of these students participated in our research study. Of the 482 students at Annapolis Middle School, 46 are enrolled in the ESL program; 8 of these students participated in our study. In total, 7 males and 11 females participated. Only students who returned a consent form signed by their parent or guardian (see Appendix IV) were allowed to participate in the study, and only students whose parent or guardian signed that they could be audio-recorded (see Appendix V) participated in interviews.

ESL students in Anne Arundel County Public Schools tend to score lower on Maryland State Tests than non-ESL students. According to 2008 data published by the Maryland Department of Education, ESL students were less likely to receive a "proficient" or "advanced" score in reading on the Maryland State Assessment (MSA).

In Bates Middle School, only 12.5 percent of sixth grade Limited English Proficiency (LEP) students scored "proficient" or "advanced" compared to 75 percent of the overall school population that did so. Only 13.3 percent of seventh grade LEP students and 21.4 percent of eighth grade LEP students scored a "proficient" or "advanced" in reading on the MSA.

At Annapolis Middle School, 37.5 percent of sixth grade LEP students received a “proficient” or “advanced” in reading on the MSA compared to the 80.8 percent of the total school population. Only 30.8 percent of seventh grade LEP students and 16.7 percent of eighth grade LEP students received a “proficient” or “advanced” score. We hope that our research can be used to show that students can become more motivated to learn English and more confident in their language skills after playing our computer gaming software.

Survey Administration and Measure

Prior to the study, students in each classroom were given consent forms to take home and have signed by a parent or guardian. Only students who returned the signed consent forms could participate in any stage of the study.

The first survey was administered to student participants before they played the game. The survey was administered and collected by ESL instructors in their classrooms. In order to keep surveys anonymous, each survey was labeled by the ESL instructor with a 5-digit ID number that corresponded with a student participant. Only the instructors knew which IDs corresponded with which participant. Students were then able to create their own password for logging into the game software.

The survey was divided into three portions: a “Who are You?” portion, a computer-use portion and a “How You Feel About Learning” portion. The “Who are You?” section featured questions regarding the students’ demographic information used to categorize survey and interview data and find trends. Information on age, gender, amount of time spent in the United States and native language was requested. Answers were in either multiple choice or fill-in-the-blank format.

The computer-use portion of the survey asked students multiple choice questions about how familiar they were with using computers and for what purposes they used computers. Finally, the “How You Feel About Learning” survey used a Likert scale; that is, answers to the survey question ranged from strongly agree, agree, neither agree or disagree, disagree to strongly disagree to assess the student participants’ self-perception of their performance and motivation in ESL class. The questions for this survey were adapted from Elaine Horwitz’s “The Beliefs about Language Learning (BALLI): ESL Version and Foreign Language Classroom Anxiety Scale (FLCAS)” (Horwitz, 2008). For this survey, students answered by checking off their answer in a grid (see Appendix IX); however, based on participating ESL instructors’ feedback after this survey was given, this format was changed for the second survey to a standard multiple-choice format in order to make the survey more user-friendly for students who were unfamiliar with completing surveys.

After conducting a training session with each instructor, team members left instructors to facilitate game play in their classrooms on their own. Students played the game in computer labs outside their classrooms. In the game play guide distributed to instructors, we asked that each student participant play the game in six, 30-minute periods; however, because team members could not be in the classroom each time students played the game, adherence to these guidelines was dependent on the instructor’s good will to adhere to our guidelines. Due to instructor error and complications in classroom schedules and student absences, the amount of time each

student played the game was inconsistent. This issue and its effects on our research will be further discussed in Chapter 6.

After game play, the second survey was administered by ESL instructors in their classrooms to student participants. This survey was also labeled with student identification numbers to maintain confidentiality. This survey had two sections: a computer game section and a “How You Learn” section. The Computer Game section consisted of six questions, including questions asking the students if they thought the game was “fun” and if they were able to understand the English text used in the game. Answers were requested on a Likert scale as previously described. Two questions asking what for the student’s favorite and least favorite parts of the game were discarded because the multiple-choice answers were mislabeled. This, however, was reconciled in the student interviews.

The “How You Learn” section consisted of questions similar to the first survey; however, this time students were asked about their perceived game performance and motivation to learn English after playing games related to the classroom. An example of this type of prompt is, “After playing this game, I feel better about learning English” and “After playing this game, I feel more confident in my English vocabulary.” Students were asked to answer on a Likert scale in multiple-choice format (see Appendix X).

Interview Administration and Measure

Interviews were administered to both student participants with parental consent for audio-recording and participating ESL instructors. At Bates Middle School, students volunteered to participate in interviews, while at Annapolis Middle

School, the instructor selected eligible students to participate. ESL instructors served as translators for students who needed help understanding the interview questions. (This service was only needed in interviews at Bates Middle School.) The interviews provided an opportunity for student participants to expand upon their answers to the second survey, specifically answers to questions asking students what they liked and did not like about the game and how the game software affected their outlook on learning English. Interviews were given in a quiet place outside of the classroom to students and their instructors individually during class time by one team member using an audio recorder and/or hand-written notes. The student interview consisted of 21 questions with room for follow-up questions, if deemed necessary by the interviewer (see Appendix XI). Students were asked if they liked or did not like various aspects of the game design including graphics, music, storyline and controls. Students were also asked to describe their favorite and least favorite activities in the game. To expand on student self-perceptions outlined in the first and second surveys, students were also asked to explain if and how the game software affected their outlook on their English language capabilities and their motivation to learn English, within the context of playing the game. Such questions included “Did the game make you more confident about your English language abilities?” and “If you played this game whenever you wanted to, do you think you would be more excited about learning English?”

Participating ESL teachers were then interviewed individually in order to gain a professional opinion on the game as a tool to be used in ESL classrooms. They were asked 17 questions concerning their current teaching practices, their thoughts on the

use of educational technology in the classroom, their student's overall reaction to the computer game and what changes could be made to the game to make it more effective when used by middle school ESL students (see Appendix XII).

Survey and Interview Coding

After data collection, surveys were coded in order to organize the information for later analysis discussed in the following chapter. To code surveys, pretests and posttests for each student who fully participated in the study were matched by ID number and reviewed by at least two team members for accuracy. Data was then entered into four electronic spreadsheets: Bates Pretest, Bates Posttest, Annapolis Pretest, and Annapolis Posttest. Each question was coded similarly, using digits 0 for "strongly disagree," 1 for "disagree," 2 for "neither agree or disagree," 3 for "agree," and 4 for "strongly agree." For questions without Likert-format answers, differentiation in code was stated within the spreadsheets. Unanswered questions were left blank in the spreadsheets and not taken into account in data analysis. Student's t-test was performed on each of the interview questions and correlations were calculated between the responses to the questions.

Interview coding methods were based on procedures developed by Raymond Gordon (1992). These methods focused on categorizing interview data. Before they were coded, interviews were first transcribed from audio recordings. Three team members individually read over transcripts for student and teacher interviews and then came together to enter simple yes/no answers into electronic spreadsheets organized into columns corresponding to each interview question. (One team member then reread the interviews and organized more in-depth answers—that is, answers that

could not be answered with a simple “yes” or “no”—by key words and general themes.) One team member then read the group of answers for each interview question in search of common key words or general themes to then formulate into categories. After identifying these key words and themes, the team member then counted the number of students whose answers that fit in those categories and recorded this number on the spreadsheet. For example, for the question “What game was the most difficult to play?” one answer theme was Chapter 3 “The Cart Game;” once this theme was recorded on the spreadsheet, the team member counted the number of students who stated that they had had the most difficulty playing “The Cart Game.” Categories were then reviewed and validated by two other team members. Additional keywords and themes were added if these team members observed gaps in the original list of categories. At the conclusion of this process, the three team members read over the interview responses again to identify trends (e.g. overall positive or negative responses to each question). Quotations that represented the opinion of the overall group of responses were extracted from both student and teacher interviews, delegated page and line numbers and will be referred to in later chapters to support our findings.

Teacher Focus Group

In order to further explore the game’s potential as an educational tool and motivational factor, an addendum was made to the original IRB application to allow the game to be played by a group of 21 graduate students enrolled in EDCP634, a class on ESOL teaching methods taught by Dr. Roberta Lavine. The teachers who participated in this focus group were either ESL teachers or teachers with an interest

in ESL education. The purpose of this branch of the study was to gain a more detailed idea of the pedagogical benefits of the game.

The focus group was divided into three parts. The first segment was a discussion focused on current ESOL teaching methods and pedagogical challenges and the potential benefits of using educational computer games in an ESOL classroom. The second segment of the study was a 20-minute game-play session. The study was concluded with a wrap-up discussion, during which the teachers discussed their reactions to the game. The focus group occurred Thursday, December 2, 2009 at 7:30PM, during normal class time, in the normal classroom. This classroom was equipped with enough computers for each teacher to play the game independently. The game had been installed on the main computer prior to the focus group. The pre- and post-game play discussions were led by Dr. Lavine. Game play was facilitated and overseen by members of our team.

Before the focus group began, participants were asked to sign a consent form outlining the nature of the study and the terms of their participation. As participants read through the informed consent forms, members of our team present introduced themselves and briefly described the research project. Once the consent forms were returned, the participants were each given a login code composed of 5 randomly combined digits, necessary for logging into and playing the game.

The pre-game play discussion was led by Dr. Lavine with members of Team ILL taking notes and observing. The participants were asked to comment on their students' level of English proficiency and attitude regarding classroom materials. Teachers were then asked to describe their normal approach to teaching in terms of

materials and the presentation of information. Teachers were also asked to discuss the challenges they encounter when teaching ESL or EFL students. The pre-game play session ended with a discussion of the potential benefits of computer gaming as a complement to existing ESL curriculums.

After this discussion, teachers were asked to log into a classroom computer and then sign into the game itself using the 5-digit code assigned to them earlier. Many of the classroom computers were unusable due to some prior adjustments made to many of the computers' language setting; consequently, teachers played the game in three groups of 8 to 10 individuals. The teachers played for approximately 20 minutes. None of the teachers made it past the beginning of the second chapter, "The Cave Game." Members of Team ILL took notes on the teachers' reactions to and comments during the game. Game data was saved and stored on a flashdrive and a team member's computer.

After approximately 20 minutes of game play, teachers were asked to return to their seats for a wrap-up discussion. Once the teachers had returned to their seats, a team member demonstrated the game's visual diversity and variety by briefly showing several of the other chapters. The team member also demonstrated how to play the third chapter, "The Cart Game" and how to navigate through the fifth chapter, the "The Maze Game." Because the sound on the computers the teachers used was not working, this demonstration was also intended to give the teachers a chance to hear the game's sound effects and original score.

To begin the wrap-up discussion, teachers were asked to give their general impressions of the game from both a player's and teacher's perspective; this was

intended to give the teachers a chance to discuss what they enjoyed about the game, what they thought needed to be improved and suggestions for making the game a more effective educational tool. Teachers were also asked to comment more specifically on the age group and skill-level of the students for whom this game should be intended. The notes taken during this study were compiled, and themes were identified among the teachers' responses before, while and after playing the game in a similar fashion to previous student and teacher responses at Annapolis and Bates Middle Schools.

Chapter 5: Results

Introduction

During the testing phase of our project, when the game was played by ESOL students from Bates and Annapolis Middle Schools and during subsequent interviews, we collected a variety of data. This data can be grouped into four different datasets. First, there were the pre- and post-game surveys completed by all of the students who played the game. These surveys included questions that the student answered on a Likert Scale, providing quantitative, numerical data that was used to measure the overall motivational impact of the game. Second, several students were interviewed and asked open-ended questions about such topics as their favorite part of the game, the part they found most difficult, and if they thought the game helped them learn. Third, the teachers of these ESOL classes were interviewed and asked to speak about their thoughts on such topics as technology in the classroom and their opinions of our game. Finally, the game was given to a class of teachers enrolled in a graduate class about ESOL teaching methods at the University of Maryland. These teachers participated in a discussion about technology in the classroom, games as motivational tools, and the overall attitudes of their students toward learning English. They then played the game and expressed their opinions about it. This chapter will address the results of our study in two portions: the students' reactions, as characterized by the survey and interview results, and the teachers' reactions, as seen in the Bates and Annapolis teacher interviews and classroom group discussion.

T-Values

The results of the survey were analyzed using Student's t-test to determine which survey questions resulted in significant results. To apply the t-test, first a t-value has to be calculated for each question. The formula for the t-value is $t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$, where \bar{x} is the calculated arithmetic mean of the results for the question, μ_0 is the assumed arithmetic mean for the results under the null hypothesis of the test, s is the calculated standard deviation of the results, and n is the number of observations. For our results, $\mu_0=2$ and $n=18$, the number of students surveyed, for all tests. Under our null hypothesis, the value $\mu_0=2$ indicates the assumption that the average response to each survey question would be "Neither agree nor disagree."

Once all of the t-values were calculated, they were compared to the table of critical values for t-value distributions. This table includes t-values for different strengths of statistical significance. By comparing the calculated t-values to the values in the table, it was determined which results were statistically significant. This gave evidence that the null hypothesis could be rejected in favor of the alternative hypothesis $\mu > 2$ for sixteen of the questions and the null hypothesis $\mu < 2$ for two of the questions. For the sixteen questions with $\mu > 2$, this means that the true average answer is statistically shown to be in agreement with the question rather than the survey choice "Neither Agree nor Disagree". For the two questions with $\mu < 2$, the true average answer is shown to disagree with the question. The t-values for those eighteen questions can be seen in Table 2. For each of those questions, the t-value was significant at the $\alpha=0.1$ level. This means that we can be at least 90% certain that

the true average response is either greater than or less than 2 depending on whether the t-value is positive or negative, respectively.

Question	T-Value
Pretest: Writing in English makes me feel nervous.	3.267
Pretest: Writing English is fun for me.	-2.01
Pretest: When I write in English, I feel I make a lot of mistakes.	1.943
Pretest: I feel confident when I read sentences in English if it's short.	2.27
Pretest: I feel confident when I read paragraphs in English if it's long.	-1.572
Pretest: I like learning English in School	1.669
Posttest: I thought the game was fun to play.	4.528
Posttest: I knew many of the English words in the game.	3.591
Posttest: I was able to read the English game.	2.117
Posttest: I had fun playing this game.	3.528
Posttest: This game helped me practice reading English.	4.885
Posttest: This game helped me practice writing English.	4.658
Posttest: I learned English Vocabulary from this game.	4.142
Posttest: After playing this game, I feel more confident in my English vocabulary	1.671
Posttest: After playing this game, I feel more confident in speaking in my ESOL class.	2.283
Posttest: This game made me more excited about reading in English.	2.283
Posttest: This game made me more excited about writing in English	2.197

Table 1: Statistically Significant T-Values

From these results there are few trends but are clearly identifiable. From looking at the first five results in the table, which are all from the pre-test, it seems

that the students did not have fun learning English before playing the game. They were nervous and lacked confidence in their English reading and writing skills. This established a good baseline against which to compare our results from the post-tests.

The results of the post-test showed a great improvement in attitude about learning English as well as significant evidence that students believed the game helped them learn. The four largest t-values obtained indicated that the students thought the game was game fun, it helped them increase their vocabulary, and it helped them practice their English skills. These show that the game was greatly successful at achieving its purposes of being educational and fun.

Also, there is significant evidence that students felt the game increased their motivation to learn English even though the questions relating to excitement resulted in small t-values. Students indicated that the game made them more excited and motivated to learn reading and writing in English, which is precisely what we were investigating with our research question. The fact that the question is proven, along with the added benefits that the game was fun and students felt it was helpful, indicates that the game was indeed a success.

Correlations

In addition to the t-tests, the results of the student surveys were also analyzed by calculating the correlations between each pair of questions. These correlations represent the extent to which the answer a student gives for one question can be used to predict the answer he or she gives to another question assuming that the relationship between the two answers is linear in nature. Correlation values can be between -1 and 1. Values of 1 or -1 indicate that the result of one question can be

used to perfectly predict the answer a student will give for the other question used to obtain the correlation. A value of 0 indicates that the results of the two questions are completely independent from each other.

For example, from our analysis we determined that there was a correlation of 0.962 between the survey questions “This game made me more excited about reading in English” and “This game made me more excited about writing in English.” The value is close to 1, so it can be stated that there is a strong correlation between the two questions. A student giving a high answer on the Likert scale to one of the questions is very likely to have given a high answer to the other question as well. Conversely, the correlation between the questions “After playing this game, I feel more confident in my English writing” and “I do not think this game helped me practice writing in English” was -0.728. The correlation between these two questions is weaker than the first two since the value is closer to 0, but it is also a negative correlation. This means that a student who gives a high answer to one of the questions in the pair is more likely to give a lower answer for the other one.

Correlations were used for our analysis because they are suitable for identifying trends between answers to different questions in the survey data. They indicate not only whether the results of the two questions are independent or not but also how strong the relation is and whether it is a positive or negative relationship. This allows for a more thorough analysis and interpretation of the results.

Unfortunately, due to the small number of observations that could be obtained, none of the results are statistically significant. However, the stronger

correlations found indicate relationships that might be significant were the game and surveys to be repeated with a larger number of students.

Results and Interpretation

While over a thousand correlations were calculated (See Appendix XVIII for the full list), a smaller subset of these were strong enough to conclude as having a possible significance. In order to single out the strongest correlations, those having values either less than -0.6 or higher than 0.6 were selected from the rest of the data and ordered by absolute value. This resulted in a list of a little more than thirty correlations that had a strong possibility of highlighting interesting relationships between the questions on the surveys. The focus of the data analysis was on those strong correlations and other relationships between questions that we expected to be strong, but were not.

Of all the correlations that were predicted to have a high value, all but one turned out to actually be weak correlations. In some cases, this is easily explainable, as in the case of how often the student uses a computer and how fun he or she thought the game was to play. In this case, the correlation between the answers to these two questions was -0.339. A student that uses a computer often might better enjoy playing the game because he or she likes to play computer games. Conversely, a student that uses a computer less often might also have had fun playing the game because he or she hasn't played as many professionally produced video games and has less to which to compare our game.

However, some of the correlations that should have been strong instead turned out to be fairly weak. The correlation between the answers to the questions "This

game helped me practice writing English” and “I do not think this game helped me practice writing English” was only -0.256. Given that the questions are the negated versions of each other, the correlation should have been a much stronger negative correlation. In this case it appears that the only possible reason the correlation is so weak is that not all of the students fully understood what the questions was asking.

The only strong predicted correlation was between the answers to the questions “This game made me more excited about reading in English” and “This game made me more excited about writing in English” which were both on the post-test. It also happened to be the strongest correlation of any of the sets of answers. While the correlation of 0.962 is very high, it is also a fairly straightforward relationship between the two questions. If the game makes students more excited about writing then they would be likely to exhibit a similar excitement about reading as well since the two abilities are similar. Some of the other strong correlations strengthened this conclusion as they also had high values relating being excited about learning in English with being excited about writing in English. This can be seen in the correlations between the question “After playing this game, I am more excited about learning English” and the questions “The game made me more excited about reading in English” and “The game made me more excited about writing in English.” These correlations can be seen in Table 1, which displays the ten strongest correlations.

Questions	Correlation
This game made me more excited about reading in English.	0.962
This game made more excited about writing in English.	

After playing this game, I am more excited about learning English. This game made me more excited about reading in English.	0.884
After playing this game, I am more excited about learning English. This game made more excited about writing in English.	0.850
This game helped me practice writing English. After playing this game, I feel more confident in speaking in my ESOL class.	0.764
I thought the game was fun to play. I had fun playing this game.	0.757
I feel confident when I read sentences in English if it's short. I am happy with the amount of English I know now.	0.752
Writing in English is fun for me. After playing this game, I feel more nervous about learning English.	0.748
After playing this game, I feel more confident in my English vocabulary. I do not think this game helped me practice writing in English.	-0.728
Do you think computer games can help you learn? I never feel confident when I am speaking in our ESOL class.	0.718
I feel confident when I read sentences in English if it's short. I feel confident when I read paragraphs in English if it's long.	0.708

Table 2: The Ten Strongest Correlations Found

The strongest correlation that presents an interesting relation is between the questions “The game helped me practice writing English” and “After playing this game, I feel more confident speaking in my ESOL class.” This indicates that the students who felt they had useful practice just playing the game also felt that it improved their confidence when utilizing other English skills in the classroom when not playing the game.

Another interesting correlation to note is that between “Writing in English is fun for me” and “After playing this game, I feel more nervous about learning English.” The first question is from the pre-test and the second is from the post-test. These resulted in a correlation value of 0.748. One possible explanation for this is that the students are confident in their ability to write on the topics they have encountered in class. However, when faced with new topics and sentence structures, such as those introduced in the game, they are less confident about their skills with the English language.

The only strong negative correlation that was found was the one between “After playing this game, I feel more confident in my English vocabulary” and “I do not think this game helped me practice writing in English” that was mentioned in the examples. Both of these questions are from the post-test. As with some of the other correlations, this one makes a lot of sense even at face value. Since this is a negative correlation it means that the students who thought the game helped them practice writing in English also felt more confident in their vocabulary after playing the game. Since they would have to learn new words and grammar in the process of practicing it is only natural that their vocabulary would improve.

One point of concern, however, is that the correlation value between “I thought the game was fun to play” and “I had fun playing the game”, also both from the post-test, was only 0.757. Given that the questions are identical and only worded slightly differently it would be expected that the value would be much higher than this. This indicates that some of the students may not have fully understood the questions that were asked on the survey.

Although they were not strong correlations, it is also interesting to note how students' computer usage seems to relate to their enjoyment of the game. The questions about how often and how good the students are at using computers both had weak negative correlations to how fun they thought the game was. This would mean that students who use a computer more often or are better at using a computer had less fun playing the game. It is possible that these students were accustomed to playing professional video games. However, it is also quite likely that the results indicate no relationship at all since the correlations are so weak.

Overall the t-test and correlations results indicate an overwhelmingly positive response from the students to the game. Although the sample size of students surveyed is small, the positive trend becomes apparent when the results of the quantitative surveys are paired with those from the qualitative interviews.

Student Interviews

In addition to the quantitative data obtained through surveys, qualitative data was also obtained through interviews with the students who played the game. Students from both schools who consented to be interviewed and recorded were spoken to, and the transcripts of these interviews appear in Appendix XV.

Following Raymond Gordon's coding procedures as detailed in our research methodology, we compiled the chart as seen in Table 3. This table details the major themes that were present in students' answers to the more open-ended questions—those that could not be answered with a simple “Yes” or “No”.

Question	Theme	# of responses
Q1: What did you not like about the	Instructions Difficult	1

game?		
	Admiral Adult Too Slow	1
	Questions Difficult	1
	Nothing	2
Q6: What game was the most difficult to play?	Cart Game	2
	Technical Difficulty	1
	Nothing	2
Q7: What made that game difficult for you to play?	Difficult Questions	2
	Typing	1
Q11: What was your favorite activity?	Baking Cake	4
	Cart Game	2
	Exploring Mall	2
	Finding Brett	1
Q12: Why was that your favorite activity?	Enjoy Shopping	3
	Easy Activities	1
	Practice Activity	2
Q13: What was your least favorite activity?	Cart Game	2
	Gathering Information	3
	Nothing	4
Q14: Why was that your least favorite activity?	Question Difficulty	2
Q15: What did you learn from the game?	Vocabulary	7

	Moral Lesson	1
	Games as Learning Tools	1
	Game (in general)	1
	Nothing	1
Q18: How did playing the game make you feel about your English language abilities?	Learning English	1

Table 3: Themes Observed in the Interviews

Of the twelve students interviewed, four of them said that the introduction section of the game, in which they went shopping for a recipe book and cake ingredients, was their favorite part. Many of them spoke favorably of the activity and from comments, such as

Interviewer: Why did you like that?

Student: Because you went shopping

and

Interviewer: Why do you think that baking the cake was your favorite?

Student: Because I had to buy things

It can be inferred that shopping was an activity that the students could relate to and therefore enjoyed being able to do in a game. Two cited the Shopping Cart Race—an activity that the other students reported enjoying while not holding it as a favorite—as their favorite game. The team expected that this game, with its more video game-like racing format, would appeal to the students. One student admitted that he had not been able to complete the game past the cart game. He explained that it was a little difficult to understand what to do at first, and that he encountered some challenges when the grocery store patrons asked him questions. However, when asked to explain

further, he said, “Those questions weren’t too hard, they were just asking what they should get,” and when asked if it was difficult to control the cart he said, “No, I learned it easily,” leading us to believe that stopping to answer questions interrupted his focus, which made steering the cart and completing the game difficult for him.

The team also made several predictions while creating the game as to which activities would be the most popular amongst the players. For example, we were correct in expecting the character creation activity in the beginning of the game to be popular among the students; overall, students positively rated this portion of the game.

Another activity that we thought would be popular among students was the Cave Game. In this game, the student had to help their character jump from level to level, an activity commonly found in many popular video games. However, this game was less popular than anticipated. Based on one student’s statement that he did not like typing “Ready” to begin the game and had difficulties with typing responses in later games, such as the flash card game, it is possible that the transition from the largely mouse-controlled prologue to the more keyboard-controlled latter parts of the game was an unexpected and unwelcome change to those students uncomfortable with typing. These findings also support Crawford’s belief that the use of both the mouse *and* the keyboard as modes of user input can cause player frustration (2008).

Another somewhat unexpected result was that three of the students believed that “Finding Brett”, a task that consisted of moving the character on the starting screen and talking to the first person the student encountered, and merely exploring the mall were their favorite activities because they were “easy”. As the skill level of

students varied highly within each classroom, it is possible that some of the lower level students simply found exploring the mall area and doing the most basic beginning tasks most fun because they did not have to challenge their skills.

All of the students stated that they enjoyed the game and learned from it. One student said “I learned how to say things that I didn’t know how to say before.” The theme of learning useful vocabulary was a very predominant one in the results of our game, with a high percentage of students believing that the game improved their vocabulary, as seen in the t-test results, and 7 students giving responses to the interview question “What did you learn from this game” that could be coded as vocabulary-related. Overall all of the students said that they would play the game in their free time. Three of the students said that the game increased their motivation, while one said it did not and the last was undecided.

The surveys indicated that students who believed that the game improved their skills believed that they improved in reading and writing, responses that are supported by the t-test results, and students also stated in the interviews that they believed their listening skills had improved. The interviewees all stated that they enjoyed the game and would play it in their free time. A larger sample size of students, combined with more game play and a larger group of interviewees, would result in more data and allow overall trends, such as the feelings of improvement that some students expressed to be more easily quantified, as well as provide a larger sample size to allow the t-test to achieve even stronger statistical significance. More interviews within this larger sample size would also allow for more students to be questioned about how they felt their motivation to learn English was affected by the game.

Teacher Interviews

In addition to conducting interviews with students who played the game during class, we also conducted interviews with the two teachers who facilitated game play in their classrooms. The teachers were asked questions gauging their students' levels of English proficiency, their thoughts about how useful a game could be as a motivating factor in the classroom, how technology is used and could be used in their classrooms, and how successful they thought our game could motivate their students to learn English in the classroom (for a full list of questions and full interview transcriptions, see Appendices XII and XVI).

During the teacher interviews, both teachers indicated that their students generally had a low level of English proficiency, although there were a few students performing at a higher level in one of the classrooms. One teacher indicated that many students in his/her classroom had only recently arrived in the United States or have had previous issues with motivation, attendance, and ability, which has limited their academic and language growth. Both teachers had previously incorporated some form of technology into their classrooms in the form of videos, laptop use, and document cameras. One teacher indicated a usage of technology in the classroom through assigning three projects during the year that require students to use such programs as Microsoft® PowerPoint® and Word®. While this teacher indicated that his/her students were somewhat proficient in their use of technology, the other teacher indicated that many of his/her students were not comfortable with technology and that many enter the classroom having never been near a computer. It was indicated through the teacher interviews that a general lack of motivation could

potentially hinder progress in ESOL classes, and this lack of motivation could be amplified by socioeconomic factors outside of the scope of the classroom such as high poverty rates among this student population and a lack of English fluency among the parents of these students. One teacher suggested that the game could have been more successful if the directions and activities in the game had been phrased more simply, as this would have made the game easier for lower level students to understand. One teacher indicated that students were more excited about learning English after playing the game, while the other teacher said that students did not have enough time to play the game for him/her to get a good idea of whether the game made her students more excited about learning English. All in all, the two teachers indicated that our game could potentially be used to motivate ESOL students to learn English, but increased play-time would be necessary to accomplish this goal.

Teachers Study

In order to receive feedback on the game and the potential of the game to be implemented in a classroom setting, we conducted a study in which teachers enrolled in EDCI634, a graduate Methods of Teaching ESOL course instructed by Dr. Roberta Lavine, played the game and gave us feedback about the game and its potential as an educational tool. We held a discussion before game play about the use of educational technology in the ESOL classroom, allowed the teachers 20-minutes of game play and then conducted another discussion about reactions to the game and how the game could fit into the classroom (for a full list of discussion questions and topics, see Appendix XVII).

Pre-Game Discussion

During the pre-game discussion, the teachers in our sample indicated that vocabulary words are a challenge in the classroom. Similarly, teachers indicated that it is difficult to get students to understand cultural differences among a diverse population and it is difficult to get students up to the state-mandated level.

Additionally, due to large class sizes and a variety of different levels in a single classroom, teachers said that it is difficult to have differentiated topics based on individual student interests and skill levels. Many issues such as lack of materials, low student motivation, and limited parent communication and involvement present difficulties for these teachers. Teachers indicated that common challenges they face are the discrepancy between what students speak in the classroom and what they speak at home, the pace of the curriculums they have to follow, the dilemma of whether to teach communicative language or language necessary for standardized examinations, limited class time, and complaints from parents when teachers try to do something new in the classroom.

Teachers said that they use a combination of textbook materials and materials they make themselves and that higher-level students prefer to be taught without textbooks, while lower-level students prefer to be taught with the textbook. In terms of using technology in the classroom, these teachers said that they use various websites based on the units they are teaching and that technology can provide a combination of studying and fun. Most teachers indicated that technology could be beneficial in the classroom.

Responses During Game Play

While playing the game, participants thought that it was a positive feature of the game that the students could begin the game from wherever they stopped the last time they played and many of the teachers enjoyed creating their own avatar during the beginning sequence of the game. Additionally, teachers thought that the game did a good job of requiring students to follow directions and that the chat option was a positive feature of the game. One teacher said that his students would be very excited if they were given the opportunity to play this game in the classroom. However, several participants thought that there was too much text in the game and that some directions were difficult to understand. Teachers also liked that they could moderate the student conversations and that the content of the game could be customized.

Post-Game Discussion

Participants in this study indicated that they liked that the game gave feedback when incorrect responses were given and that students could later view all of their incorrect responses. Teachers liked that the game required the player to go back to the text to find out information, which they believe is an important skill for students to master. The teachers liked “The Cart Game” because it taught new and practical vocabulary and they said that the game looked like video games that students play. Because the game looks similar to the games students typically play, participants stated that students would probably have little or no trouble learning how to play. Teachers also liked that this game exposes players to everyday tasks. Importantly, teachers noted that this game could be used for 4th through 7th graders but would be too challenging for 2nd graders and might seem too childish to 8th graders. Notably,

the participants in this study believed the game would be good for intermediate level English speakers. Overall, teachers indicated that the game would fit into their vision of learning because it is differentiated and allows practice and mastery of material. Participants liked the game graphics and music. Additionally, participants indicated that the game addresses new types of literacy such as reading on the computer and manipulating functions on the computer. Participants liked that the game was interactive and independent, while still incorporating learning.

We asked teachers for suggestions on how to improve the game, and they said that the activity in the chatbox caused it to scroll too quickly, particularly when both the game's instructions and user chatting vied for the same space. Teachers said that it would be helpful if the chat window were larger. The teachers also thought that a dictionary feature would be helpful. Another suggestion was to include a feature that periodically asks if the player understands what he is reading.

In conclusion, while results of the classroom game study were limited due to factors outside our control, our studies have indicated that the use of an interactive video game for learning English in the classroom could potentially motivate students to learn English. This result is supported both by student feedback after playing our game as well as teacher feedback regarding the usefulness of a videogame in the classroom.

Chapter 6: Conclusion

An important goal of this research project was to determine whether our interactive computer game intended to complement the middle school ESOL classroom curricula at AACPS could increase students' motivation to learn English. Based on our small testing sample, it is difficult for us to draw generalizable, quantitative conclusions regarding the game's actual effect as a motivating factor. However, as a whole, our statistical findings do point to certain positive trends regarding the game's potential as a motivating ESOL tool.

Although answering our question was an important component of our project, an equally important component was creating the game itself. With minimal experience in game design, aside from our own experiences playing games and some team members' background in programming, we worked much like a professional game developing team would to create a completely original computer game. In addition to creating almost every game element ourselves with a minimal budget and under very stringent time constraints, we were able to do so in such a way as to seamlessly implement TESOL language learning standards into the game's plot. Further, based on teacher and student feedback obtained through interviews and focus group discussions, we are able to conclude that our game as a product was a success.

Referring back to our data and interpretations presented in the Chapter 5 of the thesis, the quantitative component of our study does not provide enough reliable data on its own for us to definitively claim that our game increased our study population's motivation to learn English. As was stated in the results chapter, over a thousand correlation values were calculated between responses to survey prompts

taken from both the pre-survey and post-survey. Due to the insufficient size of our study population, none of the correlation values could be considered statistically significant, and only ten demonstrated strong correlations. Although these higher correlation values indicated that students felt as though their language skills and sense of motivation to learn had improved, the observation that the overwhelming majority of the correlation values could not be used calls the impact of these correlation values into question. While these values indicate positive trends regarding the game's effect on students' perceived sense of skills improvement and enthusiasm to learn English, these data alone are not strong enough for us to claim that our game had any substantial effect on students' motivation in their ESOL classes, when examined in the context of the problems that we encountered during testing, such as limited testing time and language barriers.

Although the data obtained through correlation calculations were not statistically significant, data obtained through Student's t-tests do support the point that our game was both an entertaining and educationally valuable motivating factor for our specific study population. As was stated in the results chapter, the data obtained through Student's t-test provide relatively strong evidence that students in testing groups felt that the game made them excited to learn English, specifically in terms of reading and writing. On a related note, the impact of these t-test data is enhanced by higher t-test values that indicate that students felt as though the game provided them with a useful opportunity to practice these skills. Data obtained through Student's t-test likewise strongly support the point that the game was successfully designed for a middle school audience in terms of its recreational value.

Based on these results, we are able to claim that the game was entertaining. We are also able to claim that our game did increase self-reported levels of motivation to learn English among our specific study population. In other words, for our specific study population, we are able to affirmatively answer our research question; for our study population, our game did serve as an effective motivating factor for ESOL middle school students.

To reiterate, these t-test data provide statistically significant evidence regarding the game's effect on students' perceived senses of motivation and skills improvement. However because our study population was so small, we would have to retest the game on a larger, more diverse population over a longer testing period to further verify the reliability and generalizability of these findings. Indeed, considering the overall insignificance of the data obtained through correlation tests, it would be prudent to retest the game before making any definitive claims regarding the game's effect as a motivating factor.

The quantitative data obtained through the surveys give somewhat inconsistent information regarding the game's actual effect as a motivating factor for middle school ESOL students. However, the qualitative component of our mixed methods study, comprising student and teacher interviews at Bates and Annapolis Middle Schools and discussions with teachers who participated in our follow-up focus group indicate that the game is entertaining and shows potential as a motivating classroom tool.

During the interviews, students were not especially informative about the game's specific effect on their motivation to learn English. For instance, when asked

whether they felt as though the game had increased their motivation to learn English, three of the five students said that they thought that it had, while one said that it did not and the other was undecided; none of the students went into detail about their answers. However the students' responses to questions about the game's overall appeal made it clear that they enjoyed playing the game and would play it during their free time. Students' positive reactions to the game's storyline, activities and overall aesthetic value indicate that we were successful at identifying our audience and assessing what game features and activities would appeal to them. Further, all of the students stated that they felt as though they learned from the game, demonstrating the game's potential value as an educational tool from a student's point of view.

The instructors at Bates and Annapolis Middle Schools confirmed that their students enjoyed playing the game and would have been excited to have more opportunities to play. One teacher stated that, after playing the game, his students asked repeatedly for more opportunities to play. These teachers' observations further confirm our success at appealing to our audience. The teachers at Bates and Annapolis Middle Schools suggested that the game might have been better suited for students at a higher level of English proficiency than the majority of the students who played the game; however, the teachers' discussion of the importance of further implementing technology into their lesson plans to engage students in classroom materials indicates this game's potential success and relevance in today's middle school ESOL classroom. Although the game does not necessarily review all the specific skills and vocabulary that AACPS's students are tested on in such standardized exams as the Maryland State Assessment (MSA), one teacher's praise of

the game for its practical application of vocabulary and language skills indicate the game's value as a complement to traditional classroom materials. The focus group participants' praise of the game's customization feature further confirms our game's potential popularity among educators as an effective classroom tool.

In general, middle school teachers struggle to engage their students in classroom materials and strive to find or create relevant materials that maintain students' interest. This game represents a potential solution to this teaching dilemma. Based on the Bates and Annapolis students' positive responses, we have concluded that the game appeals to middle school students in terms of entertainment value and also had a positive effect on their self-reported levels of motivation. These findings allow us to deduce that this game has the potential to provide teachers with another option for engaging their students with classroom materials. However, further testing would be necessary to definitively conclude this hypothesis.

Aside from the challenge of engaging students with classroom materials, ESOL teachers are also faced with the challenge of teaching students with different skill levels and learning styles simultaneously. Focus group participants praised the game for its variety of activities and its adjustable difficulty feature; together, these game features offer teachers a new way to meet more students' learning needs in one classroom session. Based on the suggestions that teachers offered, some changes should be made to the game so that it can more accurately meet ESOL teachers' and students' needs. These changes will be described in the following chapter.

We acknowledge that certain adjustments should be made to both our study and our game, in order to quantify the game's effect as a motivating factor for middle

school ESOL students. However, from the overall positive response that our game received from teachers and students, we can conclude that the game has the potential to be a popular and useful educational tool in middle school ESOL classrooms.

Further, we feel that it is likewise necessary to point out that, despite the quality of our survey data and the information it provides regarding the game's motivational effect on ESOL middle school students, gathering and interpreting this data was only part of the study's objective. Designing and creating the game was an incredibly challenging phase of our project that required a great deal of thought, effort and collaboration. Although the official objective of this project was to determine the game's effect as a motivating factor in an ESOL middle school classroom, it can certainly be stated that another objective of this project was to determine whether a diverse team of undergraduate students with no professional game design experience could pool their talents, ideas and knowledge in order to design, create and test an educational yet entertaining interactive computer game. Although further testing is necessary for obtaining reliable quantitative data regarding the game's actual capacity to motivate middle school ESOL students to learn English, we consider our current product to be a successful prototype to a potentially motivating educational game.

Chapter 7: Limitations and Future Directions

Limitations

Research Process

The majority of the limitations in the actual game creation and research process can be directly linked to both constraints of time and resources available to conduct research and issues related to our testing population. When our team formed, we began exploring the idea of developing a computer game in order to test retention of new English vocabulary after game play as compared to retention gained in traditional ESOL classroom activities (e.g. worksheets). Administrators from AACPS told the team this project would be difficult to conduct within the three year time limit because a standardized pre- and post-test would need to be created in order for the team to gather accurate results as to which test group (the computer game vs. the traditional classroom activities) better retained vocabulary. Due to the compounding factors that suitable pre- and post-tests did not already exist and that it would take several years for a team-created test to be approved by the county, we opted to explore the ability of computer games to motivate students to learn, rather than teach them new lessons directly. This approach was also more suitable because it did not require a control group; this practice is against AACPS policy because all students would not receive equal treatment.

The team had to work around time constraints generated by AACPS. The majority of the ESOL curriculum is dedicated to preparing for the MSA each spring; the team could only test in the last few weeks of the county's school year. Because

the team is led by full-time students, the team had to collaborate with the participating ESOL classroom instructors to implement the majority of the research procedure. Team members visited each of the classrooms prior to and after game play in order to recollect materials, but were not available to monitor the majority of game play. Because of each instructor's unique daily lesson plans, participating students played varying amounts of time. At Bates Middle School, we estimate that students played the game between one and two hours. At Annapolis Middle School, students are estimated to have played the game for less than one hour. Both of these game play times are less than the amount of time we anticipated the students would spend playing our game.

Issues related to our test population also contributed to limitations in our research project. Due to time constraints and recommendations made by the AACPS administration, we selected two schools in which to conduct our tests. Although these two schools had the highest number of ESOL students in AACPS, not every student participated in the project because some did not return their parental permission forms. A language barrier between our test population and research materials was an additional challenge. Because Spanish, not English, was the first language of most of our test population, participating students may not have fully understood the team's surveys and interviews given in English. Students, unfamiliar with surveys, may have also been confused by the Likert scale questions. While a translator was available to help students understand the interview questions at one school, this did not happen at the other school.

Game Creation

Due to time constraints and the limited number of team members with programming and art experience, several parts of the original, more ambitious game design were not included in the final version of the game. Some of these features were either modified or excluded. The features that were eliminated or simplified included parts of the storyline, the original plans to have complex and highly detailed isometric graphics in each game, educational content taught in each game, an accurate game-saving feature, functionalities to adjust the difficulties in the game for each individual student, an improved spell checker for the chat box, and several others.

One of the areas where the team eliminated detailed material was the game content. While early on, plans were made to change the scope of the game from an entire town to just a shopping mall, the game was originally designed to be much more interactive. Between completing the main tasks in each chapter, students were supposed to be able to play side games for fun, talk to computer-controlled characters, and explore the mall. Also, a computer-controlled character in the secret base was to allow the student to revisit chapters they had already completed, such as the Shopping Cart Race, at any time instead of only after they had fully completed the game. A revised version with extra content could make the mall a more entertaining area rather than just an area between chapters, and possibly cause the students to want to play longer. This bonus content in the main shopping mall could also serve to expose students to random words, phrases, or idioms that may not necessarily be covered in the main chapters.

Future Directions

Research Process

Because of time and resource limitations, as well as issues with our original test population, we would like to see our research design implemented again with more control in order to gather more robust results. This would include a larger testing population playing the game over a longer period of time.

In the future, language barriers between research materials (e.g. surveys, game directions, interviews) and student participants would need to be overcome so that students can fully understand what they are being asked, give their most honest answers on surveys, and feel more comfortable expanding their answers in face-to-face interviews. This may involve using interpreters because some students have difficulty reading both English and Spanish.

Ultimately, we would like to see our game implemented in an experiment to test for retention of new English vocabulary prior to and after game play, similar to our original idea explored after team formation. This would require researchers to either purchase or create standardized pre- and post-tests to measure any improvements in vocabulary retention, decide on a set of vocabulary words that match the academic expectations of the targeted learning level of ESOL student participants, and input these words into the game using the existing customization feature.

Game Design

The game could be improved by including elements that were removed or simplified, as well as including some new features. For example, there could be more tools to assist students with unknown words. When a student does not know the meaning of a word, the student could move the computer mouse over it (or click on the word) and a picture would appear. If the word is a noun, the item itself would be shown, if it is an action verb, a brief video of the action would appear. For those words that could not be shown in pictures or videos, a dictionary would open with the definition of the word and some uses in a sentence. These words would then be saved in the dictionary for later use. A teacher would be able to keep track of what words students have the most difficulty with and further tailor their classes accordingly.

Due to how the game is set up, more chapters can potentially be added within any point in the game. Cutscenes were developed to link the chapters together, so the addition of new chapters would necessitate the creation of new cutscenes as well. Nonetheless, this flexibility of allowing more chapters and cutscenes to be added gives the game a broad capability for adaptation to different learning styles. Certain methods, such as increased verbal instructions, may be added in some sections in order to more successfully address student needs.

Further developed, the game could cover more diverse themes that are often covered in English language education. The main shopping mall setting would need to be expanded to include more stores that the player can access in order to play games with themes that are based on the type of store. For example, a music store can be the setting of a game that teaches the names of different musical instruments or

different musical genres in English. A game located in a clothing store can teach the student to identify different types of clothing, colors, and size numbers. Vocabulary words can often be put in discrete categories or themes, and a simple way to learn such new vocabulary words is to use them in any situation that involves that particular theme. By implementing new stores and new games in updated versions of the game, the game's overall storyline can become more complex and create room for subplots.

Multiplayer games were originally included in the design of the game. An example of this is the Shopping Cart Race, which as originally planned could either be played against Admiral Adult or against multiple friends. In fact, originally students would not have been able to complete the entire game as a whole without going through at least one multiplayer game. This would mean students would have to talk to each other to learn who had already completed this part of the game and who would be willing to work together to complete it. One such example was to allow one student be able to see a map of the Maze Game and give directions to another student navigating the maze. The first student would not be able to see the other player's position in the maze and the second would not be able to see the map. If the game includes this interactive feature, students could potentially find the game more entertaining and therefore wish to play longer.

One of the issues the teachers told the team was that the directions given were too wordy and difficult for the students to understand. In order to improve on this, the format of the instruction could be changed or the wording made less difficult. These changes could be made to match the reading ability of each student. That is, for

students who have more difficulty reading, the directions could be made less complicated and could be supplemented with video while students at a higher reading level could be given the more complex instructions.

The dynamic difficulty feature of the game could also be improved. Although several chapters, such as the Shopping Cart Race and the Final Battle, have three different difficulty levels, the difficulty gap between each is fairly large. Additionally, the current method used to determine the student's level is very simple. This could be improved by including a greater variety of difficulty levels and keeping a log of the numbers and types of correct and incorrect answers. An improved algorithm would relate the levels to the student's ratio of correct to incorrect answers, and the game could continually and more accurately adjust the difficulty level according to the student's performance. The individual games would need to be reprogrammed to have such features that would modify their difficulties and content according to the performance of each student. This is a modification that would ensure that later versions of the game can provide differentiated instruction: adjusting to students at a lower level and challenging the more advanced students, allowing these students to learn more from the game.

A very rudimentary save system is featured in the game. After the student completes a chapter and enters his or her thoughts about the particular chapter in the response box, the student is able to quit and return to the game at a later time without having to start over. However, we encountered several problems with this system; during testing, students would sometimes quit before entering their thoughts on the chapters they just completed. Because of this, their progress would not be saved, and

the students would have to play through that chapter again. Also, some of the chapters had multiple parts to them, such as the Maze Game with its three floors; the save system did not save at each of these points. In the future, an improved game would save the student's progress every time the student completes a time-consuming task.

The game comes with a built-in chat feature to allow the students to practice communicating in English with classmates while playing the game. While this spell checker utilizes a large database of words and frequently suggests correct words, several limitations still exist. First, since the entire process is automated, the spelling suggestions include words that may confuse ESOL students. For example, the spell checker will suggest both the British spelling “colour” and the American spelling “color” on the same list. Additionally, there are archaic English words in the database, such as “thou”, which the spell checker would not flag as incorrect if ESOL students accidentally type them. While many confusing words have already been removed, this process would need to be continued to further improve the chat feature. An additional problem encountered with the chat feature was that game prompts and student messages appeared together in the chat box. In the future, these messages should be separated so as to avoid student confusion.

Speaking and pronunciation are important topics in English language education. The overall game does not feature any activities that require the players to practice English pronunciation and other speaking skills. The use of microphones and speech-processing technologies could allow the implementation of additional mini-games that require the student to engage in speaking activities. These games could

include activities in which the player must read a group of words from the computer screen, or vocally enter commands or make requests of characters in the game world. Such activities would help the students practice pronunciation, develop English speaking skills, allow the students to practice both formal and informal conversations in English, and build the students' confidence in spoken English. This addition could enhance the game's educational, interactive, and entertainment qualities.

To complement the variety of challenges in the game, we would like to provide interesting rewards for players. One way to accomplish this would be to reward students with a form of virtual currency that they could spend to customize their avatars and their world. Additionally, players could be rewarded with special treasures or items after completing certain tasks, which could directly improve the abilities of their character. Examples of additional improvements include aesthetic ornaments or useful items, which can be attained after changes in a player's status. A model such as this could lend itself to cooperation among students if they are able to trade or share their items in order to accomplish larger goals. The key to any of these reward systems is that it gives the player a sense of accomplishment, investment, and control in their virtual world.

The team envisioned that the game's graphics would be drawn in an isometric form, a view from the top that allows for a three-dimensional appearance using two-dimensional graphics. Since an isometric virtual reality environment also gives the artists and programmers opportunities to creatively add more in-game objects and computer-controlled characters, this type of environment potentially allows for more

in-game student-computer interaction as well as add to the visual appeal of the overall game.

Many future directions for this game involve building on and improving aspects of the current version of the game or adding features that were never implemented due to a lack of resources and time. The first version of the game is a functional, entertaining, and educational game, but implementing the changes described in this section could potentially make the game even more intuitive, entertaining and educational. We hope that our research will at the very least become a foundation for future investigation into enhancing the learning environment through fun and exciting new technologies.

“Congratulations. You’ve beaten the game.”

-quote from our game, Shenanigans

Appendices

Appendix I: IRB Application

Gemstone Team Interactive Language Learning (ILL): IRB Application

Instructions for Completing the Application

The Departmental Signature block should be signed by the IRB Liaison or Alternate IRB Liaison unless there is a conflict of interest. If the Department or Unit does not have an IRB Liaison, the Department Head, Unit Head or Designee should sign the application.

Please provide the following information in a way that will be intelligible to non-specialists in your specific subject area.

1. **Abstract:** Provide an abstract (no more than 200 words) that describes the purpose of this research and summarizes the strategies used to protect human subjects. For HHS sponsored or funded research, you must submit a copy of your grant application for review.

Due to a lack of educational complements to English as a Second Language (ESOL) curricula, our goal is to create such a complement in the form of an interactive, multi-player computer game. Through literature research, we found that language acquisition is a complex process that requires individuals to be motivated to learn and confident in their abilities in order to successfully grasp knowledge. The game is intended for middle school ESOL students with some knowledge of English, specifically those in Anne Arundel County Public Schools (AACPS) in Maryland. We hope to gauge students' motivation to learn English before and after playing our game via surveys while also gathering more specific qualitative data in interviews with both student participants and their instructors. Our research will present no opportunity for harm to students. The confidentiality of student participants will be ensured by both teachers and researchers. We, the researchers, will provide teachers with a list of ID numbers that they will then assign to their participating students. Only the teachers and team mentors will have access to which ID numbers correspond with which student participants. Student progress in the game and survey data will be tracked using these ID numbers.

2. **Subject Selection:**

- a. Who will be the subjects? How will you recruit them? If you plan to advertise for subjects, please include a copy of the advertisement.

Participants will be middle school ESOL students from Annapolis Middle School and Bates Middle School (as a part of Anne Arundel County Public Schools). These schools were selected because they have the largest ESOL classes in the county (49

students at Annapolis, 42 students at Bates) and thus, are our best opportunities for a large sample. Using team-created guides and scripts, teachers will be responsible for introducing the project to students (See Appendices 2 and 6). The team members will not be recruiting the student participants directly.

- b.** Will the subjects be selected for any specific characteristics (e.g., age, sex, race, ethnic origin, religion, or any social or economic qualifications)?

Participants will not be selected based on any predetermined characteristic other than their enrollment in the ESOL class, but will be allowed to participate only if a parental consent form is signed and returned to the teacher. Teachers will encourage all of their students to return the form, however, they will make it clear (see script labeled Appendix 2) to students that participation is completely voluntary and will not affect students' grades.

- c.** State why the selection will be made on the basis or bases given in 2(b).

We are not requiring students be selected on any demographic basis other than their enrollment in an ESOL class so as to create the largest possible sample base.

- d.** How many subjects will you recruit?

We hope as many students as possible (as many as 91 students, see part a) will participate in our study.

- 3. Procedures:** What precisely will be done to the subjects? Describe in detail your methods and procedures in terms of what will be done to subjects. How many subjects are being recruited? What is the total investment of time of the subjects? If subjects will complete surveys and/or other instruments on more than one occasion, state this in the procedures section. If you are using a questionnaire or handout, please include a copy within each set of application documents. If you are conducting a focus group, include a list of the questions for the focus group. If you plan to collect or study existing data, documents, records, pathological specimens or diagnostic specimens, state whether the sources are publicly available and if the information will be recorded in such a manner that subjects can be identified, directly or through identifiers linked to the subjects. If you are collecting or studying existing data, describe the dataset and list the data elements that you will extract from the dataset.

For a step-by step explanation, please see Appendix 7. For a narrative explanation, please see below:

All potential student participants will be introduced to the game two weeks prior to the start of the study by their classroom instructor who was previously trained to use the game by team members (See Appendix 6). The classroom instructor will orally emphasize that participation in the study will not affect students' grades or school records in any way. Prospective student participants will then receive a letter

introducing the study to parents (see Appendix 1) and two consent forms to be signed by a parent or guardian. The first consent form (Appendix 3) will, if signed, allow for students to participate in the study while the second (Appendix 4) will permit students to be audio recorded in a one-on-one interview with a research team member for the purpose of transcribing the interviews into text. The audio tapes will then be destroyed. Students will have two weeks to return their consent forms. If at least the first consent form (Appendix 1) is returned signed, students will receive from their teacher a numeric code they will use to log in to the game. The classroom instructor and team mentors will have access to the identity of students and their corresponding codes for back-up purposes. This information will be destroyed at the conclusion of the study. Participating students will complete an online survey (see questions in Appendix 8) prior to playing the game regarding their experience with computer games and their motivation to learn English. Once all participating students are in the school's computer lab, teachers will explain how to locate the survey on SurveyMonkey.com. The survey should take no longer than 15 minutes to complete. The game will then be demonstrated by the classroom instructor before students can play alone. Students will play the game in 30 minute periods, # times of a week over the next # weeks (we expect students will play for 30 minute periods, however, the exact amount of time and the number of times students will play the game over # weeks is still undecided and will ultimately be determined by the amount of time teachers and the curriculum allow). At the conclusion of the game-playing period at the end of # weeks, students will complete an online follow-up survey (see Appendix 9) on SurveyMonkey.com regarding any changes in motivation, confidence and opinions on various elements of the game (storyline, graphics, etc.). Students will be directed to this survey by teachers. A few students will then be chosen at random by the teachers to participate in an audio-recorded one-on-one interview with a team member expanding on answers to the follow-up survey (see Appendix 10). Only student participants who returned the second consent form signed will be allowed to participate. Interviews will take place the week following the conclusion of the study (exact dates TBD). Recordings will then be transcribed into text. The team will interview participating classroom instructors, with their consent, about their students' attitudes towards the game at the conclusion of the study (see interview protocol in Appendix 11). Participants are not required to answer any questions that make them uncomfortable, and may elect to terminate the survey or interview at any time.

4. **Risks and Benefits:** Are there any risks to the subjects? If so, what are these risks including physical, psychological, social, legal and financial risks? Please do not describe the risk(s) as minimal. If there are known risks, please list them. If not, please state that there are no known risks. What are the benefits? If there are known risks associated with the subject's participation in the research, what potential benefits will accrue to justify taking these risks?

We do not foresee any physical or psychological risks involved in this research study that participants would not otherwise encounter in everyday life, or when conversing with another person. Participants will be asked to answer questions established ahead of time, and will be given the option of refusing to answer if the questions make them

uncomfortable. They are also given the option of terminating their participation in the research study at any time. Benefits of this project include the possibility of contributing to the development of a useful educational tool.

5. **Confidentiality:** Adequate provisions must be made to protect the privacy of subjects and to maintain the confidentiality of identifiable information. Explain how your procedures accomplish this objective, including such information as the means of data storage, data location and duration, description of persons with access to the data, and the method of destroying the data when completed. If the research involves audio taping, videotaping or digital recordings, state who will have access to the tapes or recordings, where the tapes or recordings will be kept, and state the final disposition of the tapes or recordings (i.e. Will the tapes or recordings be destroyed? If so, when will the tapes or recordings be destroyed?). Please note that as per the University of Maryland policy on records retention and disposal, all human subject files, including work done by faculty, staff, and students, must be retained for a period of no less than 10 years after the completion of the research and can then be destroyed. Human subject files include IRB applications, approval notices, consent forms, and other related documents. For more information on records retention, go to: http://www.dbs.umd.edu/records_forms/schedule.php (Faculty and Academic Records) or contact Michelle Solter Evers, Assistant to the Director of Business Services at 301.405.9277 or mevers@mercury.umd.edu.

While the identity of participants will be recorded, findings will be reported in a manner that respects the confidentiality of participants. Each student participant will randomly be given a numeric code to log in to the game by their instructor so students' identities' when playing the game will not be known to anyone except for their instructor and two team members designated responsible for this information. Names and other potentially identifying information will not be reported in the final results of the study. The results of the interviews will be kept by a member of the team and will be destroyed upon completion of the experiment. At no time will names or other identifying information be used in the summary of the experiment.

6. **Information and Consent Forms:** State specifically what information will be provided to the subjects about the investigation. Is any of this information deceptive? State how the subjects' informed consent will be obtained. Will you obtain informed consent in a language other than English? If so, list the language(s) in which you will obtain informed consent. Provide consent forms in all languages that will be used. Refer to the attached consent form template, sample consent form and additional consent form guidance on pages 9 to 18. If a consent form has more than one page, please add a signature and date line and the number of pages (e.g., "1 of 2," "2 of 2") to each page. Please allow a 2-inch bottom margin to accommodate the IRB approval stamp. If you plan to obtain consent over the telephone (e.g. consent for a telephone survey), include a copy of the consent script.

Student participants and parents will be informed about the purpose of the research. Students will receive an oral introduction to the game by their teachers who will use a team-created guide (See Appendix 6). Students will then receive a letter of introduction for parents (see Appendix 1) and two consent forms to take home to their parents or guardians. The first consent form (See Appendix 3) will allow for students to participate in the survey/game-play portions of the study. If students return the second consent form (See Appendix 4), then students could possibly be audio-recorded in a one-on-one interview with a team member for the purpose of transcription. Classroom instructors will also be given a consent form they must sign in order to participate in an audio-recorded focus group to be held at the conclusion of the study (see Appendix 5).

- 7. Conflict of Interest:** Describe the potential conflict of interest, including how such a conflict would affect the level of risk to the study participants. Please consult the University of Maryland policy on conflict of interest as defined by the University of Maryland Policies and Procedures III-1.11 and II-3.10. These may be viewed at: <http://www.usmh.usmd.edu/Leadership/BoardOfRegents/Bylaws/SectionIII/II111.html>. If there is no anticipated conflict of interest, please state “No conflict of interest.” This section must be included in your application.

We do not foresee any conflicts of interest.

- 8. HIPAA Compliance:** State whether you are using HIPAA protected health information (PHI). Currently, researchers employed by the University of Maryland Center or who are working within or under the auspices of the University Health Center are subject to specific HIPAA requirements regarding the creation, use, disclosure, or access of PHI. Please consult the University of Maryland’s Summary of HIPAA’s Impact on University Research. For more information on HIPAA, go to: <http://www.hhs.gov/ocr/hipaa/> If you are not using HIPAA protected health information, please state “Not Applicable.” This section must be included in your application.

We are not using HIPAA protected health information in this study.

- 9. Research Outside of the United States:** Provide responses to the following questions. Separate responses are required for each country where the research will be conducted. If you are not conducting research outside the U.S., please state “Not Applicable.” This section must be included in your application.

Not applicable.

- 10. Research Involving Prisoners:** Provide responses to the following additional IRB criteria for research involving prisoners. If you are not conducting research involving prisoners, please state “Not Applicable.” This section must be included in your application.

Not applicable.

Appendix II: Letter to Parents (English/Spanish)

Dear Parents,

I am writing to inform you of a research study organized by students from the University of Maryland (UMD) that will take place in our school between (DATES will be inserted as soon as they are finalized by the school). This period occurs after state standardized testing. The study includes interaction with a computer game created by this research team that teaches English to students in ESOL classes, which your child attends. The UMD students will be researching the beneficial effects of this game. Your child's participation in this research study is completely voluntary. Participants may even leave the study after they have already agreed to participate. Most importantly, the study is not known to have any potential dangers to participants.

The study will help develop knowledge of your student's motivation to learn English. Students will begin the study by completing an electronic survey asking them about their current computer usage and confidence in learning English. Students will then play the research team's computer game in the school's computer lab (number will be filled in upon confirmation from school officials) times a week for 30 minutes at a time. At the end of the last session, your student will complete another electronic survey that measures any changes in confidence and motivation. Knowledge of an increase in your student's motivation to learn through the incorporation of educational computer games in the classroom could encourage your student's school to incorporate more educational technology in the classroom in future. Your child's participation in this study is extremely important to its success. Your agreement to have your child participate is greatly appreciated.

Your student should have given you, along with this letter, two consent forms for you to sign. The first allows your student to fully participate in phase one of the study, as described above. The second offers participants a chance to meet with a UMD research team member and discuss their experiences at the conclusion of the study. Please note that these interviews will be audio-recorded. Please read these consent forms carefully and sign and return them to your student so that he may submit them to the ESOL instructor.

If you have any questions regarding this study, feel free to send a note with your student to his or her ESOL instructor, or email the research team directly at gemstoneteamill@gmail.com. In addition, the research team's mentors, faculty from the University of Maryland, may be contacted. Please email Dr. Roberta Lavine, former chair of the Spanish Department at the University, at rlavine@umd.edu or Dr. Amitabh Varshney, professor in the Computer Science Department of the University, at varshney@cs.umd.edu.

I thank you for taking the time to consider this study, and I hope that your student will participate.

Regards,

(Principal's Signature)

Estimados Padres,

Me comunico con ustedes a fin de informarlos sobre la investigación que un grupo de estudiantes de la Universidad de Maryland (UMD) realizará en nuestra escuela entre fecha a determinar. El trabajo se llevará a cabo una vez finalizadas las evaluaciones estatales. En esta investigación, los participantes deberán interactuar con un juego de computadora creado por el equipo, el cual enseña inglés a los estudiantes de las clases ESOL que toman sus hijos/hijas. La investigación de los estudiantes de Maryland pretende encontrar los beneficios educativos del juego que proponen para sus niños. La participación de su hijo/hija en esta investigación es absolutamente voluntaria e incluso, si así lo desearan, aquellos que acepten colaborar pueden dejar de hacerlo pese a haberlo aceptado. Es fundamental que sepan que este estudio no supone ningún tipo de daño potencial a los participantes.

Gracias a este trabajo, se buscará información de lo que motiva a sus hijos/hijas a estudiar inglés. Al inicio, los participantes comenzarán el estudio completando una encuesta electrónica sobre cuánto usan la computadora y qué tanta confianza sienten de aprender inglés. Luego, los estudiantes jugarán con el juego en la computadora en el laboratorio de tecnología de la escuela fecha a determinar veces por semana durante 30 minutos. Al final de cada sesión, el participante responderá otra encuesta que permitirá medir los cambios en la confianza y la motivación. Saber si la motivación aumenta cuando se aprende usando juegos en computadora durante una clase va a promover un mayor uso e incorporación de tecnología educativa en las clases de la escuela a futuro. La participación de su hijo/hija en este estudio es sumamente importante para que se tenga éxito y agradecemos profundamente que autorice a su hijo/hija a que participe.

Junto a esta carta, su hijo/hija debe haberle dado dos formularios de autorización para que los firme. En el primero, usted autoriza a su hijo a participar en la primera fase del estudio que se describió en el párrafo anterior. El segundo formulario es para que los participantes en esta prueba, una vez concluido el estudio, puedan entrevistarse con un miembro del equipo y conversen sobre su experiencia. Tenga en cuenta que estas entrevistas van a ser grabadas. Le pedimos que lea con detenimiento los formularios de autorización, los firme y devuelva a su hijo/hija para que se los entregue al maestro de ESOL.

Si usted tiene cualquier duda sobre este trabajo de investigación, le ruego envíe una nota con su hijo al maestro de ESOL, o puede contactarse con el equipo de investigación directamente por correo electrónico al gemstoneteamill@gmail.com. También puede ponerse en contacto con los mentores de este equipo quienes son profesores de la Universidad de Maryland. Envíe un correo electrónico a la Doctora Roberta Lavine, quien fuera jefa del Departamento de Español de esta universidad, a la dirección rlavine@umd.edu, o bien al Doctor Amitabh Varshney, profesor del Departamento de Ciencias de la Computadora de la universidad, a varshney@cs.umd.edu.

Les agradezco mucho que consideren este estudio y espero que su hijo/hija pueda participar en él.

Atentamente,

(Principal's Signature)

*Appendix III: IRB Oral Introduction of Research Study for ESOL Teachers to Share
with Potential Participants (English/Spanish)*

Suggested Script for Teacher:

We'll be beginning a new activity in class for the next XXX (to be completed once we know the number of weeks that the school will allow us to have) weeks. A student research team from the University of Maryland is testing out a computer game that teaches English. They want to see if it helps increase your motivation to learn English. To play the game, your parents will have to sign a consent form that you will need to bring back by (date to be determined). If your parents sign the second consent form, then you may be chosen to participate in an interview with one of the University of Maryland students to talk about how you liked the computer game. Please give your parents the consent forms and this letter that explains the activity. Students who return the consent form by (date to be determined) will be able to begin playing the game in the computer lab on (date to be determined). It is important to know that you do not have to participate in this activity if you or your parents do not want you to. It is not mandatory and will not affect your grade or status in this class in any way. However, playing this computer game might be a new and fun way to potentially practice your English and I hope you participate. Remember to return your consent forms by (date) if you want to participate.

Suggested Script for Teacher:

Comenzaremos una actividad nueva en clase durante las próximas fecha a determinar semanas. Un equipo de investigación de la Universidad de Maryland está haciendo pruebas con un juego de computadora que les permitirá a ustedes aprender inglés. A estos investigadores, les interesa saber si este juego los ayuda a ustedes a estar más motivados para aprender inglés. Para jugarlo, sus padres deberán firmar la primera autorización y traérmela antes del fecha a determinar. Si ellos firman la segunda hoja también, es posible que ustedes sean entrevistados por uno de los miembros del equipo y hablen sobre el juego, si les gustó o no, etc. Por favor, entreguen a sus padres los formularios de autorización y esta carta que les explica la actividad. Quienes traigan los formularios firmados antes de la fecha a determinar, podrán comenzar a jugar en la computadora del laboratorio la fecha a determinar. Es importante que ustedes sepan que no están obligados a participar de esta actividad si ustedes no quieren hacerlo o sus padres tampoco lo quieren. Esta actividad no es obligatoria y no afectará sus notas o su trabajo en nuestra clase de ninguna manera. Por otro lado, aprender inglés con estos juegos de computadora puede ser una manera nueva y divertida para que practiquen el idioma. Espero que puedan participar. Recuerden traerme sus autorizaciones antes de fecha a determinar si quieren jugar con la computadora y el inglés.

CONSENT FORM

Project Title	<i>Interactive Language Learning</i>
Why is this research being done?	<i>This is a research project being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. We are inviting your child to participate in this research because he/she is enrolled in a middle school ESOL program. The purpose of this research is to determine whether an online, interactive computer game can be used as a motivational tool for learning English in school.</i>
What will my child be asked to do?	<i>The procedures involve your child playing the game during normal ESOL class hours in 30-minute increments for a total of approximately five hours. The game will include material similar to the material that your child is learning in his/her ESOL class, including vocabulary, grammar, reading, and writing. Game play will take place at your child's school.</i>
What about confidentiality?	<i>We will do our best to keep your child's personal information confidential. To help protect your child's confidentiality: (1) he/she will be randomly given a numeric code to log into the game by his/her teacher and this code will be anonymous to the researchers, (2) only your child's teacher and the research team's faculty advisors will have access to the identification key and this information will never be made available to the researchers, (3) his/her name and other potentially identifying information will not be reported in the final results of the study, (4) all data stored on a computer will be password protected, and (5) all tangible data will be kept in a locked cabinet. If we write a report or article about this research project, your child's identity will be protected to the maximum extent possible.</i> <i>Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.</i>
What are the risks of this	<i>There are no known risks to participating in this</i>

research?	<i>research.</i>
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Project Title	<i>Interactive Language Learning</i>
What are the benefits of this research?	<i>This research will allow your child to participate in the development of a useful educational tool and potentially become more motivated to learn English. We hope that, in the future, other people might benefit from this study by having a helpful resource to aid in learning English in the classroom.</i>
Does my child have to be in this research? Can he/she stop participating at any time?	<i>Your child's participation in this research is completely voluntary. You may choose that your child not take part at all. If you decide to have your child participate in this research, he/she may stop participating at any time. If you decide your child will not participate in this study or if your child stops participating at any time, your child will not be penalized or lose any benefits to which your child otherwise qualifies. Participation is not a course requirement for your child. Choosing to not participate in this study will not affect your child's grade in his/her ESOL class in any way.</i>
What if I have questions?	<p><i>This research is being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. If you have any questions about the research study itself, please contact Dr. Roberta Lavine at (301) 405-6443, rlavine@umd.edu, Dr. Amitabh Varshney at (301) 405-6761, varshney@cs.umd.edu, or Gemstone Team Interactive Language Learning at (443) 625-8435, gemstoneteamill@gmail.com.</i></p> <p><i>If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678</i></p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>

Project Title	<i>Interactive Language Learning</i>	
Statement of Age of Subject and Consent	<p><i>Your signature indicates that: you are at least 18 years of age; you are the parent or legal guardian of the child who is participating in this research; the research has been explained to you; your questions have been answered; and you freely and voluntarily choose to have your child participate in this research project.</i></p>	
Signature and Date	NAME OF PARENT/GUARDIAN	
	NAME OF SUBJECT	
	SIGNATURE OF PARENT/GUARDIAN	
	DATE	

FORMULARIO DE AUTORIZACIÓN

Título del Proyecto	<i>Aprendizaje Interactivo del Idioma</i>
¿Por qué se realiza este estudio?	<i>Se trata de un proyecto de investigación realizado por el equipo Gemstone de Aprendizaje Interactivo del Idioma de la Universidad de Maryland, College Park, bajo la dirección de la Dra. Roberta Lavine y el Dr. Amitabh Varshney. Invitamos a su hijo/hija a que participe ya que él/ella asiste al programa ESOL en la escuela media. El propósito del estudio es determinar si un juego online e interactivo de computadora puede ser útil como herramienta que motive el aprendizaje del inglés en la escuela.</i>
¿Qué se le va a pedir a mi hijo/hija que haga?	<i>El estudio pedirá que su hijo/hija juegue en la computadora por 30 minutos durante el horario regular de una clase ESOL, llegando a un total de 5 horas (in 30-minute increments for a total of approximately five hours). El juego tendrá materiales similares a los que utiliza usualmente su hijo/hija en la clase ESOL, tanto de vocabulario, gramática, lectura y escritura. En la escuela se dará espacio a este juego.</i>
¿Es confidencial?	<i>Haremos todo lo que esté a nuestro alcance para conservar de manera confidencial la información sobre su hijo/hija. Para proteger su identidad, (1) el maestro de ESOL asignará por azar un código numérico para que su hijo/hija ingrese al juego y este código será anónimo para los investigadores, (2) el maestro de su hijo/hija y los dos profesores que supervisan el estudio serán quienes tengan acceso a los códigos y los nombres por lo que esta información nunca estará disponible para los investigadores, (3) el nombre de su hijo/hija o cualquier otra información de su identidad no figurará en el reporte final con los resultados del estudio, (4) toda la información almacenada en la computadora estará protegida por claves de acceso, y (5) toda información material será guardada en gabinetes bajo llave. Si se escribe un reporte o artículo sobre este estudio, la identidad de su hijo/hija será protegida lo más que se pueda. Su información puede ser compartida con representantes de la Universidad de Maryland, College Park, o con autoridades gubernamentales si usted o alguien está en peligro o si la ley lo exige.</i>
¿Existe algún riesgo al participar?	<i>No hay riesgos conocidos asociados a la participación de una persona en este estudio.</i>

<p>Título del Proyecto</p>	<p><i>Aprendizaje Interactivo del Idioma</i></p>
<p>¿Qué beneficios tiene este estudio?</p>	<p><i>Este estudio autoriza a su hijo a participar en el desarrollo de una herramienta educativa útil que lo puede motivar más para aprender inglés. Esperamos que en el futuro, otros se beneficien de este trabajo e incorporen este recurso útil que ayuda al aprendizaje del inglés en la clase.</i></p>
<p>¿Es obligatorio que mi hijo/hija participe? ¿Puede comenzar y luego abandonarlo en cualquier momento?</p>	<p><i>La participación de su hijo/hija en este estudio es completamente voluntaria. Usted puede negarse a que su hijo/hija participe. Si usted lo acepta, de igual modo él/ella pueden abandonarlo en cualquier momento. Si usted no quiere que participe o su hijo/hija abandona el estudio, no recibirá ningún tipo de penalización ni afectará los beneficios que recibe. Participar no es un requisito de la clase ESOL, por lo que las notas de su hijo/hija no se verán afectadas en la clase si participa o si no lo hace.</i></p>
<p>¿A quién consulto en caso de tener dudas?</p>	<p><i>Este proyecto de investigación es realizado por el equipo Gemstone de Aprendizaje Interactivo del Idioma de la Universidad de Maryland, College Park, bajo la dirección de la Dra. Roberta Lavine y el Dr. Amitabh Varshney. Si usted tiene cualquier duda sobre este estudio, por favor, contacte a la Dra. Roberta Lavine al (301) 405-6443, rlavine@umd.edu, o al Dr. Amitabh Varshney al (301) 405-6761, varshney@cs.umd.edu, o bien al equipo Gemstone de Aprendizaje Interactivo del Idioma al (443) 625-8435, gemstoneteamill@gmail.com.</i></p> <p><i>Si tiene alguna consulta sobre sus derechos como participante de un trabajo de investigación o desea reportar una lesión ocasionada por este estudio, por favor, contacte a Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (teléfono) 301-405-0678</i></p> <p><i>Este trabajo de investigación ha sido examinado según los procedimientos IRB de la Universidad de Maryland, College Park, para toda investigación que incluya seres humanos como participantes.</i></p>

Título del Proyecto	<i>Aprendizaje Interactivo del Idioma</i>	
Edad del Firmante y Consentimiento	<p><i>Su firma certifica que:</i> <i>Usted tiene al menos 18 años de edad;</i> <i>Usted es el padre/madre/tutor/guardián legal del niño/niña que participa en este trabajo de investigación;</i> <i>A Usted se le ha explicado el estudio;</i> <i>A Usted se le han respondido sus dudas; y</i> <i>Usted libre y voluntariamente acepta que su hijo/hija participe en este trabajo de investigación.</i></p>	
Firma y Fecha	NOMBRE DE PADRE/MADRE/TUTOR/GUARDIÁN LEGAL	
	NOMBRE DEL PARTICIPANTE	
	FIRMA DE PADRE/MADRE/TUTOR/GUARDIÁN LEGAL	
	FECHA	

CONSENT FORM

Project Title	<i>Interactive Language Learning</i>
Why is this research being done?	<i>This is a research project being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. We are inviting your child to participate in this research because he/she is enrolled in a middle school ESOL program. The purpose of this research is to determine whether an online, interactive computer game can be used as a motivational tool for learning English in school.</i>
What will my child be asked to do?	<i>The procedures involve your child playing the game during normal ESOL class hours in 30-minute increments for a total of approximately five hours. The game will include material similar to the material that your child is learning in his/her ESOL class, including vocabulary, grammar, reading, and writing. Game play will take place at your child's school.</i>
What about confidentiality?	<i>We will do our best to keep your child's personal information confidential. To help protect your child's confidentiality: (1) he/she will be randomly given a numeric code to log into the game by his/her teacher and this code will be anonymous to the researchers, (2) only your child's teacher and the research team's faculty advisors will have access to the identification key and this information will never be made available to the researchers, (3) his/her name and other potentially identifying information will not be reported in the final results of the study, (4) all data stored on a computer will be password protected, and (5) all tangible data will be kept in a locked cabinet. If we write a report or article about this research project, your child's identity will be protected to the maximum extent possible.</i>

<p>Project Title</p>	<p><i>Interactive Language Learning</i></p> <p><i>This research project involves audio taping an interview with your child. Audiotapes will be made only when your child is being interviewed regarding his/her motivation to learn English. Your child has been selected to be interviewed based on a recommendation from his/her teacher. Your child will be once after playing the game. Interviews will take place during your child's regularly scheduled ESOL class at your child's school.</i></p> <p><i>Only the researchers will have access to these tapes. Tapes will be kept in a locked cabinet and will be transcribed as quickly as possible following the interview. Only the researchers will have access to the locked cabinet in which the tapes will be kept at the University of Maryland, College Park. Tapes will be immediately destroyed after transcription. Your child's name will not be included anywhere in the transcriptions of the interviews.</i></p> <p><i>Your information may be shared with representatives of governmental authorities if you or someone else is in danger or if we are required to do so by law.</i></p>
<p>What are the risks of this research?</p>	<p><i>There are no known risks to participating in this research.</i></p>
<p>What are the benefits of this research?</p>	<p><i>This research will allow your child to participate in the development of a useful educational tool and potentially become more motivated to learn English. We hope that, in the future, other people might benefit from this study by having a helpful resource to aid in learning English in the classroom.</i></p>
<p>Does my child have to be in this research? Can he/she stop participating at any time?</p>	<p><i>Your child's participation in this research is completely voluntary. You may choose that your child not to take part at all. If you decide to have your child participate in this research, he/she may stop participating at any time. If you decide your child will not participate in this study or if your child stops participating at any time, your child will not be penalized or lose any benefits to which your child otherwise qualifies. Participation is not a course requirement for your child. Choosing to not participate in this study will not affect your child's grade in his/her ESOL class in any way.</i></p>
<p>What if I have questions?</p>	<p><i>This research is being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr.</i></p>

	<p><i>Roberta Lavine and Dr. Amitabh Varshney. If you have any questions about the research study itself, please contact Dr. Roberta Lavine at (301) 405-6443, rlavine@umd.edu, Dr. Amitabh Varshney at (301) 405-6761, varshney@cs.umd.edu, or Gemstone Team Interactive Language Learning at (443) 625-8435, gemstoneteamill@gmail.com.</i></p>
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<p>Project Title</p>	<p><i>Interactive Language Learning</i></p> <p><i>If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678</i></p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>	
<p>Statement of Age of Parent/Guardian and Consent</p>	<p><i>Your signature indicates that:</i></p> <p><i>you are at least 18 years of age;</i></p> <p><i>you are the parent or legal guardian of the child who is participating in this research;</i></p> <p><i>the research has been explained to you;</i></p> <p><i>your questions have been answered; and</i></p> <p><i>you freely and voluntarily choose to have your child participate in this research project.</i></p> <p><i>I agree to my child being audio recorded _____ Yes</i> <i>_____ No</i></p>	
<p>Signature and Date</p>	<p>NAME OF PARENT/GUARDIAN</p>	
	<p>NAME OF CHILD</p>	
	<p>SIGNATURE OF PARENT/GUARDIAN</p>	
	<p>DATE</p>	

FORMULARIO DE AUTORIZACIÓN

Título del Proyecto	<i>Aprendizaje Interactivo del Idioma</i>
¿Por qué se realiza este estudio?	<i>Se trata de un proyecto de investigación realizado por el equipo Gemstone de Aprendizaje Interactivo del Idioma de la Universidad de Maryland, College Park, bajo la dirección de la Dra. Roberta Lavine y el Dr. Amitabh Varshney. Invitamos a su hijo/hija a que participe ya que él/ella asiste al programa ESOL en la escuela media. El propósito del estudio es determinar si un juego online e interactivo de computadora puede ser útil como herramienta que motive el aprendizaje del inglés en la escuela.</i>
¿Qué se le va a pedir a mi hijo/hija que haga?	<i>El estudio pedirá que su hijo/hija juegue en la computadora por 30 minutos durante el horario regular de una clase ESOL, llegando a un total de 5 horas (in 30-minute increments for a total of approximately five hours). El juego tendrá materiales similares a los que utiliza usualmente su hijo/hija en la clase ESOL, tanto de vocabulario, gramática, lectura y escritura. En la escuela se dará espacio a este juego.</i>
¿Es confidencial?	<i>Haremos todo lo que esté a nuestro alcance para conservar de manera confidencial la información sobre su hijo/hija. Para proteger su identidad, (1) el maestro de ESOL asignará por azar un código numérico para que su hijo/hija ingrese al juego y este código será anónimo para los investigadores, (2) el maestro de su hijo/hija y los dos profesores que supervisan el estudio serán quienes tengan acceso a los códigos y los nombres por lo que esta información nunca estará disponible para los investigadores, (3) el nombre de su hijo/hija o cualquier otra información de su identidad no figurará en el reporte final con los resultados del estudio, (4) toda la información almacenada en la computadora estará protegida por claves de acceso, y (5) toda información material será guardada en gabinetes bajo llave. Si se escribe un reporte o artículo sobre este estudio, la identidad de su hijo/hija será protegida lo más que se pueda.</i>

Título del Proyecto	<i>Aprendizaje Interactivo del Idioma</i>
	<p><i>Este estudio incluye la grabación de una entrevista con su hijo/hija. Las grabaciones solamente se harán cuando se lo entreviste sobre su motivación para aprender inglés. Su hijo ha sido elegido para realizar esta entrevista a partir de lo recomendado por el maestro. La entrevista tendrá lugar durante la clase ESOL regular de su hijo en la escuela. Los investigadores solamente tendrán acceso a estas grabaciones. Las grabaciones serán guardadas en un gabinete con llave y se hará una transcripción tan pronto como sea posible una vez finalizada. Los investigadores solamente tendrán la llave de estos gabinetes que serán guardados en la Universidad de Maryland, College Park. Una vez completada la transcripción, las cintas se destruirán. El nombre de su hijo/hija no figurará en ningún lugar de la transcripción de la entrevista. Su información puede ser compartida con representantes de la Universidad de Maryland, College Park, o con autoridades gubernamentales si usted o alguien está en peligro o si la ley lo exige.</i></p>
¿Existe algún riesgo al participar?	<p><i>No hay riesgos conocidos asociados a la participación de una persona en este estudio.</i></p>
¿Qué beneficios tiene este estudio?	<p><i>Este estudio autoriza a su hijo a participar en el desarrollo de una herramienta educativa útil que lo puede motivar más para aprender inglés. Esperamos que en el futuro, otros se beneficien de este trabajo e incorporen este recurso útil que ayuda al aprendizaje del inglés en la clase.</i></p>
¿Es obligatorio que mi hijo/hija participe? ¿Puede comenzar y luego abandonarlo en cualquier momento?	<p><i>La participación de su hijo/hija en este estudio es completamente voluntaria. Usted puede negarse a que su hijo/hija participe. Si usted lo acepta, de igual modo él/ella pueden abandonarlo en cualquier momento. Si usted no quiere que participe o su hijo/hija abandona el estudio, no recibirá ningún tipo de penalización ni afectará los beneficios que recibe. Participar no es un requisito de la clase ESOL, por lo que las notas de su hijo/hija no se verán afectadas en la clase si participa o si no lo hace.</i></p>
¿A quién consulto en caso de tener dudas?	<p><i>Este proyecto de investigación es realizado por el equipo Gemstone de Aprendizaje Interactivo del Idioma de la Universidad de Maryland, College Park, bajo la dirección de la Dra. Roberta Lavine y el Dr. Amitabh Varshney. Si usted tiene cualquier duda sobre este estudio, por favor, contacte a la Dra. Roberta Lavine al (301) 405-6443, rlavine@umd.edu, o al Dr. Amitabh Varshney al (301) 405-6761, varshney@cs.umd.edu, o bien al equipo Gemstone de Aprendizaje Interactivo del Idioma al (443) 625-8435, gemstoneteamill@gmail.com.</i></p>

	<p><i>Si tiene alguna consulta sobre sus derechos como participante de un trabajo de investigación o desea reportar una lesión ocasionada por este estudio, por favor, contacte a Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (teléfono) 301-405-0678</i></p> <p><i>Este trabajo de investigación ha sido examinado según los procedimientos IRB de la Universidad de Maryland, College Park, para toda investigación que incluya seres humanos como participantes.</i></p>
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Título del Proyecto	<i>Aprendizaje Interactivo del Idioma</i>	
Edad del Firmante y Consentimiento	<p><i>Su firma certifica que:</i> <i>Usted tiene al menos 18 años de edad;</i> <i>Usted es el padre/madre/tutor/guardián legal del niño/niña que participa en este trabajo de investigación;</i> <i>A Usted se le ha explicado el estudio;</i> <i>A Usted se le han respondido sus dudas; y</i> <i>Usted libre y voluntariamente acepta que su hijo/hija participe en este trabajo de investigación.</i></p> <p><i>Acepto que mi hijo/hija sea grabado en la entrevista</i></p> <p>_____ Sí _____ No</p>	
Firma y Fecha	NOMBRE DE PADRE/MADRE/TUTOR/GUARDIÁN LEGAL	
	NOMBRE DEL PARTICIPANTE	
	FIRMA DE PADRE/MADRE/TUTOR/GUARDIÁN LEGAL	
	FECHA	

CONSENT FORM

Project Title	<i>Interactive Language Learning</i>
Why is this research being done?	<i>This is a research project being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. We are inviting you to participate in this research because you are a middle school ESOL teacher. The purpose of this research is to determine whether an online, interactive computer game can be used as a motivational tool for learning English in school.</i>
What will I be asked to do?	<i>The procedures involve aiding your students in playing the game during normal ESOL class hours in 30-minute increments for a total of approximately five hours. The game will include material similar to the material that your students are learning in his/her ESOL class, including vocabulary, grammar, reading, and writing. Game play will take place at school. You will also be asked to complete an interview prior after the testing period is over with a member of Interactive Language Learning to determine whether the game was useful in your classroom and your feelings about the game.</i>
What about confidentiality?	<i>We will do our best to keep your personal information confidential. To help protect your confidentiality: (1) you will be randomly given a numeric code and this code will be anonymous to the researchers, (2) your name and other potentially identifying information will not be reported in the final results of the study, (3) all data stored on a computer will be password protected, and (4) all tangible data will be kept in a locked cabinet. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.</i>

<p>Project Title</p>	<p><i>Interactive Language Learning</i></p> <p><i>This research project involves audio recording an interview with you. Audiotapes will be made only when you are being interviewed regarding the use of the game in your classroom. You have been selected to be interviewed because you are a middle school ESOL teacher. You will be interviewed twice once after game administration. Interviews will take place at your convenience. Only the researchers will have access to these tapes. Tapes will be kept in a locked cabinet and will be transcribed as quickly as possible following the interview. Only the researchers will have access to the locked cabinet in which the tapes will be kept at the University of Maryland, College Park. Tapes will be immediately destroyed after transcription. Your name will not be included anywhere in the transcriptions of the interviews.</i></p> <p><i>Your information may be shared with representatives of governmental authorities if you or someone else is in danger or if we are required to do so by law.</i></p>
<p>What are the risks of this research?</p>	<p><i>There are no known risks to participating in this research.</i></p>
<p>What are the benefits of this research?</p>	<p><i>This research will allow your students to participate in the development of a useful educational tool and potentially become more motivated to learn English. We hope that, in the future, other people might benefit from this study by having a helpful resource to aid in learning English in the classroom.</i></p>
<p>Do I have to participate in this research? Can I stop participating at any time?</p>	<p><i>Your participation in this research is completely voluntary. You may choose to not take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide to not participate in this study or if you stop participating at any time, you will not be penalized. Participation is not a requirement for your school system. Choosing to not participate in this study will not affect you in any way.</i></p>
<p>What if I have questions?</p>	<p><i>This research is being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. If you have any questions about the research study itself, please contact Dr. Roberta Lavine at (301) 405-6443, rlavine@umd.edu, Dr. Amitabh Varshney at (301) 405-6761, varshney@cs.umd.edu, or Gemstone Team</i></p>

	<i>Interactive Language Learning at (443) 625-8435, gemstoneteamill@gmail.com.</i>
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<p>Project Title</p>	<p><i>Interactive Language Learning</i></p> <p><i>If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678</i></p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>	
<p>Statement of Age and Consent</p>	<p><i>Your signature indicates that:</i> <i>you are at least 18 years of age;</i> <i>the research has been explained to you;</i> <i>your questions have been answered; and</i> <i>you freely and voluntarily choose to participate in this research project.</i></p> <p><i>I agree to being audio recorded ____ Yes ____ No</i></p>	
<p>Signature and Date</p>	<p>NAME OF PARTICIPANT</p>	
	<p>SIGNATURE OF PARTICIPANT</p>	
	<p>DATE</p>	

Appendix VII: Teacher Start-Up Guide

Thank you for helping Team Interactive Language Learning with your support of our game. This step-by-step guide is designed to help you guide your students through the process of launching our game for the first time. When each student begins the game, they will be prompted to create an account. We will be providing a list of identification numbers. Each of your students should be assigned a different number on this list by you. The students will create their own passwords. We suggest that they write down their ID and password somewhere so that they will be able to play even if they forget them. You may want to keep a record of students' passwords in case one forgets.

We require each student to have an account so that it is possible for us to track their progress, and a password so that one student may not impersonate another. The use of numbered accounts ensures that Team Interactive Language Learning will be able to track the progress of individual students without collecting any personal information. The only information collected will be completely anonymous records of student's progress and their response to surveys administered within the game. This information will also be made available to you, and you will be able to see the progress of your students by name using your list of which students correspond to which ID.

The steps to set up the game are as follows:

Double-click the "Team ILL" Icon on the Desktop, or go to Start > Programs > Team ILL > and click "Game"

Instructions will appear on screen which instructs the student to type their ID Number in the prompt box.

Instructions will appear which require the student to select a password and type it in a box, then in another to confirm. The student will not be able to proceed until the passwords in both boxes match.

Finally, the game's ordinary login screen will appear. Here, the student should put their ID number into the box marked "ID" on top, and their password into the box marked "Password" on the bottom. This screen will appear from now on every time the student launches the game.

The game will now begin. Since it will be the first time the student plays, several on-screen prompts will teach them the controls, and then they will be taken to a screen where they can personalize the character which will represent them in the game. From there, the student will be able to play the game itself.

In all future times the student plays the game, they will be required to log in with their ID and password. They will begin the game in the place where they were when they quit in their previous play session. If they quit the game while in

the middle of an activity, they will start in the area they were just prior to starting that activity.

If you have any questions, please do not hesitate to contact Team Interactive Language Learning at gemstoneteamill@gmail.com.

Appendix VIII: Study Procedure

1. Team ILL members will meet with participating ESOL teachers individually to familiarize them with the computer game and research procedures for which the team will require their support. Teachers will receive the introductory information that they will share with their students (see Appendix 2), a letter of introduction addressed to parents of students (see Appendix 1), two consent forms to distribute to all of their students (see Appendices 3 and 4), a start-up guide (see Appendix 6) to explain game-play to participating students, and a list of student ID numbers generated by the team. After teachers receive and sign an informed consent form (see Appendix 5), team members will then walk teachers through the game so as to answer questions and address concerns students may have during game-play.
2. Using the introductory information given to them, teachers will present the study to their students orally two weeks prior to the study's start date, emphasizing that participation in the study will not affect a student's grades or status in the class. At that time, teachers will also distribute several items to all potential student participants: the introductory letter to parents and two informed consent forms. Teachers will only accept consent forms signed by a student's parent or guardian. The first consent form allows students to participate in phase one of the study, which involves a pre-test, intervention (game playing), and a post-test. The second form allows students to be audio-recorded if chosen by their teacher to meet with a team member for a one-on-one interview. Final collection of consent forms will be on (date to be determined).
3. Teachers will compile a list of students whose parents or guardians have signed consent forms and will randomly assign each student an ID number. The team mentors will also have a copy of this list for back-up purposes and will keep it locked in a cabinet in their offices. Teachers will store their copy of the list in a locked cabinet in their classrooms. All team members will not know the corresponding student name to each ID number and will only track student progress and survey data by anonymous ID number. At the completion of the study, these lists will be destroyed with only a list of ID numbers remaining without corresponding names of students.
4. On (date to be determined), teachers will bring the participants to the computer lab for one hour. Using the start-up guide (see Appendix 6), teachers will explain to students how to first login to SurveyMonkey.com to complete the pre-game survey regarding student demographic information, experience with computers and current motivation to learn English.
5. Once participants complete the survey, teachers will use the start-up guide to introduce participants to game-play. Participants will then be given 30 minutes of playing time before they must log off of the game.

6. Team members will periodically go to the school to check to make sure game is collecting data properly and to address any concerns.
7. Participants will return to play the game in the computer lab for 30 minute periods # more times. The last time participants play the game, teachers will instruct participants on how to log back into SurveyMonkey to complete the post-game survey.
8. Teachers will then submit to the team a list of participants who returned the second consent form (designating if the student can be interviewed and audio-recorded) and recommend three to five students to be interviewed by a team member as a way of providing more comprehensive responses to the post-game survey regarding the game design and changes in motivation and confidence to learn English.
9. On (date to be determined), each student will meet with a team member to be interviewed about his/her gaming experience during the study (for questions, see Appendix 10). The same team member will interview all students at that particular school. Participants are not required to answer any questions that make them feel uncomfortable and may stop the interview at any time. The team member will use a digital audio recorder to record the interview. That team member will then transcribe the interviews and be responsible for destroying the audio once transcription is complete. Prior to completion of the study, the audio recorder will be locked in a cabinet in the office of one of the team's mentors.
10. On (date to be determined), ESOL teachers who participated in the study will meet with three team members for a focus group regarding their opinions of the game and its use in the classroom as an educational tool (see Appendix 11). The focus group will take place after school hours at AACPS headquarters. Participants are not required to answer any questions that make them feel uncomfortable and may stop the interview at any time.
11. If teacher schedules prevent one focus group from being held, then each instructor will meet with a team member for an individual interview. The same questions proposed to be used in the focus group will be used in the individual interviews.

Appendix IX: Pre-Game Survey

Instructions:

The following survey asks you about your background, how you use computers, and your feelings about learning English. Read each sentence and select the choice that is closest to your answer. There are no right or wrong answers. Your answers will be kept confidential.

Demographics Survey (Answers that are not free-response will be given in a pull-down menu)

1. How old are you?
 - 10
 - 11
 - 12
 - 13
 - 14
 - 15
 - 16
2. What is your gender?
 - Male
 - Female
3. Where were you born? _____ (Free response blanks)
4. How long have you been in the U.S.?
 - Less than 6 months
 - 6 months to 1 year
 - More than 1 year
5. If you weren't born in the U.S., what age were you when you came here?
 - I was born in the U.S.
 - Age: ____ (free response blank)
6. What language do you speak at home?
 - English
 - Spanish
 - Other

Computer-Related Survey

1. Do you have a computer in your home?
 - Yes
 - No
2. How often do you use a computer?
 - Never
 - Once a week
 - A few times a week

- Everyday
- 3. When you use a computer, do you play games?
 - Yes
 - No
- 4. Do you think computer games can help you learn?
 - Yes
 - No
- 5. Do you think computer games can help you learn English?
 - Yes
 - No
- 6. How good are you at using computers?
 - Very good
 - Good
 - Okay
 - Bad

“How You Feel About Learning” Survey

Put a checkmark in the box matching how you feel about each corresponding statement.

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
I never feel confident when I am speaking in our ESOL class.					
I always feel that the other students speak English better than I do.					
I feel confident when I speak in ESOL class.					
I do not worry when I hear new or unfamiliar words.					
I think I know a lot of English vocabulary.					
I am comfortable reading in English even if the reading is long.					
I can read English, but I don't like to.					
Writing in English makes me feel nervous.					
Writing in English is fun for me.					
When I write in English, I feel I make a lot of mistakes.					
I feel confident when I					

read sentences in English if it's short.					
I feel confident when I read paragraphs in English if it's long.					
I like learning English in school.					
I am happy with the amount of English I know now.					
English is fun for me.					

Appendix X: Post-Game Survey

Instructions:

The following survey asks you about your opinions of the computer game you played in this study and how you now feel about learning English. Read each sentence and select the choice that is closest to your answer. There are no right or wrong answers. Your answers will be kept secret.

Answers (unless otherwise noted): Strongly agree, agree, neither agree or disagree, disagree, strongly disagree

Game-Related Survey

1. I thought the game was fun to play.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
2. What was your favorite section of the game?
 - Students will type their answer in a free-response box
3. What was your least favorite section of the game?
 - Students will type their answer in a free-response box
4. I knew many of the English words in the game.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
5. I was confused by many of the English words in the game.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
6. I was able to read the English game.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree

Motivation and Confidence Survey

1. I had fun playing this game.

- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
2. I did not enjoy playing this game.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
3. I would play this game at home, if I could.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
4. After playing this game, I feel better about learning English.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
5. After playing this game, I feel more nervous about learning English.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
6. This game helped me practice reading English.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
7. This game helped me practice writing English.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
8. I learned English vocabulary from this game.
- Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree

- Strongly Disagree
- 9. After playing this game, I feel more confident in my English vocabulary.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 10. After playing this game, I am more excited about learning English.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 11. I do not think this game helped me practice reading in English.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 12. I do not think this game helped me practice writing in English.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 13. After playing this game, I feel more confident speaking in my ESOL class.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 14. This game made me more excited about reading in English.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree
- 15. This game made more excited about writing in English.
 - Strongly Agree
 - Agree
 - Neither agree or disagree
 - Disagree
 - Strongly Disagree

Appendix XI: Student Interview Questions

Interviewer Script: Hello. My name is (interviewer's name). For the next 15 to 30 minutes, I'm going to ask you some questions about your experiences learning English and about how you felt about the computer game that you have been playing for the past few weeks. If I ask you a question that you do not understand, please stop me and I will gladly clarify it. Remember, this interview is not mandatory and you can quit at any time. I also want to remind you that I will record this interview for transcription purposes. If you are ready, let's start.

Interview Questions for Students

- What did you like about the game?
- What did you not like about the game?
 - Did you like the game graphics?
 - Did you like the music?
 - Did you like the storyline?
- Did you have any trouble understanding how to play the games?
 - What game was the most difficult to play?
 - What made that game difficult for you to play?
 - Were the game instructions difficult to understand?
 - Was it difficult to remember which keys to press?
 - Did you have trouble understanding the goals of the game?
- What was your favorite activity?
- Why was that your favorite activity?
- What was your least favorite activity?
- Why was that your least favorite activity?
- What did you learn from the game?
- Would you play this game at home during your free time?
- Did playing the game make you want to learn English?
- How did playing the game make you feel about your English language abilities?
- Did the game make you more confident about your English language abilities?
- If you played this game whenever you wanted to, do you think you would be more excited about learning English?
- Follow up questions may be asked as needed

Appendix XII: Teacher Interview Questions

Interviewer Script: Hello. My name is (interviewer's name). For the next 15 to 30 minutes, I'm going to ask you some questions about your students' experiences with both the English language and the computer game that they have been playing for the last few weeks. If I ask you a question that you do not understand, please stop me and let me know and I will gladly clarify. Remember, this interview is not mandatory and you can quit at any time. I also want to remind you that I am recording this interview for transcription purposes. If you are ready, let's begin.

Teacher Interview Questions:

- How would you characterize your students' general level of English proficiency?
- Please describe how you normally teach course materials.
- Please describe your students' general attitude and level of motivation regarding class materials.
- Please describe how technology is typically incorporated into a normal lesson plan.
- How would you evaluate your students' use of technology?
- Please describe how the game fit into your curriculum.
- How would you evaluate the implementation of our game into your lesson plans in terms of:
 - Quality of the exercises?
 - Usefulness to students?
- Please describe anything that you have learned by participating in our project.
- Do you think your students enjoyed playing this game?
- Do you think your students were excited about playing this game?
- Do you think your students became more excited about learning English after playing this game?
- What challenges do you face when teaching ESOL students?
- In what ways has our project helped to address these challenges?
- What changes would you suggest be made to our game in order to more effectively address these challenges?
- Do you have any additional concerns or suggestions regarding our project that may not have been touched upon earlier in this session?
- Follow up questions may be asked as needed.

Appendix XIII: IRB Addendum Application for Graduate Student Focus Group

Portion of Study

UNIVERSITY OF MARYLAND COLLEGE PARK
 Institutional Review Board
Addendum Application

Protocol Number	#09-0036
Protocol Title	Gemstone Team Interactive Language Learning
Risk Classification (<i>check one</i>)	<input type="checkbox"/> Greater than Minimal Risk <input type="checkbox"/> Minimal Risk <p style="text-align: right;">Yes, Minimal Risk</p>

Principal Investigator	Dr. Roberta Lavine	Email Address	rlavine@umd.edu
Address for Approval Letter	2102 Jimenez Hall	Telephone Number	301-405-6443

Student/Co- Investigators	Victoria Kriz	Email Address	vkriz@umd.edu
Telephone Number	301-448-0235		

To ensure an accurate and streamlined review of your Addendum Application, please provide the following information:

1) State what is being proposed and where in the protocol and/or consent what was changed.

In order to expand the amount of qualitative data the team has collected from professionals in English as a Second Language, we propose an addition to our research study where team members will sit in on a classroom of University of Maryland graduate students who are currently teachers with an interest in ESL or are ESL teachers themselves. Some students are currently ESL teachers. Graduate students will sign a consent form similar to Appendix X from our original application. The graduate students will first engage in a discussion with their professor, Dr. Roberta Lavine, about their experiences with and opinions of educational technology in the classroom. Grad students will then have a chance to play the team-created computer game as first discussed in our original research application. Team members will be present to give introductory instructions regarding how to start playing the game. After a certain amount of play time, grad students will then engage in a second discussion with Dr. Lavine about the game they just played and how they think their students could use it in their classrooms. All conversations will be audio recorded (as listed in the consent form).

2) Provide the rationale/justification for the change.

In our previous study, conducted in May-June, the team intended to collect data from the two professional ESOL instructors we worked with at Bates and Annapolis Middle Schools regarding educational gaming in ESOL classrooms and how their students reacted to playing the team's game overall. After reviewing this interview data, the team is not satisfied with the amount of useful information provided and would like to collect more in order to draw more concrete conclusions.

3) State what impact the change has on risks to participants. Please state the number of currently enrolled participants and if the change in risk will require re-consent. If the changes will not require re-consent, please state why.

There is no change in the risk on participants in this new portion of our research. Because we are using different participants, all 23 graduate students will need to sign consent forms before we begin this new research.

4) State whether the change has an impact on the scientific integrity of the study, (i.e. decreases, increases, no impact).

This addition to our research will only increase the integrity of our study. We will be collecting more data so that we can then draw more concrete conclusions.

5) List the documents included with the application that have been modified (consent forms, flyers, data collection forms, surveys). State what has been changed in each modified document.

Appendix A: Consent form for graduate students (including consent to be audio-recorded)
Appendix B: Questions for Part I and II of discussion

Appendix A: Consent Form for Teachers

Page 1 of 3

Initials _____ Date _____

CONSENT FORM

Project Title	<i>Interactive Language Learning</i>
Why is this research being done?	<i>This is a research project being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. We are inviting you to participate in this research because you are an educational professional interested in or currently teaching English as a Second Language. The purpose of this research is to determine whether an online, interactive computer game can be used as a motivational tool for learning English in school.</i>
What will I be asked to do?	<i>The procedures involve participating in a class discussion about educational technology in the classroom and playing the computer game yourself. A post-game-play class discussion will ask you to give your opinion about the game and its possible uses in an ESL classroom.</i>
What about confidentiality?	<p><i>We will do our best to keep your personal information confidential. Although team members will ask for your name and general occupational position prior to each discussion, to help protect your confidentiality, your name will not be reported in the final results of the study. If we write a report or article about this research project, only your occupational position will be printed in association with your remarks recorded during these discussions.</i></p> <p><i>This research project involves audio recording an interview with you. Audiotapes will be made only when you are participating in the class discussion. You have been selected to be interviewed because you are interested in ESL or are currently teaching ESL. Only the researchers will have access to these tapes. Tapes will be kept in a locked cabinet and will be transcribed as quickly as possible following the interview. Only the researchers will have access to the locked cabinet in</i></p>

Project Title	<i>Interactive Language Learning</i>
	<i>which the tapes will be kept at the University of Maryland, College Park. Tapes will be immediately destroyed after transcription.</i>
	<i>Your information may be shared with representatives of governmental authorities if you or someone else is in danger or if we are required to do so by law.</i>
What are the risks of this research?	<i>There are no known risks to participating in this research.</i>
What are the benefits of this research?	<i>This research will allow your students to participate in the development of a useful educational tool and potentially become more motivated to learn English. We hope that, in the future, other people might benefit from this study by having a helpful resource to aid in learning English in the classroom.</i>
Do I have to participate in this research? Can I stop participating at any time?	<i>Your participation in this research is completely voluntary. You may choose to not take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide to not participate in this study or if you stop participating at any time, you will not be penalized. Participation is not a requirement for your graduate class. Choosing to not participate in this study will not affect you in any way.</i>
Is any medical treatment available if I am injured?	<i>The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland provide any medical treatment or compensation for any injury sustained as a result of participation in this research study, except as required by law.</i>
What if I have questions?	<i>This research is being conducted by Gemstone team Interactive Language Learning at the University of Maryland, College Park under the direction of Dr. Roberta Lavine and Dr. Amitabh Varshney. If you have any questions about the research study itself, please contact Dr. Roberta Lavine at (301) 405-6443, rlavine@umd.edu, Dr. Amitabh Varshney at (301) 405-6761, varshney@cs.umd.edu, or Gemstone Team Interactive Language Learning at (443) 625-8435, gemstoneteamill@gmail.com.</i>

<p>Project Title</p>	<p><i>Interactive Language Learning</i></p> <p><i>If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678</i></p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>	
<p>Statement of Age and Consent</p>	<p><i>Your signature indicates that:</i> <i>you are at least 18 years of age;</i> <i>the research has been explained to you;</i> <i>your questions have been answered; and</i> <i>you freely and voluntarily choose to participate in this research project.</i></p> <p><i>I agree to being audio recorded ____ Yes ____ No</i></p>	
<p>Signature and Date</p>	<p>NAME OF PARTICIPANT</p>	
	<p>SIGNATURE OF PARTICIPANT</p>	
	<p>DATE</p>	

Appendix B: Questions for Part I and II of discussion

Directions: Dr. Lavine will lead her class in the following discussions. Students will be asked to identify their names and professional positions prior to each discussion so that team members can track each participant's comments.

Part I: Educational Technology in the ESOL Classroom

- What challenges are faced when teaching ESOL students? Are there more challenges than teaching foreign language students?
- For those of you who are ESOL teachers, how would you describe the current English proficiency of your students? Are there varying levels within one classroom?
 - Please describe how you normally teach course materials.
 - Please describe your students' general attitude and level of motivation regarding class materials.
 - How does this compare for teachers of a foreign language?
- How are you incorporating or think you can incorporate educational technology/gaming in the classroom? Are you open to introducing more technology into your classroom?
- Do you think educational computer gaming could be an effective supplement to your existing curriculum? An ESOL curriculum?

Part II: Reaction to Team ILL Computer Game

- How would you evaluate our game in terms of: Quality of the exercises? Usefulness to students? General aesthetics (illustrations, music, sound effects, etc.)? Level of enjoyment?
- What specifically about the game did you enjoy and what did you find most challenging?
- Did you like the option to edit the content of the game to whatever English terms you so choose? Would you use this option or find it too complicated? How would you use this option?
- Do you think ESOL students would enjoy this game? Would they be more motivated to learn in a classroom if this game was a part of curriculum activities?
- Do you think this game would be accessible to students of all different English skill levels? At what level do you feel this game is targeted?

- How could this computer game fit into your current curriculum/vision of learning?
- In what ways has our project helped to address the challenges faced when teaching ESOL students as discussed prior to playing the game?
- What changes would you suggest be made to our game in order to more effectively address these challenges?
- Do you have any additional concerns or suggestions regarding our project that may not have been touched upon earlier in this session?
- Follow up questions may be asked as needed.

Appendix XIV: TESOL Standards

STANDARD 1: Listening/Listening Comprehension

English language learners will listen to English to acquire language, comprehend and interpret meaning, and respond appropriately in basic interpersonal and academic contexts.

1.1: Participate in basic interpersonal and academic discourse using appropriate verbal and nonverbal behavior.

Not Used

1.2: Respond appropriately to question and prompts given orally for a variety of purposes.

Maze Game

Final Battle Game

1.3: Demonstrate comprehension of vocabulary presented orally in a variety of contexts.

Maze Game

Final Battle

1.4: Identify and differentiate phonological patterns to interpret meaning.

Not Used

1.5: Comprehend and apply academic and non-academic information presented orally.

Maze Game

Final Battle Game

1.6: Use strategies to prepare for and comprehend oral language that is presented in a variety of contexts.

Not Used

1.7: Apply knowledge of specific English structures and grammatical features that impact listening comprehension.

Not Used

STANDARD 2: Speaking

English language learners will speak in English for a variety of basic interpersonal and academic purposes, with fluency, using appropriate vocabulary, grammar, pronunciation, and nonverbal communication strategies.

2.1: Ask questions for a variety of purposes.

Not Used

2.2: Apply vocabulary appropriately in a variety of contexts.

Not Used

2.3: Speak with sufficient clarity and fluency to be understood.

Not Used

2.4: Express personal information, ideas and opinions.

Not Used

2.5: Use standard academic American English grammar to develop accuracy and clarity in oral communication.

Not Used

2.6: Formulate and present academic information, concepts and ideas for a variety of purposes.

Not Used

2.7: Participate in discourse using verbal and non-verbal communication strategies on a variety of social and academic topics.

Not Used

STANDARD 3: Reading/Reading Comprehension

English language learners will read English to acquire language and comprehend, analyze, interpret, and evaluate a variety of literary and informational texts.

3.1: Read orally with accuracy and appropriate pronunciation, intonation, pacing, and expression.

Not Used

3.2: Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

Cave Game

Cart Game

Memory Card Game

Maze Game

Final Battle Game

3.3: Use strategies to prepare for reading informational and literary text (before reading).

Not Used

3.4: Use strategies to make meaning from informational and literary text (during reading).

Not Used

3.5: Use strategies to demonstrate understanding of informational and literary text (after reading).

Not Used

3.6: Demonstrate an understanding of how English informational and literary texts are organized.

Not Used

3.7: Demonstrate an understanding of how English informational and literary texts are interpreted.

Not Used

STANDARD 4: Writing

English language learners will write in English for a variety of basic interpersonal and academic purposes with fluency, using appropriate vocabulary, grammar and Standard English writing conventions.

4.1: Use Standard English structure and grammar to develop clarity in written communication.

Memory Card Game

Final Battle Game

4.2: Use standard American academic English language conventions to develop clarity in written communication.

Memory Card Game

Final Battle Game

4.3: Use pre-writing strategies to compose text for a variety of purposes.

Not Used

4.4: Compose text to express personal ideas and academic information in order to inform, to describe, to explain and to persuade.

Not Used

4.5: Edit, revise, and publish text for clarity, completeness, and effectiveness.

Final Battle Game

Appendix XV: Transcripts of Student Interviews

Annapolis Middle School

Interview 1

Jen: “Okay, so I'm Jen. I'm just going to, um, interview you about the game, and your experiences learning English with the game, and whether you liked it, whether you didn't like it, um, what you thought could've been better, um, how much you played it. It'd only take like 15 or 30 minutes, um, and if there's something that I ask you, you don't understand, I can clarify it, or, um, if you need help with anything, just let me know. It's not mandatory that you do this, so if you don't want to do it, you can stop at any time. Um, we obviously really appreciate you helping us out, but if you don't want to do it, we can always stop. Okay? Um, I'm just recording it so that we can transcribe it later. No one's – it's completely anonymous, so no one's ever going to know that it was like you that, um, was giving us this interview. Sound good? Okay. Let's start.”

Jen: “Um, what did you like about the game?”

Student: “I like, like, you know when he was chasing that man,”

Jen: “Mm hmm.”

Student: “that you had to catch him,”

Jen: “Mm hmm.”

Student: “and that you had to stop and answer the questions,”

Jen: “Mm hmm.”

Student: “and you had to get them right. That. I like that one.”

Jen: “You like that?”

Student: “Yeah.”

Jen: “That, so that part was fun for you?”

Student: “Yeah.”

Jen: “Mm hmm. Um, what didn't you like about it?”

Student: "Uh, I didn't like, that, when he was outside and just walking around."

Jen: "He was just walking around? So it could've been faster?"

Student: "Yeah."

Jen: "Like running, or, driving, or something? Yeah? That would've been fun?"

Student: "Yeah."

Jen: "Did you like the pictures in the game? Like the graphics?"

Student: "Yeah."

Jen: "And the way it looked? You liked it?"

Student: "Yeah."

Jen: "Okay. Um, did you like the music that was in the background? Did you remember it at all?"

Student: "No."

Student: "Yeah."

Jen: "You don't remember it? Okay. Um, did you think it was fun? Did you like the story to it?"

Student: "Yeah."

Jen: "Mm hmm. Would you play it on your own time? Like if it wasn't just in school, you think this is a game that you might play at home, or...?"

Student: "I would."

Jen: "You would? Okay. Um, did you have any trouble understanding how to play the games, like, with the controllers that you had to use, or...?"

Student: "No."

Jen: "No? No trouble? Okay. Um, which of the, of the parts of the game did you think was the hardest?"

Student: "Um, answering the questions."

Jen: "Answering the questions? Just throughout all the games, or in one particular part?"

Student: "All, all of them."

Jen: "All of them. Was it the language that made it hard, or, was it, typing, or having to hear things?"

Student: "Typing."

Jen: "Typing was hard."

Student: "Yeah."

Jen: "Did you feel like you couldn't type fast enough, or, um, was it like the time, or was it just finding the keys?"

Student: "Yeah."

Jen: "Or something else?"

Student: "The time."

Jen: "The time? Gotcha. Um, did you feel like the instructions were hard to understand, like when they told you how to play the game?"

Student: "No."

Jen: "No? Okay. Well that's good. Was it difficult for you to remember which keys you had to press throughout the game?"

Student: "No."

Jen: "No? Okay. Um, did you have trouble understanding any of the goals of the game, like what you're supposed to do at the end, like whether you're supposed to catch someone, or you're supposed to, um, like bake the cake, or...?"

Student: "It was like, you know at the end when you catch the man?"

Jen: "Mm hmm."

Student: "And then he got another part, and that where you play cards?"

Jen: "Mm hmm."

Student: "And you gotta find it?"

Jen: "Mm hmm."

Student: "Um, that, almost at the end, it didn't come, the pictures didn't come up. Only the cards, and it was blank."

Jen: "Oh, okay. Well that's good to know. It was probably, like, a problem with the game, with the way that we did it. So that was, um, okay. What, um, so what, during the game, was your favorite activity that you did?"

Student: "Catch the man."

Jen: "Catching the man? Was there a certain part that, just like the end that you liked, or did you like, um, like doing the cards, or did you like, um, chasing through the shopping market?"

Student: "Chasing."

Jen: "You like chasing him through the shopping market? What did you like about that?"

Student: "That, that you had to stop and answer the questions then keep going until you catch him and you gotta turn."

Jen: "Mm hmm."

Student: "And all that."

Jen: "Mm hmm."

Student: "Yeah."

Jen: "So, were the questions in that game, did you think they were harder, or easier than the rest of the game, or...?"

Student: "Easier."

Jen: "They were easier than the rest of the game. Is, is that something that, helped you like it more?"

Student: "Yeah."

Jen: "That like, yeah. Um, I know in that game, when you get more questions right, it helps you go faster."

Student: "Mm hmm."

Jen: "Was that something that you liked about it, that you could...?"

Student: "Yeah."

Jen: "Yeah, you liked that about it. Cool! Um, which activity didn't you like in the game?"

Student: "Um, the one that was, that, you had to type if he was ready or not in the game."

Jen: "Mm hmm."

Student: "It'd be like, and the cards that, it says, like, if it was hockey, you had to find out where the picture."

Jen: "Mm hmm."

Student: "And you had to click the card."

Jen: "Mm hmm."

Student: "And then you had to, like, type in your own words. The, the hockey card is in the middle."

Jen: "Mm hmm. Yeah."

Student: "At first I had trouble, but then, I, I had, I got the hang of it."

Jen: "Oh, cool. So did you think it was trouble understanding how to play the game, or do you think it was the material, like the, the words that you had to use?"

Student: "The material."

Jen: "The material? Okay. Um, so you felt like, the, material in that game was harder than the other games?"

Student: "Yeah."

Jen: "Okay. Um, what did you learn from the game?"

Student: "That, that you could be nice with people, and like, not be bad, like, the, the man, that you have to chase."

Jen: "Mm hmm."

Student: "Yeah."

Jen: “Did the game help you learn English at all? Did you learn any language from it?”

Student: “Yeah.”

Jen: “Yeah? Um, did, it make you feel more confident in class, with your English, or...?”

Student: “Yeah.”

Jen: “Mm hmm. Did, did you find it helping you at all outside of class?”

Student: “Yeah.”

Jen: “Mm hmm. Okay. Um, would you play the game at home during your free time, if you, could?”

Student: “Yes.”

Jen: “Okay. Um, did playing the game make you want to learn English more? Like did it motivate you to, um, want to learn more, language?”

Student: “No.”

Jen: “No? Okay. Um, but you've, you did say that you felt like it helped learn the language, right?”

Student: “Mm hmm.”

Jen: “Okay. Um, so did playing the game make you more confident in class?”

Student: “Yes.”

Jen: “So did you feel like, um, you were better able to speak or understand English?”

Jen: “Um, if you could play this game whenever you wanted to, do you, like, at home or in school or whenever it was available to you, do you think this would make you more excited to learn English?”

Student: “Yes.”

Jen: “Yeah? Okay. Um, did you use, use the game to talk to other students in the classroom while they were playing it? 'Cause I know there was a chat feature to the game where you could like talk to other people, during the...”

Student: “Yeah.”

Jen: “You did? What did you like about that?”

Student: “About that, that he was talking to, the, um, Brett something.”

Jen: “Mm hmm.”

Student: “And that he, that, that he, that you had to find out the things for the cake.”

Jen: “Mm hmm.”

Student: “And, you, you had to put if you were ready.”

Jen: “Mm hmm.”

Student: “If you weren't...”

Jen: “Mm hmm.”

Student: “Just put, 'I'm not ready!'.”

Jen: “Mm hmm.”

Student: “And all that stuff.”

Jen: “Mm hmm. Did you ever use it to talk to other students, so like, not in the game, other, like, students in your class who are also playing the game?”

Student: “Yeah.”

Jen: “You did? And what did you, do with that? Like what did you guys talk about?”

Student: “About, um, the, chasing game thing.”

Jen: “Mm hmm.”

Student: “And like, how, like, when we was asking, like, how difficult it was, like, to find, um, the things for the cake.”

Jen: “Mm hmm. Did you guys, um, work to try to figure out the answers to questions together?”

Student: “No.”

Jen: “No? Okay. Um, did you talk to other people about the game outside of like, talking on the computer? Maybe, like, turn to the person next to you and say like, 'Oh, like, do you know what the answer to...?’”

Student: “No.”

Jen: “No? Okay. Did you feel like you needed a lot of help from your teacher to do it?”

Student: “Not at all. No.”

Jen: “Not a lot? Okay. Um, all right! Well, I think that's all the questions I have for you. Thank you so much!”

Student: “You're welcome.”

Interview 2

Jen: “Okay, so I'm Jen. I'm from, um, the team that helped make the computer game that you were playing in class to learn language. Okay. Um, for about, like, 10 or 15 minutes, I'm just going to be asking you some questions about the game that you played, um, just like your experiences learning English with it, whether you liked it, whether you didn't like it, um, whether it helped you learn English, and stuff like that. Um, if I ask you something that you don't really understand, just let me know. I can try to clarify it. Um, it, this is not required for you to do, so you don't want to do it for some reason, you don't have to do it. If you want to stop at any time, we can stop, and we don't have to finish. Okay? And I'm just going to be recording it, so that later we can, like, type it up, so that we can read it, and it's going to be completely anonymous. No one's going to know it's you. Okay? Sound good? All right.”

Jen: “So, just in general, what did you like about the game?”

Student: “Um, the game was, like, good. I, I think, 'cause, I, I didn't play the game.”

Jen: “Mm hmm. You played it.”

Student: “I didn't play it.”

Jen: “Oh, you didn't play it.”

Student: “No.”

Jen: “At all?”

Student: “'Cause I didn't bring the, uh, the form back.”

Jen: “You didn't, oh you didn't bring the form back. All right, well...”

Interview 3

Jen: “Okay. So, I'm Jen. I'm from the team that helped make the video game that you were playing in class. Do you know, did you play that game?”

Student: “Yeah.”

Jen: “Yeah, okay, cool. Um, for about like, 10 or 15 minutes, I'm just going to be asking questions about the game, what you liked, what you didn't like, if it helped you learn English or make you feel more confident. Um, if there's something that I ask you that for some reason you don't understand, just let me know. I'll help clarify it, um, just so that you can understand we're getting, good responses and stuff. Okay?”

Student: “Okay.”

Jen: “Um, this is not required for you to do, so if you don't want to do it, or if you want to stop at any time, just let me know, and we'll stop.”

Student: “Mm hmm.”

Jen: “I'm recording it, so that later, we can, like type it up and then look at everything. It's, no one's going to know this is you. It's completely anonymous. Um, so it's just for, to help us know what was good about the game and what wasn't and what we can change. Okay?”

Student: “Mm hmm.”

Jen: “Um, what did you like about the game?”

Student: “When he was trying to catch the, the...”

Jen: “The, the bad guy?”

Student: “Yeah.”

Jen: “Okay. Um, why did you like that?”

Student: “Because, he was, like playing in ... they were asking, it was kind of hard and ... something.”

Jen: “Mm hmm. You liked it 'cause you learned from it?”

Student: “Yeah.”

Jen: "Okay. Um, what didn't you like about the game?"

Student: "When, when I was trying to get the, cake for, the, boss."

Jen: "Mm hmm. How come you didn't like that?"

Student: "Because we, I didn't get it, actually."

Jen: "You didn't get it?"

Student: "Yeah."

Jen: "Was it hard for you to find the things that were supposed to go in the cake?"

Student: "Yeah."

Jen: "Yeah? Um, did you, was there a problem with the directions, like you didn't understand, what you were supposed to do, to make the cake?"

Student: "Yeah."

Jen: "Okay. Um, did you not know where to go inside the game? Like, you had to go to different stores, to get, the, ingredients?"

Student: "Um, no."

Jen: "You, you, that was okay?"

Student: "Yeah."

Jen: "Yeah? Okay. Um, you just didn't know that, like, you were supposed to make a cake and then bring it back."

Student: "Mm hmm."

Jen: "Okay. Um, did you like the way the game looked, like, did you like the pictures, and, the animations, like the moving things? Did you like them?"

Student: "Yeah."

Jen: "Yeah? Did you, um, so did you like the colors, and the drawings?"

Student: "Yeah."

Jen: “Yeah? Okay. Um, did you, did you like the music that was in the background? Did you notice it, or...?”

Student: “I don't remember it at all.”

Jen: “You don't remember it? Okay. Um, did you like the story to the game? Did you think it was interesting or fun?”

Student: “It was both.”

Jen: “It was both interesting and fun. Okay. Um, uh, did you have any trouble understanding how to play the games, like the, what controls you had to use, on the computer?”

Student: “No.”

Jen: “No? You understood the controls?”

Student: “Yeah.”

Jen: “Cool. Um, did you have any trouble understanding what you were supposed to do, like what you're supposed to type, or what you're supposed to listen to, or look at?”

Student: “Uh, I don't think so.”

Jen: “You don't think so? Okay. Um, which of the parts of the game was the most difficult for you to play? So which was the hardest?”

Student: “When we, we were, trying to catch the, ... , the bad boy.”

Jen: “Yeah, uh huh. In the supermarket?”

Student: “Yeah, in the supermarket.”

Jen: “Okay. What was hard about it?”

Student: “Because, the bad boy, it was, like, it was, too, um, too far away.”

Jen: “It was too far away. So he was moving really fast?”

Student: “Yeah.”

Jen: “Okay. Um, did you think that the questions were difficult that they were asking you?”

Student: "Some of it."

Jen: "Some of them are difficult. Um, did you have trouble with the controls in that game, with using the arrows?"

Student: "No."

Jen: "No, okay, good. Um, did you feel like the instructions in this part of the game were difficult? Like did you, did you know that you were supposed to follow, the, the bad guy and like, press the arrows to get him and stuff and answer the questions?"

Student: "At first, I, I didn't get it, but, then, Ms. Zotti explained to me."

Jen: "Okay. So did she, did, um, she help you out a lot with, trying to figure out the game?"

Student: "Yeah."

Jen: "Okay, good. Um, did you have any trouble understanding, what you were supposed to do in any of the games, like that you were supposed to catch the bad guy, or you were supposed to, um, like write down what each of the cards were? Did you have any trouble, knowing that you were supposed to do that?"

Student: "Not really."

Jen: "Not really? Okay. Um, uh, so which activity was your favorite? You said that you, your least favorite was, chasing the bad guy through the supermarket."

Student: "Mm hmm."

Jen: "Do you remember which one, you liked the best?"

Student: "Mm, when I find, um, uh, what's his name? Uh..."

Jen: "Admiral Adult? Or Brett?"

Student: "Brett. Yeah."

Jen: "Brett."

Student: "Yeah, I thought it's fun. It was that one."

Jen: "Mm hmm. When, that was your favorite?"

Student: "Mm, yeah."

Jen: "Finding him in the beginning ... "

Student: "Because it was easy."

Jen: "Because it was easy. Okay. Um, so did you like the games more where you felt like the, the language was easier? Like ... "

Student: "Yeah."

Jen: "Yeah? Um, did you also feel like it was, easier to, like, know what to do in the game, like, with the, arrows, or with, clicking?"

Student: "Yeah."

Jen: "That part was easier too, so you liked that one."

Student: "Yeah."

Jen: "Okay. Um, what did you learn from the game, if you learned anything?"

Student: "New words."

Jen: "New words? Okay, good. Um, if you had the opportunity to, so if you could, would you play this game at home during your free time?"

Student: "Yeah."

Jen: "Yeah? Okay. Um, did playing this game make you want to learn English more? So did it make you want to learn even more words, or make you want to, learn how to write or read even more?"

Student: "Yeah."

Jen: "It did? Okay. Um, did, playing the game make you feel more confident, or like, more, sure of yourself in class about English?"

Student: "Kind of."

Jen: "Kind of? Okay. Um, how, how could you describe maybe how, how, that happened more, or um, like, how things might have been different after the game, in class? Like were you, were you, answering questions more in class, or, did you feel more like you could answer questions?"

Student: "Yeah."

Jen: "You did?"

Student: "Yeah."

Jen: "Okay, good. Um, if you could play this game whenever you wanted to, like at home, or in class, or whenever, do you think that you would, be more excited about, English?"

Student: "Yeah."

Jen: "Yeah? Do you think you would feel more confident so that you would be more likely to raise your hand and answer questions, or, um, you, you would feel like you knew the answers more?"

Student: "Mm hmm."

Jen: "You do? Okay. Um, did you, talk to other students in your classroom through the game? Like you could, type to them on the computer, and talk to, like, people who were at the computer next to you?"

Student: "No."

Jen: "You didn't do that? Okay. Did you, um, did you use Ms. Zotti a lot to help you with the game?"

Student: "Mm, yeah."

Jen: "Yeah. Um, and did you, um, did you, like, talk to students, like, turn to someone and say, like, 'Oh, what, what did you, answer this question?' without typing to them? Did you just ask people next to you?"

Student: "Um, kind of, yeah."

Jen: "Kind of? Okay. Um, uh, what did Ms. Zotti help you with, when, um, she was helping you with the game?"

Student: "With the, answers."

Jen: "With the answers?"

Student: "Yeah, when he was trying to catch the, thief."

Jen: "Mm hmm."

Student: "And, the question was kind of hard"

Jen: “Uh huh.”

Student: “And I didn't get it.”

Jen: “Okay.”

Student: “... and she helped me with it.”

Jen: “Okay. So she helped you, if, like, the questions were too difficult, and you just couldn't get past it?”

Student: “Yeah.”

Jen: “Okay. Did she, help you a lot with, knowing, like, which arrows to press, or when to click?”

Student: “No.”

Jen: “No. Okay. All right, um, I think that's it. Thank you so much, for helping us out ...”

Interview 4

Jen: Okay. Um, I'm Jen. I'm from the team that helped make the video game that you were playing in class.

Student: “Mm hmm.”

Jen: “You played that game, right?”

Student: “Yeah.”

Jen: “Okay. Um, just for like 10 minutes or so, I'm just going to be asking you some questions about the game, like what you liked about it, what you didn't like about it, whether it helped you learn English, um, just so, we can improve it in the future and know how it worked, out for you guys. Okay?”

Student: “Mm hmm.”

Jen: “Um, if I ask something or I say something that you don't understand, just let me know. I'll try to clarify it.”

Student: “Okay.”

Jen: “Um, and, this is not required for you to do so if you don't want to do it, you don't have to. We can also stop at any time if you don't want to, answer any more questions or something. Okay?”

Student: “Okay.”

Jen: “And I'm just going to be recording it ... ”

Student: “Mm hmm.”

Jen: “... so that, um, later we can, like, listen to it back and type it up, so that we can just look at, um, what your answers were so that we can try to change it. It's also completely, anonymous, so one will know that it was you that was, was saying this or anything. Okay?”

Student: “Mm hmm.”

Jen: “All right. Um, what did you like about the game?”

Student: “Um, when, uh, I was a, a spy.”

Jen: “Mm hmm. You were a spy, yeah?”

Student: “Uh huh.”

Jen: “So you liked that, that you got to, play a different role?”

Student: “No, it was fun.”

Jen: “It was fun? That you, got to be something else? Um, what didn't you like about the game?”

Student: “Really, when I was in, when I was shopping.”

Jen: “Mm hmm. When you were shopping.”

Student: “Uh huh. And I, and I don't understand, I didn't understand, what, uh, they ask me.”

Jen: “Mm hmm. So the questions were hard when you were shopping?”

Student: “Mm hmm.”

Jen: “Yeah? Um, did you like the pictures in the game, like did you, think they were pretty, or they were cool, or, um ... ?”

Student: "Yeah, they were cool."

Jen: "Yeah. They were cool? Okay. Um, did you like the music that was in the background?"

Student: "Yeah."

Jen: "You did? You did? Cool! Um, did you like the storyline? Did you like, um, like the, what you did in the game, like that you, um, were trying to, catch the bad guy, and that you were, like, go through the shopping mall? Did you like the ... ?"

Student: "Mm, yeah."

Jen: "Did, so, did you like the things you had to do in the game?"

Jen: "Yes. Okay. Um, did you have any trouble understanding how to play the game, so like, with the, arrow keys, or, having to click?"

Student: "Um, not really."

Jen: "No, not really? Um, did you, have trouble understanding the questions, so, with the, figuring out what the answers were, or ... ?"

Student: "Mm hmm."

Jen: "Um, figuring out what to, what to type?"

Student: "Yeah."

Jen: "Um, which of the parts of the game was the hardest for you?"

Student: "When I was, um, ... "

Jen: "Mm hmm."

Student: "They ask me, for, ... , for all the, the, I don't know, for ... "

Jen: "Ingredients?"

Student: "Uh huh."

Jen: "For, for the cake?"

Student: "For the cake."

Jen: "Mm hmm. What, why do you think that was, hard?"

Student: "Uh, because, I don't understand the part."

Jen: "You didn't understand ... ?"

Student: "Mm hmm."

Jen: "... what, um, like what you were supposed to do?"

Student: "Uh huh."

Jen: "Yeah. Um, did, you think that that was hard because, of, like, having to, click or use the arrow keys, or did you think that was hard because of, the language? So because of like the words?"

Student: "I think the words."

Jen: "The words were hard. Um, when you were doing that, did you know where to go, like, did you know that you were supposed to go buy the book to find the recipe and then from there go to the grocery store?"

Student: "No."

Jen: "No, you didn't know where to go."

Student: "No."

Jen: "Okay. Um, um, did you think that the instructions to the game were hard to understand, like, for each of the games did you know what you were supposed to do in the game? Um, like, for the shopping cart game ... "

Student: "Mm hmm."

Jen: "... did you know that you were supposed to answer the questions to chase him around?"

Student: "No."

Jen: "No, you didn't? So those were difficult for you to understand, were the questions."

Student: "Mm hmm."

Jen: "Okay. Um, was it difficult for you to remember which keys to press, to go, different places?"

Student: "No."

Jen: "No. Okay. Um, did you have any trouble, understanding, what you were supposed to do? Like, so, um, that you were supposed to catch the bad guy, or, that you were supposed to, um, type in answers, to ... ? Did you, like um, did you have trouble with, what you were, like, what the big picture was? Do you ... ?"

Student: "No ... "

Jen: "Okay. Well that's good. Um, so, which part of the game was your favorite? Like, what was the favorite, your favorite thing that you did?"

Student: "I think all."

Jen: "All of it?"

Student: "Yeah."

Jen: "You liked all of it? Okay. What, um, why did you like it?"

Student: "Because, they are fun, and, I like it ... they, um, ask me question in English ... "

Jen: "Uh huh."

Student: "... and I try to answer."

Jen: "Oh, okay. Okay. Um, uh, what, what didn't you like at all? What was bad?"

Student: "Nothing."

Jen: "Nothing? That's good! Um, what did you learn from the game?"

Student: "Um, I don't know."

Jen: "You don't know what you learned? Did you learn, new words?"

Student: "Yeah."

Jen: "Yeah? Did you, learn, um, did you feel like you, you were, better able to understand English by listening to it? Like, did you, did you think you became a better listener, from it? Like, um ... "

Student: "Yeah."

Jen: "Yeah."

Student: "I know."

Jen: "Yeah."

Student: "... "

Jen: "Yeah? Okay. Um, if you could, would you play this game at home when you have free time, like when you weren't, if you have this game at home would you play it?"

Student: "Yeah."

Jen: "Yeah? You think it's fun enough that you'll play it at home?"

Student: "Mm hmm."

Jen: "Okay. Um, did playing this game make you want to learn English more?"

Student: "Yeah."

Jen: "Yes? Okay. Um, did it make you more confident about, um, learning English? Like, did it make you, want to raise your hand more in class, or, make you feel like you knew more answers?"

Student: "... "

Jen: "No? Okay. Um, if you could play this game whenever you wanted, like, if you could play it at school or at home, do you think you would be more excited about learning English?"

Student: "Yeah."

Jen: "Yeah? Okay. Um, when you were playing the game, did you talk to other people in the class through the computer, like through typing to them? Like, 'cause you, you guys played it at the same time, right?"

Student: "Mm hmm."

Jen: "Did you, talk to them on the computer?"

Student: "Like, um, ... "

Jen: "Like to other students in your classroom."

Student: "No."

Jen: “No. Okay. Did you, like, turn to the person next to you and ask, what, their answer was or something, or, how to do something?”

Student: “No.”

Jen: “No? Um, did Ms. Zotti help you with ... ?”

Student: “Yeah.”

Jen: “So, what did she help you with?”

Student: “Um, to translate the words ... ”

Jen: “Uh huh.”

Student: “ ... that, that I, I don't understand.”

Jen: “Okay. So she helped you with the language part of it.”

Student: “Mm hmm.”

Jen: “Um, did she help you with, the controls of the game, like the arrows, or the clicking?”

Student: “Um, the others, guys, um, I don't know, yeah ... ”

Jen: “Okay, yeah. Someone else helped you with that?”

Student: “Mm hmm.”

Jen: “Okay. Um, that's all the questions I have. Thank you so much for playing the game and answering them. Okay? Have a really good summer.”

Interview 5

Jen: “Okay. Um, I'm Jen. I'm from the team that helped to make the video game that you played during class.”

Student: “Uh huh.”

Jen: “You played that game, right?”

Student: “Oh no.”

Jen: “You didn't play it?”

Student: "No."

Jen: "Um, did you not play it 'cause you didn't bring the form back?"

Student: "No. They didn't give me the form."

Jen: "You didn't, they didn't give you, okay. Um, then I'm not ..."

Interview 6

Jen: "Okay, I'm Jen. I'm from the team that helped make the video game that you played in class. Um, I'm just gonna be interviewing you for like about 10 minutes about what you liked about the game, what you didn't like about the game, um, just so we can make it better, and, um, more fun, and stuff like that. Um, I'm gonna be recording it just so like later we can type it up, so we can look at your responses."

Student: "Mm hmm."

Jen: "No one will know it's you. It's completely anonymous. Um, we take your name off of it. Um, if you don't understand something I ask or something that I say just let me know and I'll try to clarify it."

Student: "Mm hmm."

Jen: "Um, yeah, this is not a required interview, so we can stop at any time. You don't have to do it if you don't want to. Um, there's like no penalty or anything for not doing it. All right? Um, ready? Okay."

Jen: "What did you like about the game?"

Student: "Um, because, with, with the English ..."

Jen: "Mm hmm."

Student: "... but, it's still hard to, to go up in the stairs."

Jen: "Mm hmm. It was hard to go up the, stairs?"

Student: "Yeah."

Jen: "Okay. Just like in the game trying to go up the stairs?"

Student: "Yeah."

Jen: "What was hard about it?"

Student: "Um, to put my name because they say, 'That is incorrect.'"

Jen: "They say your name was incorrect?"

Student: "Yes."

Jen: "Oh my gosh! Um, did you like the pictures in the game?"

Student: "Yes."

Jen: "Yeah, did you think they were cool?"

Student: "Yes."

Jen: "Yeah. Um, did you like the music that was in the background?"

Student: "Yes."

Jen: "You, you did? Um, did you like the story to the game? So like, what you had to do throughout, that you went through like different parts, and that ... ?"

Student: "Yes."

Jen: "You liked that? What did you like about the story?"

Student: "Um, to find the book of recipes."

Jen: "You liked finding the book? Did you like chasing the bad guy?"

Student: "Yes."

Jen: "Yeah? Why, why did you like those parts?"

Student: "Because it's so fun to do."

Jen: "Mm hmm. Um, do, what did you think was fun about it?"

Student: "Um, ..."

Jen: "Did you, did you think the, language was fun, like learning was fun?"

Student: "Yes."

Jen: "Learning was fun? Did you think the, the pictures were fun?"

Student: "To, uh, when we don't know, uh, the English, you know the pictures, and ..."

Jen: "Mm hmm. Okay. Um, what didn't you like?"

Student: "None."

Jen: "Nothing? You liked everything? Okay. Um, was anything, like, really hard for you, that kind of made you not like it?"

Student: "..."

Jen: "Nothing was too hard? Did you, did you think it was hard to understand like the, the arrows that you had to push, or when you had to click?"

Student: "No."

Jen: "No?"

Student: "No."

Jen: "Did you, think it was hard figuring out, how to go places, like how to move?"

Student: "No because when you, um, the computer said where do you need to go ..."

Jen: "Mm hmm."

Student: "... and the voice ..."

Jen: "Helped you out?"

Student: "Yes."

Jen: "Okay. Um, did you think that the instructions were difficult to understand?"

Student: "No."

Jen: "No? Okay. Um, ... , um, was it difficult for you to remember which keys you had to press?"

Student: "..."

Jen: "It was? Yeah. How did you try to help yourself remember, how to press them?"

Student: "From the pictures."

Jen: "From the pictures?"

Student: "Yeah."

Jen: "How did you do that?"

Student: "Um, ..."

Jen: "You don't know? Okay. Um, did, did you have trouble understanding what, like, the overall goal was, like that you were supposed to catch someone, or that you were supposed to answer questions? No, you knew how to do that? What helped you understand how to do that?"

Student: "... I know ... that other teacher helped me, how to do ..."

Jen: "Mm hmm. So the, the other teacher helped you?"

Student: "Mm hmm."

Jen: "Okay. Um, what was your favorite part of the game? Making the cake, you said?"

Student: "Uh huh."

Jen: "Okay. Was there anything else that you really really liked? No? Did you like any of the ...?"

Student: "Oh, and buy the, for the, ... , buy the food for the cake."

Jen: "Buying the food for the cake? Did you like any of the games that you played after that? Like, did you play the games after that? You did? Okay. Um, did you finish the whole game?"

Student: "Mm, no."

Jen: "No? Okay. Um, what do, what did you learn from playing the game?"

Student: "Um, I don't ... really."

Jen: "You don't know? Did you learn new words?"

Student: "Yes."

Jen: "Yes? Did you learn, um, did you learn how to make sentences?"

Student: "Yes."

Jen: "Yeah, um, did, did you learn, um, better, like listening skills, like how to, how to, understand through, listening more?"

Jen: "Yes, okay. Um, if you could, would you play this game at home during your free time?"

Student: "Yes."

Jen: "You ... Yes? Okay. Um, did playing the game make you want to learn English?"

Student: "Yes."

Jen: "Yes? Um, how did it make you want to learn English?"

Student: "I don't know. I ... "

Jen: "You don't ... Was it because it was fun? So if you ... "

Student: "Yes. It's fun. And you need to buy and do sentences that help you to learn more things."

Jen: "Mm hmm. Okay. Um, did playing the game make you more confident about learning English, so like, did it make you want to raise your hand more in class or answer questions more?"

Student: "Yes."

Jen: "Yes? Um, did, did you feel like you were speaking more in English after playing the game?"

Student: "Yes."

Jen: "Yes. Okay. Um, if you could play this game whenever you wanted, so like, if you could play it at school, or if you could play it at home, do you think you would be even more excited about learning English?"

Student: "Yes."

Jen: "Um, did you talk to other students on the computer through the game, like other, other students in your classroom, while they were playing?"

Student: "Yes."

Jen: "What did you ask them about, or talk to them about?"

Student: "Um, the, the playing ... and they, they help you to learn the English ..."

Jen: "Mm hmm."

Student: "... and, they need to play for, if they, if they don't know the English. That help you?"

Jen: "Mm hmm. So did you guys try to answer the questions together?"

Student: "Yes."

Jen: "Okay. Um, did you do that a lot, or just a little, or ... ?"

Student: "A little."

Jen: "A little? Okay. Um, did you talk to students, just like turn to them and talk to them to ask them questions about how to answer the questions? Or how to play the game? You did?"

Student: "Yes."

Jen: "Okay. Um, did Ms. Zotti help you with things throughout the game, or another teacher?"

Student: "No, another teacher Ms. Bandler."

Jen: "Uh huh. She, what did she help you?"

Student: "Um, I didn't know how to get in, and she helped me, ... helped me, when I don't, um, I don't understand some questions she helped me."

Jen: "Mm hmm. So she helped you with the language."

Student: "Yes."

Jen: "Did she help you figuring out the controls of the game, so like, the arrows, or the ... ?"

Student: "No."

Jen: "No. Okay. All right, well that's all the questions I have. Thank you so much for ..."

Interview 7

Jen: “Okay, so I am from the team that helped make the video game that you played in class. Um, I'm just going to ask you some questions, like 10 minutes or so, about what you liked about the game, what you didn't like about the game, um, if you thought it was fun or not, and stuff like that. Okay? Um, I'm gonna record it just so that later we can, like, listen to it back and type it up, and then we can look at what you said. No one's gonna know this was you. Um, your name's not on it anywhere. Um, if I ask something that you don't understand, just let me know, and I will try to make it clear. Um, this is not required for you to do. There is, like, no punishment or anything if you don't do it. We can stop at any time that you want to stop. Um, yeah. So, if you're ready, we can start.”

Jen: “Um, what did you like about the game?”

Student: “Um, that you can learn a little bit, how to speak and learn.”

Jen: “Mm hmm. Um, was there a certain part of the game that you think helped you do that more?”

Student: “Yeah because you read, and you, when you write, they tell you this is right or wrong ... ”

Jen: “Mm hmm.”

Student: “ ... when you write.”

Jen: “Mm hmm. Um, was there a, like a, a, a little game, within the, big game that helped you do that more, a certain task that you had to do, like there was baking a cake, and there was through the, through the, supermarket, and, there were card games, and ... ?”

Student: “The supermarket.”

Jen: “The supermarket one you liked?”

Student: “Yeah.”

Jen: “Okay. Um, did you like the pictures in the game?”

Student: “Yeah.”

Jen: “You did? What did you like about the pictures?”

Student: "They are good because they talk and, they were good, they drawn good ... "

Jen: "Okay. So did you think that they looked nice, like that they were, cool, or pretty, or ... ?"

Student: "No."

Jen: "Mm hmm."

Student: " ... "

Jen: "Okay. Um, did you like the music?"

Student: "Yeah."

Jen: "Yeah. Did you like the overall story to the game, so like, what you had to do in the game?"

Student: "Mm hmm."

Jen: "Okay. Um, what didn't you like?"

Student: "Um, that sometimes the, the thing is not very good ... like stop and then ... go ... "

Jen: "So there were like, problems with ... "

Student: "Yeah."

Jen: " ... the game itself."

Student: "Yeah."

Jen: "Were there any, tasks in the game, like any parts of playing the game that you didn't like? So ... "

Student: "I didn't."

Jen: "You liked all the, parts that you had to play?"

Student: "Yeah."

Jen: "Okay. Um, did you have any trouble understanding, like, what keys you had to press ... ?"

Student: "No."

Jen: "... to go around? No, you didn't have any trouble with that? Did you have any trouble understanding what you had to do in the game, like, where you had to go, or ... ? No? Okay. Um, was it difficult for you to remember which keys to press? No? Okay. Um, did you have any trouble ... Okay. Um, what was your favorite activity that you did in the game?"

Student: "... like when you write, where you want, and where you looking for ..."

Jen: "So did, you liked when you wrote?"

Student: "Yeah."

Jen: "Okay. Um, what, do you remember which part you wrote in?"

Student: "Like, in the ... or the vegetable, fruit ..."

Jen: "Okay. So you liked when you had to type things."

Student: "Yeah."

Jen: "Okay. Um, what was your least favorite thing that you did?"

Student: "Mm, go to all the place."

Jen: "Go, so like, trying to find your way around the game you didn't like?"

Student: "No."

Jen: "Um, was that hard for you because you just didn't know where you were supposed to go, or you didn't know, like, that you had to click, or that you had to use the arrow keys?"

Student: "..."

Jen: "You liked it? Um, okay. Um, what did you learn from the game?"

Student: "Mm, the words."

Jen: "The words?"

Student: "Mm hmm."

Jen: "So you learned new words?"

Student: “Mm hmm.”

Jen: “Um, did you learn anything else? No? Okay. Um, if you could, would you play this game at home when you have free time?”

Student: “ ... ”

Jen: “Mm hmm.”

Student: “ ... ”

Jen: “Okay. Um, did playing this game make you want to learn English?”

Student: “ ... ”

Jen: “How did it make you want to learn English? Like what, what about it made you want to learn English?”

Student: “Like, read.”

Jen: “Reading?”

Student: “Mm hmm.”

Jen: “Okay. Um, how did playing the game make you feel about your English?”

Student: “That I learn more ... ”

Jen: “That you learned more?”

Student: “ ... and better.”

Jen: “Better? Did it make you feel more confident, like you were more sure of yourself?”

Student: “Yeah.”

Jen: “Did it make you feel like you wanted to raise your hand in class more to answer more questions?”

Student: “Mm hmm.”

Jen: “Um, if you could play this game whenever you wanted to, do you think that you would be even more excited about learning English?”

Student: "Yeah."

Jen: "Yes?"

Student: "Mm hmm."

Jen: "Um, did you talk to other students through the computer while you were playing the game, like type questions to other students?"

Student: "Yeah."

Jen: "What did you guys talk about?"

Student: "Like, if you needed help ..."

Jen: "Mm hmm."

Student: "... understand the letter, I help."

Jen: "Okay, good. Um, did you, like, turn to another student in your class and ask them, rather than typing it to them?"

Student: "Mm hmm."

Jen: "You did? What did you talk about when you just, like, turned and, like, spoke?"

Student: "Maybe I don't know how to write a word ..."

Jen: "Okay."

Student: "... I guess ..."

Jen: "Okay. Did your teachers help you with anything?"

Student: "Yeah."

Jen: "What did they help you with?"

Student: "I learned that computer is not okay, when I need help."

Jen: "Did they help you with, um, understanding the questions?"

Student: "When I don't, understand them."

Jen: “When, when you don't understand. Did they help you with the keys on the game, so like, what to do ... ? No? All right.”

Student: “I understand the ... ”

Jen: “You understood it. Well that's good. All right. Well that's all the questions I have for you. Thank you so ... ”

Bates Middle School

Interview 1

AUSTIN: My name is Austin and for the next couple minutes I'm going to ask you some questions about your experiences learning English and about how you felt with the computer game that you've been playing for the past few weeks.

STUDENT: Ok

AUSTIN: If you have a question that you don't understand, just stop me and I'll try to clarify more and if this interview is not mandatory and you can stop at any time and I also want to remind you that I'm going to be recording the interview for transcription.

[Translator]

AUSTIN: If you're ready, let's get started

[Translator]

AUSTIN: First thing I wanted to ask is what do you like about the game? What types of things?

[Translator]

STUDENT: I like when the players find things (inaudible) and walk too

AUSTIN: Just make sure you speak loudly so we can hear you.

AUSTIN: Did you like the graphics of the game?

[Translator]

STUDENT: Yes

AUSTIN: Do you have any other comments about what types of graphics you liked or which pictures you liked more than others?

[Translator]

AUSTIN: Did you like the music? Do you have any comments about the music in the game?

[Translator]

STUDENT: Yeah

AUSTIN: What about the storyline of the game? Did you enjoy the storyline?

[Translator]

STUDENT: Yeah

AUSTIN: Did you think that the game was difficult to play or did you have trouble?

[Translator]

STUDENT: Easy

AUSTIN: Were the game instructions difficult to understand?

STUDENT: No

AUSTIN: Was it difficult to remember which keys to press at all?

[Translator]

AUSTIN: Did you have trouble understanding the goals or objectives of the game?

STUDENT: A little bit

AUSTIN: What was your favorite activity in the game?

STUDENT: Going into the stores.

AUSTIN: What was your least favorite activity?

STUDENT: Interviewing the people

AUSTIN: What do you think might make that more fun?

STUDENT: No

AUSTIN: What did you learn from the game?

STUDENT: How to say things when you were in the store.

AUSTIN: Would you play this game at home or during free time?

STUDENT: Yes, during free time.

AUSTIN: Did playing the game make you want to learn English?

STUDENT: Yes

AUSTIN: How did the game make you feel about your English learning abilities?

STUDENT: I learned how to say things that I didn't know how to say before and how to interview people in English

AUSTIN: Do you think the game made you more confident about learning English?

STUDENT: Yes

AUSTIN: If you played this game whenever you wanted to, do you think you would be more excited about learning English?

STUDENT: Yes

AUSTIN: Ok, I think that's all.

Interview 2

AUSTIN: My name is Austin and for the next couple of minutes I'm going to ask you some questions about learning English and about how you felt using the computer game that you've been playing for the last few weeks. If I ask you a question that you don't understand, just stop me and I'll try to clarify it and remember that this interview is not mandatory and you can stop at any time. I also want to remind you that I will record this interview for transcription purposes. Are you ready?

AUSTIN: Alright, so, what did you like about the game?

STUDENT: I liked like doing different things like missions

AUSTIN: Did you like the graphics or what pictures did you like more than others

STUDENT: I liked the part when I had to make my own self, character

AUSTIN: Did you like the music?

STUDENT: Yeah

AUSTIN: What about the storyline in the game?

STUDENT: The what?

AUSTIN: The storyline, the story

STUDENT: It was kind of

AUSTIN: So so?

STUDENT: Yeah

AUSTIN: Did you like the admiral character or the cutscenes, the little movies that played? Ok. Did you have any trouble understanding how to play the games?

STUDENT: No

AUSTIN: What game did you think was the most difficult to play

STUDENT: I didn't have any difficulties

AUSTIN: So, then, I guess the instructions weren't too difficult?

STUDENT: No

AUSTIN: And did you have any trouble understanding the goals of the game?

STUDENT: No, but I didn't actually pass the whole game, right now I'm at the place where I have to chase the carts

AUSTIN: What was your favorite activity in the game?

STUDENT: Um, I guess baking the cake.

AUSTIN: OK. What was your least favorite activity?

STUDENT: I didn't have any least favorite

AUSTIN: Why do you think that baking the cake was your favorite?

STUDENT: Because I had to buy things

AUSTIN: Ok. What did you learn from the game?

STUDENT: I think I learned that even in videogames you can learn

AUSTIN: Ok. Would you play this game at home during free time?

STUDENT: Yeah

AUSTIN: Did playing the game make you want to learn English?

STUDENT: Yeah

AUSTIN: How did playing the game make you feel about your English learning skills?

STUDENT: I felt like I was learning more English

AUSTIN: Did the game make you feel more confident about your English language abilities

STUDENT: Yeah

AUSTIN: If you played this game whenever you wanted to, do you think you would be more excited about learning English?

STUDENT: Yeah

AUSTIN: How much of the racing game have you played?

STUDENT: I'm chasing the carts right now I just started chasing the carts but I don't really know the goal of that little part because it's do I really have to chase the red point

AUSTIN: Yeah

STUDENT: Yeah that's a little difficult because you always stop to talk to other people and

AUSTIN: Do you think that what did you think of the questions that those people would ask?

STUDENT: The one like asking where what different what they should do?

AUSTIN: Did you think those questions were too hard or just about right

STUDENT: Those questions weren't too hard, they were just asking what they should get.

AUSTIN: Did you think that it was hard to control the cars?

STUDENT: No, I learned it easily

AUSTIN: Alright, well, that's all I have to ask. Thanks for playing the game.

Interview 3

AUSTIN: My name is Austin and for the next couple minutes I'm going to ask you some questions about your experiences learning English and about how you felt using the computer game that you've been playing. If you have a question you don't understand, just stop me and I will clarify it. This interview is not mandatory and you can stop at any time and I'm going to be recording the interview. Are you ready? Okay. What did you like about the game?

STUDENT: When they made the cake

AUSTIN: Did you like the graphics or pictures in the game?

STUDENT: Yes

AUSTIN: What about the music in the game?

STUDENT: Yes

AUSTIN: Did you like the story?

STUDENT: Yes

AUSTIN: Do you have any suggestions about those aspects?

STUDENT: No

AUSTIN: Did you have any trouble understanding how to play the games?

STUDENT: A little bit

AUSTIN: What made the game difficult to play?

STUDENT: Getting the condiments for the cake

AUSTIN: Were the instructions difficult to understand?

STUDENT: No

AUSTIN: Was it difficult to remember which keys to press or how to control the game?

STUDENT: A little bit

AUSTIN: Did you have any trouble understanding the goals of the games?

STUDENT: A little bit

AUSTIN: What was your favorite activity in the game?

STUDENT: Level 2

AUSTIN: What was your least favorite activity?

STUDENT: Nothing

AUSTIN: What do you think you learned from the game?

STUDENT: Words I didn't know before

AUSTIN: Would you play this game at home?

STUDENT: Yes

AUSTIN: Did playing the game make you want to learn English?

STUDENT: Yes

AUSTIN: Did the game make you feel more confident with your English language abilities?

STUDENT: A little bit

AUSTIN: If you played this game whenever you wanted to, do you think you would be more excited about learning English?

STUDENT: Yes

AUSTIN: Okay. Thank you.

Interview 4

AUSTIN: My name is Austin and I'm going to ask you some questions about learning English and about the computer game you played. If you don't understand a question, just ask me and I can clarify. This interview is not mandatory and you can stop whenever you want. I also want to remind you that I'm recording and when you're ready. What did you like about the game?

STUDENT: You know English when you play the game.

AUSTIN: Did you like the graphics or pictures in the game?

STUDENT: Yeah

AUSTIN: What about the music?

AUSTIN: You didn't like it?

AUSTIN: And what about the story of the game?

STUDENT: I liked the story

AUSTIN: Did you have any trouble understanding how to play?

STUDENT: I know how to play. It was a little bit hard to understand

AUSTIN: What do you think made the instructions difficult to understand?

STUDENT: Mr. Myers showed us how to go to different places.

Translator: He taught them how to use it

AUSTIN: Did you have trouble understanding the goals of the game?

STUDENT: Sometimes

AUSTIN: What was your favorite activity in the game?

STUDENT: When you go to the mall to the shopping

AUSTIN: Why did you like that?

STUDENT: Because you went shopping

AUSTIN: What was your least favorite activity?

STUDENT: I liked everything

AUSTIN: What do you think you learned from the game?

STUDENT: How to play

AUSTIN: Do you think this game made you learn English?

STUDENT: Yes

AUSTIN: Would you play this game at home in your free time?

STUDENT: Yes

AUSTIN: Did playing this game make you want to learn English?

AUSTIN: How did playing the game make you feel about your English language skills?

STUDENT: Good

AUSTIN: Did the game make you feel more confident?

STUDENT: Yes

AUSTIN: If you played this game whenever you wanted, do you think you'd be more excited about learning English?

STUDENT: Yeah

AUSTIN: Alright, that's all the questions.

Interview 5

AUSTIN: My name is Austin and for the next couple of minutes I'm going to ask you some questions about learning English and about how you felt using the computer game.

STUDENT: Ok

AUSTIN: If you have any questions that you don't understand, just stop me and I'll clarify. Remember that this interview is not mandatory and you can stop at any time and I also want to remind you that I'll be recording this interview. Are you ready? What did you like about the game?

STUDENT: The first part

AUSTIN: If you want to explain in more detail, you can, or in Spanish if you want

STUDENT: Well, You create the cake

AUSTIN: Did you like talking to the character or did you like shopping for the ingredients?

STUDENT: I liked shopping for the ingredients

AUSTIN: Did you like the game graphics or pictures?

STUDENT: Yeah

AUSTIN: What about the music in the game?

AUSTIN: It's ok?

STUDENT: Yeah

AUSTIN: What about the story? What did you think about the story?

STUDENT: A little bit

AUSTIN: Did you have any trouble understanding how to play?

STUDENT: No

AUSTIN: Were the instructions difficult to understand or were they adequate?

STUDENT: It's not hard

AUSTIN: Ok. Did you have any trouble with any other parts of the game?

STUDENT: Yes

AUSTIN: What did you find hardest?

STUDENT: There's one. You shop for the ingredients.

AUSTIN: Was that hard because you didn't know where to go or was it hard to buy them?

STUDENT: Buy them

AUSTIN: What was your favorite part of the game?

STUDENT: When you create the cake

AUSTIN: What was your least favorite part of the game?

STUDENT: When you shop for the ingredients

AUSTIN: What did you learn from the game?

STUDENT: Nothing

AUSTIN: Would you play this game at home in your free time?

STUDENT: No

AUSTIN: Did playing the game make you want to learn English?

STUDENT: Yeah

AUSTIN: How did the game make you feel about your English language abilities?

STUDENT: Cool

AUSTIN: Did it make you feel more confident?

STUDENT: Yeah

AUSTIN: If you played this game whenever you wanted to, do you think you would be more excited about learning English?

STUDENT: Maybe

AUSTIN: Thank you, that's all the questions.

Appendix XVI: Transcripts of Teacher Interviews

Annapolis Middle School

Please note that the teacher of Annapolis Middle School did not consent to be recorded; thus the team has no transcript of the interview and what follows is the student's notes as taken during the interview.

- How would you characterize your students' general level of English proficiency?

Majority: Low level; though there are a few "high level" students

- Please describe how you normally teach course materials.

Visual aids: pictures and graphic organizers

Gestures

Hands-on activities

Document reading

- Please describe your students' general attitude and level of motivation regarding class materials.

Document reading: not motivated and even a little "grumpy"

***To combat this negative attitude: Visual activities: "Thinking Map": visual organization of background information of a document (Teacher's example: if the reading takes place in Japan, she will spend time discussing Japan (history, geography, etc) before starting the actual reading): Very positive response*

Or when she uses the "Document Camera" (a computer program that projects the document onto a screen in the front of the classroom and allows the teacher to highlight key vocabulary terms or direct students' attention to specific portions of the document): LOVE this. Very motivate by all things technology

- Please describe how technology is typically incorporated into a normal lesson plan.

Document Camera (explained above): facilitates an added degree of student-teacher interaction

- How would you evaluate your students' use of technology?

10-15% of her students have computers at home but many enter her class without ever having been "near a computer."

- Please describe how the game fit into your curriculum.

It didn't.

The game would have been perfect for the ESOL1 curriculum at the beginning of the year, but her class at the end of the year focuses more on Language arts (i.e. similes, metaphors, etc), so for ESOL2&3, the game did not really fit into the curriculum

- How would you evaluate the implementation of our game into your lesson plans in terms of:

- Quality of the exercises?

Scale of 1-10: 5.

Good exercises but did not correspond to what was being taught in the classroom

- Usefulness to students?

5

See above explanation

- Please describe anything that you have learned by participating in our project.

"Interaction of all the areas" mostly she learned about how academic diversity can be a major asset to a major research project (well, to ours, specifically).

Also part of Teacher's answer: application of "social language;" rather than focusing only on "academic language," the game focused on practical and more everyday language

- Do you think your students enjoyed playing this game?

The student's enjoyed playing, but they had no time to get to higher levels

- Do you think your students were excited about playing this game?

Yes

- Do you think your students became more excited about learning English after playing this game?

Can't tell; not enough time to see a correlation between student level of excitement and game-playing

Though in general if a game is involved, the students get excited about learning

- What challenges do you face when teaching ESOL students?

*Getting her students to the required level of language for success in school (MSAs and Academic Yearly Progress benchmarks) **Creates lots of pressure for teachers*

***Because of this, teachers have no time to focus on social language; the tests focus on academic language, so that is what the teachers must concentrate upon close to exclusively (9 weeks allowed for the "social language" lesson)*

- In what ways has our project helped to address these challenges?

It hasn't

Game focuses on social language, but the class focuses on academic language

- What changes would you suggest be made to our game in order to more effectively address these challenges?

Address academic language: games and vocabulary should be related to this area

- Do you have any additional concerns or suggestions regarding our project that may not have been touched upon earlier in this session?

Game walking through the window & doors: Because it's from the player's perspective, you can't actually see the player, but it would be helpful to make the player's hands or feet visible

Bates Middle School

AUSTIN: My name is Austin and for the next 15-30 minutes I'm going to ask you some questions about your students' experiences with both English language and the computer game that they've been playing.

TEACHER: Ok

AUSTIN: If I ask a question that you don't understand, just stop me and let me clarify. Remember that the interview is not mandatory and you can stop at any time and I wanted to remind you again that I'm recording this interview.

TEACHER: Sounds great

AUSTIN: Alright, so, how would you characterize your students' general level of English proficiency.

TEACHER: I would say we had sent a language aptitude survey language assessment survey and it ranged from 1 to 5. The students that I instruct range from between 1 to 2. I don't have any 3s that take part in my ESOL classes, they're in the other classes that receive instruction directly from other instructors through my assistance of course. The students that I do instruct are 1s and 2s either are newly arrived students from their home countries mostly our population which is Central America or you're just a student that hasn't had as tremendous growth due to motivational concerns, attendance concerns, or just ability. There may be students who have concerns with interrupted education transferring back and forth between the United States to their home country. Generally they're between 1 and 2 level and they exercise more of an emphasis on strength in their speaking skills versus writing and reading skills and this is language as learned and speaking skills develop much more faster than those skills.

AUSTIN: Ok. How do you normally teach your course or use your course materials?

TEACHER: We follow a syllabus of course. We use the Vision series, it's from Glencoe I believe, a publisher. It ranges from Visions A through C and my students primarily are either Visions A or Visions B. And the students in the first period class are Visions A and it's introduction to the textbook it reinforces skills that are used in our curriculum and it's nothing new to them, it's presented in a different level with a lot more concerns on their abilities. It kind of if you will it teaches the concepts in a different way plus we like to utilize a new strategy developed is thinking maps. Thinking maps is a strategy we use to help the young English language learner to develop their thought patterns and to develop their writing.

AUSTIN: When you're teaching do you use more workbooks or do you kind of like what kind of style I guess

TEACHER: You kind of have to follow a lot of what the mainstream classrooms are doing so you have to have a warm up you have to have a guided practice you have to follow the lesson. My focal point is to have 3 skills tested per lesson. Want to have oral skill testing I want to have your written skill tested and I want to have your reading skill tested so all skills are reinforced in the lesson. I also like to incorporate technology. I have them use laptops to promote their warm ups to type up their information so use some technology in the classroom. I use a lot of videos to help activate prior knowledge or photographs. Something called realia to help activate their minds. When you're teaching ELLs you want to emphasis prior knowledge. If they don't speak English, they still may have the concept already in their previous or first language so if you can activate what they've already known through photographs, images, some kind of diagram, you're going to be able to activate that knowledge and they'll be able to expand on that.

AUSTIN: Following on that, how would you evaluate your students' use of technology?

TEACHER: I would say they're average. With the access of the three computer labs we have in our building and the laptops, there has been a lot more access this year than I've heard previously and a lot of the teachers are going into the lab and utilizing them. IN my classroom, I've designed 3 projects this year using the technology. We've done powerpoints, we've done the webquests, and just general assignments with the computers. I think they can do a lot of things. They can print documents, they can save documents, they can file documents and word processing primarily is the main skill the focus on and they use a calculator.

AUSTIN: Why don't you describe your students' general attitude or their level of motivation regarding the class or learning English.

TEACHER: Well, I think motivation is a very hard thing to grasp. It's the demographics here are very socioeconomic driven there's a lot of very low income housing students and there's dictates a lot of things those concerns can dictate progress and performance in the classroom. But you couple that alone where they live where they're coming from what we call a lot of the socio social concerns such as the culture shock cycle where they come to the United States, they're enamored here they want to be here they're happy to be here then they start learning the language basic phrases how do you do my name is they're on the playground the teachers can pick up that they're learning the language orally that means they're developing their BICS basic information communication skills then they move in the direction of this is hard I have to write now I have to read now I don't want to read in front of my friends I'm in other classes I'm getting other things than other students are getting I feel funny and then things at home you know our world is increasingly with all kinds of things in the world problems landslides students have problems at home mom's not home mom's in another country and then the roles they take on individually reading the mail to their families paying the bills managing the checkbooks because they have the English skills and that's the way a lot of parents have set things up they're making them like the primary home owner of the house they run the house they tell you what this bill is for they have that responsibility couple those concerns at that age there's not a lot of time to be a kid not a lot of time to enjoy learning it's kind of a forced issue versus so those motivational factors alone would be a concern the general id of this community is largely Hispanic and the need to speak English isn't emphasized that's also a concern and a motivation when you're in a community where everyone speaks Spanish, where does the need arise that I need to use English? And it's a concern. Others I've taught in the state of Maryland it's a lot different I've had maybe Spanish students maybe Asian students they have the same concerns they have the need to learn English because no one speaks Chinese so the motivation in this area and then there's students that love learning they want to be here they see the writing on the wall they follow every teacher's every move and they want to move on I've had 2 students this year that have emphasized that they want to go to higher education can I move to the language arts classroom can I prove myself in writing and I made

those changes and the students have reflected and have answered back with tremendous improvement. So you have more or less students trying to push themselves and that's the motivation they're lacking and there's some reasons we've talked about why those things are there.

AUSTIN: How do you think that the game might be able to fit into your classroom or in

TEACHER: Well, I think in a couple things. This classroom really needs to have PBIS. It's a form of rewarding for discipline and students here are in classes ESOL students are in modified classes for 90 minutes and they sit in the chairs and they can't get up and all the other teachers follow the same suit. With an ESOL classroom you try to get them up doing different things different activities, but then again that's not enough, they need to go outside and stretch their legs. I'm thinking about changing the venue if I could use the game as you know if we're doing a recipe doing a lesson on learning about the community that would absolutely be a great place to implement this game with the baking the cake walking around the mall you could activate prior knowledge with the game. Shopping of course, the visuals of the shopping cart, moving around, then testing their knowledge of those levels. You could use it as a reward system if I finished my homework Mr. Myers, can I play the game. Absolutely it would be a motivation to get your work done homework points that could be awarded more time on the game if more levels are completed it could be an ongoing program it could be part of the what we call PBIS system where students are rewarded for good behavior. I think also it could be used like a some form of assessment where the students could come in and demonstrate their knowledge of the level but where it comes to the different point breaks of the game where they could write their essay practicing their writing. I noticed that during the games played they were supposed to reflect on what they thought so far they kind of I like game, they didn't really give a lot of emphasis or reflection. I think that we could really emphasize some of those things again in the classroom and improve in the process.

AUSTIN: How would you evaluate the implementation of our game into your classroom in terms of the quality of the exercises in the game.

TEACHER: I would just say from the beginning a lot of the students got lost with all the directions. I think if you could introduce one direction and then finish it versus you've got to get a cake you've got to go get the ingredients to get the cake, if there's a way you could break that up like if you could go meet Brett and Brett walks with you and talks to you as you're walking up the escalator this is what you need to do instead of all this moving around Brett could take you to the first step oh here here's the boss more like a leading direction because a lot of students got lost on which direction to go they didn't know where to find the boss they didn't know which book to get to they spent a lot of time trying to find which book which is inquiring the language that was a great activity it just they some of the book titles they didn't know what they were like shoelaces I had to explain shoelaces to them and would this be a good book also one thing I had a question about was in the shoe if you don't buy the

book and you leave the bookstore, you can't get inside to buy the ingredients and I found that out myself and it kind of like why can't we buy the ingredients we know where the book is but we didn't buy the book and we didn't say yes and I'm closed you have to come back later which was fine but that was just one thing that set them back a little bit. If you could break it up for example I mean just the walking around is fine but if if you could like eliminate and if part of the game you had to go back to that level but some of the stores they tried to go in and ask questions why couldn't they get to the bank they asked some of those kind of things I know they were good for the graphics but it kind of like you know deterred them a bit

AUSTIN: It just needs to be simpler I guess

TEACHER: Yeah, simpler I guess

AUSTIN: Do you think it would have been better if I don't think any of the students got this far but we showed you the Maze Game where there was spoken instruction on which way to go do you think it would have been better if the instructions instead of they're all being text if they were spoken

TEACHER: Absolutely. I think at this level for this level student, the spoken would be a lot more easier to understand because I reflected my lessons on a lot of TPR total physical response getting up and hearing my voice and responding and I think that would open up a lot more channels of more communication to be understood

AUSTIN: Do you think that the game was useful to students?

TEACHER: Absolutely and the time couldn't have come at a better time. Just for them to take a break before exams to show like as an assessment for the year ok you've heard me teach these stories you've heard me do these points powerpoint projects with they've been doing things in other classes for them to sit down and do something that's real familiar to them as a videogame and in this classroom you really have to stress how much of an emphasis you need to have as a period of downtime because I don't know about you but you know if I had to rely on my second third fourth fifth whatever language I was on all day and that translates to the way their brain functions the L1 and L2 back and forth I'm tired and if you have to go to algebra have to go to social studies and you get like 20 minutes for lunch your brain is tired so this is kind of a downtime where they don't realize they're learning at the same time but they are. They're using skills that they've had over the past 4 or 5 years or 2 months however long they've been in the United States they're applying the skills through visualization they're applying the skills through breaking up and decoding the messages what do they need to do and the majority of them got passed the second level and majority of them did you know I was pretty excited about that ones that just gave up are just 8th grade kids and they just give up you know they give up with a lot of things but majority of them tried to get to the second level they got to that point like I like the game but you know I think I think it was just the best time right now just a time where they could detach a little bit and they saw a progress they

saw them moving in the direction where they're moving up the levels they're kind of like teasing each other they did try the chat feature and answering each others questions and stuff so they're exploring with language and I think that's also what this game does it gives them the ability to explore the language. Any language teacher French, German, Spanish will tell you the better you get the more risks you take and this encourages them in the peer setting in a fun setting to take risks

AUSTIN: Do you think your students became more excited about learning English in general after playing the game?

TEACHER: I have to say yes and I will say that we have help day after school and some of them asked to be a part of that they asked if they could play the game after school but they didn't show up but they inquired about staying after school. Unfortunately we didn't have activity buses for them to get a ride home but I would say that of the entire year that was the biggest change I've seen and I would say it could have been attributed to the game it could have been attributed to I passed my finals what could I do, but I have had more students after the game just ask can we play the game can we play the game teacher does it say they liked the game because it was fun or is it a chance to just not be here. I don't know those answers but I think after the game was played I think they found it interesting.

AUSTIN: What changes would you suggest any other changes other than the ones we've already discussed

TEACHER: I think the music was fine if perhaps if you're making this for English language learners I would have something relative to their culture a lot of baking the cake that was a concept for them that it just wasn't really there like in the cultures here they like to go buy the cakes and bakers that's a profession so when they said they had to go bake a cake a lot of kids didn't know what goes into a cake and that kind of thing and you also want to not say go buy a taco because then they would say oh you're generalizing so you just have to tread on some of that a little bit. I would also I'd make some kind of a point system like if you find the boss you get 20 points and like a check like when you play the game medal of honor it tells you exact objectives you have to follow go find the lead point guy go knock off the mini German guy if you have like a checkpoint like what objectives we need to fulfill, then they can click back to that and say did I finish getting the recipe did I finish I think that would keep them more focused and organized and then they could see visually okay I checked off these three and then they got like 300 points then that the point system will activate them to go further because there's something at the end of it there's either going to be something really cool if I got the most points Mr. Myers is going to give me a reward because if you go you saw the boss you get 500 points if you catch the admiral on the first level you get an extra 10,000 points just those kind of things and then they could take those points and cash them in for something they like I'm not telling you go off on a tangent but then go do something with the points because when they see that fact that's real relevant to them because it's in their school system with the points that's going to increase motivation too. Have like dialogs that

reflect them like as middle school kids like hey guys did you go talk to the boss versus you know more like middle school or kid-like language and that's hard for you to do because you're not working with kids and that's not a knock or anything it's just if you can get some of that information if you you don't really need trademarks another suggestion I definitely would recommend would be if you could have like the game is great, Austin, it really was, it took a different motivation for the students and I was looking for that as well and your game may impact on how my exams are going to go it may it may not I think if you give them something like this to use as part of our curriculum or as a reward system it can't hurt the student at all you're only helping the student and you're encouraging the student to take risks with the language which is if you can present that in the videogame that's great because sometimes they don't want to take risks in the classroom in front of their friends but with a screen one on one no one knows what kind of risks they're taking so you definitely can see that and I saw that being there at the main server. Overall if at all possible could we have had more time I would have love to have done this right before the holidays Christmastime winter break whatever because they're just so charged up so full of energy they don't want to read about Roberto Clemente, they want to do something that's really fun and this would have been perfect time for them and yet it could have been an assessment you could have let them to pre-assessment for first part of the semester and then post-assessment at the end but I understand that this came together and this was a lot of work and this was a pilot and you could only go better it's a pilot. Great.

AUSTIN: Any other concerns or

TEACHER: No. I wish you guys luck and I just appreciate the opportunity to work with our population our English language learners and good luck with the project I hope everything you get out of the research if there's anything else you need from me I can be reached at the school here and then after that e-mail you have my e-mail but great. Thank you for the opportunity.

Appendix XVII: Questions for Graduate Student Focus Group

Directions: Dr. Lavine will lead her class in the following discussions. Students will be asked to identify their names and professional positions prior to each discussion so that team members can track each participant's comments.

Part I: Educational Technology in the ESOL Classroom

- What challenges are faced when teaching ESOL students? Are there more challenges than teaching foreign language students?
- For those of you who are ESOL teachers, how would you describe the current English proficiency of your students? Are there varying levels within one classroom?
 - Please describe how you normally teach course materials.
 - Please describe your students' general attitude and level of motivation regarding class materials.
 - How does this compare for teachers of a foreign language?
- How are you incorporating or think you can incorporate educational technology/gaming in the classroom? Are you open to introducing more technology into your classroom?
- Do you think educational computer gaming could be an effective supplement to your existing curriculum? An ESOL curriculum?

Part II: Reaction to Team ILL Computer Game

- How would you evaluate our game in terms of: Quality of the exercises? Usefulness to students? General aesthetics (illustrations, music, sound effects, etc.)? Level of enjoyment?
- What specifically about the game did you enjoy and what did you find most challenging?
- Did you like the option to edit the content of the game to whatever English terms you so choose? Would you use this option or find it too complicated? How would you use this option?
- Do you think ESOL students would enjoy this game? Would they be more motivated to learn in a classroom if this game was a part of curriculum activities?

- Do you think this game would be accessible to students of all different English skill levels? At what level do you feel this game is targeted?
- How could this computer game fit into your current curriculum/vision of learning?
- In what ways has our project helped to address the challenges faced when teaching ESOL students as discussed prior to playing the game?
- What changes would you suggest be made to our game in order to more effectively address these challenges?
- Do you have any additional concerns or suggestions regarding our project that may not have been touched upon earlier in this session?
- Follow up questions may be asked as needed.

Appendix XVIII: List of Correlations

	Pre1	Pre2	Pre3	Pre4	Pre5	Pre6	Pre7	Pre8	Pre9
Pre1	1								
Pre2	0.04759531	1							
Pre3	-0.2062842	0.1387863	1						
Pre4	0.19677003	-0.0800118	0.41714339	1					
Pre5	0.03054236	-0.4247346	0.44970061	0.6547285	1				
Pre6	0.44398371	-0.0821071	-0.1324102	0.07304175	0.40849122	1			
Pre7	0.45230814	-0.4794021	-0.0877058	-0.0077042	0.31051721	0.66299354	1		
Pre8	0.02468196	-0.2212212	0.41323572	0.61904762	0.66501709	0.13659756	0.13867505	1	
Pre9	0.49956115	-0.0316735	-0.3173285	0.04259824	0.18743842	0.7181644	0.4854939	0.17692012	1
Pre10	-0.0624924	0.36349557	0.02880756	-0.2976781	-0.5020704	-0.1632428	-0.3027598	-0.5538288	-0.046488
Pre11	-0.2301396	-0.176118	0.1796053	0.01437993	0.26940795	0.15554275	0.25663245	0.01717682	0.03065217
Pre12	-0.2689696	-0.4042673	-0.0460776	-0.0774723	-0.1843103	-0.1995217	0.31038296	-0.4450765	-0.2437773
Pre13	0.57476703	-0.1977948	-0.463713	0.23586409	0.05455447	0.51970115	0.53452248	0.07304359	0.52604249
Pre14	0.45564976	0.12636013	-0.492366	-0.1626109	-0.1230915	0.21320072	0.11306675	-0.2236688	0.09978463
Pre15	0.36380344	-0.2387097	-0.1443376	0.07227393	0.1490712	3.31E-17	0.17407766	-0.1622214	-0.2165064
Pre16	-0.3777628	0.11545097	0.22528178	-0.1923944	-0.3504383	-0.2167775	0.0919709	-0.3255713	-0.4314664
Pre17	-0.3349972	0.25423611	0.40050094	-0.1082219	0.10012523	-0.21251186	-0.0919709	-0.22968445	-0.6365197
Pre18	-0.4610029	-0.1096774	3.05E-17	-0.3110855	-0.2125119	0.21251186	0.5790409	-0.2312585	0.20576372
Pre19	-0.3863456	-0.1157021	0.05025189	-0.1569115	0.07537784	0.13055824	0.43082022	-0.0432532	-0.1415071
Pre20	-0.0445789	-0.2600058	-0.1565561	-0.2256213	-0.1565561	0.05423261	0.38348249	-0.2096147	0.05343698
Pre21	-0.1656718	-0.1254953	-0.1246757	-0.3593537	0.02077929	0.07198158	0.45808794	-0.4689931	-0.3227113
Pre22	-0.1441008	0.2603337	-0.1324532	-0.1177025	0.00883022	0.1123903	0.24182542	-0.0768733	-0.0854982
Pre23	-0.1093745	0.09780829	0.08535792	0.09226039	0.12803688	0.22176638	0.47043754	-0.07347	-0.1311077
Post1	-0.164135	-0.2122002	-0.3938928	-0.3388889	0.03535534	0.31075944	0.37442263	-0.2142857	0.14563331
Post2	-0.1391497	-0.4207153	-0.3634998	0.05965832	0.2847474	0.0481311	0.3257541	0.23011065	-0.125582
Post3	-0.4309908	0.32051323	0.47303312	-0.1760411	-0.198638	-0.3303874	0.12154311	-0.1059457	-0.2924919
Post4	-0.0166595	-0.3163616	-0.2452912	-0.2964134	0.09848485	0.2996456	0.58834841	-0.0505076	0.24690136

	Pre1	Pre2	Pre3	Pre4	Pre5	Pre6	Pre7	Pre8	Pre9
Post5	0.02468196	-0.3060588	-0.633042	-0.5277778	-0.1936126	0.28173246	0.47545731	-0.2142857	0.10041412
Post6	-0.5423261	0.15067707	0.31311215	0.1016416	0.09166985	-0.5636019	-0.1941839	-0.1462545	-0.5597181
Post7	0.11072546	-0.5247771	-0.1577713	-0.2229113	0.05254069	0.38632342	0.5564202	-0.0477667	0.11514979
Post8	-0.5129219	-0.2139622	-0.0538525	-0.5868056	-0.3903819	-0.2988072	-0.0086672	-0.3660714	-0.4213376
Post9	-0.1501277	-0.0821071	0.33513344	-0.2091861	0.07509626	-0.3600362	-0.1606646	-0.244127	-0.4319233
Post10	-0.1892641	-0.0432742	0.26967994	0.25357526	0.02151657	-0.1200198	0.01265924	0.42383293	-0.0733455
Post11	-0.2036533	-0.4889012	-0.09759	-0.0220059	0	-0.5238095	-0.2182179	0.19557956	-0.3044992
Post12	-0.2469659	0.13968606	0.16568337	-0.4323152	-0.2750095	-0.219437	-0.2646281	-0.0609879	-0.394771
Post13	0.21924108	-0.3280305	-0.3151789	-0.2984978	-0.2441365	-0.133286	0.0469841	-0.2346122	-0.0894189
Post14	0.07129138	-0.4319001	0.13177004	0.00330148	0.0567048	-0.0928737	0.29464677	0.23892914	-0.1842654
Post15	-0.0412043	-0.0815591	0.05923489	0.20035651	0	-0.3179403	-0.5298129	-0.2204657	-0.1246112
Post16	-0.1441591	0.19910898	0.20541046	0.51469494	0.46792836	0.0206333	-0.1994963	0.30826893	-0.0589397
Post17	-0.2216244	-0.4247346	0.02560458	-0.2542376	-0.032686	-0.3812213	-0.1826923	-0.0544795	-0.4820827
Post18	-0.0179695	-0.1710564	0.31578979	0.07318961	0.10622957	-0.2403352	0.14423077	0.19810721	-0.4071961
Post19	-0.0592824	-0.2087324	0.24402659	-0.0465968	0.04493032	-0.1731571	0.29606845	0.0980348	-0.362524

	Pre10	Pre11	Pre12	Pre13	Pre14	Pre15	Pre16	Pre17	Pre18
Pre10	1								
Pre11	0.14202553	1							
Pre12	0.37725807	0.50896019	1						
Pre13	-0.213117	-0.1322767	0.12820061	1					
Pre14	-0.2655926	-0.4476847	-0.1829141	0.41298427	1				
Pre15	-0.0646742	0.45617155	0.29210312	1.54E-17	-0.0780869	1			
Pre16	0.38449747	0.57995249	0.68164866	-0.2785762	-0.2957895	0.26432744	1		
Pre17	-0.0659806	0.02697453	0.13148553	-0.3154466	0.20335531	0.13608276	0.22180451	1	
Pre18	0.10493336	0.1083843	0.47193619	0.13179426	-0.1484247	-0.4073065	0.40821954	0	1
Pre19	-0.4536169	0.18953563	0.17713459	-0.0986928	0.08350533	-0.0640184	0.35094589	0.3849084	0.54757771
Pre20	-0.4472609	-0.1687098	0.21641169	0.28184752	0.46249729	-0.1596174	0.09405128	0.2351282	0.49301678
Pre21	0.00682805	0.36947501	0.49404894	-0.0952227	0.11893556	0.58299883	0.42244284	0.57422666	0.20148057
Pre22	-0.5099411	-0.0225177	-0.0588292	0.15458995	0.48367454	-0.1754538	0.03522916	0.5033223	0.20557169

	Pre10	Pre11	Pre12	Pre13	Pre14	Pre15	Pre16	Pre17	Pre18
Pre23	0.24069296	0.37943569	0.52211708	0.19907206	0.14184225	0.27076518	0.54804314	0.22114022	0.28306337
Post1	-0.2812157	0.12296734	0.22083008	0.41085983	0.42137491	0	-0.0685511	0.13710212	0.27808448
Post2	-0.4750509	0.09475784	0.01620669	-0.0047971	-0.04332945	0.2981424	-0.1012479	-0.0748354	0
Post3	0.19114069	0.13264731	0.3913512	-0.191383	-0.1931818	-0.1616904	0.53611855	0.48065801	0.57625369
Post4	-0.1324051	0.21555187	0.28500576	0.16116459	0.09090909	-0.2364331	0.00462171	0.08781252	0.48685383
Post5	-0.26124	-0.0843549	0.08656468	0.35871503	0.28906081	0.08703883	-0.1175641	-0.0470256	0.24816039
Post6	-0.0042567	0.32257081	0.36700146	-0.4600788	-0.115342	0.15961738	0.37528643	0.68020665	0.1137731
Post7	-0.1830384	-0.308546	0.15111825	0.30671918	0.24510168	-0.0743294	-0.0938216	-0.0820939	0.38852733
Post8	0.4090944	-0.0459782	0.40498486	-0.2420726	-0.2153247	-0.2229882	0.27340443	0.19650943	0.38852733
Post9	0.11034221	-0.0725222	0.07442199	-0.5507089	0.02485134	0	-0.0404292	0.7479404	-0.1083843
Post10	0.03944638	-0.3019786	-0.1438772	-0.1048285	-0.39177445	-0.2041241	0.04208628	-0.3727642	0.1939959
Post11	-0.1778803	-0.2483498	-0.0596253	-0.3113762	-0.2869095	0.18093672	-0.2333141	-0.2738613	-0.280303
Post12	0.42211831	0.29054942	0.02906535	-0.4277592	-0.2952575	0.1871203	0.37910955	0.04449942	-0.3102526
Post13	0.27989142	-0.177558	0.13370059	-0.1517855	-0.0310797	-0.0740196	-0.1137329	-0.0444994	-0.1136364
Post14	0.06306306	0.104496	0.19192336	-0.2233211	-0.4426416	0.45821986	0.26996631	-0.259268	-0.041687
Post15	-0.0671156	-0.3062317	-0.0380286	0.05416186	0.31514743	-0.1619174	-0.3224132	0.232889	-0.2716612
Post16	-0.4429761	-0.0286377	-0.3232674	-0.0347945	0.27477404	0	-0.1955687	0.23548063	-0.2199707
Post17	0.13240514	0.1000556	0.10267667	-0.4862645	-0.4457216	0.47885213	0.05577837	0.01394459	-0.3413193
Post18	0.16819991	0.05461471	0.17280666	-0.4866114	-0.4616352	0.34684399	0.30953701	0.09641317	-0.1236128
Post19	0.22002137	0.14296635	0.3562994	-0.384626	-0.426918	0.2941742	0.42127133	0.14801425	0.09319262

	Pre19	Pre20	Pre21	Pre22	Pre23	Post1	Post2	Post3	Post4
Pre19	0.70805148								
Pre20	0.47928718	0.27326243							
Pre21	0.75168395	0.66303257	0.45206126						
Pre22	0.05790686	-0.0601349	0.45494816	-0.0288697					
Pre23	0.30964606	0.42874646	0.48370467	0.58902939	0.17532172				
Post1	0.35791689	-0.0275324	0.39101126	0.24380879	0.04503393	0.29530866			
Post2	0.29226866	0.28906081	0.29158394	0.18201002	0.43734695	-0.040452	-0.3257952		
Post3	0.43144422	0.31796689	0.38749972	0.47765876	0.02364038	0.6363961	0.35809143	0.03467137	
Post4	0.28322059	0.29411765	0.44893114	0.43262512	-3.34E-17	0.75714286	0.55610073	-0.1878128	0.65200755
Post5	0.42379345	0.1466997	0.45757038	0.42332322	0.16996601	-0.0505722	0.13453456	0.48886435	0.12284483
Post6	0.12949244	0.36674926	0.26285958	-0.0047275	0.11997601	0.50712317	0.20571136	-0.0601147	0.45853696
Post7	0.05145714	-0.0267185	0.31561871	-0.0854982	0.08740516	0.25625	0.13842594	0.30338994	0.41783583
Post8	0.12174619	0.10114435	0.33561582	0.10678721	-0.1550987	-0.1737853	0.11028219	0.18463724	-0.410771
Post9	-0.1448414	-0.2632249	-0.3643448	-0.5199246	0.13839059	-0.5294651	0.11028219	0.18463724	-0.410771
Post10	-0.1939959	-0.1629088	-0.0225417	-0.3648193	-0.3979419	-0.078811	0.53085882	-0.2182179	-0.0253104
Post11	-0.2364163	-0.4208868	0.16482521	-0.2389867	0.08082643	0.01911448	-0.0609879	0.10585122	0.018416
Post12	-0.1418498	-0.1350014	0.14284852	-0.0351451	-0.3825784	0.11878064	0.24664359	-0.2819046	0.59399883
Post13	-0.0918292	-0.2313418	0.24185968	-0.5270463	0.14302045	-0.2010041	0.37306479	0.06547706	0.04936404
Post14	-0.0618646	0.3324866	-0.2659738	0.13698773	-0.4018571	-0.1435095	-0.4239725	-0.1324532	-0.3840703
Post15	0.25239607	0.09985034	-0.0960834	0.30351476	0.1224915	-0.1668762	0.1004138	-0.0737121	-0.4438846
Post16	-0.2519516	-0.436076	0.27782046	-0.5393132	-0.1307672	-0.138675	0.38625129	-0.1215431	-0.0579434
Post17	-0.1375262	-0.4125841	0.29908062	-0.4124588	0.22062423	-0.2565488	0.30713958	0.19633887	0.09360088
Post18	-0.0171431	-0.2848436	0.44422726	-0.2832559	0.33487255	-0.0686244	0.31728605	0.29816209	0.30879385
Post19									

	Post5	Post6	Post7	Post8	Post9	Post10	Post11	Post12	Post13
Post5	1								
Post6	-0.2689312	1							
Post7	0.62892827	-0.4893226	1						
Post8	0.46875	0.07978836	0.40054372	1					
Post9	-0.1737853	0.58823529	-0.0936186	0.31860645	1				
Post10	-0.2412587	-0.2750095	0.10683185	0.09128709	-0.2855584	1			
Post11	0.19557956	-0.0187559	0.22428065	0.33510052	0.09166985	0.33517752	1		
Post12	0.1558579	-0.0911858	0.05439605	0.55641304	0.06669961	0.0090325	0.24253563	1	
Post13	0.43914591	-0.0179144	0.33802623	0.5716491	0.33553358	-0.2646104	0.39985806	0.30585945	1
Post14	0.17186131	-0.1883526	0.45088463	0.33644945	-0.0412588	0.53079253	0.62153957	0.46263271	0.32763454
Post15	-0.4239725	0.23724498	-0.3539463	-0.2972744	0.33384893	-0.3390751	-0.086711	-0.4416406	-0.2053655
Post16	-0.4603483	0.34397391	-0.4842231	-0.6437683	-0.0333341	0.04727684	-0.2563692	-0.5369975	-0.727615
Post17	0.19810721	0.01754926	0.16615325	0.52436503	0.29722951	0.20254787	0.76376262	0.58218174	0.42285689
Post18	0.02971608	0.13464028	0.29753025	0.37702279	0.22894705	0.41775499	0.54554473	0.47633051	0.42285689
Post19	0.19062321	0.17149859	0.40367462	0.51468267	0.22968413	0.3132259	0.44961799	0.48708276	0.4969397

	Post14	Post15	Post16	Post17	Post18	Post19
Post14	1					
Post15	-0.6114217	1				
Post16	-0.5070023	0.46683055	1			
Post17	0.68750913	-0.2649065	-0.4109624	1		
Post18	0.88394032	-0.5960396	-0.4109624	0.67307692	1	
Post19	0.84992978	-0.6731725	-0.5352937	0.60271078	0.962222248	1

Key

- Pre1:** How long have you been in the U.S.? 0=Less than 6 months, 1=6 months to 1 year, 2=More than 1 year
- Pre2:** If you weren't born in the U.S., what age were you when you came here?
- Pre3:** Do you have a computer in your home? 0=No, 1=Yes
- Pre4:** How often do you use a computer? 0=Never, 1=Once a week, 2=A few times a week, 3=Everyday
- Pre5:** When you use a computer, do you play games? 0=No, 1=Yes
- Pre6:** Do you think computer games can help you learn? 0=No, 1=Yes
- Pre7:** Do you think computer games can help you learn English? 0=No, 1=Yes
- Pre8:** How good are you at using computers? 0=Bad, 1=Okay, 2=Good, 3=Very good
- Pre9:** I never feel confident when I am speaking in our ESOL class. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre10:** I always feel that the other students speak English better than I do. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre11:** I feel confident when I speak in ESOL class. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre12:** I do not worry when I hear new or unfamiliar words. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre13:** I think I know a lot of English vocabulary. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre14:** I am comfortable reading in English even if the reading is long. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre15:** I can read English, but I don't like to. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Pre16:** Writing in English makes me feel nervous. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree,

4=Strongly agree

Pre17: Writing in English is fun for me. 0=Strongly disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree,
4=Strongly agree

Pre18: When I write in English, I feel I make a lot of mistakes. 0=Strongly
disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Pre18: I feel confident when I read sentences in English if it's short. 0=Strongly
disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Pre19: I feel confident when I read paragraphs in English if it's long. 0=Strongly
disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Pre20: I like learning English in school. 0=Strongly disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree,
4=Strongly agree

Pre21: I am happy with the amount of English I know now. 0=Strongly disagree,
1=Disagree, 2=Neither agree nor disagree,
3=Agree, 4=Strongly agree

Pre22: English is fun for me. 0=Strongly disagree, 1=Disagree, 2=Neither agree
nor disagree, 3=Agree, 4=Strongly agree

Post1: I thought the game was fun to play. 0=Strongly disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree,
4=Strongly agree

Post2: I knew many of the English words in the game. 0=Strongly disagree,
1=Disagree, 2=Neither agree nor disagree,
3=Agree, 4=Strongly agree

Post3: I was confused by many of the English words in the game. 0=Strongly
disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Post4: I was able to read the English game. 0=Strongly disagree, 1=Disagree,
2=Neither agree nor disagree, 3=Agree,
4=Strongly agree

- Post5:** I had fun playing this game. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post6:** I did not enjoy playing this game. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post7:** I would play this game at home. If I could. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post8:** After playing this game, I feel better about learning English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post9:** After playing this game, I feel more nervous about learning English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post10:** This game helped me practice reading English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post11:** This game helped me practice writing English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post12:** I learned English vocabulary from this game. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post13:** After playing this game, I feel more confident in my English vocabulary. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post14:** After playing this game, I am more excited about learning English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post15:** I do not think this game helped me practice reading in English. 0=Strongly disagree, 1=Disagree, 2=Neither agree nor disagree, 3=Agree, 4=Strongly agree
- Post16:** I do not think this game helped me practice writing in English. 0=Strongly disagree, 1=Disagree,

2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Post17: After playing this game, I feel more confident in speaking in my ESOL class. 0=Strongly disagree, 1=Disagree,

2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Post18: This game made me more excited about reading in English. 0=Strongly disagree, 1=Disagree,

2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Post19: This game made more excited about writing in English. 0=Strongly disagree, 1=Disagree,

2=Neither agree nor disagree, 3=Agree, 4=Strongly agree

Appendix XIX: Comprehensive Game Guide Provided to Teachers

Running the Game

Instructions:

1. Start up the Final Server.jar (located inside the Server folder) on one computer. This is the server machine.
2. Start up the Final Software.jar (located inside the Software folder) on another computer. This is the client machine on which the game is played. As long as one computer is acting as the server, multiple computers can run the game. Students playing the game may chat with one another while playing by typing "C:" at the very beginning of their entry (C: is case sensitive). The teacher can monitor everything said by the students to each other. The game will automatically notify the server if a student ignores a word that is considered incorrect.
3. For testing purposes, use user ID "test". The first password you type in will become the password for that username. This rule applies to every username, so students will be able to pick their own passwords.
4. Type the IP address from the server machine into the client machine and click the red "GO!" arrow.
5. Follow the instructions to run the software. The software automatically saves at the end of each section.

Introduction to the Secret World of Spies

The game's plot is centered on a secret kids-only spy organization that works tirelessly to thwart the evil plans of Admiral Adult, their evil arch-enemy. This spy organization is led by the "Boss" and exists within the setting of the typical American shopping mall. The student player begins the game as the newest recruit in this organization.

When the game begins, the student is greeted by "Jason," who asks the student to type in his name, specify the student's gender, and create his avatar as explained below. The student is then introduced to the mall and the game controls. The student is able to move his avatar by using his mouse to click on the screen where he wants their avatar to move and the avatar will go there. Clicking in certain areas throughout the game will trigger certain events. Clicking on the person in the mall will prompt the character to speak with the student's avatar. When the character in the mall is talking to the student and has a lot to say, the student may need to click on the character multiple times to cause the character's entire message to appear. Clicking on a door will cause the student's avatar to enter the room. Clicking on an escalator will cause the student's avatar to go up or down a floor depending on its current location. After "Jason" has finished his introduction, the student creates an avatar.

How to Make Your In-Game Avatar

The player is prompted to create his character's avatar, which will represent his character in the game. The avatar-creation screen is split into two halves: one side contains the preview of the avatar and the other has the single feature currently selected. There are arrows that the player can click to cycle through the available features. The changeable features are the face, eyes, mouth, ears, nose, and hair. Each feature has a button that must be clicked before changing that feature. Clicking the "GO!" button saves the avatar's status and enters the player into the game, so only click on the "GO!" button after the avatar has been finalized. The player will not be able to change the avatar until the game has been fully completed.

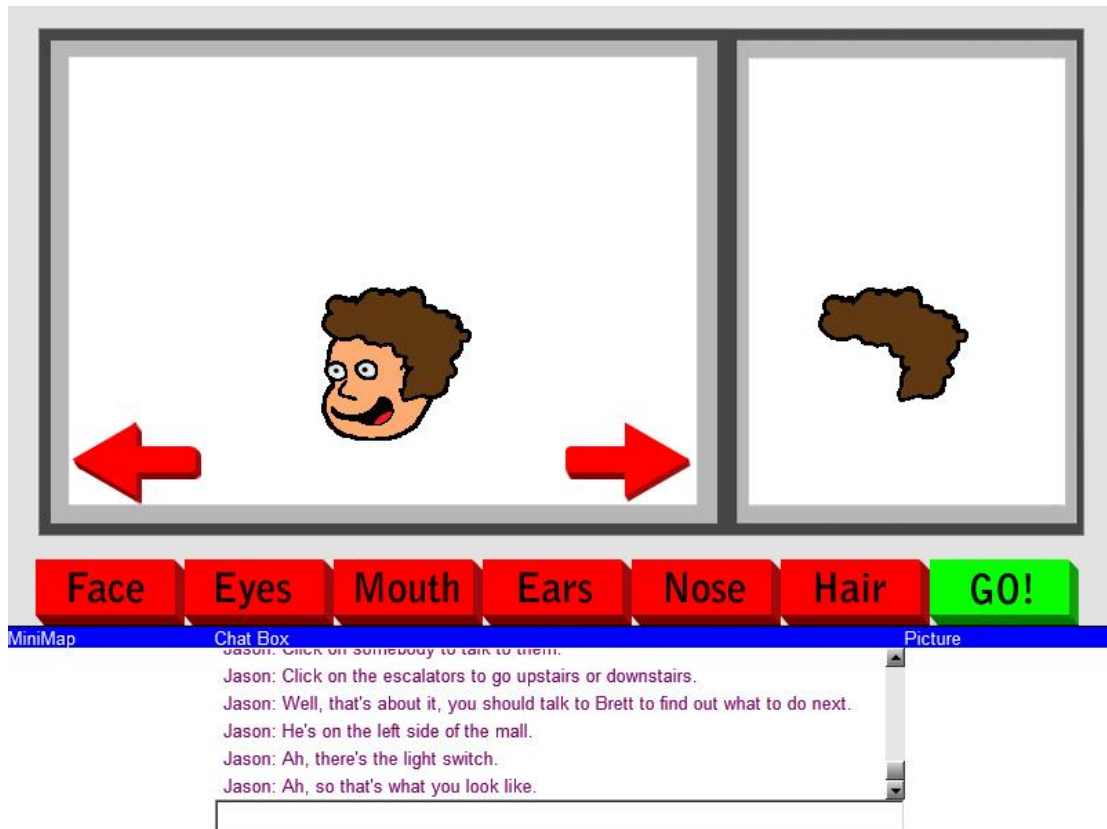


Figure 7: Choosing the avatar.

Chapter 1: Joining the Spy Organization

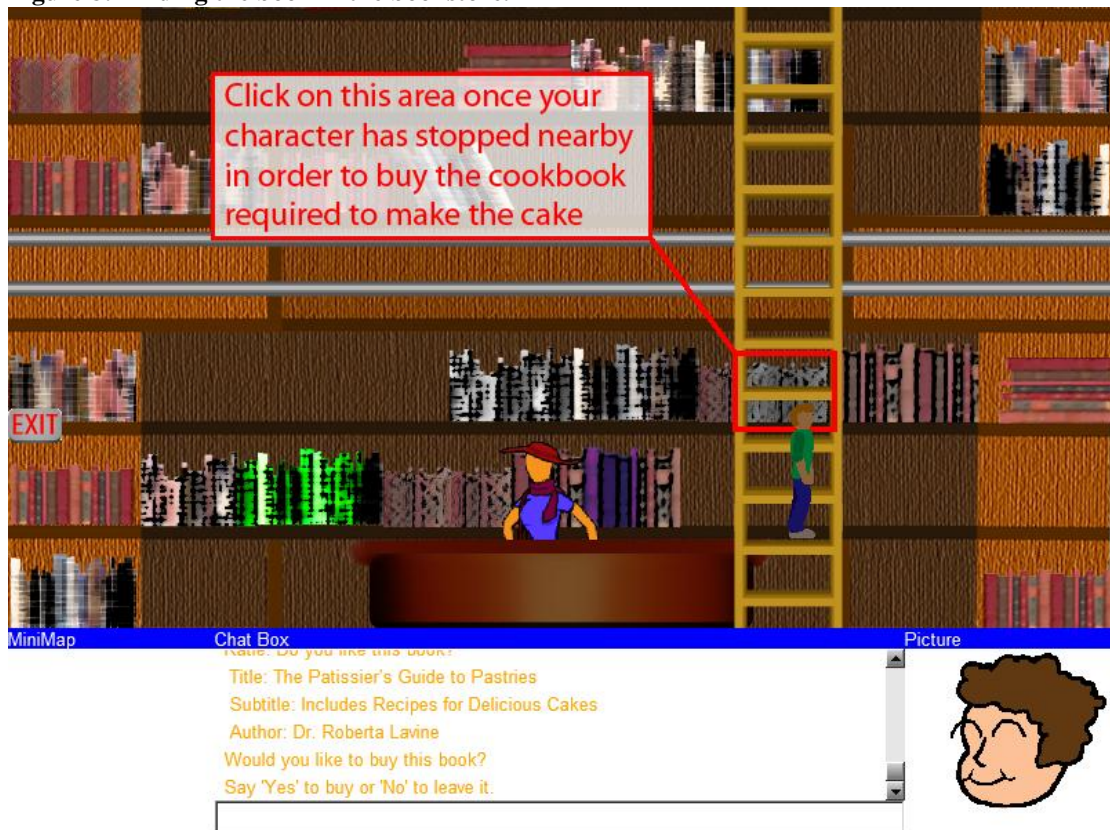
Game Play

When the player first reaches the mall area, "Brett" welcomes him to the mall and tells him to go visit the Boss. The Boss is located in the upstairs building labeled "Shenanigans." By clicking on an escalator to go up to the second floor, and then clicking on the door of Shenanigans, the student can find the Boss. Once the player has entered the secret base, he can click on and have the option to wake the Boss. After clicking, typing "yes" will wake the Boss and "no" will leave her sleeping. If the player chooses to wake the Boss, the Boss will be in a bad mood and will tell the player to go make a cake.

At this point, the player must return to talk to "Brett" as instructed by the Boss. "Brett" will suggest that the player go to the bookstore and buy a cookbook (no money is necessary in this game). Within the bookstore, there are various shelves, each of which has different books on it. The player can find out which books are available by clicking the books on the shelves. In order to pick a book, the player must first click on the book he wants to see. Then, once his avatar has stopped at the correct spot on the shelf, the player needs to click in the same spot again to choose the book the student wants. Most of the books will not help the player, but one of them is a cookbook that contains a recipe for the cake. The player will indicate that he wants to purchase this book. For each book, if the player does not want to purchase the book, he should type "no," and if he does want to purchase the book, he should type "yes."

Once the cookbook has been purchased, the cake recipe will be displayed in the player's chat box. The player can type "read" into the chat box or use the scroll-up button on the chat box if he wants to review the cake recipe until the player gives the cake to the Boss.

Figure 8: Finding the book in the bookstore.



Once the player has found and purchased the cookbook, he should go to the grocery store to purchase the ingredients. When the player clicks on the person behind the counter in the grocery store, a list of food categories will appear. On that page, clicking on a category name will cause the cookbook pages to turn to the relevant page. On these pages, a list of the foods within the category chosen appears and clicking on a specific food buys that item. Clicking on the curled upper-left corner of the page flips back to the main page with the main food categories. The player should purchase all of the items listed in the recipe for cake. Once the player has finished purchasing ingredients, he can then close the menu by clicking on the upper left curled corner while on the main page.

Figure 9: Buying ingredients in the grocery store.



Once the player has purchased as many ingredients as he wishes, he must return to "Brett" who will bake the cake. The more ingredients the student buys from the recipe, the better the cake will be. He must then take the cake back to the Boss inside Shenanigans, who will then instruct him to go to "Brett" for his next assignment.

Chapter 2: The Cave

Purpose of the Game

For the teacher: Allow the player to get comfortable with various game controls, following instructions, and reading from and typing in the chat box.

For the student: To find the pieces of the location tracking system.

TESOL Standards

PRIMARY STANDARD: (3) Reading: Reading Comprehension

3.2 Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

Students will be required to make their way through the Cave Game by reading textual instructions. Vocabulary includes colors, numbers and basic directions.

Game Guide

The player's avatar begins this game standing in the mall. The Boss will give instructions to the player through the chat box. The player will sometimes be prompted to type responses in the text box below the chat box. The left and right arrow keys move the character to the left and right, respectively. Use the up arrow key to jump. By simultaneously clicking on the up and either left or right arrow keys, the character will jump at that angle.

To begin the game, use the right arrow key to move the player's character near the "H"-shaped plants on the mall's lower level. A question will appear followed by four answers:

Question: "What do you want to do?"

Correct answer: "Water them."

Incorrect answers will receive confused responses from the Boss. After clicking on the correct answer, a secret door will appear. The player automatically goes through the door, and a black screen appears. The Boss instructs the player to click on a corner of the screen to find light. If the player clicks in the wrong area, the question will be repeated, but the location may change. Once the player clicks the correct corner, a prompt will appear:

Question: "You found a headlamp. What do you want to do with it?"

Correct answer: "Put it on."

After clicking on the correct answer, the player will see their character standing in a dimly lit room. A question from the Boss appears in the chat box:

Question: "Now that you can see, are you ready to find the two puzzle pieces?"

Answer: Type "Ready" or "Yes" into the chat box.

The Boss will prompt the user to "tell [her] when you're ready" if the correct response is not given. Once the player types "ready" or "yes," the screen will automatically change to the next stage of the game.

In the chat box, the Boss asks the player to move their character to the big rock which is located at the bottom right corner of the room. The student can move to the rock by using the right arrow key. When the avatar reaches the rock, the Boss will ask the player to select a specific color. The player should use the mouse to click on the color along the right side of the screen. If the player selects the correct color, his jumping capability will increase. The player will only be able to progress by clicking on the correct colors throughout this chapter. The Boss will then ask the player to select another color. Once the player clicks on the correct color, they should move their character so that they are standing on the first ledge (remember to use the up button or a combination of up/side buttons to jump).

With each correctly selected color, the player should move his character from one ledge to another to reach the puzzle piece at the top. If the player tries to jump without selecting the correct color, his character will fall through the ledge, and he will have to try again. If the player selects the correct color but misses the jump, the player can jump back up to the ledge that he was last on without selecting more colors. The player must move over the puzzle piece once his character reaches the top ledge to retrieve it.



Figure 10: The player jumps from one ledge to another in pursuit of the first piece.

The screen will automatically change to the next stage in the game. The player should read the Boss's instructions in the chat box. The Boss will instruct the player to change a number that will appear in the lower left-hand corner of the screen. In order to follow these instructions, the player must use the buttons in the upper right-hand corner of the screen. For example, if the Boss says "Your number must be equal to one," use the plus and/or minus buttons on the screen to make the numeral "1" appear. Then type "go" in the chat box. If the number is correct, the player's character will run under all the walls to reach the puzzle piece on the other side. If it is incorrect, the walls will fall and block the player's character from reaching the puzzle

piece. If the player is off by one, only the last wall will fall. If the player is off by two, the last two walls will fall. If the player is off by three or more, all of the walls will fall. If the player does not make it through, he will be given the chance to try again with a different number. When the player reaches the puzzle piece, he will be congratulated and taken to a screen where he will put the puzzle pieces together.

In the chat box, the Boss will ask the player if he is ready. The player must type “ready” or “yes” in the chat box to continue. "Joe" will use the chat box to ask the player to count the number of certain colored parts on the machine. The player must spell out the number, not simply enter the numeral. If the player is wrong, he will start over. The questions and answers are as follows:

Question: “How many purple objects do you see?” Answer: “One”

Question: “How many red objects do you see?” Answer: “Two”

Question: “How many orange objects do you see?” Answer: “Three”

Question: “How many green objects do you see?” Answer: “Two”

Question: “How many blue objects do you see?” Answer: “Four”

Once all of the questions have been answered correctly, "Joe" will thank the player and the screen will change to display The Cave Game’s ending cut scene.

Cutscene

*NOTE: The student will NOT be able to actively play during the cut scene.

The student is instructed to test out the system by throwing its tracking device. On his first try, the player will successfully attach the sensor to a dog. The player will then throw the sensor again to make sure he is comfortable with the device. On the second attempt, the player will accidentally attach the sensor to a nearby man. The man will reveal himself to be Admiral Adult in disguise. The player will then be instructed to catch Admiral Adult.

Chapter 3: Racing Shopping Carts

Purpose of the Game

For the teacher: Allow the player to explore another game play mode: using arrow keys to move around. Enjoy a fast-paced game while learning to read and understand English questions.

For the student: Catch Admiral Adult as he tries to escape through the grocery store.

TESOL Standards

PRIMARY STANDARD: (3) Reading/Reading Comprehension

3.2 Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

The students will be asked questions by shoppers looking for goods in a grocery store as they drive a shopping cart through the store's aisles. The questions presented to the students will cover a variety of food topics that require students to make connections between food and guiding concepts (ex. dieting).

SECONDARY STANDARD: (1) Listening/Listening Comprehension

4.1 Use Standard English structure and grammar to develop clarity in written communication.

The students will be exposed to correct sentence structures in the questions, which will range from simple sentences to more complex structure.

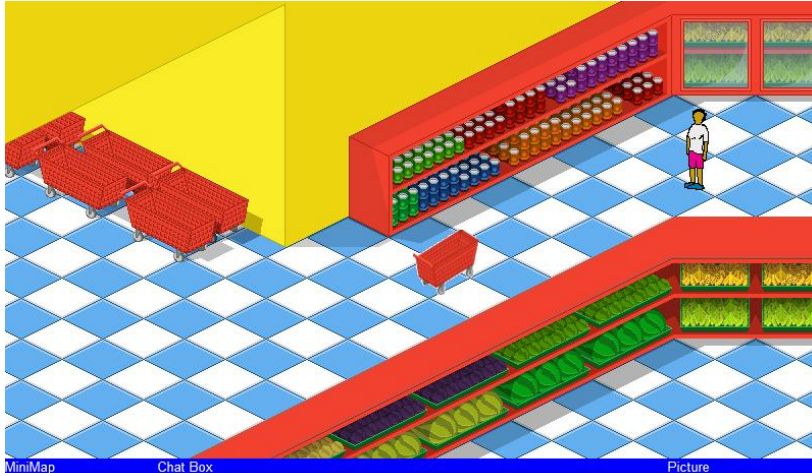


Figure 11: The player begins chasing the Admiral in the grocery store. The player has just run into the grocery store to chase Admiral Adult, but he has already jumped into a shopping cart and is racing away. The player must now chase him and catch him before he escapes the grocery store.



The bottom left corner of the screen will show a map of

the supermarket. On this map, the student's cart will be represented as a blue square, and Admiral Adult's cart is a red square. A picture of the player's avatar will appear on the bottom right of the screen.

Figure 12: The player receives a question after crossing paths with a shopper.



In order to move the cart, the player must push the arrow keys on the keyboard that point in the desired direction.

Combinations of keys may be used to move

the cart at angles. For example, the right arrow key will move the cart directly right, and the up and left arrow keys will move the cart to the up and left of the screen. As the player's cart travels through the supermarket, shoppers will ask food-related

questions. If the player answers correctly, the cart will accelerate. If the answer is wrong, the cart will slow down. The questions range in difficulty from easy to hard.

Easy questions include simple relationships and direct questions. For example:

Which of these fruits are red?

1. *Banana*
2. *Strawberry*
3. *Orange*
4. *Lemon*

Medium questions include more difficult relationships and more complex questions. For example:

My mother told me that I should eat more fruits. What should I pack for lunch?

1. *Apple*
2. *Carrot*
3. *Celery*
4. *Broccoli*

Hard questions include an even higher degree of complexity in relationships and questions. The vocabulary also becomes more different. For example:

I'm making a pizza for my vegetarian friend. What shouldn't I use for the topping?

1. *Ham*
2. *Spinach*
3. *Mushrooms*
4. *Pineapple*

In order to answer the question, the player must click on the box containing the correct answer or press the number of the desired response on the keyboard. If the

player does not catch Admiral Adult before he escapes, the game will reset, and the player can try again.

At the end of this chapter, regardless of whether the student catches Admiral Adult, a screen will appear displaying the questions that the student answered incorrectly with the correct responses.

When the player successfully catches Admiral Adult, this chapter is finished.



Figure 13: After the chapter ends, the player is alerted to the correct answers of the questions that he missed.

Difficulty

This is one of three chapters (Chapters 3, 4, and 6) that can change difficulty based on the player's performance. Changing the difficulty of one of these adaptable games will, in turn, alter the difficulty of the subsequent games. There are three levels of difficulty: easy, medium, and hard. Each of these games starts at either medium or

hard based on the player's performance in the other games and will only operate in the easy level if the player cannot complete the game in the medium level. Levels will only change by one step at a time.

In this chapter, the easy level gives the player a faster starting speed, the medium level starts the player slightly slower than Admiral Adult, and in the hard level the player will start a lot slower than Admiral Adult.

Cutscene

The player has rammed their shopping cart into the Admiral's shopping cart, stopping him from escaping into the mall. As the player goes to take Admiral Adult into custody, the Admiral escapes on a rocket that was hidden on a nearby shelf. The player will return to the mall but should go to the base to continue to the next chapter.

NOTE: The base is in Shenanigans.

Chapter 4: Battle Card Game with Admiral Adult

Purpose of the Game

For the teacher: Learning sentence structure while receiving exposure to vocabulary.

For the student: Preventing Admiral Adult's attack on the base by beating him in a card game.

TESOL Standards

PRIMARY STANDARD: (4) Writing

4.1 Use Standard English structure and grammar to develop clarity in written communication.

Students will be asked to write grammatically correct and complete sentences in order to correctly identify illustrations on playing cards.

SECONDARY STANDARD: (3) Reading/ Reading Comprehension

3.2 Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

Students will be asked to use various vocabulary to name pictures given on playing cards.

Cutscene

When the player re-enters the base, he will discover that Admiral Adult has infiltrated and taken command. The player persuades the Admiral to play a game of cards in order to stop the Admiral from fully taking over the base.

Game Play

Play begins with Admiral Adult dealing cards to the player on a poker table. The Boss uses the chat box to communicate with the player, and the player uses the chat box to play the game.

Admiral Adult deals cards to the player, who must memorize the image on each card. Admiral Adult asks if the player is ready. When the player responds, "ready," or, "I'm ready," Admiral Adult flips the cards over and requests that the player identify an object or action on one of the cards. The player must identify this card by writing a sentence. Acceptable answers include:

The [object] is on card number one.

The picture of an [object] is on 4.

Two is [object].

The order of words and the construction of the essential parts of sentences are checked rigorously. The desired sentence structure can be altered by the teacher through the editing of the format.txt game file which can be found in the battle_card_game_stuff folder.

The game operates in three phases, each lasting for four of Admiral Adult's health points. Four correct answers are required to advance to the next stage, not counting ties. When the player correctly identifies the card, Admiral Adult loses one health point. He begins with 12 health points and the player begins with 6 points. If the player incorrectly identifies the card, he does not lose the hand automatically; Admiral Adult will ask the player to identify the incorrectly chosen card. If the player can correctly identify the new target card, the hand is a draw and play continues with a new hand. If the player can not identify this card, he loses one health point. When Admiral Adult has lost all 12 health points, the player wins. If the player loses all 6 health points, the game restarts.

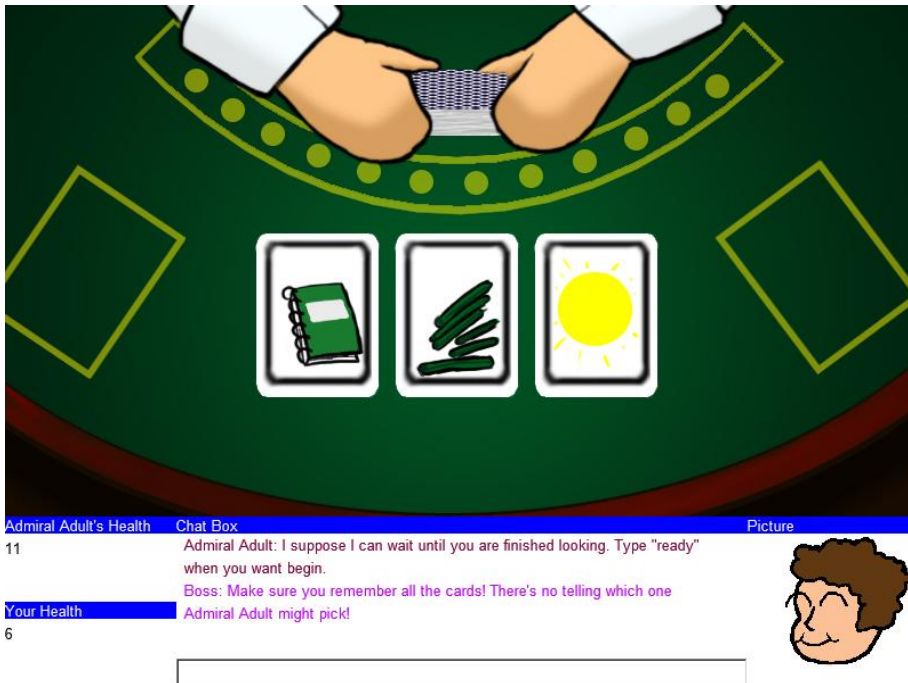


Figure 14: Admiral Adult has dealt the first hand. The player may respond "ready" when he is ready to play.

Difficulty

This is one of three chapters (Chapters 3, 4, and 6) that can change difficulty based on the player's performance. Changing the difficulty of one of these adaptable games will, in turn, alter the difficulty of the subsequent games. There are three levels of difficulty: easy, medium, and hard. Each of these games starts at either medium or hard based on the player's performance in the other games and will only operate in the easy level if the player cannot complete the game in the medium level. Levels will only change by one step at a time.

In this chapter, the easy level gives the player a faster starting speed, the medium level starts the player slightly slower than Admiral Adult, and in the hard level the player will start a lot slower than Admiral Adult.

In this chapter, easy level uses phases of 3, 3, and 4 cards; medium uses 3, 4, and 5 cards; hard uses 4, 4, and 5 cards.

Cutscene

Suddenly, Admiral Adult unleashes a smoke bomb that momentarily blinds the player. When the player regains his vision, Admiral Adult has taken the player to a maze.

Chapter 5: Infiltrating the Admiral's Base

Purpose of the Game

For the teachers: Player will learn how to listen to and follow spoken instructions.

For the students: Find the way through the maze to catch Admiral Adult in his base.

TESOL Standards

PRIMARY STANDARD: (1) Listening/ Listening Comprehension

1.3 Demonstrate comprehension of vocabulary presented orally in a variety of contexts.

Students will listen to oral directions that they must follow correctly in order to make their way through the maze successfully.

SECONDARY STANDARD: (3) Reading/ Reading Comprehension

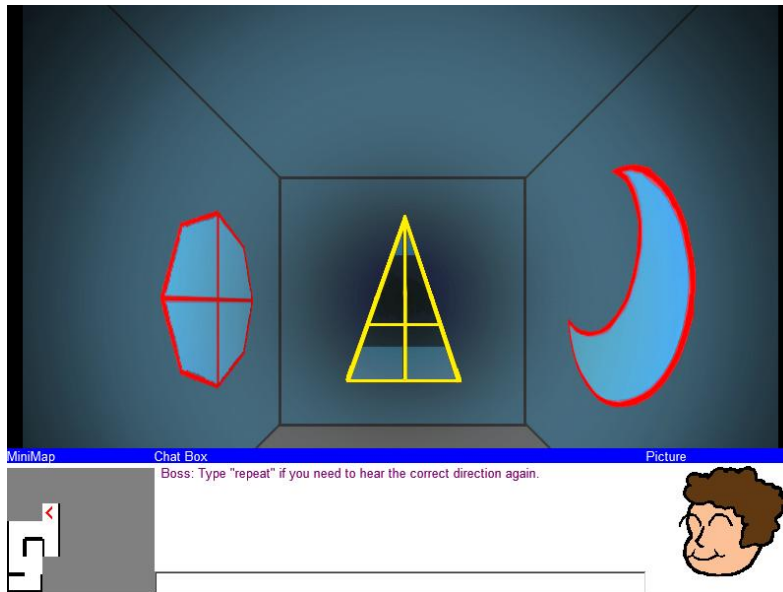
3.2 Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

If a student becomes lost, the computer will take over and guide them back to the path. The computer will speak the instructions as well as writing them in the chat box for the student to read.

Game Guide

When the game begins, the player is standing in the first room of the maze. The view of the game is taken from the avatar's perspective. A small mini-map, displayed at the bottom left-hand corner of the screen shows where the player is within the maze. At first, the map will only show the room where the player begins the game. More rooms are added as the player moves through the maze. The map also shows the locations of walls and the direction the player is facing, as indicated by a red arrow.

Figure 15: The player moves through the maze.



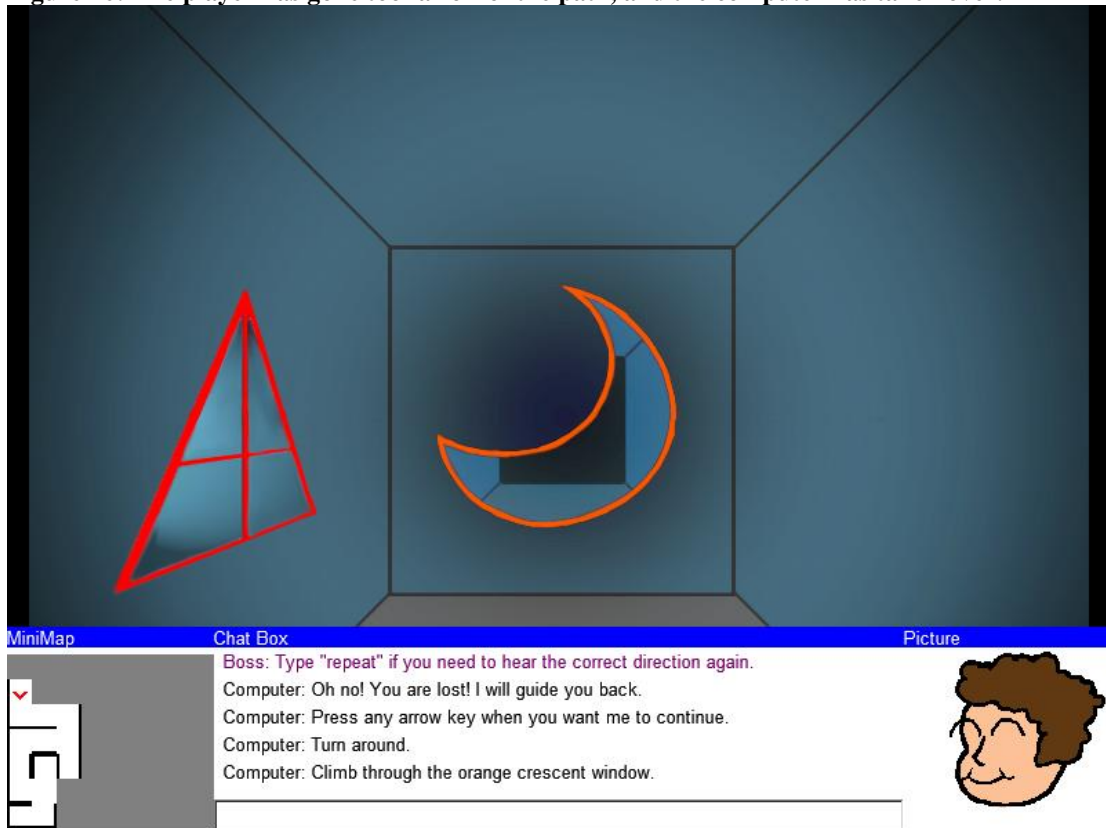
The Boss and another agent will direct the student by using a radio. Their instructions are spoken aloud to the player. The player may type "repeat" to hear the instructions again. The player must reach the end of the maze in order to

get into Admiral Adult's base.

Each room of the maze is a cube, within which the player can rotate. The right arrow key rotates the player clockwise, the left arrow rotates counter-clockwise, the down arrow key rotates the player 180 degrees, and the up arrow key moves them through the object/passageway directly ahead of them. The player must face the path that he wants to take. In order to select it, he must push the up arrow key. The game allows for 360 degrees of rotation, so the player is able to retrace his own steps in the maze. This may become necessary if the player goes off course.

The player will be alerted if he goes off course. First, the computer will alert the player that he is "going to get lost like that." If the player continues to go off course, the computer will say, "Please be careful! Your radio is almost broken!" When the player goes too far off course, the computer will redirect him back to the correct path. The alert, "Oh no! You are lost! I will guide you back," will appear in the chat box. Once the player returns to the path, the computer will return control to the player.

Figure 16: The player has gone too far off of the path, and the computer has taken over.



The player must travel through all three levels of the maze before he can exit the maze. Congratulatory applause and words of encouragement await the player after completing each level. After the final level, the player moves on to face Admiral Adult in one final battle.

Cutscene

The player moves through the final exit door to find Admiral Adult unleashing his most diabolical scheme yet: a machine that sucks the fun out of everything. The player is immediately thrust into a battle to save all fun in the world.

Chapter 6: Saving the World's Fun

Purpose of the Game

For the teacher: The player will use all of the skills practiced in the game to be able to win against the machine.

For the student: The player is trying to save all the fun in the world.

TESOL Standards

PRIMARY STANDARD: (4) Writing

4.1 Use Standard English structure and grammar to develop clarity in written communication.

Students will be asked to find spelling and grammatical errors in English sentences and to rewrite the sentences correctly.

SECONDARY STANDARD: (3) Reading/ Reading Comprehension

3.2 Recognize, acquire, and interpret meaning of vocabulary through exposure to text.

Students will be asked to read sentences using various levels of vocabulary.

SECONDARY STANDARD: (1) Listening/Listening Comprehension

1.2 Respond appropriately to questions and prompts given orally for a variety of purposes.

1.3 Demonstrate comprehension of vocabulary presented orally in a variety of contexts.

Students will hear a description of an activity presented visually and will hear a question about the given activity. They will answer by typing in the chat box.

Game Play

The player begins the game looking upon Admiral Adult's ultimate machine. The bottom left-hand corner will show both the player's and Admiral Adult's health. The machine's screen will display a sentence. The sentence will contain one or more grammar mistakes. The student is instructed to correct the mistakes and rewrite the sentence in the chat box.

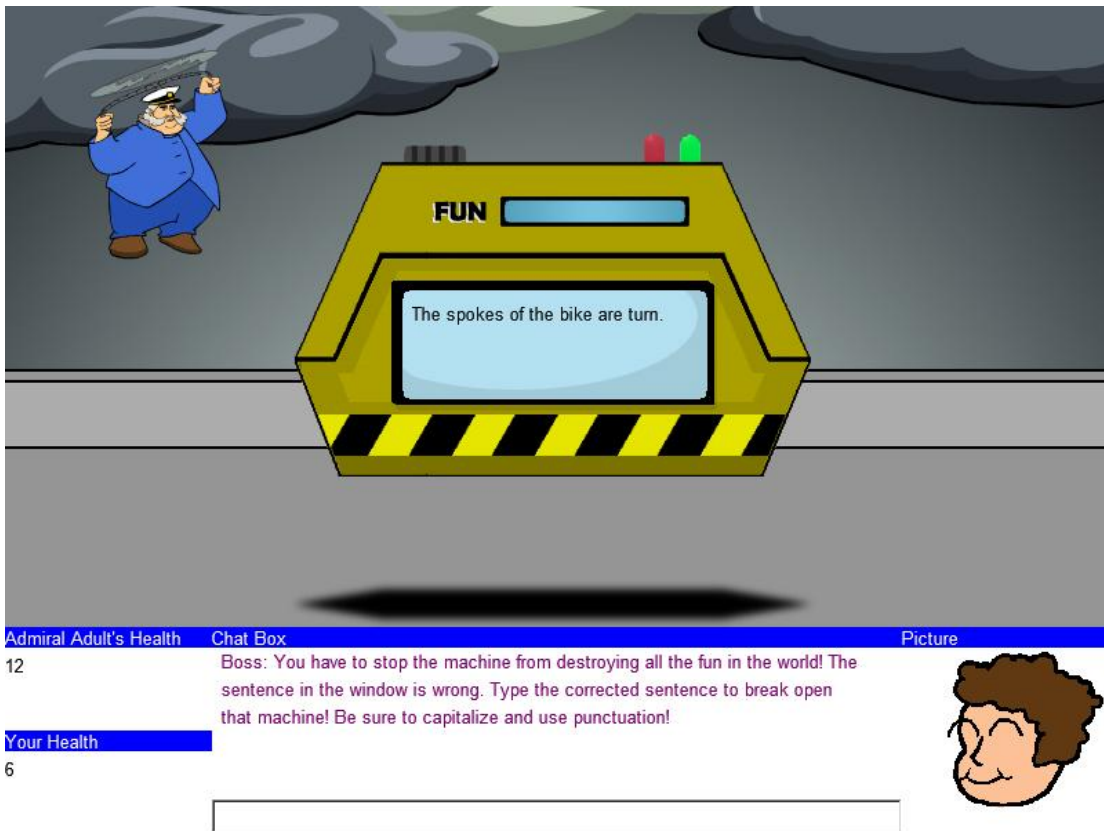


Figure 17: The machine begins with an improper sentence to correct. Admiral Adult watches in the background.

Figure 18: The player is asked a spoken question related to the picture on the machine. The start of the sentence is given to help guide the player's response.



If the player correctly changes the sentence, the machine will open and a card representing an activity will be shown. A timer gauge, displayed at the top of the machine, will begin to run down. As time goes on, the image will darken as the fun is “sucked out” of it. The player is asked a question relating to the displayed card. The player is given the first part of the answer and must use it to answer the question. If the player correctly answers the question, they will hear a password. Typing this password into the chat box will cause Admiral Adult’s machine to lose one health point. If the player does not do all of this before the timer runs out, the player will lose one health point. Once Admiral Adult’s machine loses all of his health points, the player has won the game.

When the player finishes this game, the machine explodes and the player wins the game. Admiral Adult does manage to escape yet again, but he will not cause any further trouble and the player returns to base as a hero.

Figure 19: The player has barely been able to attack the machine and stop it from sucking fun. The machine malfunctions momentarily.



Difficulty

This is one of three chapters (Chapters 3, 4, and 6) that can change difficulty based on the player's performance. Changing the difficulty of one of these adaptable games will, in turn, alter the difficulty of the subsequent games. There are three levels of difficulty: easy, medium, and hard. Each of these games starts at either medium or hard based on the player's performance in the other games and will only operate in the easy level if the player cannot complete the game in the medium level. Levels will only change by one step at a time.

In this chapter, the easy level gives the player a faster starting speed, the medium level starts the player slightly slower than Admiral Adult, and in the hard level the player will start a lot slower than Admiral Adult.

In this chapter, the easy level causes the timer to drain very slow, the medium level's timer drains a bit faster, and the hard level's timer drains very quickly.

Cutscene

The player has won and the machine explodes dramatically. Admiral Adult is defeated and calls for revenge as he escapes on his flying ship and the sky fills with color. The Boss congratulates the player and the game is complete.

Completion

Once the game has been fully completed, the player may visit any level he desires by typing its name and hitting the enter key. The level names are Intro, Cave, Cart, Battle, Maze, and Final.

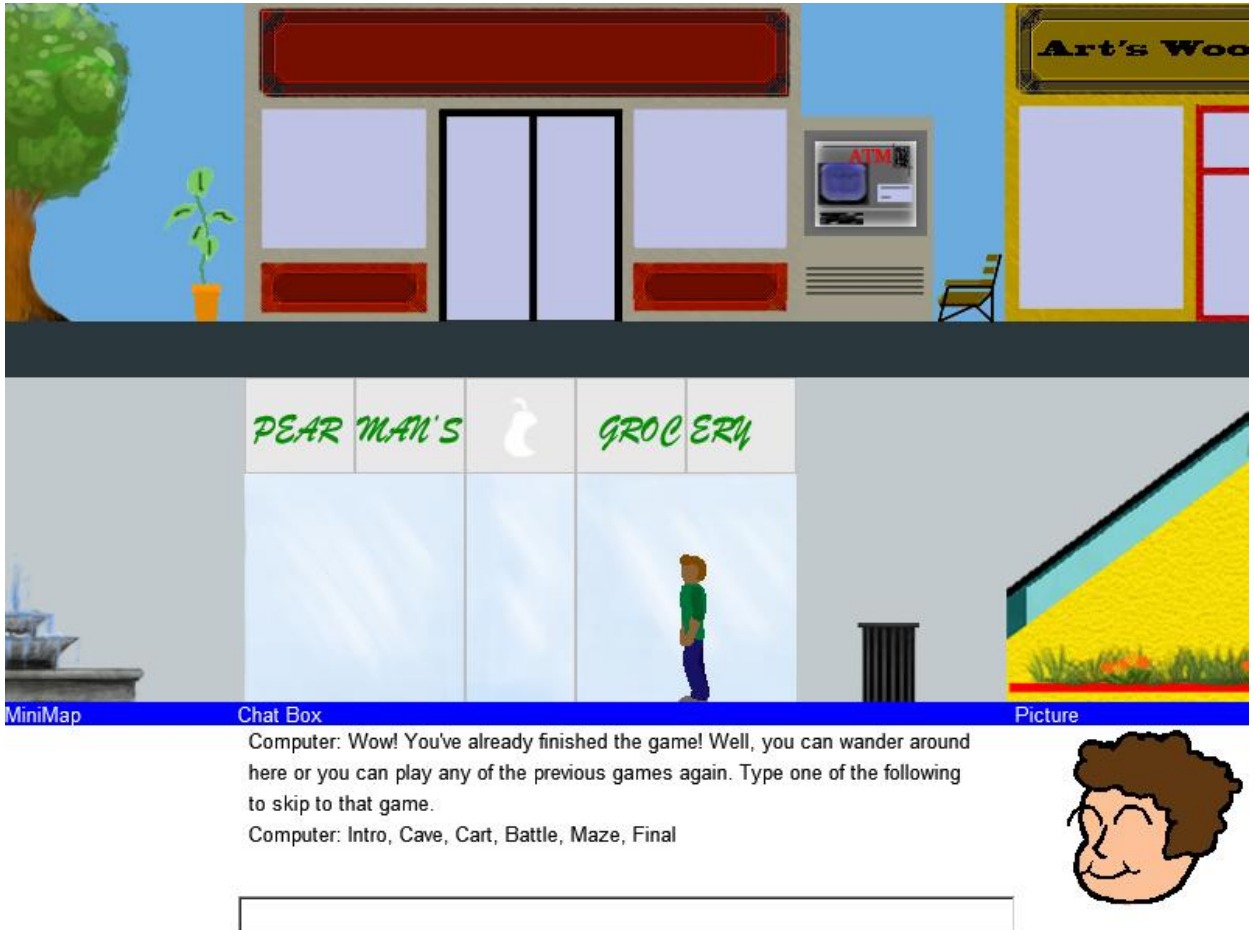


Figure 20: The player, free now to move about the mall, may select any level by typing in its name: Intro, Cave, Cart, Battle, Maze, and Final.

Appendix A: Answers

Cart Game

Easy Questions

*Note: Questions are randomized, so the sequence in the game will not match the sequence here.

Question: Can you help me? Which animal lays eggs?

Answer: a chicken

Question: Excuse me, can you tell me which animal has feathers?

Answer: a duck

Question: I just forgot. Which animal eats grass?

Answer: a cow

Question: I like red food! Which food is red?

Answer: strawberries

Question: I dislike red food. What should I get in this store?

Answer: an orange

Question: Which of these fruits is not very soft?

Answer: an apple

Question: My mother told me to go to the bakery. What can I find there?

Answer: hamburger buns

Question: I love breakfast! What should I get?

Answer: cereal and milk

Question: I love nuts. What should I buy?

Answer: cashews

Question: I have a sore throat. What should I eat?

Answer: soup

Question: What color is a ripe banana?

Answer: yellow

Question: I love sweet food! What's the perfect snack for me?

Answer: lollipops

Question: I'm going to a party where everyone is bringing green food! What should I bring?

Answer: peas

Question: I can't find the cheese. Which aisle is it in?

Answer: dairy

Medium Questions

Question: My mother told me that I should eat more fruit. What should I buy to put in my lunch?

Answer: an apple

Question: I am in the mood for a sandwich. What should I get to make it?

Answer: salami

Question: What can I make with bread?

Answer: toast

Question: I need to clean up a spill before my mom comes home. What shouldn't I use?

Answer: paper plate

Question: I'm decorating a cake for my mom's birthday. Can you help me? What should I put on top?

Answer: icing

Question: I'm looking for food from the ocean. What should I buy?

Answer: tuna

Question: My brother wants something from a tree? What can I get for him?

Answer: apples

Question: What do you recommend for my little sister's birthday party?

Answer: cupcakes

Question: My family likes to eat fruit salad. I only need one more item. What else should I buy?

Answer: bananas

Question: I want a crunchy snack. What should I get?

Answer: potato chips

Question: This is my first Thanksgiving dinner. What does everyone usually eat?

Answer: turkey

Question: We're having a barbecue. What should we put on the grill?

Answer: hot dogs

Question: I'm watching a movie with friends. What should I buy?

Answer: popcorn

Question: My brother and I are making a seafood dinner for our family. What should we get?

Answer: crabs

Question: Can you help me? I'm looking for a round vegetable, but I forgot the name.

Answer: onions

Question: I'm going to make milkshakes for all of my friends tonight. What do I need to buy?

Answer: ice cream

Question: I like to eat vegetables. What should I eat?

Answer: carrots

Hard Questions

Question: I'm making a pizza for my vegetarian friend. What shouldn't I use for the topping?

Answer: ham

Question: I am taking care of my sister's baby tonight. Can you tell me what I should get for the baby?

Answer: mashed bananas

Question: I'm really tired, but I need to stay awake. What can I drink that has caffeine?

Answer: coffee

Question: My sister is a vegetarian. What can I bring home for her?

Answer: salad

Question: Dad's on a diet, so he can lose weight. What can't he eat?

Answer: cheesecake

Question: We're having a Superbowl party next weekend. What should I bring?

Answer: chips and salsa

Question: Halloween is coming up soon. What kind of treats should I get?

Answer: candy corn

Question: My mom can't eat dairy. What can I bring her for lunch?

Answer: salad

Question: My sister needs food that is easy to chew. What can I get for her to eat?

Answer: pudding

Question: My dad loves to grill, but today he is going to bake. What should we buy for him to make in the oven?

Answer: cookies dough

Question: I'm making spaghetti tonight with my older brothers. What should we buy to make sauce?

Answer: tomatoes

Question: I'm getting a dog, but I forgot what they told me not to feed him. Can you tell me what it is?

Answer: chocolate

Battle Card Game

window



watch



volleyball



violin



tuba



trumpet



trombone



train



textbook



tennis



teacher



swimmer





surfer



sun



subtraction
sign



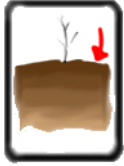
spoon



sponge



socks



soil



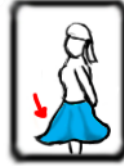
soccer game



soap



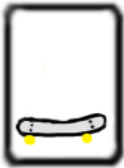
scooter



skirt



skier



skateboard



shoes



shirt



scarf



saxophone



sailboat



runner



rock



river



plum

plate



plant



plane



pineapple



piano



pencil



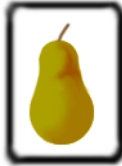
pen



peas



pear



peach



paper



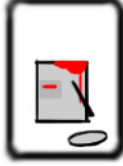
pants



palette



paint



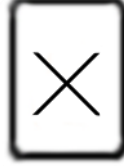
orange



notebook



multiplication sign



motorcycle





moon



money



lettuce



letter



knife



horseback
rider



hockey
player



hat



guitar



green beans



glasses



glass



fork



football
player



flute



fisher



essay



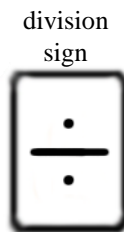
earth



drums



door



division
sign



diver



desk



dancers



corn



compass



cello



carrots



car



canvas



calculator



bus



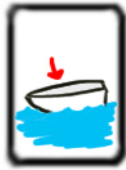
brush



broccoli



bowler



boat



biker



bike



basketball



baseball



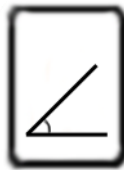
banana



asparagus



apple



angle



addition
sign

Flash Card Game: Sentence Correction

The symbol “/” denotes multiple options. Choose only one of the answers provided. For cases of his/her: choose one, not both. For purposes of clarity, contractions are not always shown.

Sentence Correction: Easy

The children wants to ride the train.

The children want to ride the train.

The child wants to ride the train.

The spokes of the bike are turn.

The spokes of the bike are turning/turn.

Peter is an firefighter.

Peter is a firefighter.

Dancing are an art.

Dancing is an art.

Sheila left a hour after finishing the drawing.

Sheila left an hour after finishing the drawing.

Sarah definitely enjoyed her day at the beach:

Sarah definitely enjoyed her day at the beach.

Bob asked Carl if she had gone to the store.

Bob asked Carl if he had gone to the store.

Jump roping is in a separate, category.

Jump roping is in a separate category.

The car and the bike rides smoothly.

The car and the bike ride smoothly.

Katy needs me to pick up milk eggs and cheese.

Katy needs me to pick up milk, eggs and cheese.

Katy needs me to pick up milk, eggs, and cheese.

The skateboarders and the roller skater goes to the store.

The skateboarders and the roller skater go/are going/went to the store.

The slide owned by Bob and Ann are fun.

The slides owned by Bob and Ann are fun.

The slide owned by Bob and Ann is fun.

You can learns to surf with lessons.

You can learn to surf with lessons.

I need you to package gift.

I need you to package a gift.

I need you to package the gift/gifts.

I need you to package some gifts.

Sheep is fluffy animals.

Sheep are fluffy animals.

A/The sheep is a fluffy animal.

The news allows him to understands important events.

The news allows him to understand important events.

The skateboarders goes to the store.

The skateboarders go/skateboarder goes to the store.

Sentence Correction: Medium

The herd of cows are moving to the west.

The herds of cows are moving to the west.

The herd of cows is moving to the west.

Before he went to the game, he polish his bowling ball.

Before he went to the game, he polished his bowling ball.

Before he went to the game, he had polished his bowling ball.

After the card is sent, I did relax.

After the card is sent, I will relax.

After the card was sent, I did relax/relaxed.

When he dropped the small ball on the floor. it rolled under the bed.

When he dropped the small ball on the floor, it rolled under the bed.

He don't want the ice cream.

He doesn't/does not want the ice cream.

The machine currently was finishing the product.

The machine is currently finishing the product.

The machine is currently is finishing the product.

The machine was finishing the product.

The machine is finishing the product currently.

The changing size of cars are intriguing.

The changing sizes of cars are intriguing.

The changing size of cars is intriguing.

Since he has finished step two, he had completed step three.

Since he has finished/completed step two, he will finish/complete step three.

His present's have red bows.

His presents have red bows.

Now that he has skied, winter was his favorite season.

Now that he has skied, winter is/will be his favorite season.

Once the sun comes out, the snowmen are beginning to melt

Once the sun comes out, the snowmen begin to melt.

Once the sun comes out, the snowmen will begin to melt.

Since the sun came out, the snowmen are beginning to melt.

Once the sun came out, the snowmen began to melt.

I will watch the television now that I had finished studying.

I will watch the television now that I have finished studying.

I built the tree house from wood, but now I had reconsidered using steel.

I built the tree house from wood, but now I am reconsidering/considering using steel.

I built the tree house from wood, but now I have reconsidered/considered using steel.

I have to go to the market before we are traveling to the beach.

I have to go to the market before we travel to the beach.

I have to go to the market while we are traveling to the beach.

Sentence Correction: Hard

"I do not think that I cannot reach the rim," said Jamal.

"I think that I can reach the rim," said Jamal.

"I do not think that I can reach the rim," said Jamal.

"I think that I cannot reach the rim," said Jamal.

Gabriel had drank all of the lemonade before I arrived.

Gabriel had drunk/drank all of the lemonade before I arrived.

If I was to exercise, I would be more fit.

If I were to exercise, I would be more fit.

If I exercised, I'd be more fit.

The explanation made sense, but he understood it.

The explanation made sense, but he could/did not understand it.

The explanation didn't make sense, but he/still he/he still understood

The explanation didn't make sense, but he could /could still/still could understand it.

Had the party been at my house, I would had bought chips and dip.

Had the party been at my house, I would have bought chips and dip.

Barbara has wrote the book.

Barbara wrote/has written the book.

Bob's presents at the meeting allowed him to meet the staff.

Bob's presence at the meeting allowed him to meet the staff.

He has sang the National Anthem for his highschool.

He sang/has sung the National Anthem for his high school.

Soccer isn't not a sport that everyone knows.

Soccer is not a sport that everyone knows.

Soccer is a sport everyone knows.

Flash Card Game: Spoken Prompts

The first word or phrase provided is the text automatically put into the chat box to help guide the player. The subsequent sentences are acceptable answers. The symbol “/” denotes multiple options. Choose only one of the answers provided. For cases of his/her: choose one, not both. For clarity, not all possible answers are given in some cases.



The pitcher

The pitcher throws/pitches/hurls the ball/baseball.



It

It is called a pass.

It is called passing the ball/basketball.



The rider

The rider stops by braking/using brakes/using the brakes

The rider stops by using his/her feet.

The rider stops by crashing.

The rider uses the brakes to stop.

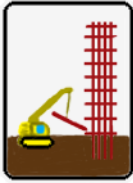


The player

The player gets the ball to the pins by throwing the bowling ball.

The player swings his/her arm.

The player throws the ball.



The material

The material used to make buildings is steel/metal/iron/brick/concrete.

The material steel/metal/iron/brick/concrete is commonly used.



The candy

The candy is wrapped.

The candy is enclosed by a wrapper/paper/plastic.



The opposing team

The opposing team tries to catch it.

The opposing team catches the baseball.



A stove

A stove provides heat/fire/energy/warmth/a flame.

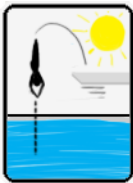
A stove provides heat/fire/energy/warmth/a flame for cooking.



The music

The music provides a/the tempo/beat/melody.

The music provides a/the rhythm.



The diver's splash

The diver's splash should be/is

small/big/compact/large/minimal/tiny/sizeable.



Artists

Artists draw on paper/canvas/walls/doors/tables/the floor.
Artists usually draw on paper/canvas/walls/doors/tables/the floor.



Fishermen

Fishermen attach lures/bait/worms/fish/food to their fishing rods.
Fishermen attach lures/bait/worms/fish/food to the end of their rods.



Players

Players wear helmets/face masks.
Players wear helmets/face masks to protect their heads.



Visitors

Visitors put umbrellas in the sand.
Visitors put umbrellas in the sand to shade themselves from the sun.



Hockey players

Hockey players skate on the ice.
Hockey players skate on frozen water.



The rider

The rider holds the reins/horse's neck.
The rider holds the reins/horse's neck to control the horse.



The ice cream

The ice cream melts/will melt.



One ball

One ball is/must be in the air.
One ball is/must be out of their hands at all times.



People

People must jump/push/leap.

Peoples jump/push/leap to get off the ground/off the ground.



People

People decorate with balloons/hats/streamers/cakes/presents/whistles.

People can use balloons/hats/streamers/cakes/presents/whistles to decorate for parties.



Cameras

Cameras have a light/flash/bulb/light bulb/flashbulb.

Cameras have a light/flash/bulb/light bulb/flashbulb in case it is dark.



You

You roll/toss/shoot dice.

You typically/usually/generally roll/toss/shoot the dice.



You

You push the button/joystick on the/a controller.

You push the buttons/joystick on the controllers to play/in order to play.



Presents

Presents are decorated/adorned with bows/wrapping paper/stickers/cards/paper/notes/ribbon.

Presents are usually/generally decorated/adorned with bows/wrapping paper/stickers/cards/paper/notes/ribbons.



Non-fictional stories

Non-fictional stories describe the real world/reality.

Non-fictional stories describe actual/real/true events/worlds/settings/places/stories.



Running

Running is faster than jogging/sitting/idling/waiting/standing still/relaxing/crawling/rolling/scooting/slithering.



Sails

Sails carry/pick up/utilize/gather/are pushed by the/use wind to move the boat.

Sails move the boat by using/gathering/picking up/carrying/being pushed by the wind.



A person

A person must exhale/breathe out of his/her mouth.

A person must open his/her mouth.

A person must blow out of his/her mouth.



They

They wear pads on their knees/shins/feet/ankles.

They wear pads on their knees/shins/feet/ankles for protection.



Temperatures

Temperatures decrease/diminish/drop/go down/decline/lower.

Temperatures decrease/diminish/drop/go down/decline/lower (as you (go up/climb/ascend the mountain.



You

You sled/go sledding/roll/slide.

You can sled/go sledding/roll/slide down a/the hill/slope.



You

You slide down it/the slide/the pictured item.

You can slide down it/the slide/the pictured item.



You

You throw/toss/hurl it/snowballs/the snowball.

You try to hit someone/somebody.



A snowman's
A snowman's nose is a carrot.
A snowman's nose is usually made from a carrot.



They
They kick/punt it.
They must kick/punt the soccer ball.



A surfer
A surfer must catch/ride a wave.
A surfer catches/rides waves to start moving.



Each movement
Each movement is a stroke.
Each movement is commonly named/called a stroke.



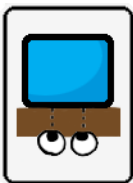
They
They hit/strike/swing at the ball.
They hit/strike/swing/at the tennis ball with the racquet/racket.



You
You reach the/a tree house by climbing the/a tree/ladder/rope.
You can climb the/a tree/ladder/rope.



The volleyball
The volleyball goes/travels over the net.
The volleyball should go/travel above the net.



Remotes
Remotes control the television.
Remotes control/change the channel/volume.
Remotes turn the television on/off/on and off/off and on.

Appendix B: Walkthrough

This section contains more detailed instructions on running the game, helpful hints and reminders, and important contact information.

Setting up the Server

1. Open windows explorer.
2. Open the folder named “Server”.
3. Go into the “data” subfolder.
4. Go into the “saves” subfolder.
5. Delete all the files inside there.
6. Go up 2 levels to the “Server” folder.
7. Double click “Final Server.jar” to start up the server.
8. Copy the IP address from the server once it has started.

Setting up the Game

1. Open windows explorer.
2. Open the folder named “Software” where the game files are located on each computer’s hard drive.
3. Double click “Final Software.jar” to start up the game.
4. Enter the correct ID, password, and IP address on the loading screen.

Helpful Reminders

1. Type “C:” and then your sentence to chat to everyone.
2. Misspell a word and type “IGN” to force the spell check to allow it.
Type “DEL” to delete a word.
3. The avatar will only move to the point in the mall where the mouse is clicked.
4. Keep clicking non-player characters (NPCs, e.g. “Brett” and “Jason”).
5. If the game doesn’t respond, try clicking to mouse or check the chat box to see if you need to respond to a question.
6. Go to Shenanigans after the cart game.

7. Mouse clicking is only required in the introductory chapter (where you make a cake), finding the correct corner for light in the Cave Game, the color-selection in the Cave Game, the number selection in the Cave Game, the intermediate return to the mall between the Cart and Battle games, and when clicking the “Submit” button in the comments section after each chapter.
8. The keyboard is used for all games not mentioned specifically in #7. However, the mouse may also be used to answer questions in the Cart game.
9. Team ILL’s technology liaison is Jason Young. His email is youngj@umd.edu.

Notes

1. The teachers are allowed to help the students after the students ask for help or become frustrated. The teachers need to document all cases of this using the student’s ID number.
2. The teachers can give a short demo of logging into the game and playing the intro, but not any of the other chapters.
3. The students are encouraged to use the chat to talk to each other throughout all parts of the game.
4. The teachers should moderate students’ chat conversations from the server program.
5. The following changes should be made before the server program is started:
6. To censor words, open the server folder. Then open the “data” folder inside that. Inside the data folder is a “cannotSay.txt” file. Enter in the words you want censored on their own individual lines. For example:
badword1
badword2
7. To add more allowable words to the dictionary, enter the server folder and open the “canSay.txt” file in the data folder. Use the same convention as in #5 to enter in these words.

8. Students MUST remember their passwords. Without them, they will not be able to continue playing the game. We suggest that the teacher keeps the list or instructs the students to keep the passwords in a safe place. Notify Jason Young (youngj@umd.edu) if a student forgets his/her password. Send him the student ID and the **data folder** (located in the server folder) and he will extract the student's password.

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