

User Centered Game Design: Evaluating Massive Multiplayer Online Role Playing Games for Second Language Acquisition

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Abstract

Unlike recreational games, serious games do more than entertain the player. Serious games promote acquisition of information and skills that are valued in both the virtual world and the real world. The challenge is to design and develop serious games that simultaneously create an enjoyable experience for the player as the player develops or improves her skill set as a result of game play and applies these newly developed skills in a real world setting. Because transfer of learning represents the primary goal of serious games, it is crucial that game designers understand the interactions associated with game tasks and their impact on players prior to game development. Borrowing heavily from interaction design, we introduce the user centered game design methodology as the framework for serious game design and apply this technique to the evaluation of the social interactions between Player Characters in a commercial Massive Multiplayer Online Role Playing Game. Significant results from experimental studies suggest that this genre of games shows great promise as an unorthodox language learning tool for vocabulary acquisition and reveals the importance of social interactions in the virtual space of video games. Finally, we discuss the design implications for serious games that facilitate Second Language Acquisition.

CR Categories: K.3.2 [Computers and Education]: Computer Uses in Education—Collaborative Learning

Keywords: Game design, interaction design, second language acquisition, serious games, user centered design

1 Introduction

Research suggests that video games effectively model the learning process in that video games require players to be active participants rather than passive observers, adapt to players' capabilities, and give immediate feedback as a result of players' decisions during game play [Gee 2003; Squire 2005]. Popular recreational video games successfully entice players to invest numerous hours playing video games as players work diligently to improve their playing abilities and progress from one game level to the next. Though video games serve primarily as a source of entertainment, recently they have begun to function as pedagogical tools, creating a genre

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of video games known as serious games [Abt 1970; Aldrich 2005; Chatham 2007; Kelly et al. 2007; Mayo 2007]. Serious games go beyond entertainment; they attempt to educate players about traditional classroom topics (e.g. physics, math, and business) and non-traditional topics, including healthcare, and political issues in the Middle East [Mayo 2007]. Game designers of serious games strive to achieve the same level of engagement associated with recreational video games with the caveat that players acquire knowledge and learn new concepts during game play that is useful in the real world. Successful integration of traditional learning objectives with the elements of entertainment, play, and fun becomes the goal for the design of serious games. However, few articles exist that report positive learning outcomes associated with serious games that demonstrate transfer of virtual skills to real world applications [Abt 1970; Aldrich 2005; Chatham 2007; Kelly et al. 2007; Mayo 2007].

To achieve this goal, we argue that the purpose for which we intend to use video games for educational purposes needs to be a crucial component of the design process. A thorough understanding of how users interact in the game world defines a framework for game design that contributes to both the design and evaluation of serious games. In response to these design constraints, we introduce user centered game design as the methodology for design and evaluation of serious games. We apply user centered design techniques, emphasizing observational studies of game play activities as the first phase of game design for the purpose of evaluating Massive Multiplayer Online Role Playing Games (MMORPGs) as potential unorthodox second language (L2) pedagogical tools. Results from experimental studies indicate that MMORPGs provide sufficient motivation and opportunities for second language students to increase in proficiency in a target language. Finally, we discuss the conceptualization phase, emphasizing design implications of serious games that facilitate Second Language Acquisition (SLA).

2 User Centered Game Design

The typical game design process involves three phases of development: 1. conceptualization, 2. prototyping, and 3. playtesting [Fullerton et al. 2004]. Conceptualization describes the planning phase which involves brainstorming, identification of formal (e.g. objectives, rules, possible outcomes, game controls, and mechanics) and dramatic (e.g. background story, characters, challenge, conflict, and fun) elements of game design [Fullerton et al. 2004; Salen and Zimmerman 2004]. Game designers produce game specifications that demonstrate the initial look and feel of the game interface, identify system behaviors for rules of interaction and procedures for game play and game controls that users will navigate in the virtual world [Rucker 2003]. Prototyping allows game designers to quickly implement an Alpha version of the game that gives players an opportunity to play the game and collect feedback on the game play experience [Fullerton et al. 2004; Salen and Zimmerman 2004]. Feedback from playtesting results in an iterative design process, forcing game developers to prioritize changes and make tradeoffs between available features, quality and the schedule for final production [Rucker 2003]. While typical game design encompasses the iterative process described above, we posit that designers of serious games need a different design framework that interweaves social interactions, learning objectives and elements of

play if we hope to design serious games that have a positive learning impact on the player. The purpose for which we want to utilize games and the effect on the player determines the focus of user centered design. We define user centered game design to be:

- Specific application
- Affordances of game play
- Effects of game play

We discuss each component below.

2.1 Specific Application

Remembering that serious games create experiences that promote the transfer of skills in the virtual to the real world, the first component of user centered game design requires agreement on the purpose of the game. The specific application refers to whether the purpose of the game is to acquire knowledge or develop skills for a specific task in preparation for real world scenarios [Abt 1970; Aldrich 2005]. Are we designing a game for educational purposes and if so, what are the learning objectives? Is the game suppose to simulate a natural disaster that trains players to think quickly and respond to life threatening situations that save lives or does the serious game promote physical interaction as an alternative to cardiovascular activity? The answers to these questions identify the specific applications and objectives of any serious game.

2.2 Affordances of Game Play

Additionally, game designers need to understand the benefits that games provide the player in the role of the student. What does the game play experience afford the player that the same experience in the real world does not? Is a particular genre of video games better suited for the specific application and if so, how? User centered game design recognizes the benefits of game play early in the design phase, allowing game developers to implement these advantages into the core behaviors of the game system. Secondly, learning does not happen in a vacuum, but includes social interactions that support the learning process. Previous research indicates that games are ideal for collaborative learning, creating opportunities for players to work together to accomplish game tasks [El-Nasr and Smith 2006; C. Steinkuehler and Williams]. Game designers should consider both face-to-face human interactions and social interactions in virtual spaces that support learning and design games that enable players to emulate these interactions during game play [C. Steinkuehler and Williams ; Jakobson and Taylor 2003].

2.3 Effects of Game Play

While one can speculate about the benefits of games, we endorse methodology that provides substantial evidence that game play produces positive learning outcomes. Equally important, designers need to strategically build games that provide a pleasurable experience for players. This means that assessment of the game play experience is required to determine the effects of game play on players. Whether this involves formal assessment (e.g. exams) or informal assessment (e.g. the players' ability to complete a game task that maps to a specific learning objective), designers of serious games need to account for assessment early in the design process. The practice of measuring the effects of game play early in the design process increases the likelihood that game designers can actually create a serious game that produces a positive experience for the user and positive learning outcomes. Hence, the criticism is that assessment of the user experience must be continuously measured,

be it quantitatively or qualitatively, and interwoven on multiple levels throughout the development process of serious games. If we do not incorporate assessment into the design process, then the result is a video game that the designer hopes accomplishes a specified goal that has meaning or value beyond the context of game play. Lofty goals and lack of assessment do not warrant the classification of serious games, especially those serious games designed for educational purposes. Without understanding the effect of game play on the user, the game designer cannot justify the classification of serious game.

User centered game design consists of one additional developmental phase that initiates the design process for serious games. See figure 1. The remainder of the paper will focus on the first two phases of game development and its application to the evaluation of MMORPGs that facilitate SLA.

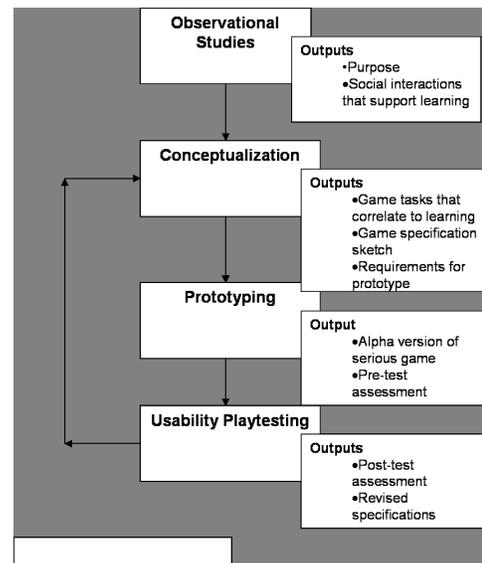


Figure 1: Model of User Centered Game Design.

3 Observational Studies: First Phase of User Centered Game Design

In contrast to traditional game design, user centered game design begins with observational studies of game play activities, a form of playtesting, rather than the typical design activity of generating game ideas [Fullerton et al. 2004; Preece et al. 2002]. User centered game design shares similarities with human-centered game design in that both design approaches begin with observational studies of the user [Abeele et al. 2007]. However, there is a subtle difference between user centered game design and human-centered game design. Human-centered game design seeks to identify the appropriate social context in the real world to create meaningful experiences in the virtual world [Abeele et al. 2007]. User centered game design observes social interactions associated with game play to identify and leverage the social interactions that support acquisition and application of knowledge. Observational studies of game play activities provide insight into the learning process and identify the cognitive processes that accompany these social interactions. Waiting until the playtesting phase to determine if a game has met its objectives can lead to misappropriation of resources, disappointed players, and the decision to cancel a video game. Instead, we advocate soliciting player input in the early stages of game design, before a software-based prototype is developed, as an

effective method for evaluating the player's experience and driving the game design process. In the early stages of serious game design, low fidelity prototypes such as a paper-based prototypes, can be used for observational studies of players' experiences [Preece et al. 2002]. Upon completion of observational studies, key stakeholders, including game designers and educators, identify potential learning opportunities relevant to a specific application or subject matter. These same learning opportunities form the basis for the user model which is based on human-to-human interactions the game environment naturally supports. The third aspect of user centered game design addresses the impact of the experience on the user. Observational studies that emphasize assessment of game play experiences help to develop the overarching goal that designers hope players will achieve as a result of game play. Next we conduct experimental studies that demonstrate the importance of user centered design for serious games.

4 Characteristics of MMORPGs that Support Second Language Acquisition

Though Standard American English remains the dominant language in the United States, 14% of its student population lives in homes where English is not the primary language [Watts-Taffe and Truscott 2000]. Educators face the challenge of creating inclusive learning environments for students who possess different linguistic capabilities, emphasizing the need for second language pedagogical supports in both mainstream classrooms and informal learning environments. Rather than relying solely on text as the means for providing critical information about the virtual environment, computer games leverage sophisticated graphics to generate images, sounds, gestures, and objects that take on different meanings relative to context of the game. Visual information becomes a crucial component of game play as players interpret visual representations and respond accordingly. In comparison to self-paced tutorials that focus on reading, writing, listening and writing skills, video games require players to follow rules and process information to accomplish game tasks where language is just a means to an end and not the end itself. Such activities overcome the lack of motivation attributed to text-based Multi-user Object Oriented (MOO) virtual environments [Backer 1999]. We identify three key components of MMORPGs that accommodate SLA: virtual identity, social interactions and game context.

4.1 Virtual Identity

Typically, foreign language students struggle with developing target language proficiency due to inhibitions about using the new language, especially in the traditional classroom setting. Students become self-conscious, not wanting to make mistakes in front of their peers [Hadley 2001; Horwitz et al. 1986]. Therefore, language instructors seek ample opportunities to engage students in target language discourse as a means of helping students to build their confidence and develop language competency and communicative performance, the ability to respond appropriately in the target language [?; Krashen 1991]. Research has shown that the use of computers (e.g. on-line chat rooms) to supplement language learning provides foreign language students with opportunities to practice their emergent language skills in a non-threatening environment or faceless interaction that alleviates language anxiety or self-consciousness [Beauvois and Eledge 1996]. As a result, students produce more interactive conversations that resemble normal face-face conversations in the target language. Foreign language students who interact online demonstrate an increase in their cognitive skills in the target language and perceived learning [Beauvois and Eledge 1996; Hudson and Bruckman 2002]. MMORPGs provide both extrinsic

and intrinsic motivation in that players complete various quests of their choice to advance the development (e.g. skills, knowledge and power) of their chosen virtual character. Active learners who assume the role of the virtual characters make a commitment to the advancement of their chosen avatar in the virtual world. Simultaneously, these virtual characters mask the true identity of foreign language students. This ability to mask foreign language students' real identity reduces anxiety associated with face-face interactions with native speakers and creates an environment that is more forgiving when foreign language students make mistakes during attempts to communicate with others [Rankin et al. 2006].

4.2 Social Interactions with Player Characters

Video games such as Massive Multiplayer Online Role-Playing Games (MMORPGs) include social interactions as part of the game play experience and become social spaces for people of different ethnicities, culture and languages to meet and communicate with one another, thus giving the L2 student accessibility to speakers in the target language [C. Steinkuehler and Williams ; Jakobson and Taylor 2003]. Social interactions in online chat rooms accelerate students' reading, thinking and writing skills in the target language [J. Payne and Whitney 2002] and support the theory that online social interactions in MMORPGs will facilitate SLA. Moreover, online social interactions promote a democratic learning environment that is conducive to both introverted and extroverted learners, evolving into learner-centered environments in which students of different language levels accept more of the responsibility for developing target language proficiency [Beauvois and Eledge 1996]. Because MMORPGs attract a vast array of players from diverse backgrounds and require Player Characters (PCs) to develop strategic affiliations with other PCs, foreign language students will have ample opportunities to interact with speakers in the target language as they seek assistance with difficult quests. Online social interactions during game play activities encourage foreign language students to continuously practice producing the target language and negotiating meaning with native speakers as foreign language students further develop communicative competence in the target language. MMORPGs supply chat windows that enable players to communicate with Non Player Characters (NPCs) as well as Player Characters (PCs) in the virtual world. Therefore, the practice of chatting with other PCs provides ample opportunities for interactions between non-native speakers and native speakers in the target language. These interactions support second language students' ability to communicate effectively with native speakers.

4.3 Context for Second Language Acquisition

Interactive media in the form of video games offers an underutilized, immersive environment for developing proficiency in a foreign language [Rankin et al. 2006]. MMORPGs utilize audio, graphical images to convey semantic meanings of potential L2 vocabulary and phrases. MMORPGs display dialogue between Non Player Characters (NPCs) and PCs to assist foreign language students with syntactical structure of the target language. Players select a response to NPC questions which feature potential L2 vocabulary and information relevant quests in the game [Rankin et al. 2006]. Interactions between PCs facilitate communicative performance as foreign language students develop an understanding of what constitutes an appropriate response while engaging in conversations with native speakers via the chat window. All of the information is displayed and heard in the target language, creating an immersive learning environment that reinforces communication in the target language. Thus, MMORPGs supply an immersive environment and opportunities to participate in social interactions with native speakers in the target language, creating an effective digi-

tal learning environment for SLA. Next we conduct experimental studies that demonstrate the importance of user centered design for serious games.

5 Observational Studies of EverQuest II

EverQuest II (EQ2) is a MMORPG that is a sequel to the original EverQuest MMORPG, both designed by Sony Online Entertainment. Prior to playing the game, players select a character from 16 races (e.g. dwarfs, barbarians, etc.) and 5 archetypes (e.g. mage, scout, artisan, priest, and fighter) with each race and archetype having specific abilities. Players assume the role of their character, an avatar that represents the player's virtual identity in the game world. For example, if the player selects a cleric from the race of dwarfs who is a member of the priest class, then the player is represented as an avatar short in height and empowered with divine magic that banishes diseases. Players are immersed in a fantasy world of beautiful 3D graphics while journeying across various terrains, including rolling hills, barren deserts, dense forests, and bustling cities. Players advance from one level to another as they successfully complete challenges/quests; EverQuest II contains 60 levels. Players may form groups known as guilds that work together to complete quests or choose to play as individuals. EverQuest II accommodates social interaction among players, allowing players to communicate with one another using text and audio while playing the game and participating in player forums which serve as a useful resource for sharing and discussing effective game strategies, forming relationships with other players, receiving assistance when faced with trouble, and learning how to play the game. EverQuest II can be played in English, French, German, Russian, and Japanese and has an international player base.

5.1 First Observational Study

To determine feasibility of MMORPGs as language learning tools, we conducted a between subjects experimental design to test the following hypothesis: MMORPGs provide adequate support for L2 vocabulary acquisition.

5.2 Participants

Twelve Advanced English as Second Language (ESL) Chinese students were randomly assigned to two conditions: 1. Six ESL students who attended three hours of class instruction; 2. Six ESL students who played EverQuest II (EQ2) for four hours.

5.3 Methods

To accommodate the learning curve associated with understanding the game objective and maneuvering the game controls, ESL students spent an extra hour becoming familiar with EQ2. All twelve Advanced ESL students were enrolled in an Intensive English Program at a southern liberal arts college. Prior to participation in each condition, participants took an assessment that measured their prior knowledge of L2 vocabulary words that were modeled in NPC speech during game play. The assessment required ESL participants to use the potential L2 vocabulary in a sentence demonstrating prior knowledge. We purposefully selected L2 vocabulary that was not specific to the game and represented college level academic words (e.g. coagulated, coalesce, fervent, revive). ESL students who attended class participated in drill and rote exercises (e.g. define the L2 vocabulary word and use it in a sentence) while the ESL students who played EQ2 were given the tasks of completing quests 1 - 8. Once both groups had completed the designated hours for the study, each participants took three assessments. The first

post test assessment asked students to use L2 vocabulary in sentences demonstrating understanding of the word. Sentences were evaluated for appropriate use of L2 vocabulary and not grammatical correctness. The second post-test assessment used a recognition task based on game play scenarios where ESL participants selected the correct meaning from multiple choice options of L2 vocabulary words. The third assessment was a rational cloze assessment which measured ESL participants' semantic knowledge of L2 vocabulary words outside the context of game play in addition to their ability to select L2 vocabulary words based on contextual clues located in the clause, the sentence, and in the text.

5.4 Discussion of Results

The average pre-test score for all twelve participants was 8.86 indicating knowledge of approximately two L2 vocabulary words. One-Way Analysis of Variance (ANOVA) of test of post test assessment of sentence usage revealed a significant difference, $F(1, 9) = 8.94$, $p = 0.02$. ESL students who participated in traditional classroom instruction had an average post test score of 54.78 (SD = 8.81) out of 100 compared to the average score 16.16 (SD = 9.65) for ESL students who played EQ2. No significant differences were found for the post test for L2 vocabulary in the context of the game and transfer of knowledge of L2 vocabulary outside the context of the game. See figure 2.

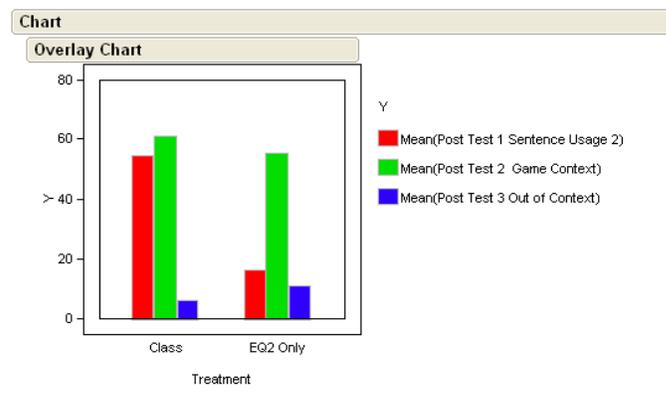


Figure 2: Results of post-test assessment of L2 vocabulary for first observational study.

6 Second Observational Study

To determine feasibility of MMORPGs as language learning tools, I conducted a second between subjects experimental design to test the following hypothesis: Social interactions between native and non native speakers in MMORPGs support L2 vocabulary acquisition.

6.1 Participants

Twelve Advanced English as Second Language (ESL) Chinese students were randomly divided into two groups of six each. Seven Native English Speakers (NES) of African American descent and enrolled in a southern university consented to participate in the study.

6.2 Methodology

Each of the twelve ESL students were randomly assigned to one of the following conditions: 1. ESL students who played EQ2 alone and 2. ESL students who formed teams of 4 people (2 NES and 2 ESL) as they worked together to complete quests. Both groups selected a virtual character who was a citizen of Qeynos (good character) and were told to complete quests 1 - 8. The one additional NES was to accommodate one game session when 1 NES participant could not attend and so another NES participant played the game in this participant's absence. At the beginning of the study, the ESL students completed a pre tests which measured prior knowledge of potential L2 vocabulary words. Both groups (ESL EQ2 solo players and EQ2 ESL w/NES) engaged in four hours of game play, exposing both groups to potential L2 vocabulary found in NPC dialogue. Upon completion of the study, three post tests were given. The first post test assessment asked students to use L2 vocabulary in sentences demonstrating understanding of the word. Sentences were evaluated for appropriate use of L2 vocabulary and not grammatical correctness. The second post-test assessment used a recognition task based on game play scenarios where ESL participants selected the correct meaning from multiple choice options of L2 vocabulary words. The third assessment was a rational cloze assessment which measured ESL participants' semantic knowledge of L2 vocabulary words outside the context of game play in addition to their ability to select L2 vocabulary words based on contextual clues located in the clause, the sentence, and in the text. Results are discussed below.

6.3 Discussion of Results

ESL students who collaborated with NES participants performed significantly higher ($M = 55.56$, $SD = 5.06$) than the ESL students who played EQ2 with no social interactions with NES ($M = 82.22$, $SD = 5.54$). An ANOVA of post test scores for L2 vocabulary in the context of game play indicate $F(1,9) = 12.62$ for $p = 0.01$. See figure 4. Despite the fact that the ESL students paired with the NES participants produced scores of zero for the post test assessment for L2 vocabulary outside the context of the game, there was no significant difference of low scores for the ESL students who played EQ2 alone. These results indicate that the social interactions between ESL students and NES participants involved discussion of quests, including critical information that featured L2 vocabulary words. See figure 5. These discussions made salient L2 vocabulary words and facilitated ESL students' increase in L2 vocabulary acquisition. Thus, results reinforce L2 pedagogy that emphasizes interactions with native speakers as the means in which second language students develop communicative competence (e.g. grammatical structure of language) and performance in the target language. See figure 3.

We predicted that the drill and rote practices used for L2 pedagogy in the classroom instruction condition would prove beneficial for post test assessment, especially since the ESL students define the words and use them in sentences. Thus, the sentence usage post test was a near task of learning for this group of participants. Though the ESL students who played EQ2 did not improve significantly, the majority of student participants in this group did increase their number of L2 vocabulary. Remember that the claim is MMORPGs can provide adequate support for L2 acquisition. We did not expect MMORPGs to outperform traditional classroom instruction, but we want to evaluate MMORPGs ability to facilitate SLA. Therefore, results suggest that MMORPGs show great promise as a second language pedagogical tool, provided game designers leverage the benefits of MMORPGs for SLA.

Upon closer scrutiny, qualitative analysis revealed an interesting pattern of social dynamics between the NES players and ESL stu-

dents. We developed a modified version of the Dialogue Acts in Several Markup Layers applicable to social interactions between native English speakers and non-native English speakers in a virtual environment [Allen and Core 1997]. After achieving a Cohen's Kappa of 80% inter-rater reliability, we coded 525 chat messages for the following four categories of speech acts:

1. request for game or personal information;
2. assertive statements demonstrating knowledge of the game, self, or world;
3. conversational openings & closings;
4. player's influence on other PCs' future actions in the virtual world;

Though NES participants produced more chat messages for each of the categories, no significant differences were found between the two groups. We assumed that there would be a significant difference in the quantity of messages coded as assertive statements since the ESL students were being introduced to EQ2 and in some cases this was their first experience playing video games. Results indicate that the lack of experience playing video games or the novelty of EQ2 had small if any impact on their ability to communicate with NES participants. However, this suggests that the ESL students' Advanced Level of Proficiency in English may have contributed to their ability to match the communicative performance of their NES teammates. The question remains if we would see the same effect if Intermediate ESL students were conversing with NES players or would the communication patterns significantly differ? These are questions to be explored in future research.

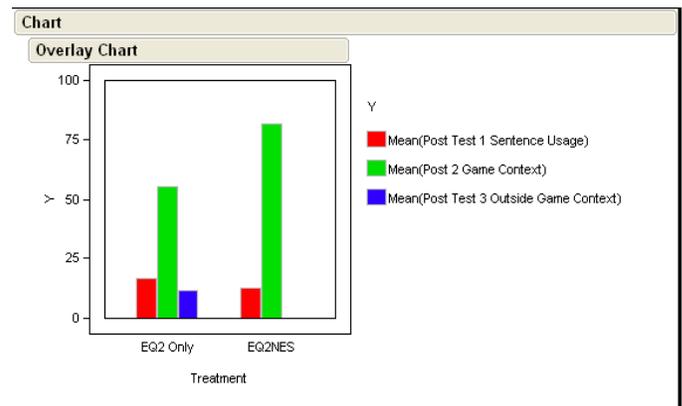


Figure 3: Results of second observational study: One-Way ANOVA of post-test scores of L2 vocabulary.

7 Conceptualization of Serious Games for SLA

The goal of serious games is to create game play experiences that develop knowledge and skills that have value in the virtual world and transfer to real world applications. The results of the first observational study indicated that the effect of traditional L2 pedagogy on post-test scores far outweighed the effect of ESL students playing EQ2. If we closely examine the practices involved in traditional L2 instruction, we find that the instructor provides guided instruction, repeatedly making salient the key points of interest such as semantics of L2 vocabulary. In comparison, games represent open-ended exploration, giving the player the freedom to do as she wishes. This contradicts L2 classroom instruction and introduces the possibility of students overlooking important information

such as potential L2 vocabulary. One design implication for serious games that lead to an increase in SLA is to incorporate experiences during game play that guide the player to relevant information in the target language. For example, the concept of intelligent NPCs that are capable of real-time multi-modal conversation that emphasizes L2 vocabulary can offer guided instruction to second language students and enhance the game play experience.

<p>ESL PC 1 says to the group, "i need to examine the parchment scrap to see if i can decipher anything"</p> <p>NES PC 1 says to the group, "click on the white message box"</p> <p>ESL PC 1 says, "Hail"</p> <p>NES PC 2 says to the group, "from the spiders?"</p> <p>NES PC 1 says to the group, "and select group"</p> <p>ESL PC 1, "how to do this quest"</p> <p>NES PC 1 says to the group, "nice, you're using group chat"</p> <p>NES PC 2 says to the group, "just kill a bunch of spiders and you'll get what you need"</p> <p>ESL PC 1 says to the group, "ok "</p>

Figure 4: Game dialogue between ESL students and NES participants using L2 vocabulary word *parchment*.

The results of both observational studies strongly suggest that social interactions between native and non-native speakers in interactive and cooperative game play become an integral factor in contributing to second language acquisition. These results position user centered game design as an effective methodology for designing game interfaces that capitalize on social interactions between players. The ability to leverage social interactions that facilitate SLA becomes a crucial requirement in the design of serious games that promote proficiency in the target language. Furthermore, our results identify that MMORPGs accommodate the specific L2 learning objectives of vocabulary acquisition, reading comprehension skills, and conversational fluency. These same learning objectives become the specifications for the design of a serious game, specifically game tasks that create game play experiences that support the development of L2 players' proficiency in the target language.

Moreover, the qualitative analysis of native and non-native speakers' chat logs collected during the second experimental study provides valuable data that informs the prototype phase. This is more effective than the traditional game design process which does not include observational studies as the initial phase of game development. The four categories of speech acts used to code the subjects' game logs serve the dual purpose of classifying the different types of social interactions between the NES players and the ESL students. Consequently, these four classifications of social interactions define the concept of a serious game that facilitates SLA. First, it supports communicative performance which is a SLA learning objective. Secondly, it gives the second language student the ability to communicate with other Player Characters which is a game activity that supports the learning objective. The output of the conceptualization phase defines the specifications for the game prototype. Based on the results of observational studies, one iterative pass of user centered game design specifies communication in the target language as one of the primary functions of the prototype. Using Sony's UI Builder, we implement an Alpha version of a game plug-in that facilitates conversation in the target language by offering conversational prompts that assist L2 students with social interactions associated with game activities. See figure 4.



Figure 5: Prototype of game plug-in that facilitates conversation with PCs.

8 Conclusion

Results from both experimental studies indicate that MMORPGs can serve as unorthodox second language pedagogical tools. Furthermore, user centered game design identifies learning opportunities in the initial stage of game development. Future work includes a prototype of a game plug-in that will provide conversational supports in the target for foreign language students. This will assist second language students' attempts to meet and collaborate with native speakers as they complete game tasks. Additional future work includes usability testing of the prototype as part of the iterative design process for MMORPGs that supplement L2 pedagogy.

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