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Player Vs Language: the Effect of Multiplayer in Gamified Language Learning Environments

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PLAYER VS LANGUAGE: THE EFFECT OF MULTIPLAYER IN GAMIFIED LANGUAGE LEARNING ENVIRONMENTS

A Thesis Presented

by

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ABSTRACT

PLAYER VS LANGUAGE: THE EFFECT OF MULTIPLAYER IN A GAMIFIED LANGUAGE LEARNING ENVIRONTMENT

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With the consistent popularity of and research regarding games and game play, the educational strategy now known as “gamification” has come more into focus. “Gamified” study tools have begun to populate the market but these tools are almost all designed for solo use. Many pre-existing language learning strategies, and indeed language itself, center around group interaction and are thus less compatible with single player study tools.

A study was performed to isolate the variable of group play (multiplayer) in a game based language learning environment. Those participants who reported that they enjoyed the multiplayer game sessions more than the singleplayer session or thought them to be more effective at conveying new grammar displayed a distinct set of characteristics. Namely, these players were regularly more eager to seek out the opinion of others, offer their own opinion, and generally be outgoing. Those who reported the singleplayer sessions to be more enjoyable were regularly more focused on the game elements and less likely to participate in group discussions

relating to the language exercises within the game. This suggests that while multiplyer, gamified tools can be effective, they require a certain type of learner or a great deal of intentional design to cater to those who do not naturally gravitate towards such learning styles.

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CHAPTER 1

INTRODUCTION

The technological landscape is changing. Every year more and more innovations enter the public consciousness as tech companies jockey to release the next big thing. The result of this surge forward is near infinite information available at the touch of a button and a world that feels incredibly close at hand. Communication has been a large focus of technological development in the past several decades, creating a real global community and making it more important than ever to be able to engage with cultures not our own. Business has also been irrevocably changed by the march of technology forcing companies to keep up or keep out of the way. These changes seem natural to us now as they have become synonymous with contemporary lifestyle as to prove the old idiom, “out with the old and in with the new.” However, there is another movement in technology with the potential to be just as impactful on our lives and it is growing every day. It is a marriage of two things technology does best, namely to entertain and to educate, and it is called Gamification.

The term Gamification is believed to have been coined by British computer programmer Nick Pelling in 2003 and has consistently gained in popularity in the last decade. Gamification is defined as “the use of game-like thinking and elements in places that aren't traditionally games. ("Gamification", 2015)” This idea has been applied to many fields from therapy to advertisement and in the last decade has been gaining significant support in the educational world as “the use of game mechanics and dynamics like badges, leaderboards, and actions can be useful for improving motivation and

learning in informal and formal settings ("Gamification", 2015).There are a myriad of examples of teachers using game mechanics to support the teaching of mathematics, physics, history, philosophy, and even foreign languages.

One striking example of game-informed educational design can be found at Massachusetts College of Liberal Arts in the classroom of professor Gerol Petruzella. Petruzella teaches philosophy in a very unique way which was inspired by Role Playing Games (RPGs) such as Dungeons and Dragons, a classic RPG invented in 1974 which sees players working together to complete challenges. The game uses only books and dice and takes place entirely as a series of conversations which resemble improvisational acting. Petruzella's class uses a similar format to introduce students to complex concepts of philosophy. The class is called dungeons and discourse and involves students travelling through the fictional world called Sophos. Every civilization in this world represents a different philosophical concept and acts as a unit on the syllabus. Petruzella also incorporates elements of social media and digital media streaming into his class, creating a cohesive, multimedia experience for students ("Dungeons & Discourse: A Social Media for Teaching & Learning Case Study", 2013).

Petruzella's class is a wonderful example of large scale gamification. However, projects such as his require significant effort on the part of the instructor and as a result they are rare. Much more common are self-contained gamified study tools such as Influent (http://playinfluent.com/), Duolingo (https://www.duolingo.com/), or even Rosetta Stone (www.rosettastone.com/). It is clear to see this is a growing trend in educational software and one with plenty of room for growth.

CHAPTER 2

THEORETICAL BACKGROUND

A. Multiplayer and Team Based Learning

It is in multiplayer games that we see players utilize skills that are so often stressed in the classroom. Collaboration, communication, and community building are as important in *World of Warcraft* as they are in any educational field, perhaps even more so. The advantage that multiplayer games have over typical classroom instruction is that they have a lower barrier for entry and that there is a wide range of player skill. Kurt Squire describes this culture quite well in his book "Video Games and Learning" where he writes, "This form of learning – having people (including novices and experts) engaging in joint problem solving – is considered by learning theorists such as Annemarie Palincsar and Ann Brown (1984) to be perhaps the 'best' form of learning. Yet it is rarely utilized in schools, which focus on individual work and are segregated by skill level. Typically in each class there is one 'expert' (the teacher), whose job it is to impart knowledge to the students, who are supposed to diligently work on their own learning (Squire, 2011, p. 12)."

What Squire is referring to is a method of learning known as Team Based Learning (TBL) or Cooperative learning (Michaelson, Knight, & Fink, 2002). TBL is a method of teaching which puts the focus on students working in small groups. Class sessions tend to include a relatively small amount of instruction and a comparatively large amount of group projects and assignments in order to both expose students to material and allow them to practice it. The core of TBL is made up of four elements;

Groups, Accountability, Feedback, and Assignment Design. Group composition and cohesion are important because groups are intended to be maintained for the duration of the course. Diversity of group members exposes everyone to a variety of viewpoints, ideas, and learning styles which increases. When forming groups it is also important to avoid members with pre-established relationships as this may interfere with group cohesion and split the group into cliques. Accountability is generated by making all group members responsible for the success of the group as a whole. Before group assignments begins, all students are given a Readiness Assurance Process (RAP) test which is designed to ensure students have sufficiently prepared and will not be unfairly relying on other group members to convey the material to them. Additionally, students are regularly given the opportunity to evaluate their peers, allowing students to learn their strengths and weaknesses in a safe environment. Feedback, both individual and on a group basis, is an integral factor for retention as well as group cohesion. This feedback should be immediate and productive, serving to encourage rather than discourage students. Finally, proper assignment design is important because TBL requires exercises which encourage discussion and interaction between group members (Michaelson, Knight, & Fink, 2002).

TBL has many features which make it an appealing option for long term success. The accountability afforded to students in a TBL environment via RAP tests and peer assessment encourages students to improve their own knowledge to ensure they are contributing as much as their partners. Additionally, because so much of the class time is spent on actually applying the knowledge rather than listening to lectures, students theoretically gain a deeper and more practical understanding of the material. Diverse group composition provides the potential for both rich discussion based on differing

opinions and backgrounds but also a built in support network if some group members are struggling.

Similar to large scale gamification, however, the actual implementation of TBL can be challenging. Exercise design must be very intentional with prompts being open enough to encourage discussion and interaction while still remaining on topic. Group formation avoiding prior connections and personality clashes is extremely difficult without a very large pool of potential group members. TBL is also designed to be implemented long term in order to foster group cohesion. Forming TBL groups for short term study eliminates much of the accountability which is the main strength of TBL.

B. Solo Study Tools

Interestingly, the effectiveness of multiplayer gaming for educational and community building purposes is not reflected in the gamified tools available today. Some of the most common options for people to engage with and learn a foreign language outside of the classroom environment are self-study tools such as Duolingo and the ever popular Rosetta Stone. Rosetta stone is certainly the most widely known language study tool in use over the last decade (www.economist.com/news/business/21569067-technology-starting-change-language-learning-linguists-online) and has in many ways become inexorably linked with self-study language learning. This software utilizes a "technology-based approach [that] recreates the immersion method, allowing [users] to learn a new language effectively (www.rosettastone.com)." While Roestta stone attempts to mimic a "natural" method of language acquisition it does so in an entirely solitary environment. The user is only engaging with the computer itself and simulated partners

via scripted conversations. There is little to no flexibility in this system and to practice communication with actual people requires users to seek out those opportunities elsewhere.

Duolingo is another popular choice for self-study and one which is often pointed to as an example of gamification. Users of Duolingo select lessons from a wide variety of topics and skill levels ranging from beginner to intermediate. The new grammar or vocabulary is then explained in text form and the user is presented with exercises reminiscent of those one might find in classroom textbooks. The exercises typically begin with multiple choice and increase in difficulty to fill in the blank and short answer style questions. As feedback is automated by the computer, only these types of exercises can be processed and feedback typically takes the form of a correct or incorrect mark followed by the computer's target response. Duolingo uses a social media element to enhance motivation and create learning communities and support networks. Achieving certain milestones rewards users with digital "badges" which are added to their profile and can be shared via social media to show off to friends. Ideally this creates a healthy competition between friends who are learning the same language as they push each other to greater and greater levels of proficiency. To support this, Duolingo gives users the option to see the scores and fastest times of other people taking the same lessons, granting users a yardstick by which to measure their own progress. Like Rosetta Stone, however, Duolingo's exercises involve only communication between the user and the computer. There is no option for players to directly communicate with one another and practice what they have learned in actual conversations. Additionally, while Rosetta Stone helps users with pronunciation by means of prerecorded audio tracks from native

speakers, Duolingo does not involve an audio component and all instruction is done in text form.

While these self-study tools can be effective for a certain type of learner, the fact that they are entirely singleplayer experiences means they are limited in terms of the educational strategies they can employ. Specifically, these tools are not well suited to group based strategies such as TBL. Luckily, group learning and teamwork is one area in which games excel.

C. The Social Nature of Games

Many COTS games utilize teamwork as a central feature which is essential for success. These multiplayer games can be extremely compelling and competitive gathering places for likeminded people and players frequently form teams, colloquially dubbed “clans,” who play together regularly and compete against other clans. Similar to the way Duolingo pushes users to perform by showing them how they compare to other users, competitive multiplayer games frequently have leaderboards which display statistics on individual players and clans, encouraging players to constantly improve. These games also involve actual communication as the coordination required for success often necessitates the use of voice chat. These clans who spend much of their free time playing games together, striving for the same goals, and pushing each other to improve often form connections that transcend the game space and form a large part of the social lives of their more dedicated players.

While this type of group formation and affinity space can be seen in many multiplayer games, perhaps the genre that most supports this phenomenon is the Massively Multiplayer Online (MMO) genre. MMO games are so classified because they involve thousands if not millions of players in a persistent world. While theme and gameplay can vary, MMOs always involve cooperation and competition amongst the enormous player base. As one of the most well-known MMOs and one which had a major influence on the genre, World of Warcraft is renowned for its social elements and dedicated clans. (Ratan, R. A., Chung, J. E., Shen, C., Williams, D. and Poole, M. S. 2010)

What is most pertinent about Word of Warcraft and MMOs in general is the way in which group learning takes place on a large scale. The most difficult content within the game requires a large amount of knowledge and statistical analysis. Without maximizing each character's effectiveness as well as the synergy between group members there is no hope of defeating certain boss monsters or completing the lengthy and devilishly hard dungeons known as "raids." Thus, success requires education. More experienced players take leadership roles and educate the newer members of their clan on the nuances of each enemy. Even more experienced players educate the entire gaming community by writing guides and publishing them on fan made websites. Groups of new players educate themselves by reading those guides and by observing the more experienced players. All of this is taken on by the players on a purely voluntary basis.

This is the motivating power of multiplayer games that is the ultimate goal of gamification in education and what is missing from modern self-study tools. Rosetta

Stone relies entirely on the individual student's perseverance and does nothing to create a community to support those students. Duolingo creates this community with its system of badges and friendly competition but the actual content, the communication, is done on a single player basis. The structure of games like World of Warcraft could be put to good use in the form of a self-study tool, allowing learners to engage with each other and nurture each other's abilities outside of a classroom environment using the strategy of TBL.

D. Technology and Communication

Gamification, Team based learning, and socially focused games like MMOs are the products of the intersection between three elements; Classroom learning, Entertainment, and Community. What has not yet been clearly defined is where these three combine, a community based gamified language learning tool. If the nature of language is to communicate from one person to another, the tools we use to practice language should reflect that. Plenty of COTS games place an emphasis on the multiplayer experience and so we know that the technology for such formats already exists. Kanji Akahori (2002) shows us exactly why single player tools are not ideal in the current day and age by detailing his "three era" theory. Akahori says that learning media is irrevocably linked with social change and societal goals and describes three main eras of society; Industrial, Information, and Network. In an industrial society the goal is the production of goods and the learning media reflects this by "dissolving an object into parts and recombining these parts to maximize the goal (Akahori, 2002, p. 1)" via audiovisual aids and programmed instruction. Audiovisual learning media such as

prerecorded conversations and instruction tapes are a hallmark of this era. The information society shifts the focus to the production of knowledge and computer assisted

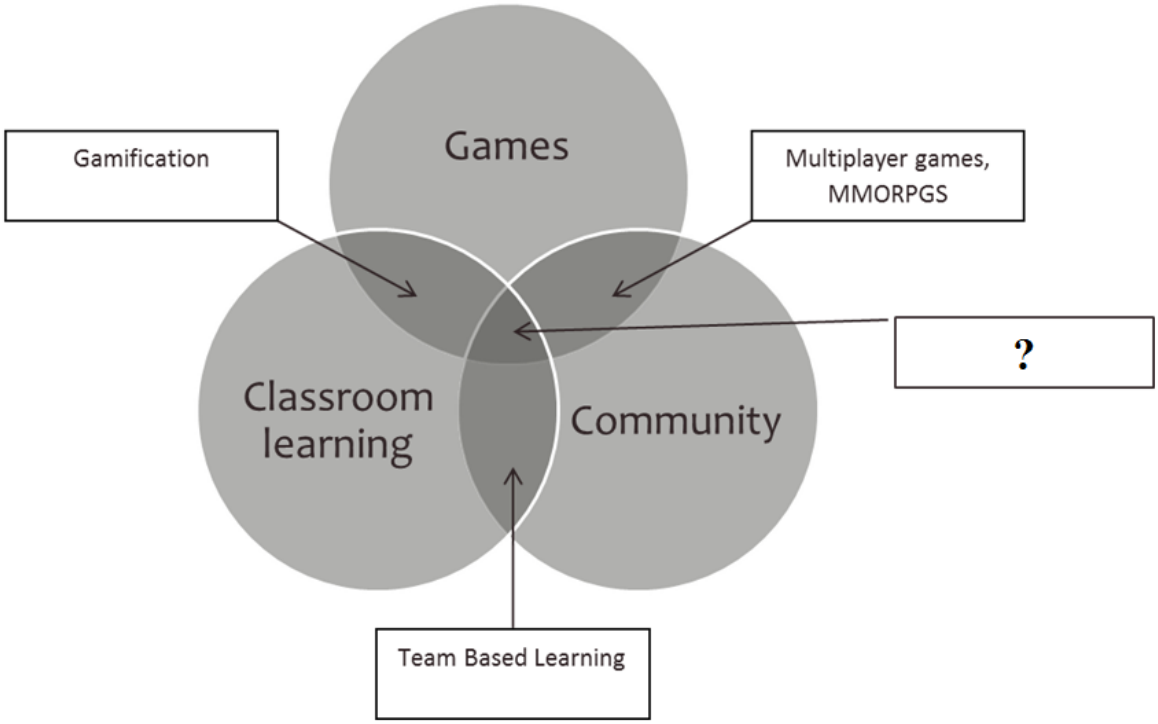

Figure 1: Intersection of Games, Learning, and Community

instruction becomes an important tool. Tools like Rosetta stone and Duolingo fall into this category involve flexible automated instruction with users interacting with the computer. Finally, the network society places a premium on communication. Human to human communication mediated through computers is the preferred method and the internet is one of the most important tools in this kind of society.

It is in this type of society that we now live and human interaction should be our top priority, even when interacting from in front of a computer screen. As mentioned previously, TBL is based on the idea of learning via interaction with other people and

thus a natural fit for learning in the information era. With that in mind, multiplayer games can provide the framework for learning tools that can bring TBL into the digital space, thereby providing more opportunity for communication between learners regardless of physical distance. This is the real potential of gamification and is an option that has not often been utilized, due in part to the difficulty of designing such systems.

CHAPTER 3

LITERATURE REVIEW

A. Games in Education

The idea of games in education is not quite as strange as it initially sounds. In fact, author Jane McGonigal (2011) lays out four elements that are inherent to any game regardless of genre or platform in her book *Reality is Broken*; a goal, rules, a feedback system, and voluntary participation (McGonigal 2011). A goal is self-explanatory; the thing which players attempt to accomplish. Rules provide arbitrary restrictions on how players accomplish the goal of the game. A feedback system lets the player known the result of their in-game actions and shows progress towards the goal. Voluntary participation means that all players know and accept the goals, rules, and feedback system. This creates a communal atmosphere between players as everyone involved has made the choice to work towards the same goal with the same conditions. Anything containing these four elements in some proportion could be considered a game.

In a language classroom these elements already exist. For example, in *Videogames and learning*, Kurt Squire (2011) details the varied types of goals which overlap to create engagement in Commercial Off The Shelf (COTS) games. Long term goals form the crux of the game and typically require three to four hours or longer to achieve. Medium term goals of 45 minutes to an hour provide players with an objective that can be completed in one game session that still feels substantial, while the bite sized short term goals create a small feeling of progress every 60 to 90 seconds which keep the player going (Squire, 2011). In the context of a language classroom Long term goals

could be something like fluency or even just the end of the semester, a medium term goal could be completing a single class session or a test, and short term goal occur every time a student is asked a question. In the same way that game rules restrict the methods players can use to complete challenges, rules are in place in the classroom to restrict the scope of acceptable answers to specific target grammar points. Grades and teacher reactions are types of feedback systems that allow students to see the results of their in-class work. Voluntary participation is also present in the language classroom as students typically understand and accept the terms of the classroom upon signing up for the course. With the exception of required high school courses, language classes consist of students who want to be there and understand that they will not immediately be fluent in their chosen language. There is an acceptance of a degree of discomfort and embarrassment that is required for all language students.

Gamification, being the combination of commercial games and classroom learning, naturally includes these elements as well. For example, let us look at Duolingo. As shown in Table 1, the self study application has language fluency and communicative competence as its goal, similar to a language classroom. The structure of instruction in terms of exercises offered provide rules and feedback takes the form of grades as well as achievements similar to commercial games. Voluntary participation is also easy to see in Duolingo's model as learning is self directed. Players can choose when they learn, what they learn, and for how long. Given this example, gamification has elements in common with both commercial games and classroom learning.

	Commercial Games	Japanese Classroom	Duolingo
Goal	Make your character increasingly powerful and defeat the final boss	Fluency/communication/etc	Fluency, communication, badges and achievements
Rules	Classes, abilities, programming	Assignments, grammar, syllabus	Assignments, grammar, programming
Feedback System	Damage numbers, deaths, achievements	Grades, tests, partner reactions during conversation	Achievements, grades
Voluntary participation	Payment, terms and conditions, forums/build guides/etc	Syllabus, enrollment, all learning is a voluntary action	Terms and conditions, learning as voluntary, self directed

Table 1: The four elements in action

With a goal, rules, a feedback system, and voluntary participation, language classrooms already contain the elements which define a game. Thus, the concept of gamification seems to be a natural fit. For a glimpse of how games can fit into the process of learning a second language let us look briefly at Computer Assisted Language Learning systems as precursors to more modern game based learning.

B. Computer Assisted Language Learning

Computer Assisted Language Learning (CALL) systems have existed since the proliferation of personal computing. Programmed Logic for Automatic Teaching Operations, also known as PLATO, was one of the first, developed in the 50's and functioning as a database of Russian vocab and grammar drills. PLATO included a feedback system which provided extra assignments based on previous errors. For example, if a user repeatedly makes a mistake when conjugating verbs to the past tense, the next assignment the program will provide will be on past tense verbs. In this way the system customized the learning experience to suit the needs of the individual user. It used

the grammar translation method and knowledge checks were fairly rudimentary as the automated feedback system was only equipped to distinguish right from wrong as opposed to more detailed explanations of errors. PLATO formed the basis for many other CALL systems to follow (Beatty, 2003).

In the latter part of the 20th century CALL systems focused on providing the learners with authentic materials such as recorded television or interviews. Suddenly CALL became a viable tool for listening and pronunciation practice. Some CALL systems, seeing PLATO as not utilizing the full potential of computers for language learning, focused more on creating simulation type programs utilizing multimedia features to provide video and audio of native speakers. For example, the system known as Montevidisco utilized the multimedia functions of early computers and focused on creating branching dialogue paths which approximated natural conversations. Users would be presented with a video scenario containing a native speaker with which to have a dialogue. The native speaker would ask a question and the user would be presented with several possible answers. Based on the user's answers, the character would respond differently, and the conversation would shift to different topics in much the same way that normal conversations between people do. This was a departure from previous CALL systems which followed a single linear path with only one acceptable answer for any given question. This simulation method supported the testing of hypothesis as the simulation could be run repeatedly in order to see how certain options affect the outcome. Users could see how the conversation changed based on their input and adjust their answers accordingly. (Beatty, 2003).

The use of computer programs for the purpose of language learning has been shown to be a generally effective strategy even amongst advanced learners. For example, in a study by Linda L. Chang at Brigham Young University, eight advanced students of Chinese participated in a semester long course utilizing a CALL program while a control group of eight students learned the same material in a typical classroom setting (Chang 2007). Pre and post tests measured student improvement in terms of grammatical accuracy, attitude, and perceived learning gains. The CALL program utilized multimedia in the form of video and audio components to enhance the learning experience and allowed for the collection of user generated audio for testing purposes. Both groups conducted assessment using the audio capture feature of the CALL program but only the test group received instruction from the program. The results of the pre and post-tests show a significantly higher growth in the experimental group over the control group. Experimental group participants outperformed control group participants on both idiom definition and open ended questions which typically require a more sophisticated understanding of the language. Moreover, students almost universally agreed that the CALL system was helpful in solidifying their knowledge of Chinese. Chang extols the virtues of the CALL system saying it "enhanced advanced CFL learners' cultural understanding and their Chinese verbal skills (Chang 2007).

C. Repurposing Early Commercial Games

As computer technology advanced, people began seeing potential for educational experience in programs which were not originally intended for CALL purposes. Created in 1978 with the intention of playing online RPGs (Felix, 2003), Multi User Domains (MUDs) and their extension Multi user domains – Object Oriented (MOOs) eventually

became a viable avenue for more self directed CALL. These programs are essentially text based environments which support simultaneous text chat between users. MOOs use a spatial metaphor, arranging the world into "rooms" which can have some small degree of customization including multimedia files and players are encouraged to create and share their own rooms. What began as a platform for Dungeons and Dragons eventually was experimented with for language learning purposes. Some MOOs served as virtual classrooms with students logging in and receiving instruction from teachers in the virtual space. Other MOOs acted as a meeting place for people who were all learning the target language on their own and merely want other students to converse with, share ideas, and get feedback.

MOOs used for language learning tended to inspire a great deal of investment in those who bought into the premise and allowed themselves to suspend their disbelief. Many others, however, found the freedom granted by the space created an environment which was too chaotic for serious language learning to occur. There was no inherent structure which allowed for the enforcement of rules and the fact that all conversation happened in text form meant that there was a steady stream of scrolling text to distract from the lesson at hand. (Felix, 2003). In the end, MOOs never became a popular method of language instruction but online forums now serve a very similar role for language learners looking for community.

D. Gamification Research

There are many examples of studies surrounding specifically game based CALL as well. Reinders and Wattana designed a study in 2014 which investigated the effect a multiplayer game environment had on student Willingness To Communicate (WTC).

Thirty students in an “English for IT” class taught entirely in English signed up to play the COTS game *Ragnarok Online* in their target language. *Ragnaros Online* is a fantasy RPG where players fight monsters, collect treasure and complete missions for the characters within the game. The researchers created custom missions within the game which provided opportunities for the players to utilize the grammar and vocabulary they were introduced to in the class but much of the basics of the game remained intact. The study lasted fifteen weeks during which 20% of class time was devoted to playing the game. Questionnaires were issued prior to starting the course and after the course was over to evaluate the students’ perceived ability and confidence. Players interact with each other via voice and text, and with in-game characters via controlled dialogues which required players to type their responses or select one from a list.

Initial findings indicated that during the normal class time, most students were very hesitant to interact in the target language. They were hesitant to talk to classmates about assignments or ask for clarification, acts which would improve their understanding of the material but might have embarrassed them (Reinders and Wattana, 2014). Additionally, they discovered that the students felt a great deal of anxiety about speaking up and were worried about making mistakes which lowered their WTC. Finally, students also reported they had little faith that classroom activities increased their fluency, further reducing their WTC.

Reinders and Wattana found that this changed dramatically when students were asked about their time in the game (Table 2 and Table 3). Anxiety levels dropped, players were more confident and more willing to make mistakes. Students were also more likely to believe that their activities were increasing their fluency. This corresponds to part of

Krashen's Moniter Model known as the affective filter which holds that variables such as motivation, self-confidence, and anxiety are important to acquisition. When these variables are negative, they form barriers (affective filter) which can prevent acquisition. It seems that the game environment helped lower the affective filter to allow students to see their own progress. In fact, Krashen himself wrote that "games can serve very well as the basis for an acquisition activity and are therefore… an important experience in the acquisition process. (Krashen 1988, pp 121)"

Communication tasks	Mean	*SD*	Interpretation
Ask for clarification when you are confused about a task you must complete.	2.86	.82	Neutral
Listen to what your classmates say in English.	2.86	.78	Neutral
Talk to your classmates about a class assignment.	2.33	.88	Somewhat unwilling
Read task description/instructions before you start completing.	1.96	.81	Somewhat unwilling
Communicate ideas, feelings and opinions.	1.63	.76	Somewhat unwilling
Overall Mean	2.33	.55	Somewhat unwilling

Table 2: Reinders and Wattanna (2014) pre-study results

Communication tasks	Mean	*SD*	Interpretation
Ask for clarification when you are confused about a task you must complete.	4.06	.78	Somewhat willing
Listen to what other game players say in English.	4.06	.69	Somewhat willing
Read quest description/instructions before you start completing.	3.86	.73	Somewhat willing
Talk to other game players about a quest assignment.	3.86	.68	Somewhat willing
Communicate ideas, feelings and opinions.	3.36	.76	Neutral
Overall Mean	3.84	.286	Somewhat willing

Table 3: Reinders and Wattanna (2014) post-study results

One reason the researchers suggest for these findings is the positive feedback that is continuously provided by the game. Players can immediately see the effects of their

language skills when they communicate to one another as well as in-game characters in order to complete challenges. The information they gain from utilizing their language skills directly and immediately leads to their in-game success which the researchers say give the players “an immediate sense of achievement”.

Reinders and Wattana go on to state that since WTC is an important factor in language learning, environments like those offered in computer games are well suited for L2 learning. “Digital games clearly make learners feel less anxious and encourage collaboration and group cohesiveness… If games encourage learners to engage more, this may help them in their learning. One important reason for these findings may well be the anonymity the games afford; although all the students in this study knew each other and were probably easily able to tell which avatar represented which student, still a degree of projection may have made students feel more comfortable to communicate, and in particular, to make mistakes (Reinders and Wattana 2014, pp 116).”

In another study called *L2 writing practice: game enjoyment as a key to engagement*, Allen, Crossley, Snow, and McNamara (2014) saw the importance of game design when using such tools for educational purposes. Using the game-like tutoring system called W-Pal, the researchers tracked a group of students as they practiced their writing skills. They found that the degree to which players reported they had fun playing the game was a predictor for several important elements of learning. First, and perhaps unsurprisingly, the more a student enjoyed the game the more likely they were to want to continue learning using the game. Of more interest is the fact that the more students reported enjoying the game the more likely they were to consider the game helpful in terms of learning the language. This is important because one potential criticism of

gamification is that the game elements are merely a distraction and that students will engage with the game itself rather than with the language. This study established that enjoyment was a strong positive factor in fostering learning gains and that perceived difficulty had little effect. The researchers wrote, “Students’ perception of learning gains and writing improvement were positively related to their ratings of game helpfulness and enjoyment. However, students’ perceptions of game difficulty had little to no relation to their perceived learning gains (Allen, Crossley, Snow, McNamara 2014, pp 137).” Moreover, the pool of participants contained a fair number of both L1 and L2 learners which provides us with an interesting perspective on the results. The researchers found that all participants, both L1 and L2 learners, experienced an increase in motivation to perform well.

CHAPTER 4

STUDY AIMS AND IMPLEMENTATION

A. Study Goals

This paper will attempt to provide evidence of the potential benefits of multiplayer focused gamification. To this end I will isolate the variable of single player vs multiplayer, exploring the effect that format and community has on a game based learning environment. Because grammar instruction requires deeper explanation than vocabulary or kanji, which are for the most part learned through rote memorization, the metric by which I measure success will be grammatical accuracy. The research questions are as follows;

1. What effect does adding multiplayer have on the efficacy of grammar instruction in a gamified environment? Efficacy here refers to the participants' post instruction grammatical accuracy.

2. What effect does adding multiplayer have on the student experience in a gamified environment. Specifically, do students feel that multiplayer is more enjoyable? Do they have higher levels of perceived improvement?

My hypothesis is that students will prefer the multiplayer format because the communal atmosphere allows them to share their successes and defeats with friends. I believe that the multiplayer format similar to the structure of TBL systems will allow participants the opportunity to actively experiment with new grammar points, using them in conversation with their partners immediately. This will likely lead to an increase in

confidence and perceived improvement. Similarly, I believe it is possible that students will show more grammatical accuracy after multiplayer sessions due to the effectiveness of a TBL style gamified environment.

B. Participant and Material selection

Before recruiting participants for this study, IRB approval was obtained after completing all necessary certifications. There was no inherent risk to any participants over the course of this study and participants were free to drop out at any point. Participation was entirely voluntary and volunteers were compensated with a free copy of the game used during the study.

Intermediate level Japanese students were selected for this study for several reasons. Primarily, the study is intended to isolate the effects of multiplayer and single player environments on learning grammar patterns through methods that will be described later. Newer students struggle with the basic syntax and vocabulary of the language, making it more difficult to convey grammar and see the result of that instruction. Advanced students already have internalized many of the more concise and common grammar points. Using these students would make it difficult to populate our game with enough new grammar points that can be quickly taught simultaneously and within the limitations of the game format. Intermediate students also have enough of a grasp of the language to interject their own examples and creative sentences unlike newer students. This allows for a wider design space in relation to the exercises within the game. Intermediate students, meaning those with a grasp of basic grammatical structure and syntax, make much larger strides forward than advanced students who, through dealing with harder, more situational materials, can find it more difficult to visualize their

progress. Since we have determined that students of intermediate level are the best fit for our purposes, recruitment proceeded by approaching a class of University of Massachusetts (Umass) students in their second year of Japanese language study to ask for volunteers. Using a single class for recruitment minimizes variance in skill level, ensuring that all participants have at least been exposed to a similar amount of language points.

The students were told they would be participating in a study of the use of videogames in Japanese language education and given a brief description of what would be expected of them. They were also told they would be allowed to keep their free copy of the commercial videogame used during the study. I felt this incentive would attract those already familiar with videogames, most likely those who already played them for leisure. Such participants would have prior knowledge of typical game controls and rules, allowing us to spend less time familiarizing the players with controlling the game and more time grappling with the language.

Once participants were selected, each was given a set of questions to set a benchmark for their current knowledge. In order to disguise the grammar which would be introduced through the study, these questions contained grammar that students of their level should know as well as all six grammar points to be introduced over the course of the study. The intent is to verify that the students are competent but are not previously familiar with the study's grammar points. The results of the pre-test showed that all participants were unfamiliar with the majority of the new grammar points. After this initial skills benchmark each student is given instructions on how to download and install their copy of Neverwinter Nights. Once all the participants have installed and configured

their games the play sessions are scheduled. Over the course of one week, participants would engage in game content which mimicked typical textbook exercises one might find in Genki (Banno, 2011) or similar textbooks.

In order to isolate the effects of the multiplayer format we must have comparable data from both singleplayer and multiplayer sessions. For this data to be comparable, the respective game sessions must be as close as possible in content with the only major difference being the switch between singleplayer and multiplayer. This necessitated our study involve game session using the same grammar and exercises. However, such a system would give a natural advantage to whichever format came second as players would have previously been exposed to the content. Thus, another pair of game sessions was added using different but comparable grammar. Together these four sessions give us data concerning both singleplayer and multiplayer and allow us to eliminate the influence of previous experience.

In all sessions a glossary was provided which contained terms that may be encountered in the session. As the focus of this study was on grammatical accuracy rather than vocabulary, participants were allowed to look up or ask the researcher for vocabulary words. After the final session, a post-study survey was administered which collected demographic information about the participants as well as gave them the chance to provide feedback.

As all participants are from the same class of 2nd year students, the grammar selected for the study was taken from the textbook *Tobira* (Oka, 2009), which the class was already using. Six grammar points were selected from material found in chapters the class had

not yet reached, ensuring that students had not been formally exposed to them previously. Each set of three grammar points is used in one single player and one multiplayer session. In order to compare multiplayer and single player effectiveness on a level ground, one set of grammar points will.

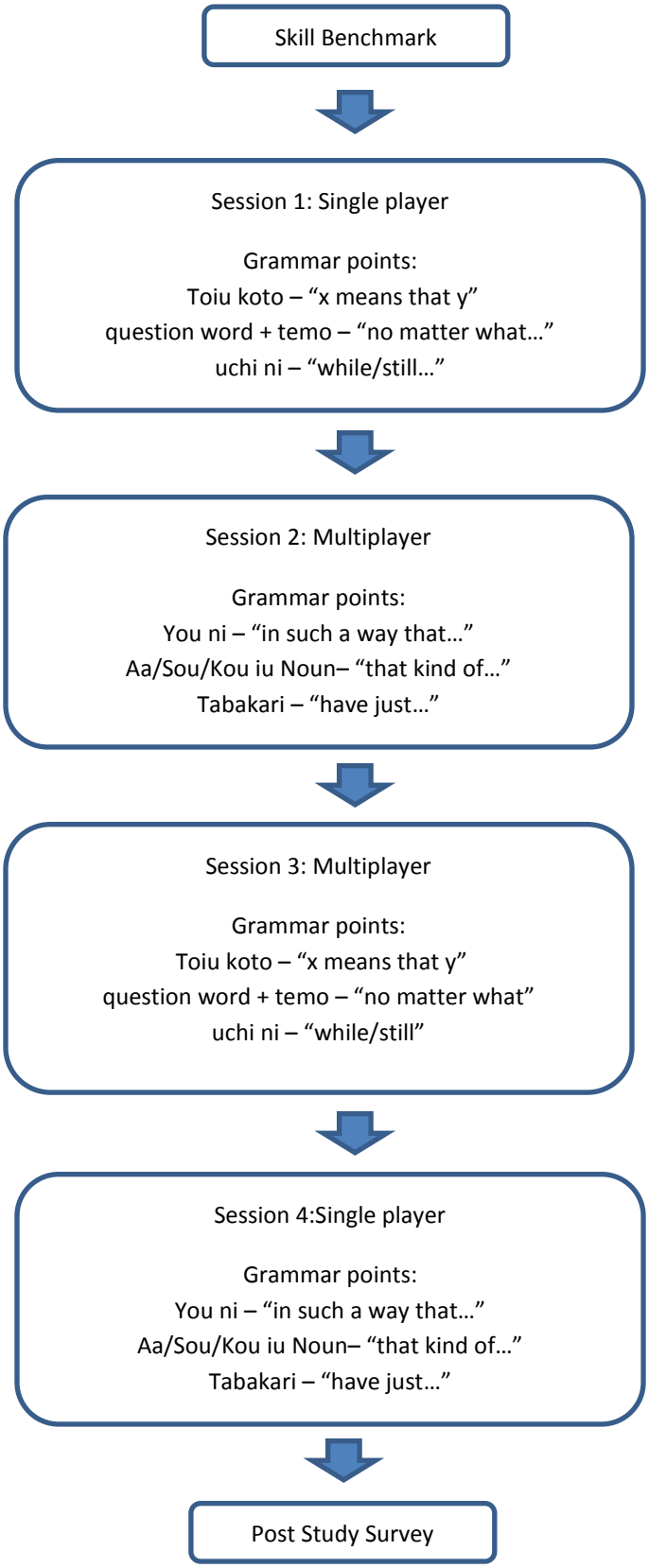

Figure 2: Progression of Study

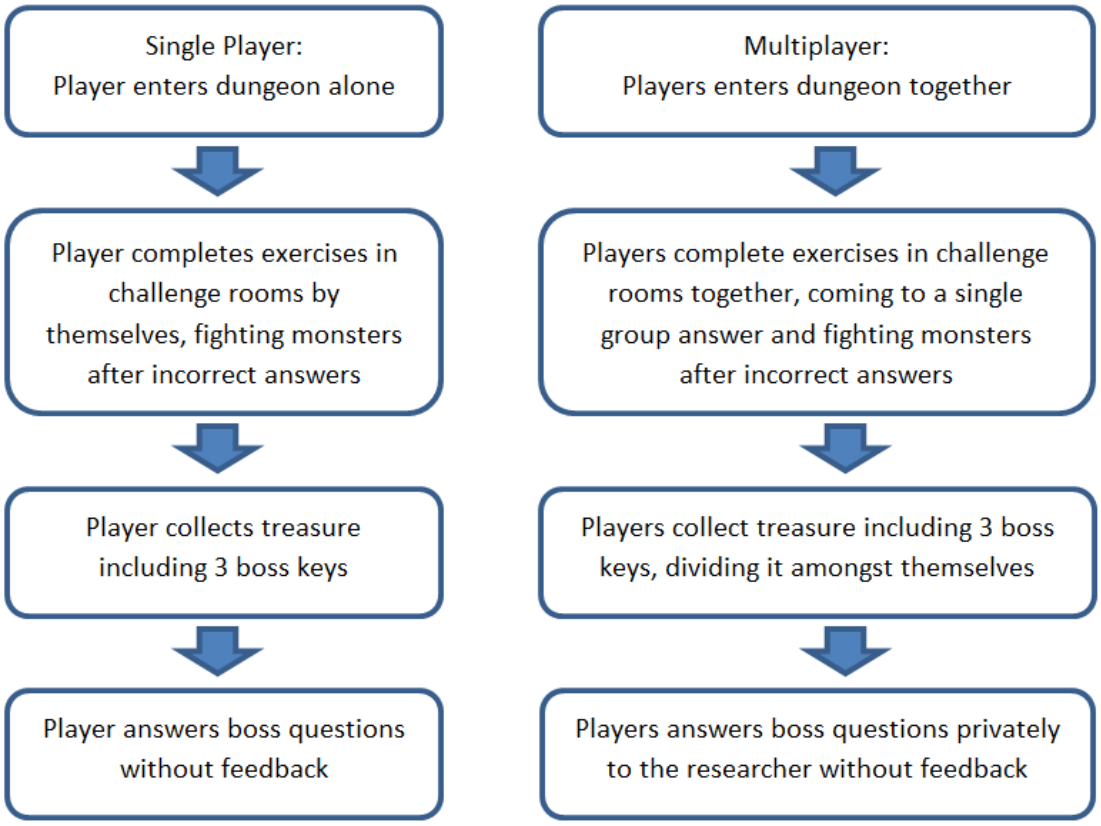

Figure 3: Progression of a game session

be taught in a single player format first and then multiplayer while the other set will be taught in multiplayer first and then single player. This allows us to minimize the effect of grammatical difficulty while highlighting the influence of format.

C. Study Design

In order to analyze the effects of a multiplayer environment when compared to a single player environment, a research experiment was designed using the COTS game Neverwinter Nights 2. Neverwinter Nights 2 is a fantasy roleplaying game which uses as its core the Dungeons and Dragons rule system. Players create an in-game persona called

an avatar by selecting their physical appearance, skill set, and equipment. They then embark on a grand fantasy adventure using their avatar to explore crypts, battle monsters, solve puzzles, and interact with the inhabitants of the world typically referred to as "Non-Player Characters (NPCs)." In the spirit of its source material, Dungeons and Dragons, *Neverwinter Nights 2* emphasizes creativity and player driven stories. As such the game comes with a robust piece of software called the Map Editor which allows anyone to create and populate their own world and take on the role of Dungeon Master (DM), the rules arbiter behind the scenes controlling all of the challenges faced by the players in the game. It is this software that I decided to put to use to create an adventure specific to learning Japanese.

The game sessions themselves took the form of "dungeons," a colloquial term used by gamers to refer to a small, contained set of challenges. Dungeons typically involve getting from point A to point B with an array of hostile monsters and puzzles blocking the way. In the dungeons designed for this study the players start in a campground where there are supplies for their adventure as well as an NPC who they may talk to in order to learn the controls and functions of the game. Once they are comfortable with the basics, the players venture into one of four cave systems, corresponding to the four game sessions, accessible from the campground. Once underground the players see a series of locked doors and are informed that beyond these doors there is the boss of the dungeon, the ultimate

goal and one of Mcgonigal's (2011) four elements of any game mentioned in II-1. To reach it, players must enter three nearby chambers and complete the challenges within to be rewarded with the keys. Players enter the dungeon in the hub room (see figure 5),

which connects all three challenge rooms and the boss room together, then make their way to each challenge room in sequence, thus creating the arbitrary restrictions on how players accomplish the goal which Mcgonigal refers to as the rules.

The challenges presented to the players were simple translation and fill in the blank style questions that one might find in a Japanese language classroom. As seen in figure 6, each challenge room contained a grammar explanation in the form of a large book which can be clicked to produce details regarding the grammar for that particular challenge. Beyond the book is a series of questions. Players were expected to read the grammar explanation and complete the exercises to finish the challenge room. The chat log on the left side of the interface (see figure 4) automatically stores any text the player encounters such as the grammar explanation or player entered text and can act as a resource for players at any time.

For example, one such challenge was designed to teach the grammar point "Question word + temo" to mean no matter how much, no matter who, etc. Players who clicked on the book were given the following text;

> "Question word -temo When "temo" is used with a question word,
> the phrase means 'no matter' or 'without regard to.'
>
> For example: nani wo mite mo (no matter what I see/saw)・itsu kiitemo
> (no matter when I hear it)・donna ni atsukutemo (no matter how hot)
>
> Read the labels and explain the effects of these magic potions;"

In the challenge room just past the book was a set of tables and on these tables were several potion bottles. Players could click on the bottles to see what the labels said in English and were tasked to explain the effects in Japanese using this new grammar. In order to have some degree of uniformity in the form of the answers, the preferred answer

Figure 4: The chat log

was also given in English and thus players simply needed to translate using the target grammar. The bottles read as follows;

> "Super Strength (lift anything, no matter how heavy)
> Recall (return home instantly no matter how far away)
> Invisibility (no matter who is looking you cant be seen)
> Stamina (no matter how exhausted you get asleep)
> Eagle Eye (no matter how small the letters are you can read it)
> Unending hunger (no matter how many cheeseburgers you eat you will become hungry)"

Players read each question and type their answers, in Japanese characters when possible and romaji if characters are unavailable, into the in-game chat box. This is where the feedback element of games from II-1 comes into effect. If the target grammar is used and

formatted correctly, the researcher uses the DM tools available within the game to create a “will-o-the-wisp,” a glowing orb of fire to signify the player’s success. If the target grammar is used or formatted incorrectly the researcher spawns a monster which attacks the player’s avatar (see figure 7). The player must then defeat the monster in combat before moving on to the next question. The researcher also provided the players with the correct answer after the monster had been defeated so players would have a way to understand and not repeat their mistakes. After all questions in a challenge room have been completed, a door opens and the player is rewarded with in game equipment such as weapons, armor, and keys.

When players had gathered the keys from each challenge room they could unlock the way to the boss which acted as a test of the knowledge learned in the challenge rooms (see figure 8). These bosses posed questions to players in order to assess their knowledge of the new grammar. This is where the majority of data collection occurred and this allowed us to see progress at every point in the instruction process. Upon entering the boss room and talking with the boss, players were presented with six sentences to translate from English to Japanese, two for each grammar point practiced in the challenge rooms

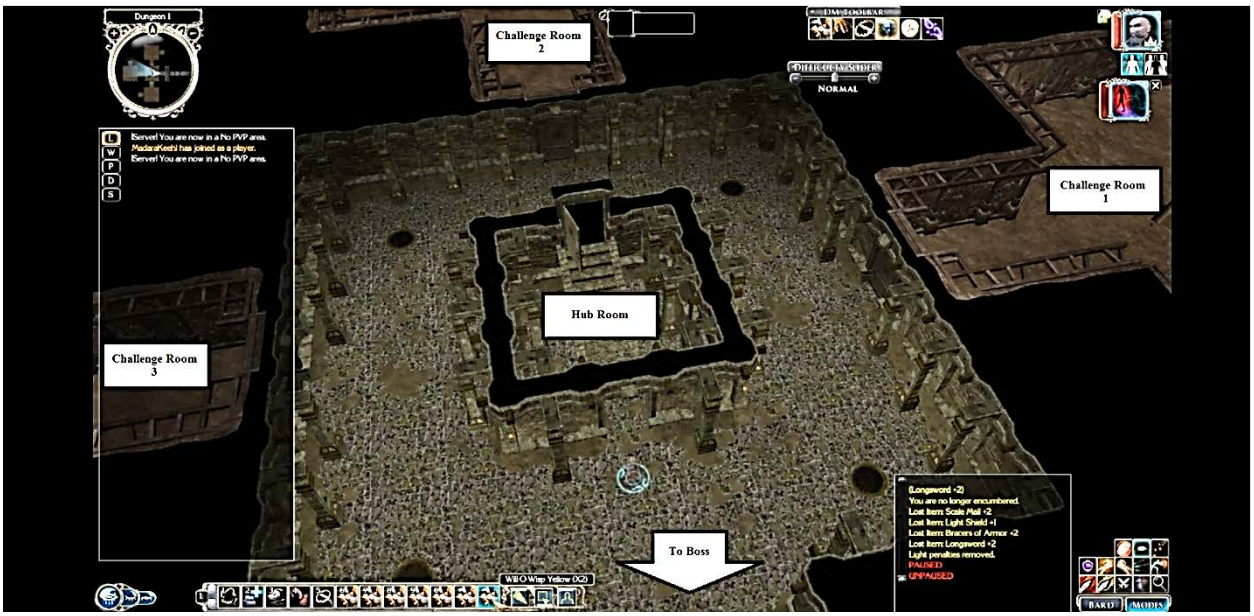

Figure 5: Entrance to the dungeon

Figure 6: Anatomy of a challenge room

Figure 7: The players battle monsters after an incorrect answer

Figure 8: A player faces off against the boss

Players were allowed to answer each question in turn with neither positive nor negative feedback in order to truly test their understanding of the grammar. During multiplayer sessions the players were instructed to not discuss the Boss questions and to answer on their own via private message to the researcher. Players could not see each other's answers in the Boss room. Finally, once these sentences were translated, players engaged the boss in combat using the equipment they gathered in the challenge rooms as the game session's finale. Finally, upon completion of the final session, participants were given a short survey to evaluate their experience with the game.

D. Game sessions

The first game session was conducted on a single player basis. Each participant logged on at their scheduled time and joined an online game with the researcher. Before the players began the challenge rooms they were given time to familiarize themselves with the controls and format of the game. A small tutorial area was provided which mirrored the form of the challenge rooms and used grammar that all participants were very familiar with. Even with this tutorial area, the first session was difficult for many participants as they were not always sure where to go or what to do. Fortunately, as the players were connected to the researcher via the voice chat program skype, they were able to reach out for help when needed. In addition to struggling with the unfamiliar controls, many participants were unable to type their answers in hiragana and kanji. Those who were unable to do so were instructed that they may use romaji and that spelling of Romanization would not be counted against them. This style of typing was foreign to several participants and thus slowed progress even more. Finally, one participant was unable to launch the game entirely. He was excused from the first session

and instructed to reinstall the program and ensure its functionality before the second session.

Regardless of the difficulties, all participants completed the exercises. Each set of challenges typically began with the participant spending several minutes reading and digesting the new grammar point after which they would attempt the first question. Often players would incorrectly answer the first question, receive their feedback, and go on to correctly answer the rest. Occasionally players made mistakes when it came to using grammar with different parts of speech but quite often they simply returned to the grammar book at the entrance to the room for an explanation of forms. With the grammar explanation always directly available to them, few errors were made past the first few questions in each room. Most participants contended quite well with the new grammar on top of the unfamiliar game structure even if the sessions typically stretched out longer than anticipated.

The second game session was conducted in a multiplayer format. All participants joined the same chat room using skype so all voices could be heard. Each then logged into the same game session within Neverwinter Nights 2 and all player avatars adventured together. Although players could discuss the questions as much as they wanted, one answer for the whole group and thus a consensus was required. Equipment rewards given after each challenge room were also left up to the players to disseminate amongst themselves (Figure 10).

The main difficulty faced in this session was connectivity issues. Several players found that their connection with the game crashed as we played and thus the group was

forced to wait for them to reconnect and rejoin the group. This made for slow progress and some amount of frustration. In addition, the simultaneous voice chat proved problematic in that some users had their volume turned up significantly higher than others. On more than one occasion this proved disruptive as those with lower microphone volume were less able to have their voices heard and participate in discussion. This problem would be easy enough to remedy given time to equalize volume levels but several participants had a limited window of time to complete the session.

This session resulted in a significantly higher amount of confusion. Likely this was due to the technical issues involving game connectivity and voice chat but the influence of the multiplayer format on the game cannot be discounted. Despite this confusion, the challenge rooms were completed with a level of accuracy very similar to that of session one. Typically each room was completed with only one or two incorrect responses as players familiarized themselves with the new grammar. There was, however, a significantly reduced frequency of questions asked to the researcher as players had each other as an additional resource.

Sessions three and four were played as multiplayer and single player respectively. Both sessions were significantly smoother than sessions one and two, likely due to players feeling comfortable with the controls and format. Additionally, as the final two sessions contained the same grammatical content as the first two, players were not exposed to any grammar for the first time. The most notable difference could be seen when comparing sessions two and three. Both were played in a multiplayer format and yet session three was infinitely more focused and productive. Players efficiently completed tasks despite facing similar connection problems and disruptive teammates.

Figure 9: A player contends with a challenge room during a single player session. The researcher, acting as DM looks on, invisible to the player.

Figure 10: Players divide the treasure after completing a challenge room in a multiplayer session

Figure 11: One player continuously returns to the grammar explanation during a frustrating multiplayer challenge room.

CHAPTER 5

RESULTS

When evaluating the game session data, I have chosen to focus on the grammatical correctness of the target grammar. Answers received a score between 0 and 10, the lower score reflecting more mistakes. Some participants neglected to provide an answer when they did not feel they understood the grammar as taught. Additionally, as player D experienced technical difficulties which prevented them from participating in the first game session, their answered have been marked n/a.

In order to compare the effectiveness of multiplayer to single player the data is best evaluated by juxtaposing sessions which utilized the same grammar. This means comparing session one with session three and session two with session four. Bosses always presented players with two questions for each grammar point practiced in that dungeon's challenge rooms. The accuracy of responses for each question were rated on a scale of 0 (completely incorrect) to 5 (completely correct) and the scores were combined for a maximum of 10 points for each grammar pattern. The results of the game sessions show a general trend towards improvement over time. This is not surprising as participants were engaging with completely unknown grammar in sessions one and two while repeating the same content in sessions three and four. Naturally we would expect to see higher scores on the tests from sessions three and four.

The most notable exception to this is player E who received significantly lower scores on their test following session three than they did following session one, despite both sessions utilizing the same content. Player E experienced significant difficulties in

both sessions of multiplayer gameplay, claiming to have retained almost nothing from sessions two and three. Part of the difficulty experienced by player E came from the composition of the group itself.

On their post study survey they remarked that single player was more effective and enjoyable because “It was much easier to focus without all the background voices. During multiplayer, everyone was trying to get their 2 cents in and I wasn’t able to remember anything.” Observing the multiplayer sessions, it was obvious this exact problem would keep some players from getting the most out of their experience. On several occasions a player would become somewhat too interested in the fantasy setting and the game itself, losing sight of the purpose of the exercise. In these instances they would create distractions by talking loudly about things unrelated to the task at hand. The nature of using voice chat rather than face to face communication meant that it was not possible to continue conversations when one person raised their voice and thus the uncooperative group members were particularly disruptive.

Player E is not the only participant to note these difficulties. Others commented that they “thought that sometimes the group sessions went off topic from the exercises and some of the other players were a bit disrupting so it was hard to focus on the task” and that the effectiveness of the multiplayer sessions seemed to “boil down entirely to the kinds of other players that are at your disposal.” However, two participants also claimed to have enjoyed the multiplayer sessions more than they did the single player sessions. Players B and D wrote favorably of their multiplayer experience, citing the opportunity to “bounce ideas off others” and the increased levels of interaction and engagement as the positive factors. The scores for player B are nearly identical between

single player and multiplayer tests and while player D received noticeably low scores on their multiplayer tests there were extenuating circumstances. Player D was unable to attend the first session and thus had little to no introduction to the game environment with their initial experience being that of the chaotic first multiplayer session. Additionally, player D experienced a significantly higher rate of technical difficulties than any other player while participating in the multiplayer sessions. It is no wonder, therefore, that they would perform poorly on the tests following sessions in which they attempted to grapple with not only the unfamiliar controls and disruptive teammates but also a volatile connection which forced them to restart the game on multiple occasions.

Participant	To iu koto	Te mo	Uchi ni
Player A	6	4	8
Player B	8	7	9
Player C	9	8	9
Player D	n/a	n/a	n/a
Player E	10	7	10

Table 4: Day 1 grammatical accuracy (single player)

Participant	To iu koto	Te mo	Uchi ni
Player A	8	6	10
Player B	8	6	10
Player C	6	8	9
Player D	3	6	8
Player E	9	7	5

Table 5: Day 3 grammatical accuracy (multiplayer)

Participant	You ni	Te bakari	Aa/sou/kou iu
Player A	n/a	n/a	n/a
Player B	10	8	10
Player C	9	10	8
Player D	4	0	8
Player E	0	8	8

Table 6: Day 2 grammatical accuracy (multiplayer)

Participant	To iu koto	Te mo	Uchi ni
Player A	10	7	9
Player B	9	8	9
Player C	8	10	8
Player D	10	9	8
Player E	n/a	9	10

Table 7: Day 4 grammatical accuracy (single player)

Participant	Day 1	Day 3	Change
Player A	18	24	6
Player B	24	24	0
Player C	26	23	-3
Player D	n/a	17	n/a
Player E	27	21	-6

Table 8: Accuracy change day 1 to day 3

Participant	Day 2	Day 4	Change
Player A	n/a	26	n/a
Player B	28	26	-2
Player C	27	26	-1
Player D	12	27	15
Player E	16	19	3

Table 9: Accuracy change day 2 to day 4

Participant	Years Studying Japanese	How often do you play videogames	How often do you use Japanese language media (movies, TV, music, etc.) just for fun? (1 being never and 5 being very often)	How often do you use media such as games, TV, movies, and music for the purposes of learning Japanese? (1 being never and 5 being very often)
Player A	1.5	5	4	3
Player B	2	4	5	3
Player C	4	4	5	4
Player D	2	4	4	4
Player E	3	5	5	5

Table 10: Questionnaire Results

Participant	How enjoyable was the experience? (1 being not at all and 5 being very enjoyable)	How likely would you be to voluntarily utilize similar game based study tools in the future? (1 being not at all and 5 being very likely)	Between single player and multiplayer, which exercises did your prefer?	Between single player and multiplayer, which exercises do you think were more effective?
Player A	4	5	Single player	Single player
Player B	4	4	Multiplayer	Multiplayer
Player C	5	5	Single player	Single player
Player D	5	4	Multiplayer	Single player
Player E	5	5	Single player	Single player

Table 11: Questionnaire Results Cont.

Despite these troubles, both player B and player D claim to have enjoyed the multiplayer experience. What sets these players apart from the others? While observing the play sessions it initially seems that these two players focused on the language exercises more while the others engaged more with the shell of the game and the fantasy setting. Players A, C, and E certainly argued most over the distribution of equipment rewards and engaged in significantly more off topic conversation. However, upon closer inspection it cannot be said that players B and D did not engage with the game elements of the play sessions. Player D seems to have spent a significant amount of time experimenting with the character creation tools, appearing as an array of avatars with

differing abilities each time they connected to the game. Player B went even further, spending time between game sessions to install modified files know in the gaming community as MODs in order to change the in game rules and create an avatar in the form of a powerful dragon. These are not the actions of a person interested only in the language problems. Instead what is noticeably different about players B and D is that they were more often than not the ones leading discussions and asking for help. These two were also frequently the designated "scribe" of the group, responsible for entering the official answer. Other players certainly talked but more often than not their input would not go further than proposing one answer. Players B and D frequently asked the group for input, double checked answers with their teammates, and explained their reasoning.

Also of note is the fact that 4 out of the 5 participants had higher perceived learning benefits from the sessions they enjoyed the most. In fact, the only player who thought otherwise was Player D who answered that he enjoyed multiplayer more yet single player was more effective. This can perhaps be explained because, as described above, Player D was missed the first session and was thus introduced to the system during a chaotic first multiplayer session fraught with technical difficulties. The remaining players all chose the session they most enjoyed as the one which was most effective, creating compelling evidence to support the conclusions of Allen, Crossley, Snow, and McNamara who linked these two qualities (2014).

Comparing the demographic data from our post study survey to the results of the game sessions, several interesting things become clear. While all players regularly engage with Japanese media and videogames, players C and E who have been studying

Japanese the longest performed an average of 2 points worse in multiplayer sessions than in single player sessions. Newer students consistently performed better on days 3 and 4 when they had previously been exposed to the materials. These more experienced students performed worse in multiplayer sessions even when they had previously been exposed to the material.

There are several possible explanations for this data. It is possible that more seasoned students tend to have more deeply ingrained study habits and that the relatively disorganized nature of multiplayer makes it difficult for them to employ these strategies. When engaging with the game on their own they have no external pressure and may take in the new material in a manner more familiar to them. Another explanation is perhaps that seasoned students have a degree more confidence with the language which, when exposed to the novelty of a game environment, leads them to focus more on the game and less on the language. In a single player format this is not an option as there is no one else to rely on and when these veteran students focus on the task at hand in their own way they thrive.

CHAPTER 6

CONCLUSION

From the results of this study we can see the difficulty in creating a group centered multiplayer environment for effective language learning. Although there were some interesting findings, I believe the study would have been more effective had it been designed strictly along TBL guidelines. While this study borrowed elements of TBL instruction, due to a lack of resources including time and volunteers some of the four elements of TBL (Groups, Accountability, Feedback, and Assignment Design) were not fulfilled. Proper TBL group design involves avoiding previously established relationships as well as ensuring that there are not personality clashes that might cause fractures in the group. Group formation for this study was done using only the few volunteers available and thus I could not account for diversity or pre-held interpersonal connections. As a result, many participants found the main factor hindering effective learning seems to have been the group members themselves. This may well have been mitigated over the course of a longer study where group members had time to acclimate to each other but not with the limited time available. However, the fact that all participants were drawn from the same class and that all had an interest in both Japanese and videogames provided some cohesiveness to the group based on shared hobbies and academic pursuit. Accountability was addressed in this study by way of individual tests as well as in game rewards. Since players were expected to distribute amongst themselves the treasure received after each challenge room, the group members had a way of giving each other feedback. However, there was no RAP test involved in this study design and no “out of class” preparation and thus cannot claim to be fully TBL. Feedback was a strong suit of this study in that it was

immediate as well as entertaining. The use of hostile creatures resulting from incorrect answers made failure visceral yet positive. Finally, assignment design was more similar to what one might find in a typical language classroom rather than strictly a TBL class. The learning gains may have been greater with the use of more conversation and interactivity built into the structure of the assignments themselves. This, again, may be something a more long term study could address.

The efficacy, in terms of participants' grammatical accuracy, of the single player and multiplayer variants are fairly comparable. In fact, participants were almost evenly split on both pairs of sessions in regards to which variant worked best for them. Between day one and day three, two participants had higher scores following a single player session and two had higher scores following a multiplayer session with the final player scoring the same after both. Between day two and day four, three players scored higher following the single player session and two scored higher following the multiplayer session. Also of note is that, with the exception of player E, no participant consistently performed better during one variant or the other. Player E performed better following each single player session than their multiplayer equivalents. Even player A, one of the most outspoken critics of the multiplayer format, scored a whole six total points higher after the multiplayer session of day three than its single player equivalent on day one.

These results tell us that, given the right circumstances, multiplayer game based environments can be just as conducive to learning as single player environments. The numbers do not show an overwhelming preference for either variant in terms of efficacy, despite the inherent technical challenges related to the multiplayer format. Furthermore, players themselves may prefer the single player variant due to its familiarity and lack of

social pressure yet even those players performed well after multiplayer sessions on certain days. Perhaps this is indicative of the influence of transitory factors such as an individual's mood on a certain day.

Multiplayer game-based environments can be an enjoyable and effective method of self-study for the right people. While the environment may not be effective for every learner, for those with a compatible personality the multiplayer environment can be effective and enjoyable. There is much room for further research into how to maximize the effectiveness of such a system and future studies should focus on participant selection and on designing a system which encourages those not already predisposed to cooperate effectively. A long terms study taking place with the same participants over the course of a semester in a specifically TBL multiplayer environment would be of particular interest.

Additionally, a study directly comparing gamified group learning with in class learning would have the potential for interesting results. The two provide very different methods of learning and a comparison of the effectiveness of both would be valuable. Not only would this allow us to further investigate the connection between game enjoyment and learning gains, something this study did not effectively measure, but also address the question does the immediate feedback of gamified options constitute short term pleasure compared to the delayed gratification of in class learning? There is evidence to suggest that delayed gratification may have more a more powerful long term effect (Mischel 1989), however, I would argue that gamification is not best used as a replacement to in class learning. Rather, the instant feedback of gamification may act as a hook to retain those who may not have otherwise continued with the language. Those who already possess the drive to succeed in language should likely engage in tried and

true classroom learning. Statistical evidence to support this theory would be most valuable to the future of gamification.

Finally, there is significant room for experimentation in program design and technological implementation. Many of the shortcomings of this study could be mitigated given sufficient programming and game design ability. For example, a possible avenue for encouraging communication would be designing challenges which required two or more players working in tandem to complete. When one player's answers affect the other player's situation there is a vested interest in helping your partner. Additionally, more native-like communication could be achieved via pairing native and non-native speakers together. This could easily be achieved by repurposing technology like that used on the website chat roulette (www.chatroulette.com). Players could click a button and be randomly connected via video chat to another person, either another learner or a native speaker, and be given a short task to complete together. Such a design would also help mitigate the effects of bad group members as interactions would be short and members would rotate frequently. Players would also be less likely to be lead astray by incorrect but confident partners due to the quick partner turnaround. Obviously implementing such features comes with its own technical challenges which would need to be addressed in future research. Including native speakers alone would require research into cross cultural game enjoyment and what makes "good game design" in different cultures.

I believe this study has shown that just the element of multiplayer and community itself, while useful, is not sufficient to maximize the potential of gamified study tools. However, if properly implemented, I believe multiplayer game based environments may be an effective way to engage students and convey material.

APPENDIX A

SKILLS BENCHMARK

Participant ID# _____

Word Bank

・られる	・こう	・ないで	・のように
・うちに	・ても	・ように	・たばかり
・ことなの	・ああ	・なさい	・てから
・のに	・そう	・させる	・間に　・ば
・てある	・させられる		

Fill in the blank with a selection from the word bank. Conjugate when necessary.

1. 昨日、私は母に野菜(やさい)をたべ（_____）。
   Yesterday I was forced by my mother to eat my vegetables
2. ２０１５年になっ（_____）ですから楽天的(らくてんてき)な感(かん)じがある。
   Since it has just become 2015 I am feeling optimistic.
3. みんなが分かる（_____）やさしい単語(たんご)を使って説明(せつめい)しました。
   I explained using simple vocabulary so that everyone would understand.
4. コーヒーを二杯(にはい)飲(の)んだ（_____）すごく眠(ねむ)いです。
   Even though I drank 2 cups of coffee I am very tired.
5. お金持(かねも)ちになることは、幸(しあわ)せになるという（_____）です。
   To become rich is to become happy.
6. 先輩(せんぱい)は私に英語(えいご)のポスターを翻訳(ほんやく)（_____）。
   My superior made me translate the english poster.
7. あたたかい（_____）海に行ったらどうですか？
   why don’t we go to the beach while the weather is still warm?

8. A:している？田中のお父さんは映画に出ている。
   B:うん、（_____）いうことはすばらしいね？
   a: Have you heard? Tanaka’s father was in a movie!
   b: Yeah, isn’t that amazing?
9. その映画を何回見（_____）泣きます。
   No matter how many times I see that movie I cry.
10. 私はズボンを敗れたので友達にいじめ（_____）。
    My friend teased me because I ripped my pants.
11. 魚（_____）泳げるんですね？
    He can swim just like a fish huh?
12. 図書館員が「静かにし（_____）」と言いました。
    The librarian said “be quiet!”

APPENDIX B

POST STUDY SURVEY

Participant ID# _____

Age: _____

Gender: M / F / Other

Years studying Japanese: _____

How often do you play Videogames? (___)

1 2 3 4 5
(never) (very often)

How often do you use Japanese language media (movies, tv, music, etc) just for fun? (___)

1 2 3 4 5
(never) (very often)

How often do you use media such as games, tv, movies, and music for the purposes of learning Japanese? (___)

1 2 3 4 5
(never) (very often)

How enjoyable was the experience? (___)

1 2 3 4 5
(not at all) (very enjoyable)

How likely would you be to voluntarily utilize similar game based study tools in the future? (___)

1 2 3 4 5
(not at all) (very likely)

Between singleplayer and multiplayer, which exercises did your prefer?

[ ] Singleplayer [ ] Multiplayer

Why?

Between singleplayer and multiplayer, which exercises do you think were more effective?

[ ] Singleplayer [ ] Multiplayer

Why?

Other Comments:

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