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Learn English or die: The effects of digital games on interaction and willingness to communicate in a foreign language

Hayo Reinders

Middlesex University

Sorada Wattana

Dhurakij Pundit University

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Learn English or die:
The effects of digital games on interaction and willingness to communicate in a foreign language

Hayo Reinders and Sorada Wattana

Abstract

In recent years there has been a lot of interest in the potential role of digital games in language education. Playing digital games is said to be motivating to students and to benefit the development of social skills, such as collaboration, and metacognitive skills such as planning and organisation. An important potential benefit is also that digital games encourage the use of the target language in a non-threatening environment. Willingness to communicate has been shown to affect second language acquisition in a number of ways and it is therefore important to investigate if there is a connection between playing games and learners' interaction in the target language. In this article we report on the results of a pilot study that investigated the effects of playing an online multiplayer game on the quantity and quality of second language interaction in the game and on participants' willingness to communicate in the target language. We will show that digital games can indeed affect second language interaction patterns and contribute to second language acquisition, but that this depends, like in all other teaching and learning environments, on careful pedagogic planning of the activity.

Keywords: *digital games, interaction, language teaching second language acquisition, willingness to communicate.*

Recent years have seen a growing interest in the pedagogical benefits of digital games for language learning. Gee (2003), for example, identified 36 learning principles that he found to be present in many of the games he investigated. An example of these is the 'Active, Critical Learning Principle'. This stipulates that "All aspects of the learning environment (including the ways in which the semiotic domain is designed and presented) are set up to encourage active and critical, not passive, learning." In other words, computer games *engage* learners and involve in the tasks at hand. A second principle is the 'Regime of Competence Principle' where "the learner gets ample opportunity to operate within, but at the outer edge of, his or her resources, so that at those points things are felt as challenging but not 'undoable.'" (Gee, 2003, p. 36). Most games adapt to the player's level until they succeed, at which point new challenges appear. These principles are intuitively appealing and grounded in educational research, but it is not clear how and to what extent they are related to second language acquisition. There is not much research on the effects of game play on learning a second language and the purpose of this article is to review this small body of research before describing the results of a study investigating the relationship between participation in an online multiplayer gaming environment and second language interaction patters and participants' attitudes towards interacting in the target language (English). We limit ourselves in this study to an investigation of the acquisition of aspects of the target language. We acknowledge the importance of sociocultural and ecological views of language acquisition (Larsen-Freeman & Cameron 2008; Van Lier 2004) but these were not the focus of this study. For a "cognitive ethnography" of gaming and its effect on literacy practices, we refer the reader to Steinkuehler (2006; 2008).

The effects of game play on second language acquisition

Many claims are made for the benefits of games on affective factors such as anxiety and motivation, but few studies have directly investigated the effects of digital games on second language acquisition. An example of such a study was conducted by deHaan, Reed and Kuwada (2010), who investigated the effects of playing a digital game versus watching it on immediate and delayed recall of vocabulary by Japanese learners. Participants in the study were given a music game in which the players had to complete parts of a song by pressing controller buttons at the correct time. Participants in this study did not collaborate but were interacting only with the computer (Chapelle's human-computer interaction; 2001). An important feature of the study, and perhaps a major limitation, is that participants did not have to understand the English in order to play the game. The authors found that playing the game resulted in less vocabulary acquisition than watching it (although both resulted in learning gains), probably as a result of the greater cognitive load of having to interact with the game. A post-experimental questionnaire revealed that there was no difference between players and watchers in terms of their mental effort, so the effects were due only to their interaction with the game. The authors argue that playing digital games and interactivity are therefore not necessarily conducive to language acquisition. However, it is of course important to understand these findings in light of the fact that the language was not a focal part of participants' experience and that they could complete the tasks without attention to the vocabulary. It is therefore important that future studies investigate gaming environments that do involve meaningful language use. Another limitation of this study was the nature of the game that was chosen. This genre of game lacks a detailed narrative component that requires comprehension in order to respond appropriately, which is common in many adventure games, for example.

That noticing linguistic elements in an environment where the primary focus is not on language is possible in a gaming environment was shown by Piirainen-Marsh and Tainio (2009), who used Conversation Analysis to examine how two teenage boys repeated language elements in the game to show their involvement and to make sense of the game. Video recordings of their game interactions showed frequent repetitions both in the form of immediate imitation but also for anticipatory use and to recontextualise previously heard utterances, or to expand on them. The authors conclude: 'On the whole, repetition offers a flexible resource through which the participants display continued attention to relevant features of the game and co-construct the collaborative play activity' (p. 166). This study did not investigate the effects of this repetition on linguistic acquisition, however.

Similarly, Zheng, Young, Wagner and Brewer (2009) focused on the effects of game play on the interaction and collaborative construction of cultural and discourse practices between native and non-native speakers in the educational game *Quest Atlantis*. The collaborative nature of the game required a deep exchange between the two dyads of players and encouraged the development of not only semantic and syntactic, but also pragmatic knowledge, and both from native to non-native speaker and vice versa. The authors refer to this type of interaction as negotiation for action.

Chen and Johnson (2004) "modded" a commercial role playing game called Neverwinter Nights (Bioware, 2002) to investigate whether a digital game simulating a foreign language learning context could promote a state of 'flow' and motivate students to practise language skills (Spanish in the case of this study) outside of the classroom. The authors used questionnaires, video transcripts, field notes, and a post-game interview to investigate this but realised that there were significant differences in the

amount of experience the participants had with playing games, and that this strongly affected their ability to play the game successfully. For example, the one participant who did have previous game-playing experience felt more comfortable in the game, spent less time accomplishing the tasks, and self-reported a higher level of enjoyment and flow in the game than the other participants. This study thus highlighted the importance of sufficient training, both to encourage greater success in playing the game, and to minimise the possibility of differences between students acting as a confounding factor in subsequent analyses.

A key element in the studies above, and in discussions of computer games in education in general, is that learners more actively participate in the activity at hand (see also Garcia-Carbonell, Rising, Montero, & Watts, 2001). In language learning, this means that games are suggested to encourage more interaction in the second language. We therefore now briefly discuss the importance of interaction on second language acquisition.

The role of interaction in second language acquisition

Interaction is the term used to refer to the interpersonal activity that takes place both face-to-face and electronically between people or between people and computer, as well as the intrapersonal activity that occurs within our minds (Chapelle, 2001). Interaction in the foreign language has been found to contribute to language acquisition. Interaction helps generate comprehensible input (Krashen, 1985), encourages negotiation of meaning (Pica, 1994), facilitates noticing (Schmidt, 1990), produces negative feedback (Schmidt ibid), and encourages output (Swain, 1985). Swain's Output Hypothesis (1985) posits that for successful second language acquisition to occur comprehensible input alone is insufficient but learners must also be given opportunities to try out new language and produce comprehensible output during interaction, which, in turn enables them to develop competence in the target language.

For comprehensible output to be produced, however, learners have to be pushed in their language production. Pica (1994) claimed that negotiation of meaning helps learners make input comprehensible and helps them modify their own output, and, in turn, provides opportunities for them to acquire new language. Similar claims for the benefits of negotiation have been made by Long (1996) in his Interaction Hypothesis. According to Long, negotiation of meaning during interaction contributes significantly to second language comprehension and the negative feedback received through negotiation facilitates second language development, particularly for vocabulary, morphology, and syntax. Negotiation also provides opportunities for learners to focus their attention on linguistic form and to notice aspects of the target language. Noticing has been considered important because when input is noticed, it can become intake, i.e. input that the learner has comprehended semantically and syntactically, which facilitates acquisition (Schmidt 1990). In addition, noticing pushes learners into a more syntactic processing mode that will help them to internalise new forms and improve the accuracy of their existing grammatical knowledge.

All of the above, however, assumes that learners are not only given opportunities to produce the target language, but are also willing to make use of this opportunity. The crucial aspect of "willingness to communicate" is therefore discussed below.
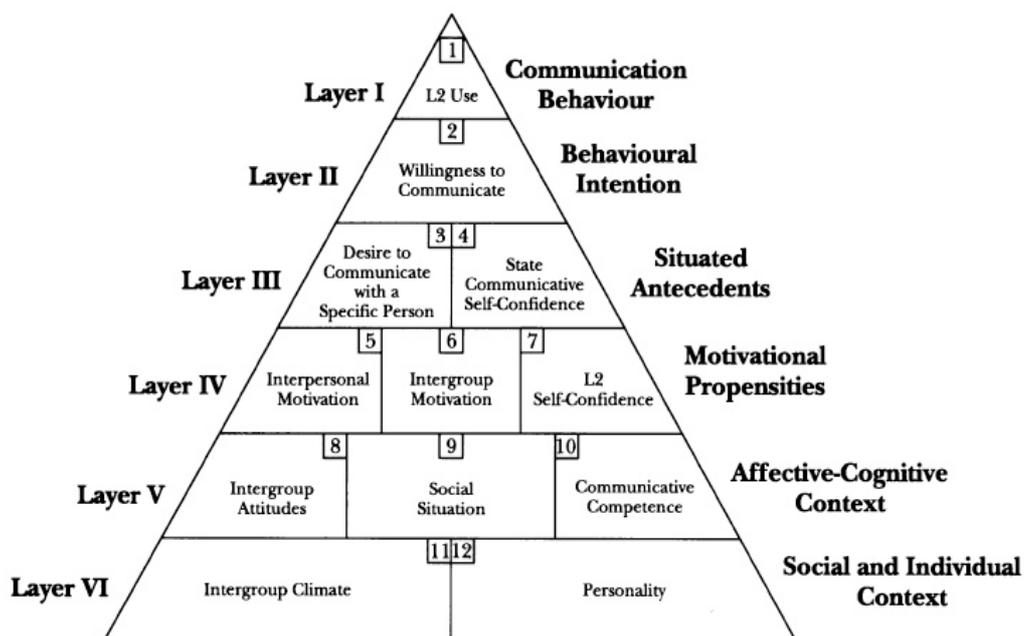
Willingness to communicate

Many claims have been made for the benefits of games on lowering affective barriers and encouraging learners to interact within a target domain. In the area of second

language acquisition this can have potentially important implications as decades of research have convincingly shown that exposure to second language input affects second language acquisition (cf. Ellis, 2002). However, even if learners have potential access to input, this does not mean that they are willing or able to interact with that input. Willingness to Communicate as an second language acquisition concept emerged from previous research on "predispositions toward verbal behavior" (Mortensen, Arntson, & Lustig, 1977), "shyness" (McCroskey & Richmond, 1982), and "unwillingness to communicate" (Burgoon, 1976). Studies were initially mainly done on first language acquisition. When applied to second language learning, willingness to communicate was used to explain why communicative competence alone is necessary but not sufficient for effective communication in the target language; situational influences affect willingness to initiate or engage in communication (MacIntyre, Dörnyei, Clément, & Noels, 1998). In this view, willingness to communicate in a second language is defined as "readiness to enter into the discourse at a particular time with a specific person or persons, using a L2 [second language]" (MacIntyre et al., 1998, p. 547).

Willingness to communicate has been found to influence the frequency with which learners engage in second language communication (Clement, Baker, & MacIntyre, 2003; Yashima, 2002), which in turn is related to the development of second language communication skills. Willingness to communicate is also regarded a crucial factor in ultimate proficiency levels in second language production (Kang, 2005); the more use of the second language, the more likely that second language proficiency will develop (although of course, proficiency does not necessarily extend to grammatical accuracy or native-like language use, as demonstrated by Swain and others). Consequently, willingness to communicate has been proposed as a fundamental goal of second language learning and instruction in line with the emphasis on authentic second language communication as an essential part of second language learning and to increase the likelihood of learners actually using the target language, not only in class, but also in more naturalistic settings (MacIntyre, Baker, Clément, & Conrod, 2001; MacIntyre, Baker, Clément, & Donovan, 2003; MacIntyre et al., 1998)

Figure 1 Heuristic Model of Variables Influencing Willingness to Communicate (MacIntyre et al., 1998, p. 547).

MacIntyre et al. (1998) conceptualized willingness to communicate in the second language as a layered pyramid model in which a range of different variables influence second language learners' eventual second language use (See Figure 1). The authors propose that willingness to communicate is influenced by both situational influences (Layers I, II, III) and enduring influences (Layers IV, V, VI). As the learner moves up the pyramid, the learner has more control over the act of communicating in a second language.

Past studies into willingness to communicate have demonstrated its positive effect on second language acquisition; a willingness to communicate is clearly related to the likelihood of students improving their second language skills, particularly in productive skills. Major findings from willingness to communicate studies indicated that learners who demonstrate willingness to communicate interact in the target language actively, which, in turn, contributes to increased frequency and greater amount of second language use (Clement et al., 2003; Freiermuth & Jarrell, 2006; Hashimoto, 2002; MacIntyre & Charos, 1996; Yashima, Zenuk-Nishide, & Shimizu, 2004). Second language researchers have recognized that language learners who are more active with second language use have a greater potential to develop language proficiency as a result of having more opportunities to communicate with others. Language learners who are more willing to communicate have been found to have more potential to practice in an second language (MacIntyre, Baker, Clement & Conrad, 2001), improve their communicative skills (Yashima et al., 2004), acquire language fluency (Derwing, Munro, & Thomson, 2008), and generally achieve greater language proficiency (MacIntyre et al., 2001; MacIntyre et al., 1998; Yashima, 2002). Clearly, an important aim of second language instruction should be to improve willingness to communicate, and for second language acquisition research to investigate how this can best be done.

Games can affect some aspects of the above variables influencing second language willingness to communicate. As games are considered by learners as "fun" and engaging, they generally create low anxiety environments. Intergroup attitudes within gaming environments are based on expectations of constant interaction and the social situation is frequently one that is non-hierarchical and inclusive, and one in which the (second language) participant has a genuine desire to communicate. In addition, games, particularly MMORPGs (online role-playing games such as Blizzard Entertainment's 2004 game, *World of Warcraft*), provide opportunities for authentic interaction and social support increasing exposure to authentic second language input and opportunities for second language output. Such social support is found crucial for developing levels of willingness to communicate especially outside the classroom (MacIntyre et al., 2001).

The Study

Willingness to communicate has been shown to affect second language acquisition and the use of computer games is thought to facilitate L second language communication. In this study we are interested in the relationship between participating in MMORPG games and second language interaction and therefore pose the following questions:

1) What effects does playing a MMORPG have on a) the quantity and b) quality of second language interaction?
2) What effects does playing a MMORPG have on learners' willingness to communicate?

Methodology

Participants. The participants were 10 male and 6 female fourth-year undergraduate IT students, between 21-26 years of age, at a university in Thailand. All of them indicated that they had played MMORPGs before and played digital games on average 27 hours per week. In addition, all males and 3 of the females had played *Ragnarok Online* (Gravity, 2002), the game used in this study, before. We therefore did not expect participants to be unduly affected by novelty and training effects. Their English proficiency levels ranged from beginning to intermediate as indicated by their grades from a previous language course, as well as their test scores on the university test of English proficiency. The pre-survey result revealed that the participants had no other contact with English other than during the class and that 14 of them considered their English communication skills only as 'fair', and all of them had previous experience playing MMORPGs.

The game and how it was adapted. Using a commercial game has the advantage of enabling students to use a high-end and attractive product. It is, however, difficult to find the right type of game with a design and with content that are appropriate for second language learners and that match the desired learning outcomes. Consequently, we decided to modify an existing game called *Ragnarok Online*, the most popular MMORPG in Thailand. We obtained permission from its Thai distributors to use the game in the computer-assisted language learning lab of a university, using a private server, and to modify the game in order to ensure its appropriateness to the second language learning context, as well as its alignment with our learning activities and objectives.

Although the game contains a variety of authentic scenarios and tasks (similar to those that players may need to achieve in real life), the content of the original game was considered less than ideal as a computer-assisted language learning environment in the sense that the opportunities for target language exposure and "language learning potential" (Chapelle, 2001) were limited. This was due to the fact that the game was created for Thai native speakers as a form of entertainment, not education. The international version available from *Ragnarok Online*'s servers was considered, but it was not possible to obtain permission to use it for our study. Also, the international version may not be suitable in terms of the language level used, which could easily be too advanced.

Another important reason for modifying the game was that the original in-game quests were considered to be too long for the study participants to complete during class time. The modification in this study, as a result, meant creating new quest events relevant to the course that the participants were on, for application of language skills at the level appropriate. The modification also meant inserting language learning content inside the game activities to use in ways perceived to be meaningful to students. Generally, the modified version of *Ragnarok Online* had some differences in the number of players, gameplay, language, and game server as shown below.

Table 1: A Comparison between Official and Modified *Ragnarok Online*.

	Original *Ragnarok Online*	Modified *Ragnarok Online*
Description	*Ragnarok Online* is set in a fantasy and adventure world inspired by a Norse mythology and a popular Korean comic (Manhwa) series by Lee Myung-jin. The game provides collaboration and social interaction, allowing players to interact with others, undertake quests, and combat computer-controlled enemies.	
Genre	Massively multiplayer online role-playing game (MMORPG)	Multiplayer online role-playing game In the study, access was limited to study participants only.
Environment	The game environment is divided into a series of maps with their own unique terrains and native monsters. Game events take place in different game locations. Players are free to explore the game environment in a non-linear manner, although they are all required to start in the same part of the online world.	
Gameplay and Tasks	Players can use the keyboard and the mouse to control most of the basic functions. Players can create several characters per account but they can only control one character at a time. Players begin as "Novices" and then gain new skills and abilities as they specialize in the job they choose and earn experience points and level up. In general, basic gameplay involves: • Finding the starting non-player character (NPC) and then accepting a quest for special rewards required to progress to the next one. • Interacting with NPCs through controlled dialogues. • Engaging in non-violent combat by attacking monsters wandering around each game area in order to collect the items required for quest completion and gain experience and level up. However, a few differences in game play for regular players and study participants are:	
	• Collaborating and communicating with other players in their native language via an in-game communication tool. • Undertaking optional series of quests from non-player character (NPC) for job advancements.	• Collaborating and communicating with other players in English via both an in-game communication tool and additional voice communication software.

Quest Description	Quests in original *Ragnarok Online* are for item hunting and NPC searching. During and after completing the quest, players will receive special rewards required to advance to other quests.	The original game quests were modified to encourage participants to use the language and practice the vocabulary and language skills they learned in class in a fun way. To complete the quests, participants were asked to talk to NPCs, read texts, listen to NPCs' dialogues, and talk to other players via either text or oral chat. Participants were asked to collaborate as they planned game strategies, discussed maps, solved problems, made decisions, helped each other, and exchanged information to progress throughout the quests. During and after game events participants were offered certain in-game rewards such as base and skill levels, top headgears, and items required to proceed to the next quests. In addition, participants were given immediate and continuous in-game feedback when they chose wrong responses while communicating with NPCs through controlled dialogues.
Language	The regional (Thailand) version of *Ragnarok Online* is in Thai.	The entire game is available in English only.
Game server	• The official game is run and managed by authorized game servers. • Players have to pay by a monthly subscription or by pre-paid card.	• The modified version of *Ragnarok Online* is implemented on a private server administered by the researchers, allowing only the participants of this study to play the game together free of charge. • This server is carried out for the purpose of this study only.

Ragnarok Online was chosen because it is one of the most popular games in Thailand. Students could therefore be expected to be more likely to know about it or be interested in playing it. We also chose it because this game allowed us to make partial modifications and extensions to the original game and host the game on our own server, giving us more control. The most important reason, however, was that *Ragnarok Online* requires participants to communicate in order to progress in the game more quickly, and for this reason it seemed particularly suited as a medium for our study.

In this study, digital games were used as computer-assisted language learning and integrated as part of the regular language course. Overall, there were two objectives for computer assisted language activities in the form of digital games. The first objective was to give students opportunities to review the course material through play, or "plearn", for "play and learn", which is also the Thai word for "enjoy" (Samudavanija, 1999). The term Plearn is one of the most important concepts in Thai education, stressing that learning should be an enjoyable activity and students should gain knowledge through their play. As part of playing newly modified quests, students had opportunities to learn and practice the vocabulary and language skills they studied in class in a fun way. By lowering the affective barrier, the intention was to encourage students to relax and learn in a more natural way (Aoki 1999). The other objective of

using computer games was to encourage more participation. Thai students are notoriously reticent and generally avoid interaction in English classes (Kamprasertwong, 2010). By encouraging students to work together in a non-threatening environment, the aim was to encourage them to become more actively involved in the learning process.

Three new quests (i.e. the missions that players are assigned to accomplish in order to get items and progress throughout the game) were specifically designed in agreement with the learning activities and objectives of the three lessons with which digital games activities were integrated, as well as students' English proficiency at a university level. The development of new quests was in alignment with particular lessons in ways that the quests purposefully contained scenarios, language, and lexical items related to what students previously studied in class. Table 2 shows an example of how learning objectives were mapped to activities in *Ragnarok Online*. Figure 2 shows an example of a screenshot of the modified quest for this study. The tasks in the quests constantly gave students instantaneous feedback and gradually increased in difficulty as the game progressed to encourage more communication. Each quest was designed to fit into a 90-minute teaching session in a computer-assisted language learning lab. Each quest itself lasted approximately 40 minutes but the remaining class time was devoted to the integration of supporting activities such as preparation and debriefing. Only data for quests 1 and 3 was recorded and is reported here.

Table 2: A Mapping of Leaning Objectives of Unit 2 to Gaming Activities.

Unit	The objectives for this Unit are for the students to:	Computer game activities are:
2. Computer Architecture	1. Use names and types of computers and computer features 2. Understand computer advertisements 3. Understand computing terms and abbreviations 4. Make inquiries and give answers about computer specifications 5. Describe the function of an item 6. Give instructions	Quest Event: Looking for a computer shop sales assistant Quest Description Students were required to pass the test about computer knowledge (i.e. names and types of computers 1, computing terms and abbreviations 3). They were asked to complete several tasks (i.e. reading computer ads 2, describing computer specs 4, using computing terms and abbreviations 3, describing functions 5) in order to be employed as a new sales assistant in a computer shop. Students needed to talk to the Shop Manager to start the quest, help a Customer, hunt for required items, exchange ideas and information, listen to each other, and help each other to progress in the quest. This help could include giving their friends instructions on how to complete each task in the quest.

Figure 2: A screenshot of Quest Event called 'Looking for a computer shop sales assistant'.
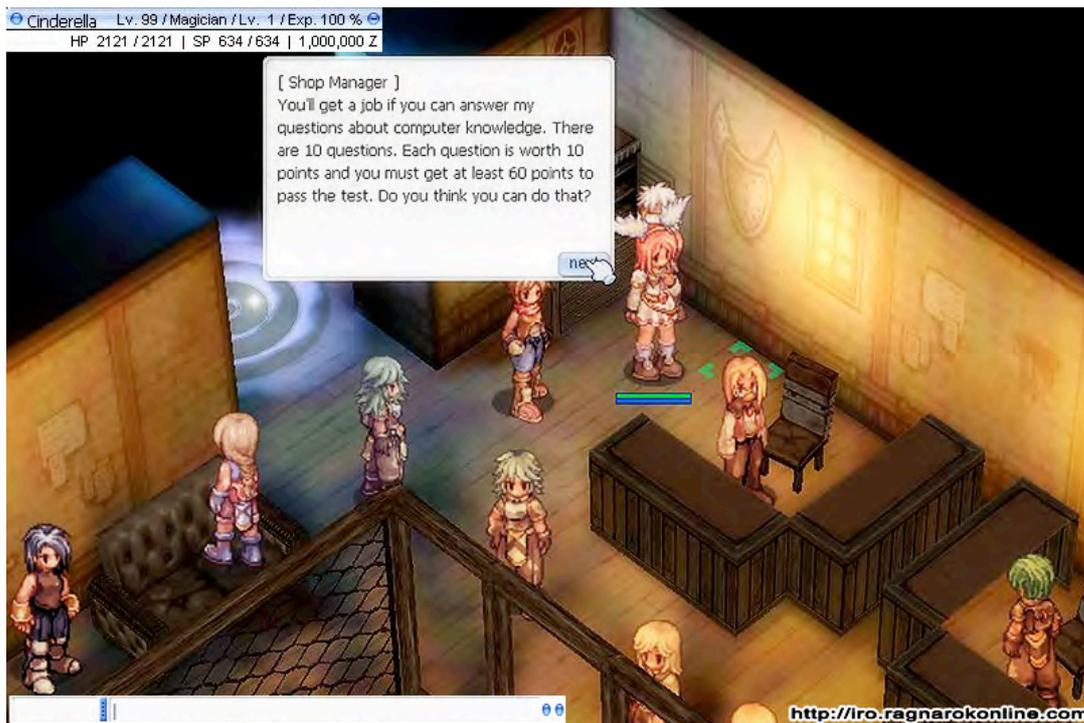
Procedures. Students were requested to participate in three game sessions. Before starting each session, a 15-minute briefing was given which included linguistic preparation (i.e. giving students planning time to write down the questions that might be asked during gameplay and to learn from each other about words, phrases, grammar, and language functions that could help them during the game), and familiarizing participants with the quests (i.e. discussing quest information such as which NPC they needed to interact with to accept the quest, what kinds of tasks needed to be completed, etc). Students were clearly briefed on what they were expected to do and when and why. The expectations involved length of class time students had to complete the quest, ground rules for communication (e.g. what is good 'netiquette'?) and collaboration (e.g. what is collaboration and what is cheating?), as advised by Whitton (2010, p. 81), things they could and could not perform as players (e.g. do's and don't's), and benefits they could obtain from the activity. Students were also instructed to focus on collaboration rather than competition, to play the game not only for fun but also for learning, and to try to use the target language for communication in the game. During game play, students were randomly divided into either a text-based chat or a voice-based chat group and were instructed to collaborate and communicate synchronously with other playing characters (PCs) in order to progress throughout the game. After each game session ended, students were asked to complete a willingness to communicate questionnaire and finally a collaborative debriefing took place during which participants were asked to discuss in small groups about their experience, success and failure in the game and how they had communicated synchronously.

Data collection and analysis. Two types of data were collected: (a) transcripts of students' produced discourse were recorded using Skype Chat Recording or Skype Call Recording for evidence of their interaction and language use as they worked on computer game activities and (b) students' responses to a questionnaire for evidence of their WTC. The questionnaire was adapted from previous studies on willingness to

communicate (Cao & Philp, 2006; Freiermuth & Jarrell, 2006; LÈger & Storch, 2009; MacIntyre et al., 1998; MacIntyre et al., 2001) and was specifically modified to focus on communication situations that commonly take place during game play. The transcripts were analyzed using (a) discourse analysis to describe the syntactic and functional characteristics of the language produced during game play and (b) interaction analysis for tabulating the number of words and the number and length of turns. Descriptive statistics were calculated for the mean and frequency of the responses to Likert scale items on the questionnaire data, revealing to what extent students accept each statement in mean scores and percentage points, and responses to open-ended questions were grouped according to recurrent themes.

Results

What effects does game play have on the quantity and quality of second language interaction?

Below we first look at the amount of interaction that took place during text and voice chat and compare them. In the following section we look at the type of interaction that took place.

Quantity of second language interaction. The results showed that game play had positive effects, compared with anecdotal observations of students' communicative behaviour during face-to-face interaction, on the quantity of second language interaction via text-based chat and oral-based chat during the three computer game sessions, as measured by the number of words and length of turns. Figure 3 and Table 5 show that students took 528 and 607 turns in text chat in session 1 and 3 respectively. Individuals ranged from 35 to 121 turns with both the average and the minimum and maximum number of turns increasing between the two sessions. The average number of turns per student in session 3 (M = 75.88, SD = 20.518) was greater than the average number of turns per student in session 1 (M = 66, SD = 18.174) when they had just started and were not yet used to the game. A paired t-test was performed to determine if this difference was statistically significant. As shown in Table 3, this was found to be the case (t = 3.837, p = .006; p < .05) with a medium effect size (d = 0.49), meaning that the amount of interaction increased from session 1 to 3.

Table 3: Paired Samples Test for Average Number of Turns via Text-Based Chat per Student in Session 3 and Session 1.

|		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Pair 1	Session 3 – Session 1	3.837	7	.006	9.875	3.790	15.960

In voice-based chat, participants took 348 turns during the first and 408 during the third session (see Table 4), again showing a similar pattern of increasing averages and a higher minimum and maximum number of turns. As shown in Figure 3, the average number of turns per student in session 1 was M = 43.50 (SD = 10.170) and in

session 3 M = 51 (SD = 9.957). According to Table 4, this difference was found to be significant (t=8.1, p = .000; p < .05) with a medium (effect size (d = 0.75).

Table 4: Paired Samples Test for Average Number of Turns via Voice-Based Chat per Student in Session 3 and Session 1.

		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Pair 1	Session 3 – Session 1	8.101	7	.000	7.500	5.311	9.689

Figure 3: Average number of turns per student, communicating via text-based chat and voice-based chat while working on computer game activities.
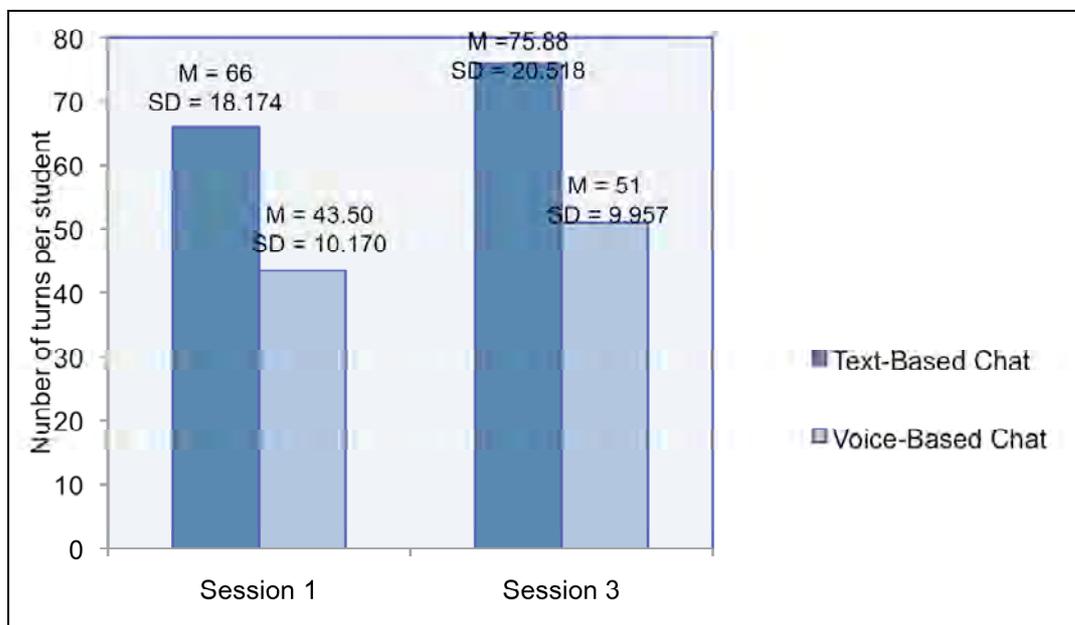

Table 5: Number of Words and Number and Length of Turns in Text-Based Chat and Voice-Based Chat during Game Play.

	Session 1		Session 3	
	Written (n=8)	Oral (n=8)	Written (n=8)	Oral (n=8)
Number of turns	528	348	607	408
Length of turn				
• Single word	49 (9.3%)	19 (5.6%)	53 (8.7%)	41 (10%)
• Phrase	27 (5.1%)	20 (5.7%)	31 (5.1%)	21 (5.2%)
• Incomplete T-units	58 (11%)	62 (17.8%)	61(10%)	65 (15.9%)
• Complete T-units	394 (74.6%)	247 (71%)	462 (76.1%)	281 (68.9%)
Total words	1,881	1,064	2,456	1,249
English-only total words	1,875	1,054	2,455	1,245

Not surprisingly, a slightly higher proportion of incomplete T-units—the shortest form of a sentence that is still grammatical—(17.82% vs. 10.98% and 15.93 %

vs. 10.05%) was found in a voice-based chat (See Table 5) while a greater proportion of the number of words produced (235 vs. 133 and 307 vs. 156 average words per student) was found in a text-based chat between the two sessions (See Figure 4). However, the increased number of words produced seemed unstable. Finally, it was found that there were a higher number of English words used through written interaction than in oral interaction (1,875 vs. 1,054 and 2,455 vs. 1,245 in sessions 1 and 3 respectively) (See Table 5).

Figure 4: Average number of words per student in text-based chat and voice-based chat.
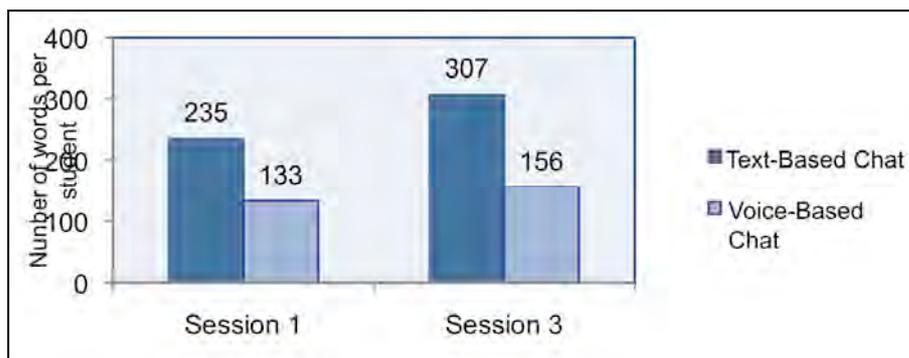
Quality of second language interaction. Although a large quantity of the target language was produced, second language interaction during game play did not seem to pose a development of accuracy and complexity of learners' produced discourse, probably due to the demands for simultaneous communication flow. However, second language interaction during game play did, indeed, encourage a variety of discourse functions, which is summarized in Table 6. The oral-based chat transcripts showed more use of greetings than did the text-based chat transcripts (16 vs. 8 and 24 vs. 6 in sessions 1 and 3 respectively). Especially in the third session of oral interaction where students seemed to have stronger interpersonal relationships, greetings were found to be more formulaic and interaction contained more turns and small talk, while students engaged in written interaction spent less time greeting each other and initiated their conversations directly (See Example 1).

Example 1

Example of voice-based chat
Hunna: Hello Momman
Momman: Hello Hunna. How are you today?
Hunna: I'm fine. Thank you. And you?
Momman: I'm fine too. Today is last game session. I so sad.
Hunna: Why?
Momman: Because I can't talk to you in game again. I wanna cry.
Hunna: Don't cry now, Momman. We   should start quest or we can't finish.
Momman: OK
Example of text-based chat
[15:09] ManN: hi
[15:11] LKAK: 🤭
[15:17]   r u ok?
[15:19] ManN: yes
[15:29]   have u find NPC "Newton"?
[15:30] LKAK: no

Use of clarification requests was present frequently through both written and oral interaction. Not surprisingly, more clarification requests were made via the oral oral-based chat than the written-based chat (21 vs. 10 and 23 vs. 4 in sessions 1 and 3 respectively). Probably because of problems with pronunciation, a lack of preparation time, the use of recording equipment and audio quality issues, clarification requests were often produced during the voice-based chat. An example of how clarification requests were used in both voice- and text-based chat is shown in Example 2.

Example 2

Example of voice-based chat

YEEHAAA: What's the function of mouse?
Innoker: control cursor
YEEHAAA: I don't understand. Say it again.

Example of text-based chat

[16:51:56] Number1:   Why you not wearing the hat?
[16:52:14] Coopy: what do you mean?

As comprehension was required to proceed to other game tasks, a large number of confirmation checks were present throughout the oral interaction (18 in session 1 and 17 in session 3), while none were present in the written communication. However, self-corrections were more frequent in the written interaction than in the oral interaction (17 vs. 6 and 18 vs. 11 in sessions 1 and 3 respectively). The fact that participants engaged in the former medium could read on-screen messages and that they had time to think and prepare would easily allow them to reflect and correct their messages before and after posting. Example 3 gives an example of confirmation checks taking place during voice- and text-based chat.

Example 3

Example of voice-based chat	**Example of text-based chat**
PzMaxGate: West is lift yes or no?	[16:34:58] Burn Zero: find another NPC
BadlyAG: Eh?	[16:35:02] where in NPC?
PzMaxGate: Sorry.	[16:35:05] where is* NPC?
West is left or right?	[16:35:39] Zerotz: north of town
BadlyAG: Left	

In addition, questions were more frequent in the written communication than in the oral communication. However, most questions asked in both mediums were incomplete (e.g. where?) and ungrammatical (e.g. "is Burn Zero download something?"). Both text and voice-based chat transcripts bore evidence of few wh-questions (i.e. what, why, how, when, or where), many yes/no questions, many uninverted questions (e.g. "u find Professor?"), and no-tag questions (e.g. questions such as "you come with me?", as opposed to "come with me, will you?"). Moreover, in the voice-based chat questions were usually interrupted by another interlocutor (e.g. "Have you finish the…" "Yes")

Table 6: Discourse functions of clauses in written and oral interaction during gameplay.

	Session 1		Session 3	
	Written (n=8)	**Oral (n=8)**	**Written (n=8)**	**Oral (n=8)**
Greeting	8	16	6	24
Clarification requests	10	21	4	23

Confirmation checks	0	18	0	17
Self-corrections	17	6	18	11
Questions				
• WH-questions	22	20	23	22
• Yes/no questions	27	24	29	21
• Tag questions	0	0	0	0

Linguistic features. Learners' linguistic features are summarized in Table 7. Overall, students engaged in written interaction were found to pay more attention to grammatical accuracy than those communicating orally via voice-based chat during game play. Lexical accuracy was also found to be generally high during written interaction (1,327 in session 1 and 1,611 in session 3) although some words were misspelled deliberately in the written interaction as an approach to saving typing time. In voice-based chat, participants did not have pronunciation problems with simple words but did with long, difficult, unfamiliar ones. Finally, use of native language words was more frequent in the oral interaction than in the written interaction, particularly in the first session (10 vs. 6), but was rare in both written and oral interaction in the last session. An example of use of native language in voice- and text-based chat is illustrated in Example 4.

Example 4

Example of voice-based chat	**Example of text-based chat**
Panzil: do u know ans about how david use computer in free time?	[15:57:31] Burn Zero: i have a problem
	[15:58:03] LKAK: serious?
Funzy: no	[15:58:13] don't worry
my ans yoong yai laew[1]	[15:58:21] IKAK: yeah drink!!
	[15:58:29]
	[15:58:31] LKAK: krean!!![1]
Note[1]: "my ans young yai laew" means "my answer is now confusing" in English.	Note[1]: "Krean" is a slang Thai word commonly used in an online game community to refer to a misbehaved gamer

Table 7: Linguistic features of the learners' language production via written and oral communication during computer game activities.

	Session 1		Session 3	
	Written (n=8)	Oral (n=8)	Written (n=8)	Oral (n=8)
Grammatical accuracy				
Tense (unit of analysis = clause)				
• Present Simple	301	203	378	233
• Present Continuous	65	33	48	35
• Present Perfect	2	0	7	0
• Future Simple	26	11	29	13
Lexical accuracy (Spelling)	1,327	-	1,611	-
Pronunciation	-	967	-	1026
Use of native language words	6	10	1	4

Use of simplified or reduced registers. Simplified or reduced registers here included (1) "leets" commonly used among chat and online game communities where letters are replaced by numbers and symbols (i.e. emoticons) and words are commonly misspelled,

(2) omission of articles, (3) contractions, and (4) abbreviations. Examination of text-based chat transcripts revealed use of emoticons to exhibit facial expressions and use of exclamation marks to represent tone of voice. Obviously, the presence of these features was to compensate for the absence of paralinguistic features found in face-to-face oral communication. Besides, many omissions of articles and contractions were found in both text- and voice-based chat, which made it easier and faster for the delivery of the messages. Abbreviations were also frequently posted in text-based chat but not much found in voice-based chat so that messages became more comprehensible to the interlocutor. With the use of simplified or reduced registers, the researchers could observe learners' increased capacity to quickly read, comprehend, and produce messages in English while communicating during game play. Use of simplified or reduced registers, particularly "leets", might be considered inappropriate (See Example 5). However, it was found necessary for gamers to interact with others quickly so that they could complete the game quest within the time allotted.

Example 5

Example of text-based chat
[15:20:31]Coopy: hi Masumoto
[15:20:55]MasumoTo: hi Coopy
[15:20:55]   have u started test yet dood[1]?
[15:21:31]   it's very hard
[15:21:38]Coopy: yes!!!!!!!!!!!
[15:21:57]   hard 4 me 2 eiei[2]
[15:22:22]Number1: How many bytes are in megabyte? What's your ans?
[15:22:57]MasumoTo: i don't know T_T
[15:23:00]Coopy: 555
[15:23:07]   die
[15:23:14]   we die!!!!!!!!!!!!!
[15:23:46]   T must kill us
[15:23:49]MasumoTo: lol

Note[1]:   dood is a deliberately inaccurate spelling for dude.
Note[2]:   eiei is the textual representation of laughter, which is like "heehee", "huhu", "haha", "hoho" etc. in Korean laughter expressions

What effects does digital game play have on learners' willingness to communicate?

After finishing each digital game session, participants were given a questionnaire to complete which asked them to rate their willingness to communicate in English on a scale from 1 ("absolutely not willing") to 5 ("very willing") in a range of situations normally encountered during game play. The obtained Chronbach Alpha coefficient was .72, which was rather high and indicated acceptable internal consistency among the five willingness to communicate items. The results revealed that participants were generally willing to communicate in English (mean 4.52) and generally showed positive changes in their willingness to engage in communication situations between the two sessions using second language. Particularly when participants were confused about the quest, they were increasingly willing to use English to ask for explanations from other players (mean 4.00 and 4.81 in the first and third session respectively). As shown in Table 8, the mean score of participants' willingness to communicate in session 3 (M = 4.84, SD = .13) was higher than the mean score of participants' willingness to communicate in session 1 (M = 4.19, SD = .34) and this was found to be statistically significant (t = 5.921, p = .004; p < .05), showing that participants became more willing

to interact in the second language over time. The actual difference (Cohen's d = 1.34) revealed a very large effect according to Cohen's d scale of magnitudes of correlation, which means that computer game playing had very practical importance in willingness to communicate improvement among second language learners.

Table 8: Willingness to Communicate.

Situations	Session 1		Session 3		Total	
	Mean	SD	Mean	SD	Mean	SD
Give game instructions to other players	4.63	.62	4.88	.34	4.76	.18
Ask for explanations from other players when you are confused about the quest you must complete.	4.00	.82	4.81	.4	4.41	.57
Talk to other players about the quest.	4.19	.75	4.88	.34	4.54	.49
Read/Listen to other players' conversations attentively.	4.38	.5	5.00	.01	4.69	.44
Read/Listen to Non-player characters' dialogues actively.	3.75	.86	4.63	.5	4.19	.62
Total Mean	4.19	.34	4.84	.13	4.52	.23

The second section of the questionnaire dealt with participants' feelings about communicating in English during game play such as apprehension, excitement, motivation, and self-confidence, which are considered important factors contributing to second language willingness to communicate. The obtained Alpha score was .69, indicating that the four items on this construct were fairly reliable. Again, each item was rated on a 5-point scale, with the anchors 'strongly disagree' (1) and 'strongly agree' (5). Overall, participants reported their positive feelings about using English to interact with others during game play (mean 4.26), which in turn suggested that they had high levels of willingness to communicate in English. However, the results showed that participants gave a low score to 'confidence' (mean 3.69). As not all of the participants were confident in their second language communication, a low level of willingness to communicate could be present. Table 9 shows that the average score of session 1 was 3.89 and the average score of session 3 was 4.63. This difference between sessions 1 and 3 was statistically significant (t=6.301, p = .008; p < .05). The effect size (Cohen's d) of 1.15 was large and showed a huge magnitude of the impact of computer games on second language learners 'feelings about communicating in English during game play.

Table 9: Participants' feelings about communicating in English in a computer game context.

Statements	Session 1		Session 3		Total	
	Mean	SD	Mean	SD	Mean	SD
I feel relaxed communicating in English during game play.	3.75	1	4.56	.46	4.15	.57
I find communicating in English during game play challenging.	4.50	.89	5.00	.01	4.75	.35
It is fun communicating in English during game play.	3.94	.85	4.94	.25	4.44	.7

I feel confident when communicating in English during game play.	3.38	.89	4.00	.97	3.69	.44
Total Mean	**3.89**	**.47**	**4.63**	**.46**	**4.26**	**.45**

The third section examined participants' reflection on their communication behavior and second language use in a digital game context. The five items showed a fairly good level of internal consistency, with a Cronbach's alpha of .68. In general, what the participants thought about communicating in the second language was found to be closely related to their actual communication behavior and discourse produced during game play. Responses given on a 5-point scale with the anchors "never" (1) and "always" (5), revealed that participants often used English only to communicate with other players (mean 4.13) and often made an effort to communicate in English (mean 4.04). Therefore, it was not surprising to find from the transcripts that the participants gradually reduced the use of their native language and became willing to use only English as a medium of communication. As shown in Table 7, the mean score of session 3 (M = 4.05, SD = .67) was also higher than the mean score of session 1 (M = 3.24, SD = .39) and again, this was significant (t = 4.866, p =.008; p < .05). The effect size (Cohen's d = 0.75) was medium (Becker, 2002) according to Cohen's d scale of magnitudes of correlation.

Table 10: Learners' reflection on their communication behavior and second language use in a digital game context.

Statements	Session 1		Session 3		Total	
	Mean	SD	Mean	SD	Mean	SD
I communicate in English fluently (with little hesitation and pauses).	3.13	.62	4.06	.57	3.60	.66
I communicate in English clearly (i.e. understandable to the interlocutors).	3.19	.83	4.13	.62	3.66	.67
I request repetition or clarification when I do not understand what other players are saying in English.	2.69	.6	2.94	.68	2.82	.18
I use English only to communicate with other players.	3.75	.58	4.50	.52	4.13	.53
I make an effort to communicate in English.	3.44	1.15	4.63	.62	4.04	.84
Total Mean	3.24	.39	4.05	.67	**3.65**	.52

The fourth section containing both Likert-scale and open-ended questions was designed to elicit participants' experience communicating in a digital game context, as well as their comments on their progress on second language communication over the three digital game sessions. Participants were required to complete this section once they had finished the last digital game session only.

Regarding participants' experience communicating in English while working on digital game activities, they gave a favorable rating to their overall experience (M = 3.8, SD = .4), thus suggesting a high level of willingness to communicate. Most of them claimed that they liked communicating in a gaming environment because of the fact that playing and having opportunities for language use went together and enabled them to communicate without anxiety or embarrassment. In addition, all of the participants

realized that game play helped them improve their second language communication in a number of ways. Here are some of the reasons given by the participants.

Playing computer games contributes to my comprehension development. If I make no effort to understand the quest assignment, NPCs' dialogues, and contributions from other players, I cannot complete the game tasks successfully.

I learn more vocabulary from the game and other players. Besides, I have a chance to use a variety of new words and language functions and therefore increase my language practice.

*Playing games is fun, thus developing more confidence and motivation to use English for communication.*

Playing computer games require instant reaction and communication, so it enhances the development of my language fluency.

Playing computer games provides me the opportunity for second language communication outside the classroom.

However, what the majority of the participants disliked about communicating in English during game play was the use of abbreviations, emoticons, smileys, simple words, and ungrammatical sentences to communicate because they felt that over-use of these would not contribute to their accuracy and complexity in language production.

There were some changes in the way participants rated their communication skills (see Figure 5). In other words, while only 6.2 percent of participants considered their English communication skills as "good" before taking part in the study, 44% claimed that their English communication skills had improved over the three digital game sessions because game play had made them feel relaxed, confident, and in turn more willing to use the target language. Similarly, the observation of the actual communication behavior of this group showed their improvement in both the quantity and quality of their language production. More interestingly, students who were normally shy in face-to-face class tended to become less reluctant, increase participation levels, and express themselves in a different way through the games. However, the participants who still considered their communication skills as poor after digital game participation reported that they did not achieve any improvement because they were unable to stay focused on second language communication but tended to concentrate on the game itself. When observing their transcripts, it was found that this group of students hardly initiated any conversations, often delayed their responses to other players, and always used only simple words, abbreviations and emoticons.

Figure 5: Percentage of learners' perceived competence in their English communication skills before and after participating in gaming activities.
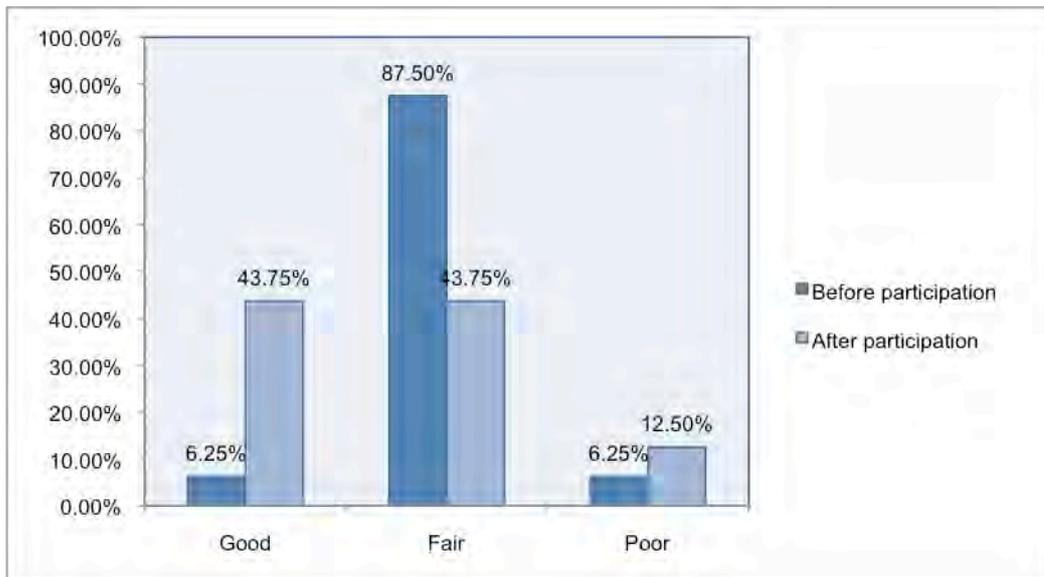
Discussion and Conclusions

The results above reveal some interesting findings. Firstly, the differences between voice and text-based chat in computer games are quite marked, as could be expected. Voice chat is generally considered difficult and more demanding while text chat might be preferred by learners as it gives them more time to read others' and prepare their own answers (see for example, Sykes, 2005; Thorne, Black & Sykes, 2009). Participants communicating using voice chat communicate less and less often, produce a greater proportion of incomplete t-units (the shortest form of a sentence that is still grammatical), and fewer words and make more clarification requests. Voice chat resulted in discourse that was, in some ways, more similar to face-to-face communication, especially in greetings, probably because this modality offers an environment which is real-time in nature and creates more authentic communicative situations for interaction. These findings support the results of other chat studies which also reported more communication (Kern, 1995) and more formal and complex discourse (Warschauer, 1996) among learners when engaging in text chat than in voice chat and face-to-face interaction. Similar results were also reported in Jepson (2005) which found that in the voice chat environment learners were more willing to negotiate for meaning and used significantly more repair moves than they did in text chat.

Perhaps more interesting is the overall high number of turns for participants. Although there was considerable variation between speakers, generally participants communicated quite freely in this online digital game, and increasingly so from session 1 to session 3. However, language production was quite inaccurate and neither complexity nor accuracy improved from session 1 to session 3. The most likely explanation for this is that participants were unable to pay attention to both form and meaning. At first glance, this finding seems to contradict those made by Piirainen-Marsh and Tainio (2009), however, in their study participants did not converse *in* the game, only *about* the game and were found to repeat input derived from the game. In our study participants met as characters in the game and therefore had to actively participate in a communicative exchange. This poses considerable cognitive demand on learners' language systems (Levelt, 1989) and prevents learners from allocating limited resources

to both exchanging meaning and paying attention to grammar. This seems to be confirmed by the fact that participants produced fewer mistakes in text than in voice chat. Similar results were found by Ortega (2009) for text chat.

When investigating participants' willingness to communicate, the results showed that on the whole students were quite prepared to speak in English, and this was confirmed by their actual participation in the computer quests. This result is more impressive than it might seem; students in Thailand are notoriously reticent when it comes to communicating in English (Kamprasertwong, 2010) and teachers frequently report having great difficulty encouraging language production in class. The digital game environment clearly posed less of a barrier to them, and – an important finding – their willingness to communicate improved significantly from session 1 to session 3. In other words, not only did the game provide an attractive environment to participants, but communicating in that environment led them to become more willing to communicate in that environment with the proportion of first language use diminishing over time.

This is particularly interesting when comparing this with participants' self-evaluation of their communication skills; seven participants felt their skills had improved. Students who were normally shy in face-to-face classes tended to become less reluctant, increased participation levels, and expressed themselves quite freely in the game. However, those participants who still considered their communication skills to be poor after participating in the game did not show any improvement. When observing their transcripts, it was found that they hardly ever initiated a conversation, often delayed their answers and tended to use only simple words, abbreviations and emoticons. When asked about this, they said they found it difficult to focus on the language while also having to learn to use the game.

Limitations and future research

This exploratory study has a number of limitations. Firstly, due to the small sample size and descriptive nature of this study, statistical analysis is challenging and the results may not be directly generalizable to other populations. Secondly, some of the data used in the study was self-reported and this poses a number of well-known challenges (Crockett, Schulenberg & Petersen 1987). Finally, and perhaps most importantly, we do not know if participants would have increased their amount of interaction as much if they had participated in a more traditional, face-to-face class. In other words, we cannot be certain that the above findings can be attributed to the computer environment (although participants' responses to the questionnaires do make this likely). Our aim was not to compare different learning environments, simply to investigate what happens when second language learners are asked to play and communicate at the same time.

There was considerable variation between players in terms of their participation levels and their willingness to communicate, as shown by the large standard deviations. This variation should not be ignored and further investigation is needed to identify the impact of individual differences and to determine if there are certain (types of) learners for whom the use of games is more suitable than others, or ways of ensuring that games are used in a way that is more inclusive.

Perhaps most importantly, this study took one, admittedly limited, approach to the students' interaction; it focused predominantly on their language production and did not take a more holistic, socio-cultural view of the learning experience of the students in this particular online environment. Future studies should investigate all aspects of the learning process to complement the more narrowly interactional perspective taken here. An example of such a study, also drawing on chat data, is Zheng et al (2009, p. 489), who applied an iterative and multilayered analysis of the chat data to show how

"meaning emerges when language is used to coordinate in-the-moment actions". This type of analysis is promising in that it can provide a deeper view on the data.

It is also important future studies further explore the effect of learners' willingness and readiness for interacting in games (cf. Chen & Johnson, 2004) and the type and amount of teacher preparation necessary to be able to make use of games.

Implications

This study has a number of implications, the most obvious of which is perhaps that commercial games can be adapted for use in second language learning and teaching, thus removing one important barrier for teachers who may not have the time and resources to develop their own games. The results have also shown that students increase their interaction when playing games, which of course is an encouraging finding. The differences between voice and chat-based text show that students write more than they speak, and make fewer mistakes in writing, but that in both oral and written interaction their participation increases; teachers can thus choose one or the other modality depending on their educational objectives.

Interestingly, however, when students were asked about changes in their *confidence* in communicating in English, they were not as positive. It is possible that playing computer games on three occasions only was simply not enough to help them build that confidence, but it is also likely that participants felt safe in the confined space of the game, access to which had been restricted from the general public. This shows that it may be important for teachers to be careful about gradually opening up communication and not to withdraw the perceived safety of the closed environment immediately, and to provide ample support and feedback when doing so.

More generally, the above shows once again the importance of affective factors in second language acquisition, especially the potentially negative impact of anxiety. Aoki (1999, p. 149) suggests the development of a "psychologically secure environment". Clearly, participants in this study found such a secure environment in the digital game. They confirmed this in their responses on the questionnaires, which showed they felt they did not have to be embarrassed or anxious to make mistakes within the game. Participants also felt that playing the game and communicating in English went together and that they were therefore less conscious of themselves. Participants mentioned other benefits too, such as the ability to develop their vocabulary, the fact that they had to respond quickly and therefore became more fluent, and that they could practice English outside the classroom.

What this study has shown, then, is that games are able to increase student enthusiasm, lower anxiety, and improve willingness to communicate. These are of course very valuable for supporting the second language acquisition process and digital games may deserve a more frequent place in the second language curriculum.

References

Aoki, N. (1999). Affect and the role of teachers in the development of learner autonomy. In J. Arnold (Ed.), *Affect in language learning* (pp. 142-154). Cambridge: Cambridge University Press.

Burgoon, J. K. (1976). The unwillingness to communicate scale: Development and validation. *Communication Monographs, 43*(1), 60-69.

Cao, Y., & Philp, J. (2006). Interactional context and willingness to communicate: A comparison of behavior in whole class, group and dyadic interaction. *System, 34*(4), 480-493.

Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing, and research.* Cambridge: Cambridge University Press.

Chen, M., & Johnson, S. (2004). Measuring flow in a computer game simulating a foreign language environment. Retrieved March 8, 2011, from http://www.markdangerchen.net/pubs/flow_in_game_simulating_fle.pdf

Clement, R., Baker, S. C., & MacIntyre, P. D. (2003). Willingness to communicate in a Second Language: The effects of context, norms, and vitality. *Journal of Language and Social Psychology, 22*(2), 190-209.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Hillsdale: Lawrence Earlbaum Associates.

de Haan, J., Reed, M., & Kuwada, K. (2010). The effect of interactivity with a music video game on second language vocabulary recall. *Language Learning & Technology, 14*(2), 74-94.

Derwing, T. M., Munro, M. J., & Thomson, R. I. (2008). A longitudinal study of ESL learners' fluency and comprehensibility development. *Applied Linguistics, 29*(3), 359-380.

Ellis, N. (2002). Frequency effects in language processing: A review with implications for theories of implicit and explicit language acquisition. *Studies in Second Language Acquisition, 24*(2), 143-188.

Freiermuth, M., & Jarrell, D. (2006). Willingesss to communicate: Can online chat help? *International Journal of Applied Linguistics, 16*(2), 189-212.

Garcia-Carbonell, A., Rising, B., Montero, B., & Watts, F. (2001). Simulation/Gaming and the acquisition of communicative competence in another language. *Simulation & Gaming: An Interdisciplinary Journal of Theory, Practice and Research, 32*(4), 481-491.

Gee, J. P. (2003). *What video games have to teach us about learning and literacy.* Basingstoke: Palgrave Macmillan.

Hashimoto, Y. (2002). Motivation and willingness to communicate as predictors of reported L2 use: The Japanese ESL context. *Second Language Studies, 20*(2), 29-70.

Jepson, K. (2005). Conversations--and negotiated interaction--in text and voice chat rooms. *Language, Learning & Technology, 9*(3), 79-98.

Kamprasertwong, M. (2010). *Willingness to communicate in English speech as a second language: A study of Thai, Chinese, and Dutch Samples.* Unpublished MA dissertation, University of Groningen, the Netherlands.

Kang, S.-J. (2005). Dynamic emergence of situational willingness to communicate in a second language. *System, 33*(2), 277-292.

Kern, R. G. (1995). Restructuring classroom interaction with networked computers: Effects on quantity and characteristics of language production. *The Modern Language Journal, 79*(4), 457-476.

Krashen, S. (1985). *The Input Hypothesis: Issues and implications.* London: Longman.

Larsen-Freeman, D., & Cameron, L. (2008). Research methodology on language development from a complex systems perspective. *The Modern Language Journal, 92*(2), 200-213.

Lèger, D. d. S., & Storch, N. (2009). Learners' perceptions and attitudes: Implications for willingness to communicate in an L2 classroom. *System, 37*(2), 269-285.

Levelt, W. J. M. (1989). *Speaking: From intention to articulation.* Cambridge: The MIT Press.

Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of language acquisition. Vol. 2: Second language acquisition* (pp. 413-468). New York: Academic.

MacIntyre, P. D., Baker, S. C., Clément, R., & Conrod, S. (2001). Willingness to communicate, social support , and language-learning orientations of immersion students. *Studies in Second Language Acquisition, 23*(03), 369-388.

MacIntyre, P. D., Baker, S. C., Clément, R., & Donovan, L. A. (2003). Talking in order to learn: Willingness to communicate and intensive program. *Canadian Modern Language Review, 59*(4), 589–607.

MacIntyre, P. D., & Charos, C. (1996). Personality, attitudes and affect as predictors of second language communication. *Journal of Language and Social Psychology, 15*(1), 3-26.

MacIntyre, P. D., Dörnyei, Z., Clément, R., & Noels, K. A. (1998). Conceptualizing willingness to communicate in a L2: A situational model of L2 confidence and affiliation. *The Modern Language Journal, 82*(4), 545-562.

McCroskey, J. C., & Richmond, V. P. (1982). Communication apprehension and shyness: Conceptual and operational distinction. *Central States Speech journal, 33*(4), 458-468.

Mortensen, D. C., Arntson, P. H., & Lustig, M. (1977). The measurement of verbal predispositions: Scale development and application. *Human Communication Research, 3*(2), 146-158.

Ortega, L. (2009). Interaction and attention to form in L2 text-based computer-mediated communication. In A. Mackey & C. Polio (Eds.), *Multiple perspectives on interaction in SLA: Research in honor of Susan M. Gass* (pp. 226-253). New York: Routledge.

Pica, T. (1994). Research on negotiation: What does it reveal about second-language learning conditions, processes, and outcomes? *Language Learning, 44*(4), 493-527.

Piirainen-Marsh, A., & Tainio, L. (2009). Other-Repetition as a Resource for Participation in the Activity of Playing a Video Game. *The Modern Language Journal, 93*(2), 153-169.

Samudavanija, C. (1999). *Plearn Puea Roo (Enjoyment for learnng).* Bangkok: Vajiravudh College.

Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11*(2), 129-158.

Steinkuehler, C. (2006). Massively multiplayer online videogaming as participation in a Discourse. *Mind, Culture & Activity, 13*(1), 38-52.

Steinkuehler, C. (2007). Massively multiplayer online gaming as a constellation of literacy practices. *eLearning, 4*(3), 297-318.

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). Rowley, MA: Newbury House.

Sykes, J. (2005). Synchronous CMC and pragmatic development: effects of oral and written chat. *Calico, 22*(3), 399-432.

Thorne, S. L., Black, R. W., & Sykes, J. (2009). Second language use, socialization, and learning in Internet interest communities and online games. *The Modern Language Journal, 93,* 802-821.

van Lier, L. (2004). *The ecology and semiotics of language learning: A sociocultural perspective.* Norwell: Kluwer Academic Publishers.

Warschauer, M. (1996). Comparing face-to-face and electronic discussion in the second language classroom. *CALICO, 13*(2&3), 7-26.

Whitton, N. (2010). *Learning with digital games: A practical guide to engaing students in Higher Education*. New York: Routledge.

Yashima, T. (2002). Willingness to communicate in a Second Language: The Japanese EFL context. *The Modern Language Journal, 86*(1), 54-66.

Yashima, T., Zenuk-Nishide, L., & Shimizu, K. (2004). The influence of attitudes and affect on willingness to communicate and Second Language communication. *Language Learning, 54*(1), 119-152.

Zheng, D., Young, M. F., Wagner, M. M., & Brewer, R. A. (2009). Negotiation for action: English language learning in bame-based virtual worlds. *The Modern Language Journal, 93*(4), 489-511.

Biographical Statements

Dr. *Hayo Reinders* is Head of Learner Development at Middlesex University in London. He is also Editor of Innovation in Language Learning and Teaching, and Convenor of the AILA Research Network for CALL and the Learner. Hayo's interests are in CALL, autonomy, and out-of-class learning. He is a speaker for the Royal Society of New Zealand. His most recent books are on teacher autonomy, teaching methodologies, and second language acquisition and he edits a book series on 'New Language Learning and Teaching Environments' for Palgrave Macmillan.

Homepage: www.innovationinteaching.org

Sorada Wattana is a lecturer at Dhurakij Pundit University, Thailand and a PhD student at the University of Canterbury, New Zealand. Her enthusiasm for the role of computer games in transforming the way people learn inspires her to investigate their potential for language learning. She is currently devoting her time to her thesis writing under the supervision of Dr. Michael Grimley, Professor Niki Davis, and Dr. Hayo Reinders, which she thoroughly enjoys.