the jaltcalljournal

ISSN 1832-4215
Vol. 10, No.3 Pages 203–219

Tasks for easily modifiable virtual environments

Robert Swier

Kyoto University
swier.stanley.26z@st.kyoto-u.ac.jp

Recent studies of learner interaction in virtual worlds have tended to select basic tasks involving open-ended communication. There is evidence that such tasks are supportive of language acquisition, however it may also be beneficial to consider more complex tasks. Research in task-based learning has identified features such as non-linguistic goals that are seen as promoting rich learner interaction. In this preliminary work, we report on the development of goal-orientated tasks for the virtual environment Minecraft, offering a qualitative examination of learner interaction using three such tasks. Results show the potential for easily modifiable platforms such as Minecraft to support the implementation of goal-orientated tasks for virtual environments.

Keywords: Learner Interaction, Virtual Worlds, Task Design, Minecraft, Second Life

Introduction

An increasing number of empirical studies have appeared in academic literature in recent years that investigate the use of 3-D multiplayer games and other virtual worlds as environments that may be conducive to second language acquisition. Key factors for this increasing interest include technological advances that make the development and use of such software more practical, as well as developments in cognitive, interactionist, and sociocultural theories of second language acquisition (SLA) concerning types of interaction that are theorized to facilitate language learning and which are seen as achievable in these environments. Following SLA theory, researchers have suggested a number of benefits to participation

Regular Paper

in computer games and virtual worlds, including exposure to comprehensible input and opportunities to negotiate meaning with other interlocutors (Garcia-Carbonell, Rising, Montero, & Watts, 2001); opportunities for goal-directed target-language use and membership in game-related social communities (Thorne, Black, & Sykes, 2009); and opportunities for target language interaction that is both learner-centered and collaborative (Zhao & Lai, 2009). As research in this area of computer-assisted language learning (CALL) is still at an early stage, the principle goal for many empirical studies conducted to date has been the necessary task of identifying and verifying such affordances for language acquisition across the range of available platforms, including commercial massively multiplayer online role-playing games (MMORPGs), games designed specifically for educational purposes, and virtual worlds (see Peterson (2013) for a recent summary). Typically, such studies assign a large part of their focus to providing an analysis of the linguistic and social interactions of language learners as they engage tasks set in the virtual world by game designers or by the researchers or educators themselves. It is this latter group of researcher-designed tasks for virtual worlds to which we will turn our focus in this study. We begin by briefly examining the types of tasks that have been used previously in significant empirical studies of virtual worlds. We will note that while the tasks described in the literature have helped shed light on important aspects of learner interaction in these environments, the range of the tasks themselves appears to be largely focused on open-ended communication. After considering some factors that may have influenced the design of tasks in previous work, we offer motivation for the use of a broader range of tasks types, specifically those incorporating clear non-linguistic goals. We then propose the use of Minecraft, a somewhat novel virtual world for language acquisition studies, along with three initial tasks. We present a qualitative analysis of the interactions of six undergraduate students at a Japanese university as they solve the tasks in pairs, and finally we discuss the results of the study and offer our conclusions and notes on future work.

Regarding terminology, we must make an important clarification before continuing. As we discuss various multi-user 3-D virtual environments, we will reserve the term *game*, when used in a technical sense, to refer only to those platforms that explicitly contain elements of gamification, such as a narrative, built-in objectives, and levels or other markers of achievement. Although such games do incorporate a virtual environment, we will reserve the term *virtual environment* (or *virtual world*) to refer only to those platforms that do not prominently incorporate such elements of gamification. In contrast to games, virtual worlds generally grant users significant power to create content and modify the environment. Thus, in studies of learner interaction based in virtual worlds, it is incumbent upon the researcher to define the tasks that will be under consideration, whereas studies involving games have the option of observing the interaction of learners as they engage the platform's built-in objectives.

Background

Studies of learner interaction in virtual worlds represent a somewhat smaller section of the available literature in comparison to work that examines games. Table 1 summarizes the chosen platform and researcher-designated tasks of 14 significant and recent studies. As can be seen from the table, most studies have chosen to explore several different tasks, and a majority of tasks involve some form of open-ended computer-mediated discourse between participants. In the study by Toyoda and Harrison (2002), for instance, using the

Table 1: Summary of tasks in virtual worlds.

Study	Virtual World	Description of Tasks
Toyoda and Harrison (2002)	Active Worlds 3-D	Engage in free discourse with a native partner
Peterson (2005)	Active Worlds 3-D	Opinion exchange: "What are the best ways to master English?"
Peterson (2006)	Active Worlds 3-D	Jigsaw picture arrangement
		Discuss options in selecting a gift
		Exchange opinions about ideal marriage partners
Deutschmann, Panichi, and Molka-Danielsen (2009)	Second Life	Self-introduction role play
		Give short presentation
Deutschmann and Panichi (2009)	Second Life	Engage in discourse about personal topics
		Give short presentation
Peterson (2010)	Second Life	Explain virtual world features to peer
		Opinion exchange about flu outbreak
		Give short presentation
Wehner, Gump, and Downey (2011)	Second Life	Interact with other users and submit chat transcripts to instructor
Jauregi, Canto, de Graaff, Koenraad, and Moonen (2011)	Second Life	Complete questionnaire and discuss cultural differences and similarities
		Explore and discuss a location in the virtual world
		Discuss areas explored in virtual world with native partner
		Discuss overall experience in virtual world
Cornillie, Clarebout, and Desmet (2012)	Custom platform	Complete interactive automated dialogs with corrective feedback, related to introducing people and business networking.
Peterson (2012)	Second Life	Treasure hunt
		Opinion exchange about improving language education in Japan
		Opinion exchange about a flu outbreak
		Short presentation
DuQuette and Hann (2010)	Second Life	Provide directions to a specific location
		Arrange furniture in a room
Milton, Jonsen, Hirst, and Lindenburn (2012)	Second Life	Situational role-play activities (bank, travel agency, museum, supermarket, etc.)
Liou (2012)	Second Life	Orientation to virtual world and free discourse
		Peer-review editing; tour of virtual world
Liang (2012)	Second Life	Role-playing, including: visual puzzle solving, verbal duels, reading poems, treasure hunt.

chat feature of Active Worlds 3-D, learners of Japanese were tasked with engaging in free, open-ended discourse with a native partner that was unrestricted to any particular topic. Later work using Second Life by Wehner et al. (2011) and Liou (2012) also incorporated

similar free and unconstrained discourse tasks for learners. Studies by Peterson (2005, 2006, 2010, 2012), Deutschmann and Panichi (2009), and Jauregi et al. (2011) incorporated tasks in which learners engaged in open-ended discourse centered on particular topics, including the best ways to learn English, ideal marriage partners, personal topics, a flu outbreak, cultural differences, and language education in Japan. In three studies – Peterson (2010), Jauregi et al. (2011), and Liou (2012) – learners were directed to discuss aspects of the virtual world itself. In studies by Deutschmann et al. (2009), Milton et al. (2012), and Liang (2012), role play scenarios were developed to cover such situations as important self-introductions, daily life scenarios, and characters engaged in linguistic play such as verbal duals and poem recitation. Finally, Deutschmann and Panichi (2009), Deutschmann et al. (2009), and Peterson (2010, 2012) incorporated tasks involving the delivery of short presentations.

Only three of these 14 studies – Peterson (2006), DuQuette and Hann (2010), and Liang (2012) – incorporate tasks involving definite non-linguistic goals. The study by Liang includes a task where a group of participants look at a visual pattern in the virtual world and try to guess its meaning correctly in order to continue on to other activities. The study by Peterson incorporates a jigsaw task in which pairs of participants each receive half of a set of six pictures depicting a series of events, and must then describe the pictures to each other and reconstruct the story line, as well as a decision-making task in which pairs of participants receive a list of possible gifts and must then come to mutual agreement on a single choice. DuQuette and Hann include a direction-giving task where one participant studies a route that must then be explained to and followed by a partner, and a furniture arrangement task in which one partner directs another to move furniture in a room to achieve a pre-determined arrangement.

Figure 1. Screen shot of Second Life with the chat window open.

Factors that have affected task design

As mentioned, the majority of tasks in recent studies of virtual worlds have tended to involve participants engaging in various types of open-ended dialogs. Perhaps one factor

that has contributed to the abundance of this type of task is the view, expressed by Wehner et al. (2011) and others, that virtual worlds are primarily social spaces. It is thus not necessarily the case that tasks for such spaces will seek to be goal-orientated or even be exploitive of the fact that they are being implemented in a virtual world. Recognition of the social context for learning dates at least to the work of Vygotsky (1978), and has been influential in various frameworks for language acquisition in computer-mediated contexts (Hampel, 2006, 2010; Warschauer, 1997). A clear purpose of many tasks, then, is to promote social interaction among learners or between learners and more competent speakers of the target language.

Still, the lack of task variety given the vast possibilities of virtual worlds may indicate the presence of another factor. All of the studies in Table 1 except for DuQuette and Hann (2010) appear to have used participants for whom proficiency in the virtual world could not be assumed. In such cases, the platform's learning curve may be significant. Consider Second Life, which was the platform of choice for most of the studies in Table 1. Second Life provides a powerful and highly customizable environment. Such power, however, inevitably leads to complexity. Completing even basic tasks such as moving, chatting, and interacting with objects requires familiarity with a user interface featuring an extensive system of menus and pop-up controls, as shown in Figure 1. Even in its most simple form, the user interface presents over two-dozen icons and menu items, including information about a custom currency system. Wehner et al. (2011), for example, devote two hours of class time to instructing students in Second Life's most basic operations. Completing tasks at higher levels of difficulty, such as creating objects or modifying the environment, may first require several days of tutorials or other engagement with the platform to gain the necessary expertise (DuQuette, 2011). Ensuring that user-built elements are kept persistent in the world and are safe from other users requires familiarity with the complicated rules of a virtual real estate market, and possibly the payment of monthly fees to Linden Labs (the publisher of Second Life). Creating objects in Second Life that respond to other users or the environment requires users to script those actions manually using a custom programming language, something that is likely to be beyond the skill and interest of all but the most devoted users. While such power very likely could be used creatively and effectively in SLA contexts, the relative lack of such uses in the literature suggests that for many studies it is simply impractical. It is worth noting that DuQuette and Hann (2010), the only study in Table 1 to include proficient users, was also the only study to involve modification of the environment. Otherwise, the complexity of advanced operations, particularly in Second Life, appears very likely to have discouraged the investigation of goal-orientated tasks that involve more significant interaction with virtual environments, and instead contributed to the focus on tasks involving open-ended communication.

Potential benefits of more complex tasks

There may be benefits for learners in the exploration of more complex tasks. Observing that learning is not inevitable in virtual environments, Milton et al. (2012) have noted that "the challenge for language learning in these environments is to engineer tasks which require learners and native speakers to interact and where a condition of success in the task is the meaningful use of language" (pg. 101). Although interaction with a native speaker may not strictly be necessary for learning to occur, and although meaningful use of language may be not so much a condition of success itself but an emergent requirement of a task's

success conditions, the point that task design greatly effects interaction is well taken. In the substantial literature on the use of tasks in communicative SLA, goal-orientation and gaps in information have been widely seen as key components of task design, in part because they are thought to promote negotiation of meaning (Long (1996); and see overviews by Bygate, Skehan, and Swain (2001) and Ellis (2003), among others). Goals have even been included in the vary definition of *task*, as with Bygate et al., "a task is an activity which requires learners to use language, with an emphasis on meaning, to attain an objective" (pg. 11). As noted previously, some virtual world studies have included tasks of this type. In particular, the study by DuQuette and Hann (2010) was further investigating the work of Peterson (2006) on the relationship between task type and level of negotiation in virtual worlds. Peterson was influenced by the work of Blake (2000) and Smith (2003), who made similar investigations using chat software. All of these studies chose tasks situated within the framework developed by Pica, Kanagy, and Falodun (1993) on types of tasks that are most likely to promote negotiation. In this framework, Pica et al. identify five types of tasks – jigsaw puzzles, exchanging information, solving problems, making decisions, and exchanging opinions – that are expected to promote negotiation of meaning to various degrees. Of all these task types, opinion exchanges and other types of tasks involving open-ended dialog are expected to promote negotiation the least. In consideration of this, and given the striking bias in the recent literature towards open-ended tasks, it may be time to further consider tasks of a broader variety as researchers continue to investigate learner interaction in virtual worlds.

Figure 2. A screenshot of Minecraft, showing a few items in the user's inventory.

The Study

Our primary objective in this work is to consider goal-orientated communicative tasks for virtual worlds, and by way of doing so we will adopt Minecraft as our platform of choice. As both the platform and the style of communicative task presented in this work remain

under-represented in the literature on virtual worlds, this exploratory work will adopt a qualitative approach in seeking to address the following two research questions:

1. How suitable is Minecraft as an environment for goal-orientated communicative tasks? More specifically, to what degree does the platform address some of the issues that appear to have discouraged task variety in other virtual worlds, such as the level of skill necessary to modify the environment for the creation or completion of tasks with non-linguistic goals?
2. What kinds of examples of feature-rich interaction, if any, are present in learner dialog generated during the completion of goal-orientated tasks in Minecraft? And, how do these findings compare with previous studies of goal-orientated tasks in virtual worlds?

Methodology

Arena for tasks: Minecraft

Minecraft is a free roaming 3-D virtual world developed by the Swedish studio Mojang AB and recently acquired by Microsoft. The software has been publically available since 2009, and a full release was issued in 2011. A screenshot is shown in Figure 2. Free-roaming worlds (also called "open worlds") allow the user to explore an environment in a nearly unrestricted and arbitrary way, free from predetermined paths, destinations, and invisible walls. Additionally, Minecraft is also a "sandbox", as users are free to modify the environment and decide for themselves what they would like to do. Minecraft begins with the creation of a procedurally generated world of identically sized blocks representing various types of material that bears some comparison to a world made of Lego (Duncan, 2011). This is in sharp contrast to a platform such as Second Life, which attempts a higher degree of graphic realism and in which the environment is almost entirely constructed by hand, rather than by an algorithm incorporating an element of randomness. Unlike some online-only platforms such as World Of Warcraft, Second Life, or Active Worlds, Minecraft allows individuals to maintain their own public or private servers, and indeed there is no single developer-run server to host all active users. As such, Minecraft can even be used in a single-player mode on a local machine, or in multi-player mode on a local network. This flexibility in server administration, combined with the ability to randomly generate an arbitrary number of vast worlds, enables Minecraft to dramatically simplify the process by which users can modify the virtual environment. Perhaps due in part to these qualities, Minecraft appears to be attracting increasing interest in its potential applicability for education, seeing use in some form in thousands of schools worldwide (Muffett, 2014). A dominant usage appears to be as providing context and material for writing or literature courses for students working in their native language (Schifter & Cipollone, 2013), however use in language acquisition contexts has also been suggested (Hausrath, 2012; York, 2014).

Tasks and task features

In this study, we propose three initial cooperative tasks with non-linguistic goals to explore task creation in Minecraft. The tasks are designed to include goals that involve some exploration and modification of the environment, while also remaining suitable for novices who lack experience with Minecraft or similar platforms. Additionally, the tasks are designed

to expand beyond open-ended communication and incorporate features seen in the framework of Pica et al. (1993) as being more likely to promote negotiation of meaning. The tasks were also designed to use an unmodified, basic version of Minecraft, thus avoiding massive infrastructure construction requiring advanced skills. In particular, the tasks take advantage of the structures and environment generated as part of the Minecraft world. All three tasks were implemented in the same world and designed for two participants. Figure 3 shows an overview map of the task world, indicating the approximate locations and walking destinations of the three tasks. The area covered by the overview is relatively large, requiring approximately five minutes to travel horizontally from side to side at Minecraft's normal walking pace. The origin point (or spawn point), where users enter the world, is directly in front of a building where the first task takes place.

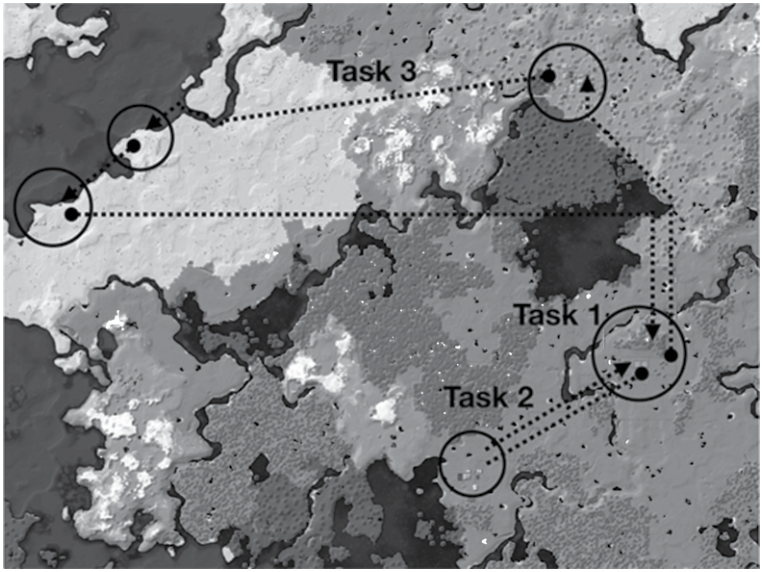

Figure 3. Overview of task world showing approximate locations and movements.

Task one: Classic information gap

Task one presents a classic information gap (Prabhu, 1987), and bears some similarity to the furniture arrangement task of DuQuette and Hann (2010). The participants are faced with a building containing two rooms, labeled "A" and "B". Both rooms contain eight differently colored blocks and are identical except for the arrangement of the blocks. One participant takes the role of entering room B where he or she is able to move the blocks. The other participant climbs to the top of the building where both rooms are visible through an open roof. The player who can see both rooms must then observe and direct the player in room B to arrange the blocks so that they are the same as in room A. The task is complete when both rooms are arranged identically. Modification of the environment necessary to

construct the task involved simply placing material to serve as the building and placing material to serve as the colored blocks in each room.

Task two: A short journey

Task two was developed as preparation for task three. The participants are told to find a location called "Fort Wild Horse", which in actuality is a small procedurally generated village a short distance from the origin point. The participants must find a trail with a sign pointing toward the village, journey to the village where they must find a chest containing some gold, and then bring the gold back to the origin. The participants must travel together, and along the journey are several obstacles and uncertainties, encouraging collaboration and mutual decision-making. This is again intended to promote rich linguistic interaction, including negotiation. Construction of the task involved locating a nearby village, placing some obstacles as well as a sign and other material to mark the trail, and placing a chest containing some gold in the village.

Task three: A long journey

Task three is a journey similar to task two, however it is much longer and involves the collection of more items. Traveling together, the participants must visit three procedurally generated structures: another small village where they must collect some diamonds, a castle where they must collect some clocks, and a pyramid where they must collect some compasses. After collecting all of the items, the participants must make their way back to the origin point. This journey involves several challenges, including some obstacles, and a larger search area to find both the items that need to be collected and the trailheads leading to the next destination. The trails are much longer than in the previous task and in some cases are poorly marked to create uncertainty. Participants were asked to stay together, requiring mutual agreement on which direction to travel. Construction of the task involved locating some suitable structures on the map, placing the items to be collected, and marking the trail. As the final item to be collected was quite far from the origin, an underground walking tunnel was constructed to provide for a faster and more efficient return trip. Although Minecraft has methods for high-speed transportation, this approach did not require additional instruction to the participants.

Participants

The tasks were tested with six first or second-year undergraduate students at a Japanese university studying English as a second language. All participants were volunteers and the first language for all participants was Japanese. Details of the participants are summarized in Table 2. Student 1 was significantly older than the other participants and had returned to university to change careers. The TOEIC scores provide some indication of the participants' English proficiency levels, with Students 1, 3, and 6 having intermediate level proficiency, and Students 2 and 4 having basic-level proficiency. Student 5 did not provide a TOEIC score or test score from another standardized English proficiency test, though observation during the session suggested that her proficiency was approximately equal to Student 4. The participants were arranged in the following pairs: student 1 with student 2; student 3 with student 4; and student 5 with student 6. Participants were questioned about their

prior gaming experience in pre-study questionnaires and interviews. One student reported having no gaming experience, while the student with 'minimal' experience reported having only a few instances of exposure to computer games. Those with 'some' gaming experience reported having more than a few experiences playing a variety of games on several different platforms. The student with 'significant' experience reported playing a wide variety of computer games regularly during childhood, though not in recent years. No participant was currently a regular player, and all were first-time users of Minecraft.

Table 2: Summary of participants.

	Age	Gender	TOEIC Score	Gaming Experience
Student 1	29	Male	740	Significant
Student 2	19	Male	530	Some
Student 3	20	Female	680	Some
Student 4	20	Female	400	Some
Student 5	20	Female	Not given	Minimal
Student 6	20	Female	650	None

Procedures

Data collection occurred during a single session for each pair, lasting approximately two hours. The start state of the virtual environment was identical for each session. In addition to completion of the tasks, the session included pre- and post-questionnaires, a Minecraft tutorial lasting approximately 20 minutes, and semi-structured interviews at the end of the session. The tutorial served to introduce the multi-user environment and covered basic operations necessary for completing the tasks, including how to move, jump, climb ladders, collect items, place items, and dig. After the tutorial, the participants were asked to review a document containing brief descriptions of the three tasks, and begin Task One when they felt they were ready. After the completion of each task, the participants were asked to move on to the next task until all tasks were completed. All three pairs of participants completed the three tasks in approximately 75 minutes. This session length is comparable to other studies of virtual worlds from Table 1, which generally range from 60 minutes (Toyoda and Harrison (2002), for example), to 90 minutes (Peterson (2005) and others).

As with many games and virtual worlds, it is not possible in Minecraft to simultaneously communicate by text and control an avatar in the environment because the keyboard is used to control many basic movements and other operations. In order to allow the participants to communicate while also controlling their avatar, the participants were asked to communicate verbally. To facilitate this, the participants were placed in the same room and seated opposite to each other. The participants could see and speak to each other, but could not see the other participant's computer screen.

During the sessions, the researcher also operated an avatar in the environment. The researcher's avatar was set to a separate game mode, thus allowing it to fly and obtain a view of the activities of both participants on the ground from an overhead third-person perspective. Screen capture software was used to record this viewpoint as well as the audio exchanges of the participants via an external microphone. This third avatar mostly remained as a neutral observer, but did intervene when necessary. For instance, in one of

the sessions an avatar died accidently during the completion of a task, causing the character to re-spawn at the origin point, far away from the other participant. The researcher's avatar was useful in guiding the re-spawned character back to the current task area in a timely manner so that the task could resume. As interaction between the researcher's avatar and the participants was otherwise kept to a minimum, this was not expected to have a significant impact on the learner interaction, and may be comparable to the physical presence of a teacher or researcher in the same room during learner interaction sessions.

Results and discussion

Participant interaction

After the sessions were completed, the video recordings were transcribed and analyzed for examples of the kinds of interaction that have been presented in the literature as being supportive of language acquisition. As previously mentioned, the degree to which a task is expected to promote negotiation of meaning has played a particularly prominent role in the evaluation of tasks in the literature. As such, we select three examples of negotiation of meaning from the transcripts to illustrate the interaction that was observed.

Dealing with an inadequate description. In the exchange shown below, from task one, Student A is the player who is able to observe both rooms containing colored blocks and who is tasked with directing Student B in how to arrange the blocks in one of the rooms. In line 3, Student B tries to indicate where the red block should be placed, saying "Near the Room A. Side of the pink side… pink side wall." Player B is attempting to indicate that the red block should be placed along the wall that is both close to room A and also close to a previously placed pink block. This description fails to convey the message successfully, and in lines 4–11 the participants progress through a series of negotiations, including: a clarification of the meaning of *pink side* (lines 3–6), and a clarification of the reference point of a directional description (lines 9–11). In line 11 Student A is finally successful in indicating which wall should be the new location of the red block, finding a simple and unambiguous description after several attempts and revisions.

(1)	1	A:	Next is red and white.
	2	B:	Red and white? Now I have red block.
	3	A:	**Near the Room A. Side of the pink side…pink side wall.**
	4	B:	Pink side wall?
	5	A:	**Pink side of wall.**
	6	B:	Do you mean pink block?
	7	A:	Yeah. **Pink block, this side wall.**
	8	B:	Do you mean this? <walks to location>
	9	A:	No no no no…**Left…Left wall.**
	10	B:	Left? I don't know which direction you mean.

11 A: Uh, sorry. **For you, back wall. Back.**

12 B: Go straight <B reaches the location intended by A>

13 A: Maybe there you have to put the red box. On the wall.

Correcting a misheard term. In this exchange, from task two, the participants have read a description of the task indicating that they must find a village called Fort Wild Horse. In line 2, Student B immediately misunderstands *horse* as *house*. The misunderstanding persists until line 9 when Student A offers a correction. Student B requests clarification of the meaning of *horse* in line 10 by repeating the term. In line 11, Student A offers the explanation that "Fort Wild Horse" is the name of the destination town. Still not understanding, Student B apologizes in line 12 and asks for clarification from the researcher. The researcher and Student A confirm in lines 13–14 that the goal of the task is to find a village named "Fort Wild Horse". In line 15, Student B for the first time acknowledges that the goal is to find a town, and enhances this success by immediately suggesting a possible method for locating it (by looking from a high place).

(2) 1 A: So, we have to find where **Fort Wild Horse** is. The town.

2 B: **Fort Wild House**…we have to find?

3 A: Yes.

4 B: I go there.

5 A: Yes?

6 B: I find…I research there. Where, where…Where, where…

7 A: Do you know where it is?

8 B: I'm nearby a pond. Mr. Bob? We can't break the…uh…**the house is in the fence?** <referring to the researcher>

9 A: **Not "house" but "horse".**

10 B: **Horse?**

11 A: **The name of the town. Look at this.** <Refers to printed instructions> **"Fort Wild Horse". It's name of the town.**

12 B: **Ah, I'm sorry. Horse?** <Looks to researcher>

13 R: **That's just the name of the town.**

14 A: **Yeah. So, we have to find the town.**

15 B: Town? Maybe we have to go to the high place.

Resolving a task-level misunderstanding. In this example, again from task one, Student A is tasked with checking the target positions of the blocks and instructing Student B in how to arrange them. Student A seems to begin the exchange not understanding the goal of the task. In line 2, Student B explains that Student A needs to describe the blocks in Room A, but does not specify what attributes are important. In line 3, Student A asks about the number of blocks. After Student B indicates in line 4 that color is also important, Student

A provides a full enumeration of the color and number of each block in Room A. Student B seems to recognize that this information is not helpful (line 6), but accepts the information and provides a more precise description of the task in line 8, this time indicating that her task is to *move* the blocks. Student A continues to misunderstand what information is relevant, and again provides a list of the blocks (line 11). It is not until Student B specifically asks about location in line 14, her third attempt at explaining the task, that Student A finally understands the goal of the task.

(3)

1	A:	How…how do I do?
2	B:	**You…you should tell me…how blocks…is there in Room A.**
3	A:	Ah! Okay. Make the number of them?
4	B:	And color.
5	A:	Color. Black is one. Red is one. Blue is one. Purple is one.
6	B:	Eh?
7	A:	Pink is one. Green is one. Orange is one. White is one.
8	B:	**This is Room B. I will move blocks in this room and I want to know how about Room A.**
9	A:	How about in Room A? Room A is uh…black…So, the color?
10	B:	Color?
11	A:	Ah, okay. Green is one. Purple is one. Orange is one. Pink is one. Red is one. White is one. Black is one. Blue is one. That's all.
12	B:	Okay. It's same. Yes…it's same.
13	A:	Yes.
14	B:	**How about place?**
15	A:	Ah! Ahhh!

Participant attitudes

In order to explore the attitudes of the participants towards completing goal-orientated tasks in Minecraft, the participants were asked to complete post-session questionnaires and brief semi-structured interviews. The questionnaires included open-ended questions as well as a number of Likert items using a five-point scale: (5) strongly agree, (4) agree, (3) no opinion, (2) disagree, and (1) strongly disagree. Every participant positively indicated that they did in fact enjoy the session, with the items *I enjoyed using the game* and *I would like to play this game again in the future* receiving mean scores of 4.7 and 4.3 respectively. Additionally, the item *In the game, I could speak English more freely than in a regular class* also received a high mean score of 4.7. Interestingly, although all pairs of participants managed to complete the tasks in roughly the same amount of time, the item *The game was easy to use* received a score of 3.3, with four participants selecting 'agree' and the two participants with the least gaming and computer experience rating the item as 'disagree'. In interviews and responses to the open-ended questions, all participants indicated that

they felt communication during the tasks could help improve their English ability and that the session provided opportunities for speaking English and working together. As one participant wrote, "Though we sometimes spoke English incorrectly, we had a lot of chances to practice to speak". Three of the six participants did comment on the length of the tasks and the amount of walking, with one participant noting that there was little to talk about when walking in the tasks involving journeys, saying, "we didn't talk much while we were just waking, I think the time should be shortened". This observation was confirmed by the transcript data, which showed that relatively little linguistic interaction took place at times during the tasks when the participants were not facing an immediate problem or decision point.

Conclusions and future work

This preliminary study sought to investigate the suitability of Minecraft as a virtual environment for the implementation of goal-orientated communicative tasks, and the ways in which such tasks in Minecraft would encourage features of learner interaction similar to what has been observed in previous studies. In regards to the first research question, Minecraft does indeed appear to be a suitable platform for developing communicative tasks for language learners. The streamlined interface and block-style simplicity of building in the environment, combined with the ability for users to generate new worlds arbitrarily and maintain independent servers, appeared to offer significant advantages over Second Life and other virtual worlds that have been focused on in the existing literature. Three goal-oriented tasks were developed with modest effort, requiring the participants to use basic operations to cooperatively explore and modify the environment around them. A short tutorial was found to be sufficient for all three pairs of participants – first-time Minecraft users, some of whom reported having little to no experience with computer games – to complete the tasks successfully and with positive attitudes overall. Regarding the second research question, the analysis in the previous section focused on examples of negotiation of meaning, as this feature has factored prominently in the influential task framework offered by Pica et al. (1993). The analysis found that negotiation did occur during the completion of the three tasks, providing at least preliminary evidence that the tasks were functioning as intended. Thus, the results presented here are largely in agreement with those reported by Peterson (2006) and DuQuette and Hann (2010), though in this case the users were novices in the platform and yet were still able to achieve a significant degree of interaction with the virtual environment itself. Additionally, the transcript analysis and feedback from participants indicated that linguistic interaction was greatly decreased during periods in which the participants were not faced with an immediate goal of solving a problem or making a decision, further underscoring the role that goals may play in promoting linguistic interaction.

It must be emphasized that this study is small, consisting of only a single session with three pairs of participants and three tasks. Additionally, some conclusions were drawn from data self-reported by the participants, which could potentially present issues with reliability. A study incorporating a larger number of participants working over several sessions is planned for future work. This larger study will provide an opportunity to explore a greater variety of goal-orientated tasks, possibly including project-style tasks that may persist over several sessions or scenarios in which groups of learners have greater freedom to choose their own activities. A larger study may also provide an opportunity to explore

ways in which goal-orientated tasks for Minecraft could play a role in SLA classroom contexts. Finally, although the use of Minecraft in this work was motivated by the ease of task creation and user modification of the virtual environment, other possible areas for future investigation include the use of Minecraft as a social arena, similar to studies of other virtual worlds.

References

Blake, R. (2000). Computer mediated communication: A window on L2 Spanish Interlanguage. *Language Learning and Technology, 4*(1), 120–136.

Bygate, M., Skehan, P., & Swain, M. (2001). *Researching pedagogic tasks: Second language learning, teaching, and testing*. Harlow, UK: Pearson.

Cornillie, F., Clarebout, G., & Desmet, P. (2012). Between learning and playing? Exploring learners' perceptions of corrective feedback in an immersive game for English pragmatics. *ReCALL, 24*(03), 257–278.

Deutschmann, M., & Panichi, L. (2009). Talking into empty space? Signalling involvement in a virtual language classroom in Second Life. *Language Awareness, 18*(3–4), 310–328.

Deutschmann, M., Panichi, L., & Molka-Danielsen, J. (2009). Designing oral participation in Second Life – a comparative study of two language proficiency courses. *ReCALL, 21*(02), 206.

Duncan, S. C. (2011). Minecraft, beyond construction and survival. *Well Played: A Journal on Video Games, Value and Meaning, 1*(1), 1–22.

DuQuette, J.-P. (2011). Task-based learning and teaching in online virtual worlds and games. *OnTask: The journal of the JALT task-based learning SIG, 1*(2), 4–15.

DuQuette, J.-P., & Hann, F. (2010). Using tasks in virtual worlds. *Temple University Japan: Working Papers in Applied Linguistics, 23,* 19–26.

Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.

Garcia-Carbonell, A., Rising, B., Montero, B., & Watts, F. (2001). Simulation gaming and the acquisition of communicative competence in another language. *Simulation and Gaming, 32*(4), 481–491.

Hampel, R. (2006). Rethinking task design for the digital age: A framework for language teaching and learning in a synchronous onine environment. *ReCALL, 18*(1), 105–121.

Hampel, R. (2010). Task design for a virtual learning environment in a distant language course. In M. Thomas & H. Reinders (Eds.), *Task-based language learning and teaching with techology* (pp. 131–153). London: Continuum.

Hausrath, Z. (2012). Minecraft. *Electronic Journal for English as a Second Language (TESL-EJ), 15*(4).

Jauregi, K., Canto, S., de Graaff, R., Koenraad, T., & Moonen, M. (2011). Verbal interaction in Second Life: towards a pedagogic framework for task design. *Computer Assisted Language Learning, 24*(1), 77–101.

Liang, M.-Y. (2012). Foreign ludicity in online role-playing games. *Computer Assisted Language Learning, 25*(5), 455–473.

Liou, H.-C. (2012). The roles of Second Life in a college computer-assisted language learning (CALL) course in Taiwan, ROC. *Computer Assisted Language Learning, 25*(4), 365–382.

Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. Ritchie & T. Bhatia (Eds.), *Handbook of second language acquisition.* San Diego: Academic Press.

Milton, J., Jonsen, S., Hirst, S., & Lindenburn, S. (2012). Foreign language vocabulary development through activities in an online 3D environment. *The Language Learning Journal, 40*(1), 99–112.

Muffett, T. (2014, July 27, 2014). Should teachers use Minecraft in our classrooms? BBC News. Retrieved from http://www.bbc.co.uk/news/education-27936946

Peterson, M. (2005). Learning Interaction in an Avatar-based Virtural Environment: A Preliminary Study. *PacCALL Journal, 1*(1), 29–40.

Peterson, M. (2006). Learner interaction management in an avatar and chat-based virtual world. *Computer Assisted Language Learning, 19*(1), 79–103.

Peterson, M. (2010). Learner participation patterns and strategy use in Second Life: An exploratory case study. *ReCALL, 22*(3), 273–292.

Peterson, M. (2012). EFL learner collaborative interaction in Second Life. *ReCALL, 24*(1), 20–39.

Peterson, M. (2013). *Computer Games and Language Learning.* New York: Palgrave Macmillan.

Pica, T., Kanagy, R., & Falodun, J. (1993). Choosing and using communication tasks for second language research and instruction. In G. Crookes & S. Gass (Eds.), *Tasks and second language learning* (pp. 9–34). Clevedon, UK: Multilingual Matters.

Prabhu, N. S. (1987). *Second language pedagogy.* Oxford: Oxford University Press.

Schifter, C., & Cipollone, M. (2013). *Minecraft as a teaching tool: One case study.* Paper presented at the Society for Information Technology & Teacher Education International Conference 2013, Chesapeake, VA.

Smith, B. (2003). Computer-mediated negotiated interaction: An expanded model. *The Modern Language Journal, 87*(1), 38–57.

Thorne, S. L., Black, R. W., & Sykes, J. M. (2009). Second language use, socialization, and learning in Internet interest communities and online gaming. *The Modern Language Journal, 93*(Focus Issue).

Toyoda, E., & Harrison, R. (2002). Categorization of text chat communication between learners and native speakers of Japanese. *Language Learning and Technology, 6*(1), 82–99.

Vygotsky, L. S. (1978). *Mind and society.* Cambridge, MA: Harvard University Press.

Warschauer, M. (1997). Computer-mediated collaborative learning: theory and practice. *The Modern Language Journal, 81*(4), 470–481.

Wehner, A. K., Gump, A. W., & Downey, S. (2011). The effects of Second Life on the motivation of undergraduate students learning a foreign language. *Computer Assisted Language Learning, 24*(3), 277–289.

York, J. (2014). Minecraft and Language Learning. In C. Gallagher (Ed.), *Minecraft in the classroom: Ideas, inspiration, and student projects for teachers.* San Francisco: Peachpit.

Zhao, Y., & Lai, C. (2009). Massively multi-player online role playing games (MMORPGs) and foreign language education. In R. Ferdig (Ed.), *Handbook of Research on Effective Electronic Gaming in Education* (pp. 402–421). New York: IDEA Group.

Author biodata

Robert Swier is a PhD student in the Graduate School of Human and Environmental Studies at Kyoto University and a lecturer at the Center for Research and Educational Development in Higher Education at Kagawa University. He has graduate degrees in computer science (computational linguistics) from the University of Rochester and the University of Toronto.