Abstract
Driven by interactionist theory and operationalized by task-based interaction, this study aims to investigate EFL learners' task-based negotiation in Second Life (SL), a 3D multi-user virtual environment (MUVE). A group of adult EFL learners with diverse cultural/linguistic backgrounds in L1 participated in this task-based virtual class. Learners used avatars to interact with peers in communication tasks via voice chat. Discourse samples were collected through their oral production to examine their language patterns during negotiated interaction. Varonis and Gass's (1985) framework of negotiation of meaning was employed to code and analyze the transcribed data. Two types of negotiation routine were identified: single-layered trigger-resolution sequence and multi-layered trigger-resolution sequence. Specifically, the interrelationship among task types, negotiation and strategy use was also established in the study: jigsaw task prompted the most instances of negotiation and strategy use, followed by information-gap and decision-making tasks, whereas opinion-exchange task triggered the least. This study suggests that two-way directed tasks with convergent, obligatory, single-outcome conditions will stimulate more cognitive and linguistic processes of negotiation involving interactional modifications—leading to more complex and lengthy negotiation routine. It is concluded that SL as a 3D MUVE is conducive to theoretically-driven, pedagogically-sound, task-based research in language acquisition.

1. Introduction

Due to the ubiquitous and ever-changing nature of emerging technologies, digital technologies have not only reshaped students' learning styles, but also challenged the way we teach in the 21st century. Dede (2005) argues that 'one-size-fits-all courses of fixed length, content and pedagogy' unfortunately can no longer meet the learning needs and interests of our *experiential learners*, who prefer a nonlinear way of thinking and personalized learning in collaboration (pp. 7-8). With students wired with technology 24/7 in the digital age, the disconnect between the conventional ways of course delivery (e.g., relying only on print materials or PowerPoint presentations) via static interfaces of electronic learning management systems (e.g., Blackboard) and the plurality of teaching beyond the class walls (e.g., telecollaboration or digital games) cannot be overlooked in today's education (Prensky, 2005a, 2005b).

3D multi-user virtual environments (MUVEs), such as World of Warcraft, Active Worlds, Second Life (SL), are growing popular with the Millennial Generation. Those 3D MUVEs allow players to simulate real-life (RL) scenarios and to explore imagination and creativity in vibrant social platforms. By the same 3D token, language learners can also simulate RL tasks in immersive, target language environments. They can easily interact with other speakers worldwide via text or voice chat in SL and immerse themselves in real-world scenarios without the burden of physical travels and costs (Canto, de Graaff, & Jauregi, 2014; Clark, 2009). Learners can spontaneously negotiate meaning with interlocutors and modify language output during task-based negotiation, thereby refining their interlanguage system (Long, 1983, 1996; Pica, 1987; Swain, 1985, 1995; also see the inconclusive findings drawn from classroom-based vs. lab studies in Foster, 1998; Eckerth, 2008, 2009; Gass, Mackey, & Ross-Feldman, 2005). As such, 3D social networking environments enable SLA researchers to test out the notion of negotiation of meaning and examine how language acquisition can take place during the interactional process in 3D MUVEs (González-Lloret & Ortega, 2014).

As Cooke-Plagwitz (2009) implicates, the 'experiential, real-time, and multimodal' features of SL are well suited to the learning interests and styles of our digital native learners (p. 176). Prior task-based research conducted has also attempted to examine whether 3D MUVEs, such as SL, can serve as a conducive learning environment for language acquisition to occur (e.g., Canto, de Graaff, & Jauregi, 2014; Deutschmann, Panichi, & Molka-Danielsen, 2009; Lan, 2014; Liou, 2012). Nevertheless, some of the prior SL studies are either anecdotal reports (e.g., Johnson, 2006; Silva, 2008; Vickers, 2007a, 2007b), or not closely framed by SLA theories (e.g., Clark, 2009; Wang, Song, Stone, & Yan, 2009)— particularly from the standpoint of task-based interaction (cf. Peterson, 2010a, 2010b, 2012). A call for more dialogues in SL literature informed by SLA theories, such as task-based language teaching (TBLT), is hence desired (Kraemer, 2008; Peterson, 2012).

Thus, this study aims to investigate whether the link between SLA research and 3D MUVEs like SL can be established with a focus on EFL learners. Specifically, empirical discourse samples evidenced in this study will demonstrate whether task-based design operated in SL can make a difference in EFL learners' language use during voiced-based, task-driven negotiation.

2. Research background

2.1. Second Life for language learning and teaching

Developed by Linden Lab in 2003, *Second Life (SL)* has over 36 million registered users worldwide and the number keeps growing (Linden Lab, 2013). SL allows users (i.e., *residents*) to take on different digital personae through creating their virtual identities in *3D avatar* form. Avatars can communicate with other SL residents from all walks of life using either voice chat, or public text chat, or 'IM' to privately text their avatar friends. Avatars can make non-verbal gestures as in RL, such as clapping or shrugging, though non-verbal cues need to be manually configured by the user. They can also walk, run, fly, teleport, change appearances and build 3D objects. This immersive, avatar-enabled, 3D sphere blurs the SL-RL boundaries as SL extends and augments user embodied cognition and experience through the dynamic duo of the 'avatar self' and 'real self' (Pasfield-Neofitou, Huang, & Grant, 2015). The sense of telepresence (being there) and copresence (being there together) amplified by avatars also makes learning more playful and resembles RL activities (Cooke-Plagwitz, 2008). The avatar-enabled immersion further fosters experiential learning and creativity, heightens engagement and motivation and promotes risk-taking that sets SL apart from its 2D counterparts and other text-based digital platforms (Dawney, Mohler, Morris, & Sanchez, 2012; González-Lloret & Ortega, 2014; Peterson, 2016b).

SL affordances, such as immersive simulation and real-time collaboration, offer a potential instructional venue for teachers to incorporate real-life tasks into foreign language learning that may be difficult to manage in a conventional classroom, such as taking multiple field trips to different countries or attending several social events located remotely (Gonzalez-Lloret & Ortega, 2014). These unique features afforded by SL have also attracted SLA researchers to examine whether or not this dynamic 3D sphere can facilitate task operationalization, leading to better language performance. For example, Jauregi, Canto, Graaff, Koenraad, and Moonen (2011) investigate the impact of real-life, interactive tasks on Spanish leaners' task performance and language acquisition. They find that not only do those authentic, problem-solving tasks enhance students' Spanish acquisition and communication skills, tasks tapping into real-world unpredictability in simulated 3D fashion also promote spontaneous negotiation of meaning that further builds learners' intercultural communication competence and enhanced engagement. These positive findings are further corroborated by their other studies in that interactive tasks performed in SL using avatars can trigger more intercultural communication and task-based negotiation than practices in a conventional classroom (Jauregi & Canto, 2012), leading to students' positive perceptions about task design in SL and better intercultural understanding (Canto, Graaff, & Jauregi, 2014). Similar positive claims are also reported in task-based research targeting other foreign languages. For example, Chinese beginners' oral communication performance and learning motivation are enhanced through problem-solving, communication tasks conducted in SL (Lan, 2014; Lan, Kan, Sung, & Chang, 2016), or SL as a 3D situated, collaborative, task-driven learning environment reinforces French learners' knowledge construction and speaking competence through role-playing movie production (Hsiao, Yang, & Chu, 2015).

The synergy of task-based design and SL unique features to enhance L2 acquisition is also evidenced in EFL contexts. For example, Peterson's (2010b) study examines EFL students' use of communication strategies and the relationship between task type and the quality of negotiation via text chat in SL (which replicates his earlier

research in *Active Worlds*, Peterson 2005, 2006). His Japanese EFL students participated in three sessions of text-based, task-driven interaction with their dyad partners. Results show that Japanese students also used both transactional strategies (e.g., split turns and time saving devices) and interactional strategies (e.g., use of politeness and emoticons) to negotiate meaning with interlocutors in SL. They also perceived English learning in SL more engaging and less intimidating through spontaneous interaction and peer scaffolding (Peterson, 2012). Another case in point is Chen's (2016b) study, which discovers that 3D multimodality afforded by SL stimulates voice-based, task-based interaction that further prompts their use of modification strategies in their output-based oral production (e.g., clarification requests or confirmation checks).

As discussed above, 3D multimodal communication enables EFL learners to switch back and forth text and voice chats to practice writing and speaking in simulated RL scenarios (Silva, 2008), and use the target language for meaningful, communicative purposes through interactive collaboration with avatar peers (Vickers, 2007a, 2007b). Wang and his research team (Wang, Song, Stone, & Yan, 2009) explore the effect of integrating SL into EFL instruction. Based on the program survey results, triangulated with student blog postings and interviews, Chinese EFL students positively perceived SL as a useful learning platform to be integrated in an EFL program. Deutschmann, Panichi, and Molka-Danielsen's (2009) examine how supportive moves (i.e., back-channeling and elicitors) and linguistic behavior (i.e., floor space and turn taking patterns) between teacher-student and student-student interaction led to students' participation and engagement in SL. They find that teachers' supportive moves were conducive to their EFL students' engagement and that students initiated more linguistic cues, signaling their active involvement in SL. This positive claim also mirrors another finding that the avatar form safeguards virtual identity and lowers learner anxiety, thereby empowering EFL students to become more vocal and active in participation (Deutschmann & Panichi, 2009, 2013).

Taken together, previous research seems to indicate that SL affordances can facilitate RL task delivery and optimize TBLT principles, such as learning by doing, authenticity, negotiation of meaning and exposure to rich and authentic input (Gonzalez-Lloret & Ortega, 2014; Ortega & González-Lloret, 2015), thereby promoting experiential and immersive learning (Liou, 2012; Chen, 2016a). Despite the positive claims, some studies are either descriptive reports, based on personal observation or experience (Silva, 2008; Stevens, 2006; Vickers, 2007a, 2007b) or still lacking the link between the results and theoretical underpinnings in SLA (Wang, Song, Stone, & Yan, 2009). Furthermore, a majority of prior task-based research in SL has been focused on text-based task interaction (e.g., Liang, 2012; Peterson, 2010a, 2010b) rather than on voice-based task interaction (Chen 2016b), which however deserves more research attention. Motivated by this research agenda, this study was conducted in SL to gather empirical evidence in oral discourse samples of EFL learners' task-based negotiation and strategy use.

2.2. Task-based interaction as a theoretical framework

From the interactionist standpoint, meaningful and real-life communication tasks can be designed to 1) provide opportunities for learners to negotiate meaning using strategies to resolve communication breakdown (Doughty & Pica, 1986; Willis, 1996); 2) prompt learners to notice linguistic forms that lead to accuracy and complexity in their language

output (Swain, & Lapkin, 1995; Yuan & Ellis, 2003); and 3) elicit learners' spontaneous discourse samples during their task-based interaction throughout various communication task types (Peterson, 2006; Pica, Kanagy, & Falodun, 1993; Smith, 2003). Language learners' cognitive and linguistic processes are enhanced when they negotiate meaning with interlocutors during communication breakdowns (Pica, 1987; Pica & Doughty, 1985). The feedback received during task-based negotiation will serve as a mechanism to reformulate input and modify output (Doughty & Pica, 1986), bearing on the attention paid to those trouble spots of learners' current interlanguage system (Swain, 1985; Swain, & Lapkin, 1995). Interactional tasks also prompt learners to use the target language spontaneously in non-scripted settings where authentic discourse samples can be elicited (Ellis, 2000).

To examine communication tasks involving negotiation and modification strategies, Long (1980, 1990) argues that two-way information exchange tasks that are *close-oriented* will trigger more negotiation and strategy use than one-way or *open-oriented* tasks. Closed, interactional tasks (e.g., jigsaw or two-way information gap task) require that each dyad member contributes equal pieces of information held by him/her in order to reach one single solution. Conversely, open, one-way tasks (e.g., opinion exchange) allow each dyad member to freely exchange information without necessarily reaching the same, predetermined solution. Duff (1986) finds that convergent (closed) or shared-goal tasks prompt not only more instances of negotiation, but also communication strategies to resolve the non-understanding. Tasks that are convergent on 'reach[ing] a mutually acceptable solution' will stimulate more negotiation of meaning, an integral factor for learners' SLA (Duff, 1986, p. 150). Conversely, divergent (open) or independent-goal tasks prompt fewer occurrences in negotiation that involves less use of modification strategies since the catalyst for negotiation (i.e., mis- or non-understandings) does not activate owing to the tasks' 'implicitly opposite or independent goals' (ibid., p. 150).

Pica, Kanagy, and Falodun (1993) further assert that optimal task conditions must be that 1) each dyad member holds a portion of information that must be exchanged to reach the same task outcome; 2) each dyad must take turns to request and give information; 3) both members share the same goals; and 4) only one single outcome is acceptable to reach the goal (p. 17). They argue that two-way information-exchange tasks are more restrictive in that each dyad interactant is required to equally contribute the information to reach the shared goal (convergent). The obligatory nature triggers more cognitive and linguistic processes by pushing learners to negotiate meaning, reformulate input and refine output—in order to make meaning more comprehensible for the sake of task completion (Doughty & Pica, 1986). In contrast, one-way or divergent tasks (e.g., opinion exchange) are not restrictive and allow for open-ended discussion without reaching the same goal, thereby generating fewer occurrences of negotiation and strategy use (Pica, Holliday, Lewis, & Morgenthaler, 1989).

Despite the positive correlation between two-way communicative tasks and negotiation of meaning reported above, counterarguments are also noted in naturalistic L2 classroom-based research. Foster (1998), for example, observes the effects of optional/obligatory information exchange tasks (e.g., *a grammar-based task* vs. *picture differences*) on negotiation patterns of an intact, intermediate-level EFL class working in pairs or small groups. Opposite to the positive claims supported by the extensive body of

task-based research, her study reveals no salient effect of interaction between the grouping and task type (though task-based negotiation was evidenced more in pairs than small groups). Negotiation of meaning was also not actively initiated by most students in either pair or group work, much less the modified output (though some of her data were discarded due to inaudibility in recordings). Replicating Foster's study, Eckerth (2009) seconds that task types (i.e., obligatory and open-ended tasks) do not differ significantly in the quantity of oral production and quality of interactional modifications, and that collaborative tasks conducted in dyadic pairing provide more opportunities for L2 acquisition and engagement to take place (Eckerth, 2008). Interestingly, Gass, Mackey and Ross-Feldman (2005) do find significant differences in learner language production measured by task-based negotiation, recasts and language-related episodes across task types (optional vs. obligatory information exchange), though the settings (classroom vs. lab) did not make a difference in learner task interaction. Thus, it is worth exploring how these inconclusive empirical results can play out in 3D MUVEs.

3. Research question

This study aims to address the key question, '*What are the interrelationship between task types, strategy use and negotiation patterns as evidenced in EFL learner's voice-based task interaction in SL?*'. As discussed previously, an immersive MUVE like SL offers a viable environment to examine English learners' cognitive processes in SLA through dyad task-based interaction using voice chat. Learners may use different interactional modifications (Pica, 1987) to negotiate meaning with their interlocutors when a breakdown in communication occurs (Gass & Selinker, 2001; Long, 1983; Long & Porter, 1985) in order to make language output more comprehensible (Swain, 1985, 1995; Swain & Lapkin, 1995). Learners' discourse samples during their voiced-based, task-driven interaction can also be elicited through various communication tasks. What types of tasks trigger more negotiation and strategy use in SL can further test the interactionist theory in a 3D setting and verify the findings regarding the interrelationship between task, negotiation and strategy in previous task-based research (e.g., the decision-making task promotes more negotiation than other task types in Peterson's (2006) finding). Implications drawn from this study will hopefully contribute to a better understanding of EFL learners' language use in 3D MUVEs, a field that still deserves more research attention.

4. Methodology

4.1. Setting and participants

VIRTLANTIS, a 3D virtual island in SL, offers free language classes, such as English, French and Spanish (Figure 1). Its flexibility and free resources attract many language learners to attend classes and interact with other avatars in various target languages. Simulated and 3D resources are also available to teacher volunteers who offer classes in SL. Different from traditional language teaching that follows a textbook in a fixed classroom setting, SL teachers can activate the *Holodeck* feature to instantly *rez* various authentic scenarios (e.g., cinema, restaurant, museum) for students to simulate RL tasks, teleport to different locations in field trips, or practice 3D object building in *Sandbox*.

(insert Figure 1 here)

An invitation notecard was sent out to the members in Virtlantis and *Cypris Chat* (another SL island for language exchange). 10 EFL learners[1] who responded with great interest in practicing English speaking participated in the study. The notecard included the purpose of this study and the outline of the virtual task-based class. They were adult EFL learners from all over the world (e.g., India, Egypt, France, Spain and Saudi Arabia) and their ages ranged from 21 to 60. They interacted in avatar form with peers and the teacher (who was also the researcher in this study). Each participant was scheduled to meet with the researcher before the task-based class in order to receive their informed consent. Their real-life identities were protected since only pseudonymous avatar names were known and oral interactions were audio recorded for research purposes only. During the one-on-one, pre-course debriefing session, the researcher had the opportunity to screen their oral proficiency by assessing whether they were able to spontaneously respond to unrehearsed questions, ask for information, use communication strategies to tackle misunderstanding or go about unfamiliar topics, following the ACTFL Proficiency Guidelines (Swender, Conrad, & Vicars, 2012). The levels of their language proficiency ranged from novice mid to intermediate high based on the ACTFL standards.

4.2. Data collection

Real-life, culture-driven topics (e.g., food, clothing, music) that were meaningful and relevant to the students were incorporated in this 10-session virtual course. The 10 virtual sessions[2], though task-based by nature, were geared more toward an open-ended task design to document EFL learners' perceptions and progress in individual oral presentations (e.g., a show-and-tell on cultural clothing). This study, however, reports on the pre- and post-course task-based interactions that focus on a convergent (closed) task design, targeting the interrelationship between the tasks, strategies and negotiations.

Before the 10-session virtual class started, students were invited to engage in the pre-course task-based interaction. Since they were located in different time zones, a Google Document was created for them to collectively fill in the time slot that suited their availabilities. Students were then paired in five dyads (based on the matched availability) and interacted with their partner in avatar form using voice chat. Each dyad spent around one hour to complete the four tasks and the whole process was audio recorded for further data analysis. The recorded oral samples were used as the baseline to examine the negotiation patterns and strategy use across task types. Students were also assigned for the post-course task-based interaction but a different dyad assignment was employed since students might have been familiar with the way their prior dyad partners talked. All the voice-based interactions and avatar-enabled activities were documented using *Camtasia*, a screen capturing program to record both audio and screen activities.

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[1] 15 participants originally participated in this study. Due to individual real-life commitments, only nine of them regularly attended each virtual session, including the pre-and post-course task-based interactions. Even though one of the 15 students couldn't attend all the 10 virtual sessions, she was able to make up for one of the five dyads in both pre-and post-course interaction sessions.

[2] Due to space constraints, the qualitative results drawn from the 10-session task-based course were reported elsewhere (Author, 2016a).

Two sets of communication tasks were conducted in the pre- and post-course task-based interactions[3]. To minimize the practice effect, the scenarios in the pre-course set were real-life oriented (e.g., city map) whereas those in the post-course set were SL oriented (e.g., object building). The rationale of this task design was to ensure authenticity and face validity since RL-related tasks were more familiar to the students before the SL course started (set one), and only after the course completion would SL-related tasks make more sense to them (set two). Four types of communication tasks were designed to prompt EFL learners' use of modification strategies during oral task-based negotiation in SL: *opinion-exchange*, *information gap*, *jigsaw* and *decision-making*. The opinion-exchange tasks were designed for each dyad to exchange opinions about which English skill was deemed most difficult to master (set one), and about the differences between learning English in RL and SL (set two). The information gap task in set one required each student to direct their dyad interlocutor to a designated location on an authentic city map whereas students in set two would help his/her partner to build a 3D object following the received notecard instructions (see Figure 2). In the jigsaw tasks, they worked together to spot the differences in two identical pictures held by each individual in both sets. Finally, the decision-making tasks required each dyad to reach a consensus on choosing a restaurant for dinner based on two authentic restaurant menus (set one), and on buying a gift for their SL friend's birthday party between two SL marketplace advertisements (set two).

(insert Figure 2 here)

4.3. Data analysis

A discourse analysis model proposed by Varonis and Gass (1985) to examine the patterns of nonnative speakers' (NNS-NNS) negotiation of meaning was adopted for coding the instances of negotiation during task-based interaction in SL. Their model is not only widely used to analyze negotiation patterns of non-understandings, but also adopted in task-based research conducted in digital settings (van der Zwaard & Bannink, 2014). According to Varonis and Gass (1985), the episode of negotiation of meaning will occur when the understanding between NNS-NNS conversational exchanges has not been reached and interactional modifications will be taken between interlocutors in order to keep the conversation going (p. 73). Their proposed model for NNS-NNS negotiation discourse includes four functional components: *trigger, indicator, response, reaction to response*. The first part of the model is termed as trigger, and the second part, resolution. The whole model can be operationalized as: 1) Triggers (denoted by T)—'utterance or portion of an utterance on the part of the speaker which results in some indication of non-understanding on the part of the hearer' (p. 74); 2) Indicators (denoted by I)—'signal that an utterance has triggered a non-understanding' (p. 76); 3) Responses (denoted by R)—'responses to the request for additional information which as been either implicitly or explicitly stated in the form of an indicator' (p. 76); and 4) Reactions to Response (denoted by RR)—'an optional unit of the routine, in some way tying up the routine before the speakers pop back up to the main flow of conversation' (p. 77). Following this framework, a coding scheme was devised to tally the turns of the negotiation occurrences and the percentage of negotiation episodes across discourse samples.

[3] Detailed task descriptions in both sessions can be accessed via https://goo.gl/1tLDWi

EFL learners' use of modification strategies during communication breakdown and the relationship between negotiation and task types was also analyzed. Three commonly used modification strategies (i.e., clarification request, confirmation check, comprehension check) indicated in prior literature (Pica & Doughty, 1985) were adopted for a coding scheme. The coding categories also included other types of modification strategies, such as self-correction, topic shift, and request for help (Lee, 2002). The frequencies and percentage of the strategies were calculated across the four task types (also see Chen, 2016b). The total number of turns in the two sessions and the turns that captured the instances of negotiation and strategy use were then tallied. The interrelationship between negotiation of meaning, task types and communication strategies was further analyzed to see whether previous findings in interaction research regarding which task type promotes more negotiation could also be evidenced in SL (Peterson, 2006; Smith, 2003).

Following the same coding scheme in NNS-NNS negotiation of meaning and modification strategies addressed above, the author and his colleague individually coded the pre-course interaction samples and reached a high inter-coder reliability of 90%. They also discussed the coding disagreements and resolved the discrepancies before proceeding with coding the rest of the discourse samples.

5. Results and discussion

5.1. Negotiation of meaning patterns

The patterns of EFL learners' task-based negotiation in this study also follow Varonis and Gass's proposed NNS-NNS interaction in either single-layered trigger-resolution sequence or more complex multi-layered trigger-resolution sequence. A total of 2319 turns, consisting of 121 negotiation patterns, occurred across the four task types (Table 1). The following episode (Figure 3)—the post-course decision-making task on which gift to buy for a SL friend—illustrates the typical trigger-resolution routine. That is, there is no embeddings in negotiation routine other than four turns of utterance within the single-layered negotiation routine[4].

(insert Figure 3 here)

This NNS-NNS discourse sample comprises four turns of negotiation in that the routine was triggered by the information delivered by student E (turn 1), which seemed unclear to her peer, student N. N indicated his non-understanding (turn 2) in order for E to clarify the meaning of her previous utterance, to which E responded and explained in more detail (turn 3). After being 'pushed' by her peer in turn 2, E's response in turn 3 demonstrates the improvement of the quality (e.g., the variety of lexicons) and quantity (e.g., the range of sentence structures and word counts) in her language output. Student N reacted to this clarification positively (turn 4), which indicates that the non-understanding was resolved.

Also noted by Varonis and Gass (1985), the discourse of most NNS-NNS interaction consists of multi-layered trigger-resolution sequences that are more lengthy and complex with embedded non-understanding routines (p. 78). The following example (Figure 4) is selected from the post-course jigsaw task of 'spot the differences' where each dyad student took turns to tell his partner the location of each difference.

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[4] In the trigger-resolution episode, trigger will be denoted as (T), indicator, (I), response, (R), and reaction to response, (RR), for the sake of data coding and presentation.

(insert Figure 4 here)

This multi-layered discourse sample illustrates a more complex routine of negotiation of meaning (17 turns), compared with the aforementioned single-layered one (4 turns). *Barrels*— the word that student U singled out (turn 1)— triggered the beginning of the negotiation routine. Student P repeatedly indicated that he was confused by the word (turn 2, 4, 6, 8, 10, 12), despite several attempts that student U made to clarify the meaning (turn 3, 5, 7, 9, 11, 13). The negotiation routine didn't reach the resolution stage until student U used the strategy of orally *spelling out the word* (turn 11, 13). At that point student P finally realized what barrel meant (turn 14)—with his relieved laughter as a reaction to his partners' response (turn 16). Again, we can clearly see that the quality and quantity of student U's language output, after being pushed by his peer's indications of non-understanding of 'barrels,' are much more improved as evidenced in turn 5 (*Barrels, something you can pour water in it*) and turn 9 (*Barrels, something bigger that maybe you can keep water or wine in it, I guess?*) than simply replying with one word 'barrels' (turn 3). Apparently, the linguistic structure of the language output—after being further pushed by the interlocutor— is far more complex, and the semantic meaning is more comprehensible as the whole negotiation process moves along (Swain, 1985; Swain & Lapkin, 1995).

5.2. Triggers of negotiation of meaning

The fact that the more complex multi-layered trigger-resolution sequence constituted a high percentage of negotiation discourse samples also supports the extended routine of negotiated interaction found in prior synchronous computer-mediated communication (CMC) studies (Blake, 2000; Lee, 20002; Smith, 2003). For example, *lexical confusions* are usually the triggers for the majority of the negotiation routines (Blake, 2000; Fuente, 2003; Lee, 2002; Pellettieri, 2000; Smith, 2003; Tudini, 2003). Around 20% (N=23) out of the overall negotiation routines (N=121) are triggered by lexical confusions in this study, such as '…. *I don't know how you say that in English*' (student P in the pre-course spot-the-difference task) or '*Repeat please. I don't understand this word*' (student B in the post-course object building task). The following discourse sample in the post-course interaction (Figure 5) demonstrates students' taking turns telling each other how to build an object in SL and indicates how the lexical confusion, 'pyramid,' triggered the extended negotiation routine:

(insert Figure 5 here)

This multi-layered discourse sample exemplifies a more complex routine of negotiation of meaning (22 turns) among NNS-NNS interaction. P*yramid*— the lexical confusion uttered by student U (turn 1)— triggered the negotiation routine. Student P continuously indicated that he was confused by this lexical gap (turn 2, 4, 6, 8), despite the effort made by student U to clarify the meaning of pyramid (turn 7). Although the confusion was not yet resolved within 10 turns of negotiation, the quality and quantity of student U's language output evolved after being 'pushed'; he began with a single-word reply (*pyramid*, turn 2), progressed to the use of a comprehension check (*You know pyramid*, turn 5), and finally began to define the word (*They are some beautiful buildings in Egypt*, turn 7). The linguistic structure of student U's pushed output became more complex as the routine of negotiated interaction moved along (e.g., turn 9). The 'pushed output' allows the learner to draw his/her attention back to the cognitive processing of the

inaccurate linguistic forms and prompts fine-tuning of the output that is more comprehensible to the interlocutor (Long, 1996; Swain, 1985, 2000).

Another interesting aspect is that student U, after trying to clarify what pyramid means but still failing, took advantage of the multimodal resources afforded by SL by directing his peer's attention to the unique 3D object building feature (turn 9). The negotiation routine was not resolved until student U instructed student P step-by-step to use the *Menu* feature of object building in SL to locate different object shapes (turn 17, 19); student P finally attended to the pyramid shape (turn 20) and understood its meaning (turn 21). After an extended negotiation routine involving multiple embedded layers, they resolved the lexical non-understanding (turn 22). This salient aspect indicates that EFL learners, after being pushed during task-based negotiation, resort to multimodal features afforded by SL (e.g., 3D objects, see Chen, 2016b; Cooke-Plagwitz, 2009) as additional visual support to enhance input acquisition in order to tackle the communication breakdown trigged by lexical confusion, in this case. It also exemplifies how tasks tapping into 3D MUVE features can be carried out in SL, which provides another evidence to distinguish task performances in a SL setting and a RL class.

This case scenario not only demonstrates that the lexical gap serves as the trigger for the routine of NNS-NNS negotiation of meaning, but also that the quality of the learner's pushed output is far better in linguistic complexity. Students focus more on semantic processing than syntactic processing during task-based negotiation (Gass, 1997; Lee, 2002). They drew more attention to how the meaning of task information could be received and conveyed more accurately for task completion than lingering on a grammar mistake—except that when they were pushed to produce their own output, they started to attend to the 'form' (Swain, 1985, 2000). This is similar to the claim made by prior synchronous CMC research (e.g., Fuente, 2003; Lee, 2002). As Blake (2000) pointed out, 'Vocabulary breakdowns constitute the most obvious barrier to learner/learner discussions, especially on the Internet where no body language clues are available to support the speaker's meaning' (p. 133). On that note, the 3D features afforded by SL provide EFL learners with additional visual resources as alternative strategies (e.g., building features accompanied by specific lexicons) to help resolve the non-understanding. Although some of the non-verbal cues could be configured in students' avatars, students did not really use those cues, but focused more on whether the meaning was understood clearly during voice-based task completion.

As evidenced in Figure 6, *phonological confusions* were also found in this study, supporting Jepson's (2005) and Sauro's (2001) findings:

(insert Figure 6 here)

In this interesting episode of multi-layered negotiation (10 turns), we can see that student U was trying to tell his partner how to build a tube object and ask her to move the tube in mid-air. It was clearly his pronunciation mistake ('hair' rather than 'air') that triggered the mis-understanding (turn 1). Student I indicated her confusion (turn 2) by using the 'confirmation request' strategy to make sure she heard it right, as 'in the hair?' (turn 2). After she literally moved the 3D object near her avatar hair (turn 6), student U realized that she got it wrong and was pushed further to modify his output (turn 7: *like the altitude of the pyramid*). This modification prompted student I to raise the intonation of the word 'sky' (air) as a confirmation resolved in turn 10 (*OH, you said AIR, ok*). This discourse vividly exemplifies how a phonological confusion can also trigger the whole

process of negotiation associated with various communication strategies to resolve a pronunciation problem.

This finding does not come as a surprise since students in this study came from different linguistic and cultural backgrounds. The phonological confusions, resulting from variation of pronunciation, intonation and accent, sometimes triggered the process of extended negotiation of meaning. Additionally, not every student was equipped with a decent quality microphone so voice breakup or background echoing might occur occasionally. Despite the technical glitches, data were still recorded and analyzed on the basis of their actual task-based negotiation that was intelligible for coding than otherwise. On the contrary, unclear language output due to the technical issues sometimes served as a catalyst for more negotiation. This evidence demonstrates how the unique 3D features in SL can provide more concrete visual support to help learners 'notice' the linguistic gap (e.g., hair vs. air) (Schmidt, 1990) in 3D form and compensate for the absence of textual support. This unique mechanism for input enhancement afforded SL is, nevertheless, not always available or attended to during task negotiation in 2D paper format in a traditional classroom. This marked difference also sets task performances in SL apart from those in RL.

5.3. Interrelationship of task types, negotiation and strategies

To get a better understanding of the interrelationship among task types, negotiation and strategy use, Table 1 sums up the overall frequencies and ratio of turns[5] in the instances of negotiation across the four tasks as well as the quantity of strategy use associated with negotiation in both pre-and-post course interactions.

(insert Table 1 here)

As shown in Table 1, *jigsaw* is the task that promotes the most occurrences of negotiation (N=65) during dyad interaction in both pre-and-post course interactions, followed by *information gap* (N=35) and *decision making* (N=16), whereas the *opinion-exchange* task is the one that triggers the least instances of negotiation (N=5). This result reveals that the oral output of EFL students was pushed the most when they were tasked in the jigsaw dyad interaction in SL. Since each dyad member needed to reach the same goal under task-related conditions, the 'closed' jigsaw task provided more opportunity for negotiation than the 'open' one (opinion-exchange) in which students were not required to reach the consensus (Duff, 1986; Long, 1980, 1990).

Similar results were also documented in the two-way information gap task. During the task interaction under the convergent condition, the opportunity for negotiation also increased more than simply exchanging opinions. The decision-making task was expected to promote more negotiation because it also pushed each dyad to reach the same goal under the convergent task condition. Interestingly, it didn't trigger more negotiation than the jigsaw or information gap tasks in this study, though it still initiated more negotiation in quantity than the opinion-exchanging task.

The extent to which the total turns of utterances were initiated in each task also corroborates the total numbers of instances in negotiation: the jigsaw task still

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[5] A turn was counted only when the utterance in each turn-taking was complete before the floor was shifted to the dyadic partner. Long pauses or utterances that were not intelligible were also coded as "…".

predominates the overall turns in students' language output (N=1125), twice more than that of the information gap (N=493) or decision-making task (N=495). The initiated turns in both information gap and decision-making tasks are almost equal, despite the fact that the former has twice the number of negotiation instances than the latter. The opinion-exchanging task, nevertheless, still initiates the fewest number of turns (N=206) when compared to its counterparts, similar to the outcome found in the counts of negotiation instances previously discussed.

If we further examine the extent to which strategy is employed in each task type, the jigsaw task still tops the chart for total turns involving communication strategies (N=238). This is more than one and a half times the number of turns in information gap (N=140), over five times the number in decision-making (N=45), and 10 times the occurrences in opinion exchange (N=23). This finding indicates that EFL students in this study employed more modification strategies when tasked in convergent, shared-goal tasks that required each dyad to come to a consensus (Duff, 1986). The divergent task of opinion exchange, however, did not prompt more strategy use than the other three tasks. This finding also aligns with that of the total occurrences in negotiation presented above.

Interestingly, decision-making tasks might have yielded more strategy use if they had been designed differently—given the fact that it also shares convergent task conditions. However, decision-making tasks are characterized by interaction that is not totally restrictive and can have multiple task outcomes. Since more than one outcome option is available and 'no one specific decision is required' in its task conditions, mutual contribution to the task completion may not be equal between the two interactants. For example, the more fluent student could possibly dominate the decision-making process and still reach the goal without equal contributions from the peer (Doughty & Pica, 1986; Pica, 1987; Pica & Doughty, 1985). Compared with the more restrictive jigsaw or information gap task, the somewhat 'semi-lenient' decision-making task in this study provided fewer opportunities for pushed negotiation involving interactional modifications (Pica et al., 1993).

The result of the total turns involving strategy use during task negotiation also consistently supports the findings reported above. That is, the jigsaw task still elicits the highest number of the overall turns in negotiation consisting of communication strategies (N=557)—nearly twice the number of turns in information gap (N=320), approximately five times the number in decision making (N=111), and almost 10 times the results of opinion exchange (N=57). The data drawn from the percentage of the turns associated with negotiation among the overall turns across tasks types also point to the same finding—jigsaw accounts for almost one fourth of the total turns in negotiation found in the four task types (24%), followed by information gap (13.8%), decision making (4.8%) and opinion exchange (2.5%).

As such, this study supports previous task-based research findings in that two-way information-exchange tasks with a 'closed' nature prompt more negotiation than one-way or 'open' tasks that allow for 'free conversation' with no 'predetermined' solution (Long, 1980, 1990). Pica, Kanagy, and Falodun (1993) further confirmed that tasks should consist of obligatory information exchange with a single task outcome to better prompt the process of negotiation involving the use of modification devices. As evidenced in this study, the two-way and more 'obligatory nature of the gap' built in jigsaw and information gap (the former in particular) initiated the most interlanguage processes and

pushed students to produce more language output operationalized in strategy use accompanying negotiation of meaning among EFL learners in SL (Doughty & Pica, 1986, p. 307). The open-ended, opinion-exchange task—free from restrictive and convergent task conditions—conversely, led to fewer instances of negotiation and strategy use, supporting the claim made by Pica, Holliday, Lewis, and Morgenthaler (1989).

To illustrate the interplay of strategy use and negotiation across task types in this study, the following vignette (Figure 7) exemplifies how the dyad used different communication strategies when negotiating meaning in the pre-course information-gap task, directing his/her peer to the final destination on a map[6].

(insert Figure 7 here)

In this sample, the negotiation routine that contains eight turns of discourse involves the use of multiple strategies. Student A—after telling student E where to start and head toward (turn 1)—used a 'comprehension check' (*Do you see that?*) to make sure that her peer was on that right track. Student E, however, did not catch the start point, *Fine Arts Building*, and therefore 'requested' her peer to clarify the meaning again (turn 2). Also evidenced in student A's reply (turn 3), her linguistic output after being pushed by her peer's request for clarification was more comprehensible with specific information provided (Swain, 1985). Student E, in this case, used a 'confirmation check' to make sure that the information was received correctly (turn 4), followed by her peer's use of a comprehension check again (turn 7) to double check that she had spotted the right location. Taken together, three different types of modification devices are used in this multi-layer negotiation routine—comprehension checks, a clarification request, and a confirmation check. It further demonstrates how the relationship between negotiation and strategy use plays out across task types, particularly in a convergent, shared-goal task.

Prior CMC studies on the effect of task-based interaction have found that communication tasks do promote negotiation of meaning and strategy use in both online text-based (Blake, 2000; Fuente, 2003; Kötter, 2003; Lee, 2001; Smith, 2003) and voice-based task communication (Jepson, 2005; Sauro, 2001), though a majority of studies were conducted in texted-based environments. This study's finding that the jigsaw task promoted more negotiation associated with strategy use in SL, supports previous CMC, task-based research. For instance, both in Blake's (2000) study investigating which task type (i.e., jigsaw, information gap, decision making) would promote more text-based negotiation, and in his later research (Blake & Zyzik, 2003), *jigsaw tasks* triggered more instances of negotiation, as predicted by Pica et al.

However, this study does not support Peterson's (2006) task-based study conducted in *Active Worlds* in that a *decision-making task* prompts more turns in negotiation than the jigsaw and opinion-exchange tasks (also see Smith, 2003). This is surprising because Peterson's and Smith's results differ not only from Pica et al.'s prediction that jigsaw task stimulates more negotiation than other task types, but also from previous CMC studies where jigsaw provides additional stimulus (e.g., Blake, 2000). This study not only echoes Blake's finding, but confirms Pica et al.'s prediction that jigsaw does trigger more negotiation than decision-making and opinion-exchange tasks. It also further verifies the claims made by prior interactionist task-based research that convergent tasks with

[6] Each strategy use was highlighted in bold and bracketed with the identified strategy.

obligatory interaction and single outcome option will generate more interactional discourse patterns associated with SLA (Doughty & Pica, 1986; Duff, 1986; Long, 1980, 1990; Pica, 1987; Pica & Doughty, 1985; Pica, Holliday, Lewis, & Morgenthaler, 1989) and similar empirical evidence can be gathered in 3D MUVEs, such as SL.

6. Implications and limitations

6.1. Extended negotiation routine of NNS-NNS interaction

This study identifies multi-layered trigger-resolution sequence as extended negotiation patterns, which are lengthy and complex in nature and involve more than one negotiation routine and multiple strategies as identified in the NNS-NNS dyad interaction. This finding implicates that EFL learners also employ similar strategies during negotiation of meaning in SL, much as they would do in RL. As demonstrated in this study, negotiation routines are usually triggered by lexical gaps found in most interactionist CMC studies (Blake, 2000; Fuente, 2003; Lee, 2002; Pellettieri, 2000; Smith, 2003; Tudini, 2003) and phonological gaps due to the voice-chat task requirement. The 'pushed output,' prompted by negotiation of meaning (Swain, 1985), is also considered to be more refined and comprehensible than otherwise (Swain & Lapkin, 1995). Therefore, 3D MUVEs like SL offer researchers an optimal research arena to conduct task-based research on examining language learners' employment of strategy use during negotiation of meaning (Gonzalez-Lloret & Ortega, 2014). The multimodal communication modes can also generate spontaneous discourse samples of negotiation triggered either by lexical (text chat) or phonological confusions (voice chat) (Chen, 2016b).

6.2. Tasks

Task-based design that embodies the task-based principles in the classroom practices can: 1) promote participants' strategy use generated by negotiation of meaning from the interactionist perspective, and 2) allow learners to co-construct meaning and mutually scaffold peers through engaging in task-based interaction from the sociocultural perspective (Skehen, 2003). As demonstrated in this study, tasks with a closed nature promote more opportunities for learners to attend to the semantic meaning of input in order to complete the task, and simultaneously to the accuracy of their output when being pushed during a negotiated interaction (Fuente, 2003). Seeding communication tasks in instruction also reveals what type of task would serve as the catalyst for learners' language acquisition in a 3D MUVE. Task principles—such as interactive, collaborative and problem-solving (Doughty & Long, 2003; Ortega & González-Lloret, 2015)—should be taken into consideration when implementing TBLT in SL. With careful attention paid to both task design and SL features (e.g., object building), a language teacher can make language learning in SL more engaging and stimulating. When EFL learners see the benefits of accomplishing a communicative task that is authentic, meaningful, and problem-solving, they invest more time and effort, which in turn, fosters their learning agency (Lave & Wenger, 1991; Norton, 2001).

6.3. Discourse analysis

As illustrated in this study, taking a discourse analysis approach to analyze language patterns of EFL learners' oral output over time can shed light on what types of strategies are employed during communication breakdowns, how negotiation routines take place,

the interrelationship between the strategy use, negotiation and task types, and whether the quality of language output improves. Above all, examining learners' language practices in SL can unearth how virtual task-based learning provides empirical evidence to prove that SL can potentially be a viable immersive learning environment. Therefore, investigating language use and the quality of oral production will contribute to the body of knowledge in the SLA field. Despite the laborious transcribing processes and the technical issues of collecting oral data, this study demonstrates that theoretically-driven, pedagogically-sound, task-based research is still feasible in a 3D MUVE. A call for more voice-based, task-oriented, discourse-analyzed research is therefore encouraged.

6.4. Limitations

Despite the positive results, difficulties encountered during data collection are also noted. First, recruiting language learners in SL is quite challenging as opposed to a fixed lab setting or physical class where the researcher has more control of the participant pool. Conducting a virtual class where all students turn up simultaneously has become even more cumbersome when they are all located remotely in different time zones. Even though pairing them in dyads according to their proficiency level might seem ideal, it was unfortunately not feasible in this study. That is, the dyadic makeup for this study was not predetermined by their proficiency levels, but contingent upon the scheduling flexibility that meets each student's timetable. Nevertheless, this mixed-level pairing stimulated more interactional modifications from a low-level dyad partner to repair mis/non-understandings as prompted by a more proficient partner so that each task can be accomplished collaboratively. Less proficient students also had the equal opportunity to contribute to the oral discourse during two-way, convergent task negotiation (e.g., jigsaw or information gap tasks) instead of being dominated by a more proficient partner or remaining silent (Foster, 1998). Finally, given the small sample size, it is not the intention of the study to generalize the results to a bigger population. That said, the diverse cultural/linguistic backgrounds of the EFL students, the detailed discourse analysis on the types of strategy use and negotiation patterns, and how technology-mediated TBLT can be operationalized in a 3D MUVE may be of interest to likeminded teachers and researchers.

7. Conclusion

Taken together, this study discovers that task-based design in SL can offer ample opportunities for EFL students to engage in communication tasks outside the class walls (Blake, 2000) and 'provid[e] an authentic and purposeful cross-cultural experience which is otherwise limited to the language teacher, members of the local community or other learners' (Tudini, 2003). Analyzing students' negotiation episodes also shows that 3D features in SL provide additional multimodal support to help learners resolve mis-/non-understandings along with their use of communication strategies (e.g., object building). Also echoing Varonis and Gass (1985) and Doughty and Pica (1986), NNS-NNS dyads from different linguistic backgrounds stimulate more negotiation of meaning and strategy use—given the sense of shared interlanguage *competence* without the 'face-threatening' effect. Safeguarded by avatar presence, students in this study not only felt less inhibited in their voice-based, task-oriented negotiation (Chen, 2016b; Deutschmann & Panichi, 2009, 2013), but also maintained "face-appropriate" solidarity in a supportive virtual

learning environment (van der Zwaard & Bannink, 2014). Nevertheless, the demographic makeup of the students in this study was quite diverse across culture, language, nationality, race, gender, and age. It would be insightful to investigate whether the same positive results could also be found in a homogenous student group sharing the same linguistic and cultural background.

Though not in its infancy, SL as an instructional environment still deserves more research attention in the SLA field. Studies done on SL for language learning, focusing on voice-based task interaction, are relatively scarce in this regard (Kraemer, 2008; Peterson, 2010a; William & McMinn, 2009). As illustrated in this study, implementing task-based design in SL has its pedagogical potential and long-term cost-effective benefits to SLA instruction, and therefore, is worth exploring. SL affordances (e.g., immersion, augmented reality, simulation) can also facilitate the operationalization of task-based methodological principles, which might be difficult to implement in a traditional RL class (Doughty & Long, 2003; Ortega & González-Lloret, 2015). The dyadic pairing in this study also suits the unpredictability manifest in SL where residents usually "expect the unexpected," and "anything could happen" in a 3D sphere. It not only enhances the face validity and practicality, but also answers Foster's (1998) call for "SLA research [to] be willing to move into the environment of an undisturbed, intact classroom, and not confine itself exclusively to places organized for or disrupted by a research experiment" (p. 4). This current study conducted in a naturally occurring virtual class (as opposed to in a fixed lab setting) provides an "ecological approach" for this research agenda (Eckerth, 2009). Nevertheless, the link between EFL learners' language behaviors associated with SLA and virtual learning in SL still needs to be connected before positive claims can be made that SL can serve as an optimal learning environment for SLA to take place.

References

Chen, J. C. (2016a). The crossroads of English language learners, task-based instruction, and 3D multi-user virtual learning in Second Life. *Computers & Education*, 102, 152-171.

Chen, J. C. (2016b). EFL learners' strategy use during task-based interaction in Second Life. *Australasian Journal of Educational Technology*, *32*(3), 1-17.

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

Blake, R. J., & Zyzik, E. C. (2003). Who's helping whom?: Learner/heritage-speakers' networked discussions in Spanish. *Applied Linguistics, 24*(4), 519–544. doi: 10.1093/applin/24.4.519

Canto, S., De Graaff, R., & Jauregi, K. (2014). Collaborative tasks for negotiation of intercultural meaning in virtual worlds and video-web communication. In M. Gonzalez-Lloret & L. Ortega (Eds.), *Technology and tasks: exploring technology-mediated TBLT* (pp. 183-212). Washington, DC: Georgetown University Press.

Clark, G. B. (2009). These horses can fly! and other lessons from Second Life: The view from virtual hacienda. In R. Oxford & J. Oxford (Eds.), *Second language teaching and learning in the Net Generation* (pp. 153-172). Honolulu: University of Hawaii, National Foreign Language Resource Center.

Cooke-Plagwitz, J. (2008). New directions in CALL: An objective introduction to Second

Life. *CALICO Journal*, *25*(3), 547-557.
Cooke-Plagwitz, J. (2009). A new language for the Net Generation: Why Second Life works for the Net Generation. In R. Oxford & J. Oxford (Eds.), *Second language teaching and learning in the Net Generation* (pp. 173-180). Honolulu: University of Hawaii, National Foreign Language Resource Center.
Dede, C. (2005). Planning for Neomillennial learning styles. *EDUCAUSE Quarterly, 1*, 7–12. Retrieved from https://net.educause.edu/ir/library/pdf/eqm0511.pdf
Fuente, M. J. (2003). Is SLA interactionist theory relevant to CALL? A study of the effects of computer-mediated interaction in L2 vocabulary acquisition. *Computer Assisted Language Learning, 16*(1), 47–81. doi:10.1076/call.16.1.47.15526
Downey, S., Mohler, J., Morris, J., & Sanchez, R. (2012). Learner perceptions and recall of small group discussions within 2D and 3D collaborative environments. *Australasian Journal of Educational Technology, 28*(8), 1405-1419.
Deutschmann, M., Panichi, L., & Molka-Danielsen, J. (2009). Designing oral participation in Second Life: A comparative study of two language proficiency courses. *ReCALL Journal, 21*(2), 206–226. doi:10.1017/S0958344009000196
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. (2013). Towards models for designing language learning in virtual worlds. *International Journal of Virtual and Personal Learning Environments (IJVPLE), 4*(2), 65-84.
Doughty, C. J., & Long, M. (2003). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology, 7*(3), 50–80. Retrieved from http://llt.msu.edu/vol7num3/doughty/default.html
Doughty, C. J., & Pica, T. (1986). "Information gap" tasks: Do they facilitate second language acquisition? *TESOL Quarterly, 20*(2), 305–325. doi:10.2307/3586546
Duff, P. (1986). Another look at interlanguage talk: Taking task to task. In R. R. Day (Ed.). *Talking to learn: Conversation in second language acquisition* (pp. 147-181). Rowley, Mk. Newbury House.
Eckerth, J. (2008). Investigating consciousness-raising tasks: pedagogically targeted and non-targeted learning gains. *International Journal of Applied Linguistics, 18*(2), 119-145.
Eckerth, J. (2009). Negotiated interaction in the L2 classroom. *Language Teaching, 42*(1), 109-130.
Ellis, R. (2000). Task-based research and language pedagogy. *Language Teaching Research, 4*(3), 193-220. doi:10.1191/136216800125069
Foster, P. (1998). A classroom perspective on the negotiation of meaning. *Applied linguistics, 19*(1), 1-23.
Gass, S. (1997). *Input, interaction, and the second language learner*. Mahwah, NJ: Erlbaum.
Gass, S., & Selinker, L. (2001). Looking at the interlanguage process. In *Second language acquisition: An introductory course* (2nd ed., pp. 192–221). Mahwah, NJ: Erlbaum.
Gass, S., Mackey, A., & Ross-Feldman, L. (2005). Task-based interaction in classroom and laboratory settings. *Language Learning, 55*(4), 575-611.

González-Lloret, M., & Ortega, L. (2014). *Technology-mediated TBLT: researching technology and tasks*. Philadelphia: John Benjamins.

Hsiao, I. Y. T., Yang, S. J. H., & Chu, C. J. (2015). The effects of collaborative models in second of French learning. *Educational Technology Research & Development, 63*(5), 645--670.

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.

Jauregi, K., & Canto, S. (2012). Impact of native-nonnative speaker interaction through video-web communication and Second Life on students' intercultural communicative competence. In L. Bradley, & S. Thou€esny (Eds.), CALL: Using, learning, knowing. Proceedings of EUROCALL conference (pp. 151-155). Dublin: Research-publishing.net

Jepson, K. (2005). Conversations – and negotiated interaction – in text and voice chat rooms. *Language Learning & Technology, 9*(3), 79–98. Retrieved from http://llt.msu.edu/vol9num3/jepson/default.html

Johnson, N. (2006). The educational potential of Second Life. In *Digital Union Showcase Union- Ohio State University [Online]*. Retrieved from http://digitalunion.osu.edu/showcase/virtualenvironments/Second_Life.pdf

Kötter, M. (2003). Negotiation of meaning and codeswitching in online tandems. *Language Learning & Technology, 7*(2), 145–172. Retrieved from http://llt.msu.edu/vol7num2/kotter/default.html

Kraemer, A. (2008). Formats of distance learning. In S. Goertler & P. Winke (Eds.), *Opening doors through distance language education: Principles, perspectives, and practices. CALICO Monograph Series* (Vol. 7, pp. 11-42). San Marcos, TX: CALICO.

Lee, L. (2002). Synchronous online exchanges: A study of modification devices on nonnative discourse. *System, 30*(3), 275–288. doi:10.1016/S0346-251X(02)00015-5

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: University of Cambridge.

Lan, Y. J. (2014). Does second life improve mandarin learning by overseas Chinese students? *Language Learning & Technology*, *18*(2), 36–56.

Lan, Y. J., Kan, Y. H., Sung, Y. T., & Chang, K. E. (2016). Oral-performance language tasks for CSL beginners in Second Life. *Language Learning & Technology*, *20*(3), 60-79.

Liang, M.-Y. (2012). Reimagining communicative context: ELF interaction in Second Life to learn EFL. *Journal of Language, Identity, and Education, 11*(1), 16–34. doi:10.1080/15348458.2012.644118

Linden Lab. (2013, June 20). *Infographic: 10 years of Second Life* [Press release]. Retrieved from http://www.lindenlab.com/releases/infographic-10-years-of-second-life

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. (1980). *Input, interaction, and second language acquisition* (Doctoral

dissertation). University of California, Los Angeles.
Long, M. H. (1983). Native speaker/non-native speaker conversation and the negotiation of comprehensible input. *Applied Linguistics, 4*(2), 126–141. doi:10.1093/applin/4.2.126
Long, M. H. (1990). Task, groups, and task-group interactions. In S. Anivan (ed.), *Language teaching methodology for the nineties* (Anthology Series 24, pp. 1-50). Singapore: RELC.
Long, M. H. (1996). The role of linguistic environment in second language acquisition. In W. C. Richie & T. K. Bhatia (Eds.), *Handbook of research on language acquisition: Second language acquisition* (Vol. 2, pp. 413–468). New York, NY: Academic Press.
Long, M. H., & Porter, P. A. (1985). Group work, interlanguage talk, and second language acquisition. *TESOL Quarterly, 19*(2), 207–228. doi:10.2307/3586827
Norton, B. (2001). Non-participation, imagined communities and the language classroom. In M. Breen (Ed.), *Learner contributions to language learning: New directions in research* (pp. 159–171). Harlow, England: Pearson Education.
Ortega, L., & González-Lloret, M. (2015). Staking out the territory of technology-mediated TBLT. In M. Bygate (Ed.), *Domains and Directions in the Development of TBLT: A decade of plenaries from the international conference* (pp. 59-86). John Benjamins Publishing Company.
Pasfield--Neofitou, S., Huang, H., & Grant, S. (2015). Lost in second life: virtual embodiment and language learning via multimodal communication. *Educational Technology Research & Development*, *63*(5), 709--726.
Pellettieri, J. (2000). Negotiation in cyberspace: The role of chatting in the development of grammatical competence. In. M. Warschauer & R. Kern (Eds.), Network-based language teaching: Concepts and practice (pp. 59-86). Cambridge, England: Cambridge University Press.
Peterson, M. (2005). Learning interaction in an avatar-based virtual environment: a preliminary study. *PacCALL Journal*, *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. doi:10.1080/09588220600804087
Peterson, M. (2010a). Massively multiplayer online role-playing games as arenas for second language learning. *Computer Assisted Language Learning, 23*(5), 429–439. doi:10.1080/09588221.2010.520673
Peterson, M. (2010b). Learner participation patterns and strategy use in Second Life: An exploratory case study. *ReCALL, 22*(3), 273–292. doi:10.1017/S0958344010000169
Peterson, M. (2012). EFL learner collaborative interaction in Second Life. *ReCALL, 24*(01), 20-39.
Peterson, M. (2016b). Virtual worlds and language learning: An analysis of research. In F. Farr, & L. Murray (Eds.), *The Routledge handbook of language learning and technology* (pp. 308-319). New York, NY: Routledge.
Pica, T. (1987). Second-language acquisition, social Interaction, and the classroom. *Applied Linguistics, 8*(1), 3–21. doi:10.1093/applin/8.1.3
Pica, T., & Doughty, C. J. (1985). Input and interaction in the communicative language

classroom: A comparison of teacher-fronted and group activities. In S. M. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 115–132). Rowley, MA: Newbury House Publishers.

Pica, T., Holliday, L., Lewis, N., & Morgenthaler, L. (1989). Comprehensible output as an outcome of linguistic demands on the learner. *Studies in Second Language Acquisition, 11*(01), 63–90. doi:10.1017/S027226310000783X

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

Prensky, M. (2005a). Engage me or enrage me: What today's learners demand. *EDUCAUSE Review*, 61-64.

Prensky, M. (2005b). Listen to the natives. *Educational Leadership*, *63*(4), 8-13.

Sauro, S. (2001). *The success of task type in facilitating oral language production in online computer mediated collaborative projects* (Unpublished master's thesis). Iowa State University, Ames.

Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11*, 129–158. doi:10.1093/applin/11.2.129

Silva, K. (2008). Second Life. *TESL-EJ, 12*(1), 1–6. Retrieved from http://www.cc.kyoto-su.ac.jp/information/tesl-ej/ej45/m1.pdf

Skehan, P. (2003). Task-based instruction. *Language Teaching, 36*, 1–14. doi:10.1017/S026144480200188X

Smith, B. (2003). Computer-mediated negotiated interaction: an expanded model. *The Modern Language Journal, 87*, 38–57. doi:10.1111/1540-4781.00177

Stevens, V. (2006). Second Life in education and language learning. *TESL-EJ*, *10*(3), 1-4.

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 Publishers.

Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honor of H. G. Widdowson* (pp. 125–44). Oxford: Oxford University Press.

Swain. M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97– 114). Oxford: Oxford University Press.

Swain, M., & Lapkin, S. (1995). Problems in output and the cognitive processes they generate: A step towards second language learning. *Applied Linguistics, 16*, 370–391. doi:10.1093/applin/16.3.371

Swender, E., Conrad, D., & Vicars, R. (2012). *ACTFL proficiency guidelines 2012*. Alexandria, VA: American Council for the Teaching of Foreign Languages. Retrieved from http://www.actfl.org/sites/default/files/pdfs/public/ACTFLProficiencyGuidelines2012_FINAL.pdf

Tudini, V. (2003). Using native speakers in chat. *Language Learning & Technology, 7*(3), 141-159.

van der Zwaard, R., & Bannink, A. (2014). Video call or chat? Negotiation of meaning

and issues of face in telecollaboration. *System*, *44*, 137-148.
Varonis, E., & Gass, S. M. (1985). Non-native/Non-native conversations: a model for negotiating meaning. *Applied Linguistics*, *6*(1), 71–91. doi:10.1093/applin/6.1.71
Vickers, H. (2007a, June). Language teaching gains Second Life: Virtual worlds offer new methods to teach languages. *Seoul Times*. Retrieved from http://theseoultimes.com/ST/?url=/ST/db/read.php?idx=5566
Vickers, H. (2007b, September). Second Life education gets real: New methods in language teaching combine virtual worlds with real life. *Avatar Languages [Online]*. Retrieved from http://www.avatarlanguages.com/pressreleases/pr3_en.php
Wang, C. X., Song, H., Stone, D. E., & Yan, Q. (2009). Integrating Second Life into an EFL program in China: Research collaboration across the continents. *TechTrends: Linking Research & Practice to Improve Learning*, *53*(6), 14–19. doi:10.1007/s11528-009-0337-z
William, S., & McMinn, J. (2009). Knowing culture in Second Life: international literacy and the technological know how in a virtual world. *Research, Reflections and Innovations in Integrating ICT in Education*, *1*, 616-621.
Willis, J. (1996). *A framework for task-based learning*. London: Longman
Yuan, F., & Ellis, R. (2003). The effects of pre-task planning and on-Line planning on fluency, complexity and accuracy in L2 monologic oral production. *Applied linguistics*, *24*(1), 1-27. doi: 10.1093/applin/24.1.1