

ESL TEACHER TRAINING IN 3D VIRTUAL WORLDS

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Although language learning in 3D Virtual Worlds (VWs) has become a focus of recent research, little is known about the knowledge and skills teachers need to acquire to provide effective task-based instruction in 3D VWs and the type of teacher training that best prepares instructors for such an endeavor. This study employs a situated learning approach to teacher training and explores what online teaching skills emerge in the process of collaborative situated learning, how these skills develop, and whether collaborative situated learning is an effective method of training instructors to teach in 3D VWs. Six English as a second language (ESL) teacher trainees enrolled in the Teaching English as a Second/Foreign Language (TES/FL) program participated in the study. During the pre-teaching stage, teacher trainees developed language tasks to implement during the teaching stage with eight EFL students in 3D VWs. Blackboard wikis used for designing tasks allowed for observing the acquisition of five 3D-specific, integrated skills. The analysis of teaching sessions recorded through screen capturing software Camtasia Relay in conjunction with the teacher trainees' wikis and journals demonstrates that for this group of teachers, a situated learning approach was an effective method of teacher training.

Keywords: 3D Virtual Worlds, Teacher Training, ESL

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INTRODUCTION

More than a decade ago, editors of the [special issue of *Language Learning and Technology on Technology and Teacher Education*](#) stated that as modern technologies become “much more complex and powerful” (Zhao & Tella, 2002, p. 3), the teacher training process also “becomes more complex”. One such “complex and powerful” technology is 3D VWs (e.g., Second Life), which are defined as “persistent virtual environments in which people experience others as being there with them and where they interact with them” (Schroeder, 2008, p. 2). 3D VWs are probably the most complex among modern educational technologies on several levels. First, 3D VWs support synchronous, multimodal communication via several communication channels including audio, text chat, collaboration boards, and webcam video. Second, 3D VWs provide users with a simulation of real-life experiences by embodying them in a graphical form as an avatar (Gerhard, Moore, & Hobbs, 2004) and with “realistic immersion” in the worlds resembling real-life locations that “usually reflect a theme, specific location, or country” (Peterson, 2011, p. 68). Third, they create learning spaces conceptually different from the face-to-face classroom and web-conferencing environments, (e.g., Blackboard Collaborate). Learning is immersed in a simulated real-life context, which suggests a shift in language pedagogy towards learning through “experiential problem solving and complex and spatially distributed forms of collaboration” (Cornille, Thorne, & Desmet, 2012, p. 245). Thus, instructors preparing to teach in 3D VWs, in addition to learning how to use 3D technology, need to learn how to embed this real-life language experience in the classroom context.

Although 3D VWs attract the attention of language educators as a potential environment for computer-assisted language learning (Peterson, 2006), only a handful of studies (e.g., Deutschmann, Panichi, & Molka-Danielsen, 2009; Peterson, 2006, 2010; Sutcliffe & Alrayes, 2012; Svensson, 2003; Toyoda & Harrison, 2002; Varli, 2013) explore language learning in 3D virtual environments. Authors working in this area of inquiry agree that language learning in 3D should be collaborative and task-based (e.g., Peterson, 2010; Varli, 2013). However, little is known about the knowledge and skills teachers need to acquire to provide effective task-based instruction in 3D VWs and the type of teacher training that best prepares instructors for such an endeavor. This study takes the first steps in this direction and uses Compton's (2009) framework for online language teaching skills as a departure point.

Online Language Teaching Skills

Compton's (2009) framework for online teaching skills is the most comprehensive theoretical framework to date and includes three sets of skills: technological, pedagogical, and evaluative. Technological skills include instructors' abilities to use software and hardware and to deal with technology-related issues. Pedagogical skills refer to instructors' knowledge of teaching approaches, learning theories, and implementation of learning activities. Evaluative skills are "an analytical ability to assess the tasks and overall course and make necessary modifications to ensure language learning objectives are met" (Compton, 2009, p. 81). The skills in each set are located on a continuum from basic to more advanced skills. Compton (2009) divides skills in each set into three levels: novice teacher, proficient teacher, and expert teacher. The *novice* teacher level is associated with knowledge of basic technological skills, the ability to use and identify features of different software, basic knowledge of pedagogy-related issues, (e.g., language learning theories, online teaching strategies), and basic knowledge of task and course evaluation. The *proficient* teacher level correlates with instructors' ability to choose technology that matches the goal of the learning tasks, to understand its affordances and constraints, to apply pedagogical knowledge in teaching, to use one or more frameworks for task and course evaluation, and to make necessary modifications. The *expert* teacher level is the most advanced and is associated with instructors' creativity in using and adapting technology, the ability to develop web-pages, knowledge of basic programming language, creativity in the instructional design of learning activities, and an almost subconscious evaluation of learning tasks and online courses using a combination of several methods of evaluation.

Compton (2009) treats acquisition of the online teaching skills as both concurrent and sequential processes. Skills from the same set of one level can be acquired concurrently. For example, technological skills at the novice level, competence in specific software, and learning how to deal with its affordances and constraints can be acquired while learning how to use the software. These skills are pre-requisites for the proficient teacher level, which are the next in the sequence. By dividing the skills into three levels, Compton accentuates the instructors' professional growth from being a novice to becoming an expert.

In spite of its strengths, Compton's (2009) framework has some limitations. First, Compton built her framework on a synthesis of literature in CALL and teacher education, which excludes research on language teaching in 3D VWs. Although Compton highlighted that expert teachers would be able to explore Second Life in order to learn how to provide learners with more opportunities to practice language, she did not specify that teaching in 3D VWs may require instructors to develop some skills specific to the 3D virtual environment. Second, while Compton maintained that some skills within the same level could be developed concurrently, she did not explain whether the skills from different sets could be acquired concurrently. Finally, Compton's framework seems to be an idealization and does not take into account cases when individuals have developed pedagogical skills at a proficient or an expert teacher level, but are in the process of exploring new software thus being at a novice level on that set of skills.

This study uses Compton's (2009) framework as a general guideline to study the knowledge and skills

required for teaching in 3D VVs. The goal of this study is to identify the skills needed specifically for teaching in 3D VVs, or 3D-specific skills, to observe how these skills are developed, and to find an effective method of teacher training that facilitates the skill-acquisition process and makes it more meaningful and rewarding.

Theoretical Framework for Teacher Training

As modern technologies develop rapidly and new technologies quickly replace the old ones, finding an effective method of teacher training is extremely important to quickly respond to the technological changes. One of the teacher training methods that was advocated by research in CALL is situated learning in the teaching context (Egbert, 2006; McNeil, 2013; Wang, Cheng, & Levy, 2010). From the perspective of social constructivist pedagogy, learning is an activity situated in a social practice, which is characterized as “legitimate peripheral participation” (Lave & Wenger, 1991, p. 29). Peripherality is defined as “a way of gaining access to sources for understanding through growing involvement” (Lave & Wenger, p. 37) and legitimacy as “ways of belonging” to the community in which learners participate. Thus, through participation in the communities of practice, learners gain knowledge and skills and “move towards full participation in the sociocultural practices of a community” (p. 29). While Lave and Wenger’s theory of learning is in line with Vygotsky’s (1978) sociocultural theory in that both view learning as a social practice, the theory of legitimate peripheral participation situates learning in a broader context of the social world. It interprets Vygotsky’s concept of the *zone of proximal development* not as the distance between an individual learner’s problem-solving ability with versus without the assistance of an expert, but as the “distance between the everyday actions of individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in ...everyday actions” (Engeström, 1987, p. 174 as cited in Lave & Wenger, 1991, p. 49). This definition emphasizes the interdependency between members of the community of practice, the changing nature of their relations, the collective nature of learning and knowing, and the permutability of shared practice as a result of the changing relations between members of the community of practice.

Herrington and Oliver (2000) operationalized the theory of situated learning by developing a framework consisting of nine elements of the situated learning design. This design provides learners with an authentic context that reflects the way knowledge will be used in real life, authentic activities, access to expert performance and modeling of the process, and multiple roles and perspectives. It also fosters collaborative construction of knowledge, coaching, and scaffolding by the instructor as needed, it facilitates reflection and articulation to shape and explicate learned concepts, and ensures authentic assessment of learning within the task.

One of the key elements of Herrington and Oliver’s (2000) framework is a collaborative construction of knowledge. Collaboration is defined as “work[ing] together interactively to accomplish shared goals” (Alesandrini & Larson, 2002, p. 118). Collaboration is different from cooperation in that it goes beyond the group members’ “positive interdependence” and “individual accountability” (Donato, 2004, p. 229) by “acknowledg[ing] the importance of goals, the mutuality of learning in activity, and collective human relationships” (p. 230). While collaboration involves acknowledgement of individual contributions for the sake of achieving the shared goal, it co-constructs new knowledge, which is not just a sum of individual learners’ contributions, but a new jointly constructed product unique to this particular group of learners (Alesandrini & Larson, 2002; Donato, 2004).

The strength of the situated learning framework is that when being engaged in a collaborative goal-oriented activity, each teacher trainee can take on the role of both an expert and a learner by sharing previous experiences, coaching others, and providing formative assessment and self-assessment of the jointly constructed and constantly evolving product. A collaborative goal-oriented activity in the context of situated teacher training could be the teacher trainees’ teamwork on development of teaching materials and learning how to teach using these materials, both of which are pedagogical skills in Compton’s

(2009) framework.

Task-based Approach to Language Teaching in 3D VWs

For developing teaching materials, it is critical to understand which pedagogical approach best fits the 3D virtual environment. Studies on online language learning in synchronous web-conferencing environments consistently report that a task-based approach is beneficial for language learners as they have an opportunity to develop language skills while participating in goal-oriented, meaningful activities (Hampel, 2006; Kozlova, 2013; Kozlova & Zundel, 2013; Rosell-Aguilar, 2005). 3D VWs could be even more effective for language learning as they simulate a face-to-face experience as students interact with other learners' avatars. Students may get "the impression that they are in a face-to-face setting and, thus, enhance their sense of being a part of a group and of participating in realistic face-to-face interactions" (Cooke-Plagwitz, 2008, p. 549). Since in real life we always participate in various communicative tasks, (e.g., solving problems, brainstorming, sharing opinions, etc.), shifting tasks to 3D VWs, which "are designed to be social and collaborative environments" (Sadler & Dooly, 2013, p. 165), can be viewed as a logical extension of the real-world practices to the virtual reality.

Studies on task-based learning in 3D VWs revealed that learners' engagement in the task depends on the type of task and communication mode. Peterson (2006) found that in a chat-based VW, decision-making tasks generate more negotiations of meaning than jigsaw tasks, which tend to elicit more negotiations in the face-to-face environment (Pica, Kanagy, & Falodun, 1993). Deutschmann, Panichi, and Molka-Danielsen (2009) found that role-play tasks did not elicit much participation from the students who interacted with the instructors taking part in the role-plays. In addition, the instructors spent too much time on explaining the task and used locations that required a lot of imagination.

Peterson's (2006) and Deutschmann, Panichi, and Molka-Danielsen's (2009) studies demonstrate that the effectiveness of the task in 3D VWs depends not on the task-type alone, but on the task-type in conjunction with the 3D technology used. This suggests that skills required for teaching in 3D VWs are rather integrated. Since Compton's (2009) framework is built on a synthesis of the literature, it cannot explain how technological, pedagogical, and evaluative skills develop in relation to each other. This study, in which teacher training is situated in an authentic teaching context, allows for focusing on the process of the skill acquisition and development.

The two research questions that this study strives to answer include:

1. What 3D-specific skills emerge in the process of collaborative situated learning and how do they develop?
2. Is collaborative situated learning an effective method of training instructors to teach in 3D VWs?

METHOD

This section provides the background for the study, specifically, a description of the teacher-training context and technology used. It also includes information on the participants and the stages of the teacher training and explains the rationale for task design, methods of data collection, and data analysis.

Teacher Training Context

The teacher-training context for this study was an international project administered jointly by the Language Institute of one of the Canadian colleges and the English Language School of a university in Turkey. Since the Turkish university uses English as a medium of instruction, students entering the university are required to demonstrate at least an intermediate-high English proficiency level of the American Council on Teaching of Foreign Languages (ACTFL) guidelines. Students who have not reached this level of proficiency are required to study English at the English Language School. Because English is taught as a foreign language in Turkey, the English Language School was looking for

partnership with colleges from the English-speaking countries so that students could improve their speaking skills working with native speakers of English online.

Participants

Six teacher trainees, five female and one male, volunteered to participate in the project. Their age ranged from 31 to 53 years old. The teacher trainees were pursuing graduate certificates in Teaching English as a Second/Foreign Language (TES/FL) in the college administering the project in Canada. The teacher trainees were enrolled in a course on Educational Technology in Second/Foreign Language Teaching taught by the first author who also coordinated teacher training for the project. The project, however, was not part of the course work. The teacher trainees were located in Canada whereas eight EFL students were participating from Turkey.

When logging in to the environment, the teacher trainees used pseudonyms instead of their real names. Female teachers, all English native speakers, were logging in as Gerri, Simone, Diane, Lynn, and Joan. Jack, a male teacher, was a native speaker of Korean and a near-native speaker of English. By the time of entering TES/FL certification program, he had completed four years of post-secondary studies in Canada and was exempted from the entry requirements for an English language proficiency test.

All of the teachers but Jack had completed teaching practicum by the time they started the project. Three of the six teachers, Gerri, Simone, and Diane, had previous teaching experience in the face-to-face classroom. Gerri had taught college-level business management courses for four years and various non-credit courses for municipality and community organizations for about thirty years. Simone had taught ESL in Korea for six years to students of all ages from kindergarten to adult. Diane worked with special needs students from kindergarten to high school for eight years. Although Jack, Lynn, and Joan had not taught in the face-to-face classroom, they had leadership experience. Jack conducted employee training when working for one of the airlines. Lynn worked as a programmer/analyst for a high-tech company and also as a project manager at another organization. Joan worked as an administrator and a volunteer for a non-profit organization where she was mentoring girls and adults. While the teacher trainees did not have experience teaching online courses, Jack used Skype for tutoring Korean students in English.

Eight EFL students participating in the study, six female and two male, were 18 years old. They were enrolled in upper-intermediate English courses in the English Language School in Turkey. They also used pseudonyms when logging in to the environment.

Both teacher trainees and EFL students were computer literate and used computers on a daily basis for personal purposes, work, and course work. While neither participants nor the course instructor had previous teaching and learning experience in 3D VWs, the course instructor had experience teaching language courses in synchronous multimodal web-conferencing environments. All of the participants had a one-hour session with a 3D technology consultant who introduced the 3D VWs. They were also provided with a navigation guide so that they could further explore the VWs on their own.

3D Virtual Worlds Used for Teacher Training

Two virtual worlds - Algonquin College Campus and Tipontia Island -- were used as learning environments for this project. These VWs were created on a cloud-based platform AvayaLive™ Engage, which has immersive real-time collaboration and web-conferencing tools. Algonquin College Campus partially replicates the real-life campus and features a study hall, several office buildings, and two amphitheaters. Tipontia Island has a vast territory with mountains, trees, a lake, a river with waterfalls, and several landmarks, e.g., a campfire, a lighthouse, tree houses.

Participants log in to the VWs as personalized avatars. In addition to being able to walk, run, and jump, avatars can perform gestures such as clapping, raising a hand, nodding, pointing, waving hello and good-bye, refusing, shrugging, speech gestures, and showing enthusiasm. The VWs are multimodal

environments where participants can interact via audio- and text-based chat as well as share web-cam video. Users can choose to send text-based chat messages to those in close proximity or globally, to single recipients or to everyone. The environments also have screens that can be used as presentation tools for posting documents, as computers to use the internet, and as collaboration tools allowing multiple participants to use the screens in a wiki-type format.

Teacher Training Stages

The teacher training consisted of two stages: a four-week pre-teaching stage and a six-week teaching stage. During the pre-teaching stage, teacher trainees explored the affordances and the constraints of the VWs, developed language-learning tasks, and tested the tasks with their peers and the instructor (see [Table 1](#)).

Table 1. *The Pre-teaching Stage.*

Activities	Participants	Environments	Feedback
Explore the 3D VWs, their locations & tools	Teacher trainees; instructor	Algonquin Campus Tipontia Island	N/A
Develop language-learning tasks	Each teacher trainee was responsible for one task	Wikis (Blackboard)	Peer and instructor written feedback on each teacher trainee's task
Test tasks (dry runs)	Each teacher trainee ran their task with their peers & the instructor assumed roles of EFL students	Algonquin Campus Tipontia Island	Peer and instructor written feedback on each teacher trainee's task

Although the teacher trainees were responsible for one task each, they were instructed to collaborate on task development by providing written feedback to each member of the team on Blackboard wikis. All teacher trainees were familiar with the task-based approach to language teaching, which was chosen as the theoretical background for the language instruction in 3D VWs based on the findings of previous research on teaching in 3D VWs (e.g., Peterson, 2006; Deutschmann, Panichi, & Molka-Danielsen, 2009). Since the teacher trainees had different experiences and professional backgrounds, by drawing on their previous knowledge and experiences, they could approach the task development from multiple perspectives and take on the roles of both learners and experts when collaboratively constructing the new products. The instructor also provided feedback on the teacher trainees' work and participated in the exploration of the VWs and their tools. Although it was planned to complete the development of all of the six tasks by the teaching stage, two teacher trainees, Simone and Diane, who were teaching in the fifth and sixth weeks, continued working on their tasks until the fifth week of the teaching stage. In spite of the fact that they had not completed their tasks by the teaching stage, they actively collaborated on their peers' task development.

When the tasks were completed, teacher trainees participated in dry runs, or teaching simulations. The goal of the dry runs was to practice teaching and to test whether all components of the task and the technology worked as planned. After the dry runs, necessary changes were made and the tasks were finalized.

As shown in [Table 2](#), during the teaching stage, teacher trainees participated in the following activities: they implemented tasks in the online class sessions with the EFL students, observed their peers' teaching, participated in the post-teaching feedback sessions, and reflected on their teaching in the journals on Blackboard.

Table 2. *The Teaching Stage*

Activities	Participants	Environments	Feedback
Task implementation	Teacher trainees	Algonquin Campus Tipontia Island	
Teaching observation	Teacher trainees; instructor	Algonquin Campus Tipontia Island	Teacher trainees and the instructor observed all other tasks facilitated by their peers
Post-teaching feedback sessions	Teacher trainees; instructor	VWs and face-to-face	Teacher trainees and the instructor provided feedback during the feedback sessions
Reflections on teaching	Teacher trainees	Journals (Blackboard)	Teacher trainees reflected on their teaching

Each class session was an hour and a half long. Each trainee was to teach two sessions with two different groups of four students in one of the six weeks; however, only Jack, Lynn, and Joan followed this schedule. Due to circumstances and to the changes made to some of the tasks, Gerri and Diane, who were teaching during the first and the sixth weeks, respectively, conducted only one session with all eight students, whereas Simone, who taught in the fifth week, conducted two sessions with all eight EFL students.

While most changes to the tasks were made after the dry runs, the actual teaching, especially in the first two weeks, revealed some issues that we could not have foreseen during the task-development stage. To address these issues, necessary changes were made to the tasks used in subsequent class sessions.

Data Collection and Analysis

This qualitative study takes an interpretive approach to data analysis. Interpretive studies focus on construction and co-construction of meanings by individuals who interact in order to come to share some understandings in the specific context (Erickson, 1986) and employ several sources of data in order to gain deeper understanding of the issues they explore (Davies, 1995). To observe what 3D-specific skills emerge in the process of collaborative situated learning and how they develop, the data from teacher trainees' wikis and journal entries, recordings from the online class sessions, and the instructor's notes were used. The effectiveness of the situated learning approach was evaluated by teacher trainees' ability to learn from each other. The following was taken as evidence of learning: (1) incorporation of peers' suggestions and borrowing peers' ideas when developing tasks on wikis, (2) providing feedback and incorporating peers' feedback during dry runs, (3) critical self-reflection on teaching sessions in journals, and (4) making necessary changes to the tasks after observing peers' teaching sessions and reading reflections in the journals.

Wikis

Six wiki pages were created on the virtual learning platform Blackboard and assigned to teacher trainees to develop their tasks. The teacher trainees had access to their peers' wikis and were instructed to provide feedback to each other on the task development. Since the Blackboard wiki tool archives all changes and provides statistics on the number of changes made by each of the participants, it allowed for tracking the changes that teacher trainees made and for identifying the skills that they employed or developed at different stages of the task-development process.

Screencasts

All online class sessions were recorded using the screen-capturing software Camtasia Relay and totaled 12 hours of screencasts. Screencasts also provided chronological evidence of online teaching skill development, student performance on the tasks, and teacher trainees' professional growth. Screencasts of the online teaching sessions were transcribed using the transcription conventions adapted from Jefferson (1984; see [Appendix](#)).

Journals

Journals were also created on Blackboard and were used by the teachers to reflect on their teaching, to share their thoughts on what could have been done differently, and to provide suggestions on the possible changes in the tasks planned for the subsequent weeks.

Data Analysis

Data from the wikis were analyzed in conjunction with the teacher trainees' journals, screencasts of the online sessions, and their transcripts to observe the chronology of task development in relation to development of online teaching skills and to evaluate effectiveness of the teacher training. Both authors first analyzed wikis, screencasts, and journals individually to identify the skills emerged in the data and coded the emerged skills manually. After that, they compared their coding, discussed and sorted out some discrepancies, and finalized the coding categories. To keep track of teacher trainees' collaboration, each teacher trainee's comment was coded in relation to the emerging skill and arranged chronologically as it appeared in the wikis and journals.

RESULTS AND DISCUSSION

Data analysis demonstrates that technological, pedagogical, and evaluative skills develop concurrently to form 3D-specific, integrated online teaching skills. These skills develop through continuous self- and peer-evaluation, articulation of thoughts, peer- and instructor-scaffolding, and incorporation of peers' suggestions. The following sections discuss what 3D-specific skill emerge and develop during the pre-teaching and teaching stages, and the effectiveness of the collaborative situated learning.

Pre-teaching Stage

Teacher trainees' wikis show that it is difficult to sort 3D-specific skills into discrete technology, pedagogy, and evaluation sets. The skills are so tightly intertwined and intrinsically connected that they can be viewed as 3D-integrated skills. The following five integrated skills emerged from the data over the course of the teacher trainees' collaboration on the task: framing the task, providing input to learners, managing students' collaboration, giving instructions, and providing feedback to students. [Table 3](#) summarizes the chronology of the emergence of 3D-integrated skills on wikis for the instructors who completed development of their task by the teaching stage. The table does not include the skill of providing feedback because it was developed during the teaching stage. The table includes the dates on which wikis were edited by the teacher trainees and the content of the changes and feedback coded by the name of the skills.

Table 3. *Chronology of the Development of 3D Integrated Online Teaching Skills.*

Dates	Gerri	Jack	Joan	Lynn
02/08/13		Adapting task from face-to-face classroom	Framing* Framing (Lynn)**	
02/09/13			Framing Framing (Lynn)	
02/10/13				Framing
02/11/13				Framing
02/12/13	Framing Framing & Input (Simone)			Framing (Simone)
02/13/13	Collaboration (Lynn)	Framing (Lynn)	Framing Framing (Lynn)	Framing Collaboration
02/14/13				Collaboration
02/15/13		Framing (Lynn) Input (Diane & Gerri)	Collaboration (Diane)	
02/17/13		Input (Lynn)		
02/18/13			Instructions	
02/20/13	Instructions			
02/21/13			Instructions	Input
02/22/13		Collaboration Instructions	Instructions	Instructions
02/23/13		Instructions	Input	

Notes. * Comments by the teachers responsible for the task; ** Names of the collaborators who made comments are included in parentheses

Skill of Framing the Task

Framing the task, or developing a scenario, incorporates choosing a task topic, an environment or location in the environment, a task-type, micro-tasks through which the goal of the task is achieved, and tools to mediate language production. Development of this skill begins with exploring 3D VWs and understanding how language can be taught in this environment. Knowing the environment helps instructors to quickly match the following: a task topic with the locations used for the task realization, communication tools that mediate learners' language production with the goal of the task, and the location and communication tools with the discourse patterns that are more likely to emerge in the chosen location. Since 3D VWs are complex technological systems, framing 3D tasks requires the fine-tuning of various task components while at the same time integrating technology and pedagogy in this process of continuous re-evaluation. This results in a big picture view of how these components fit together in the complex system of the 3D learning task.

Joan and Lynn seemed to be the teacher trainees who led the group in the beginning of the process of task development on the wiki pages. The first step in this process was framing the task. Joan posted three potential topics to be implemented on Tipontia Island to her wiki page for peer feedback: a nuclear

disaster, the island as a travel destination, and tracking a massive storm (02/08/13, wiki). Lynn provided some ideas on the task-types and discourse patterns, which students were more likely to produce while being engaged in the task. She suggested that the natural disaster scenario offered students an opportunity for interaction, teamwork, and problem solving whereas the island as a travel destination scenario allowed for interaction with the environment (02/08/13, wiki). Lynn's feedback prompted Joan to combine several ideas in the rough draft of the task scenario:

There has been some sort of disaster on the mainland (at the nuclear power plant perhaps?), and people are being sent to the island for safety. Our group (doctor, police officer, journalist, Red Cross volunteer? - theme is everyday heroes) needs to coordinate a relief project before people start to arrive. (Joan, 02/09/13, wiki)

Lynn believed that Joan's scenario had "a sense of urgency that ma[de] it exciting" and further suggested that Joan could "throw some curve balls during the game" (Lynn, 02/09/13, wiki) by telling students that people would arrive a few hours earlier or weather would impede rescue efforts. She also asked Joan about her role in the scenario.

The next day, Lynn posted her own scenario, which also incorporated some ideas for micro-tasks such as the students' open discussion and a short presentation. She also determined her role, a lawyer who will be making decisions. Lynn's scenario featured a very rich aunt who died leaving her money to charity in order to complete her dying wish of transforming the island into a health resort. When further developing her task, Lynn added the micro-task of "scouting the island", determined students' roles (e.g., a grasping niece, a family doctor, a weird neighbor), and provided approximate timing of the micro-tasks. She also added another micro-task of a group tour of the island (02/11/13, wiki).

Gerri's and Simone's wiki posts from 02/12/13 contained some of Joan's and Lynn's ideas. The topic of Gerri's task, which she planned to teach on Tipontia Island, was an art gallery. Similar to Lynn and Joan, Gerri also identified students' roles, which, in her scenario, were a curator, a critic, a reporter, an artist, and a buyer. Simone collaborated with Gerri by proposing to focus on Canadian art rather than art in general. Simone further framed Gerri's scenario by adding two micro-tasks of conducting research on paintings or an artist and presenting the information as if the students were artists. Although initially Gerri planned to implement her task on the island using screens surrounding the campfire to display uploaded pictures, she changed her mind and chose the Algonquin Campus VW. She posted pictures of the paintings on the walls in the study hall, which reminded her of a gallery and thus looked more realistic.

Simone posted two scenarios. The first scenario was a media/photo scavenger hunt during which students would follow some clues and take screenshots of places as evidence of having visited these locations. The second scenario involved the creation of a time capsule in which students decided on what to include in the time capsule and where to bury it on the island. Gerri collaborated with Simone by adding a micro-task in which she adopted Lynn's idea of students exploring the environment and introduced a new idea of populating the environment with people, e.g., teachers, who would interact with students and, thus, become a source of language input.

While Gerri was co-constructing Simone's task, Simone scaffolded Lynn's task: "Would this be you leading the tour in character and prompting students for ideas? (ex.: "maybe we could build a yoga studio here"). I think that would work well and you can give more details about Aunt Aggie as you go" (Simone, 02/12/13, wiki). Simone's suggestion seemed to echo Gerri's idea of engaging other participants as a potential source of language input.

The skill of framing the task appears to be crucial for designing tasks for 3D VWs because they are complex systems of pedagogically motivated activities mediated by online communication tools. If some of the system's components do not match, the task is not likely to be successfully implemented. Jack,

unlike the other team members, avoided the task-framing process at the beginning. He borrowed his scenario from one of the ESL websites and adapted it for use in 3D VWs. The teacher trainees who acquired task-development experience through collaborating on the construction of tasks found Jack's task was too complicated, contained too many details, and missed the collaboration component which is essential for use in a collaborative immersive 3D environment. In addition, students' roles were not clear, the VW that Jack chose did not match the topic of the task, and the environment and its tools were not used effectively. Although later Jack simplified the task and chose a different virtual location, his first dry run showed that the task was not feasible for implementation in 3D VWs. Only when Jack chose a more realistic scenario and followed his peers' steps of task development, was he able to develop a task that was possible to implement in a 3D VW. While each teacher trainee conducted one dry run, Jack had to do it four times. Since at first he did not collaborate on the development of his peers' tasks, he missed important steps in the task-development process and had to go through several dry runs to understand which components in his task could not be implemented in 3D VWs.

Teacher trainees' collaboration on framing the tasks resulted in six task scenarios. Although the tasks differed in topics and the types of language input, they had similar organization and consisted of four micro-tasks, which were logical steps towards the completion of the task and focused on the development of dialogical and monological skills. The tasks included the following micro-tasks:

1. Brainstorming: students collaborated on providing ideas on the topic of the task and took notes on the public pad;
2. Research/exploration: in pairs/groups, students collaborated on researching the topic using the Internet, gathering information from articles provided by the teacher, exploring the environment, gathering information from informants or generating their own ideas;
3. Preparing presentation: students collaborated on preparing for the presentation by incorporating the information they gathered during the research/exploration stage;
4. Presentation: presenting their projects in groups or individually.

The tasks were structured in such a way that they provided EFL students with opportunities to use language when collaborating on the task, to practice different discourse patterns, to engage in negotiation of meaning and form, and to incorporate the language they learned in their final presentations.

Skill of Providing Input

One of the features of 3D VWs is that although they simulate real-life experiences, they are not populated and, therefore, students do not have access to oral input as it occurs in real life when they interact with other people. Other types of input, e.g., texts, video, and audio, also need to be uploaded to the environment or students can browse the Internet using collaboration boards directly from the environment. The development of this skill began during the pre-teaching stage and extended to the teaching stage because observing how students interact with different types of input allowed for better understanding of the relationship between the input types and the tools used for input delivery.

Lynn and Joan both employed oral input for their tasks, which were similar in that both included a micro-task in which students collected information about how the island could be used while they explored the island. At first, Lynn (02/15/13, wiki) incorporated Gerri's idea (02/12/13, wiki) of having teachers play the role of informants so that students could elicit information from them and, then, Joan further developed the idea by placing informants in the environment. Joan involved teacher trainees who played the role of park workers and held information about the island resources. Later, Lynn opted for engaging students in producing self-generated input (03/10/13, wiki) The other types of input used in the tasks were text-based input from the Internet web pages in Gerri's, Jack's, and Simone's tasks and student-generated input in Diane's task. Testing the tasks with the teacher trainees did not reveal any problems; however,

there were some input-related differences during the class sessions, which will be discussed in the section on the teaching stage.

Skill of Designing Collaborative Tasks and Managing Student Collaboration

The skill of designing collaborative tasks and managing students' collaboration is another integrated skill that emerged from the data. 3D VWs are collaborative environments and, therefore, understanding the relationship between the students' roles and collaboration mediated by the communication tools is essential for teaching in a collaborative environment.

Lynn first focused on the students' and the teacher's roles when commenting on Joan's scenarios (02/08/13, wiki). At the beginning stages of task development, teacher trainees assigned students different roles. However, as they focused on the practical realization of the collaborative micro-tasks, they agreed that students should be assigned similar roles "because it is a realistic premise for people to be working together towards a common goal" (Lynn, 02/13/13, wiki) and because "[s]omehow the planning and working together will have to be stressed to get [students] to interact" (Diane, 02/15/13, wiki).

Another point to consider when creating collaborative tasks is what communication tools mediate students' collaboration and how. On their wikis, Joan and Lynn specified that public whiteboards would be used for brainstorming, sharing ideas, and collaboration on the task (02/13/13). Lynn proposed that students collaboratively create the Power Point slides. Since there was an application allowing desktop sharing, the slides could be made visible on each student's desktop and students could collaborate in such a way that "one student will be the scribe ...but as all of them can hear each other, they can work on it together" (Lynn, 02/14/13, wiki). Although teacher trainees began to bring some ideas on the use of collaboration tools, they were still in the process of discovery with these tools. Therefore, the course instructor suggested that the teacher trainees explore how to use the public pads, which allowed peer editing and collaboration, and then use them as collaboration tools during the teaching sessions.

Skill of Giving Instructions to Students

Joan was the first one who added instructions to the task (02/29/13, wiki) and Gerri wrote a detailed script of what she would say to students during the online session (02/20/13, wiki). The rest of the team borrowed this idea and also wrote similar scripts for their teaching sessions because dry runs showed that it was very difficult for teacher trainees to control avatars, explain the task, give directions in the environment, and manage the classroom.

Skill of Providing Feedback to Students

Although teacher trainees understood that they should provide feedback to students differently from how it is provided in a face-to-face classroom, this skill was not well discussed on the wikis because none of the teacher trainees had previous teaching or learning experience in 3D VWs. One of the challenges of giving feedback in VWs was how to provide feedback without interfering with students' interaction while collaborating on their task. Although the teacher trainees agreed that the less intrusive way of providing feedback would be to evaluate students' performance using a rubric, it was not clear whether teacher trainees would be able to take notes during their class sessions because they would be overwhelmed with other things such as controlling their avatars, managing the classroom, using communication tools, and, possibly, troubleshooting technical problems.

The data from wikis show that teacher trainees were actively collaborating on the task development and, thus, actively learning from one another. Their collaboration led to the co-construction of new knowledge, specifically, the development of five integrated skills. Collaboration also allowed them to create six language-learning tasks, or new products, unique to this particular group of people and this environment. Since collaborative construction of new knowledge and new products are the key elements of collaborative situated learning framework (Donato, 2004; Herrington & Oliver, 2000), the pre-teaching

stage can be considered an effective part of the teacher training.

Teaching Stage

After each teaching session, teacher trainees wrote journal entries reflecting on their teaching experience. In their journals, they wrote what went well, what problems they had during the tutoring sessions, and provided suggestions for improvement for the teacher trainees who taught in the following weeks. Although during the pre-teaching stage teacher trainees were able to develop skills that allowed them to create and implement language-learning tasks that engaged students in collaborative learning, during the first two weeks of teaching, they encountered some previously unidentified challenges. These challenges are addressed in the subsequent sections.

Challenges Related to the Skill of Managing Students' Collaboration

Although collaboration was discussed during the task-development stage and teacher trainees had ideas on how to implement collaborative tasks, the first class sessions taught by Gerri and Jack showed that students either did not collaborate on the task at all or collaborated but predominantly in Turkish. During the class session with Gerri, students did not collaborate because they were not familiar with the technology and they were not familiar with a collaborative type of learning. In spite of the fact that students were working on the task and found the information needed for the final presentation, they worked individually and did not share information with their peers. They also did not know how to make use of the public pad for collaboration.

The teaching stage provided support for Lynn's idea of assigning the role of a scribe to one student to facilitate collaboration. During the first class session in the second week, Jack taught students how to use the public pad. Although students contributed to the shared document, they did so mostly in silence. Only when Jack used Lynn's recommendation, did students begin to collaborate. This exemplifies that some of the skills cannot be fully developed without testing them in the environment with real students. Although the teacher trainees tested the tasks in the environment, testing did not reveal the problems they eventually encountered in class because their experiences with the technology and collaborative approach to learning differed from that of the students.

We also did not take into account that in the EFL setting, students may not be accustomed to using the target language while working on the task. As students reported at the end of Gerri's teaching session, speaking English to their peers was a new experience for them: "I think it was strange because the people you know in real world and while you speaking Turkish and when you come here, you have to speak English with your native people" (Furkan, 03/05/13, screencast). To help students to overcome the language barrier and to have them get used to speaking English, Jack added to his task a "mingling" component, a warming up activity when students had an opportunity to have informal conversations with their teachers at the beginning of the class.

These examples show that collaborative situated learning was beneficial for teacher trainees. During the teaching stage, teacher trainees were able to revisit peers' suggestions provided during the pre-teaching stage and to make valuable changes to their tasks during the teaching stage when they encountered problems.

Challenges Related to the Skill of Providing Input

Class sessions also revealed some challenges related to the types of input, the way in which input was introduced to students, and how students interacted with the input. The type of input that triggered more negotiation of meaning was oral input presented by the park workers in Joan's task. Student-generated input in Lynn's and Diane's tasks did not elicit much negotiation of meaning because students used familiar vocabulary.

Gerri's and Jack's tasks incorporated text-based input from the Internet web pages. Although students

were able to gather information from the Internet in the first week, they did not negotiate meaning. Rather than using the browser collaboratively on the built-in boards within the VW, students worked individually with different texts using browsers on their own desktops (i.e., not shared with the other participants). Students may have looked up the meanings of unknown words in the electronic dictionary or may have simply omitted the information they did not understand. Jack solved this problem by having students read the same information by sending them a link to the Internet page and by having them choose three items from a list of ten, which made students process the input and negotiate the meaning of the items on the list.

After observing Gerri's and Jack's teaching, Simone revised her task and included a jigsaw reading as one of the micro-tasks. She divided eight students participating in the task into four pairs. Each pair of students read the same text, collaboratively summarized it to a teacher trainee playing a role of the teaching assistant, and then shared the content with the rest of the group. By having students summarize readings, Simone stimulated students' input processing, as students needed to understand the reading in order to share the information with others.

These examples demonstrate once again that collaborative nature of this training was beneficial to teacher trainees. In the process of teacher training, they learned from each other that whether students process the input does not depend on the input-type alone. In order to process language input, students need to be engaged in an activity that compels them to incorporate information from the input into a new collaboratively constructed product, e.g., presentation.

Challenges Related to the Skill of Giving Instructions

The skill of giving instructions to students was taken into consideration during the pre-teaching stage, but only partially. During her class session, Gerri provided instructions orally. Although her instructions were very clear and students seemed to understand the language, they did not understand what they were supposed to do for each of the micro-tasks. Since Gerri was floating between the rooms in which students were working on the task, some of the teacher trainees played the role of teaching assistants and helped the students understand what to do. In her journal entry that she wrote after teaching, Gerri recommended that teachers write instructions on the slides and post the slides on the whiteboards so that students could see the instructions.

Jack incorporated peers' feedback in his task and wrote instructions on the slides, but in his first class session, students did not remember all of the instructions because they did not review the slides with the instructions after each stage of the task. For his second teaching session, Jack divided instructions into two parts and students understood the instructions better. Joan, who taught in the third week, simplified the task instructions even further and divided them into five steps corresponding to each part of the task. This considerably reduced the teacher talk and provided students with a better understanding of what they were required to do at each stage. Although writing clear instructions is important in both face-to-face and online teaching contexts, it is especially important for the 3D environments because of the information load on the students. In addition to learning a language, students need to adjust to a different type of environment, learn how to use communication tools, and to deal with different types of technology problems.

Challenges Related to the Skill of Providing Feedback to Students

The teaching stage revealed that in order to understand how to provide feedback in the 3D classroom, teacher trainees needed to understand how to provide feedback in a student-centered classroom and how to use communication tools for this purpose. Since students spent most of their time collaborating, they also spent most of their time talking to each other. To provide feedback, teachers would have to interrupt the students' discussions. Therefore, in order to avoid interrupting students, they used the moments when students asked for feedback or when they could provide feedback without much interference.

The screencasts of the teaching sessions exemplify two strategies for providing feedback to students. In [Example 1](#) (see [Appendix](#) for transcription conventions), Simone non-intrusively corrects Princess, a student who mispronounces the word “seagull” (lines 3 & 5) by using the word correctly in her response to the student (line 6).

(1)

- 1 Simone: ah, but there is fish ((in the lake))
 2 (a sound of seagulls)
 3 Princess: um this this is a seagull? Or girl? Seagirl?
 4 Simone: (laughing)
 5 Princess: the bird is seagirl?
 6 Simone: I think, they might be seagulls or eagles as well
 7 Princess: Eagle? Okay (that’s all?)

Another way of providing feedback to students is to use text-based tools such as chat or collaboration boards. In [Example 2](#), students are coming up with a plan of how survivors are going to live on the island. Deniz is writing on the public pad whereas Miss Jane and Ozkaya contribute verbally. Deniz misspells the word tree house (lines 4, 7) and the teacher corrects him by typing the word in the chat area (lines 10, 13). In spite of the fact that the teacher does not interrupt students’ talk, Deniz notices the teacher’s feedback and corrects the misspelled word (line 15).

(2)

- 1 Deniz: the [next
 2 Miss Jane: [tree house
 3 Deniz: um tree house
 4 [3 (then deletes)
 5 Miss Jane: [yes
 6 Miss Jane: [we can also ((use)) tree houses for
 7 Deniz: [3house
 8 Miss Jane: Um sleeping [um we put sleeping bank- bags in there and xx
 9 Deniz: [sleepin and living
 10 Teacher: *Tree house*
 11 Ozkaya: ((that’s right))
 12 Deniz: (adds g to ‘sleeping)
 13 Teacher: *Not not 3 house*
 14 (4.0)
 15 Deniz: (deletes 3 and types tree)

By the end of the sessions, teacher trainees had developed and effectively used the skill of providing feedback to students. They understood how interactions occur in 3D VWs and how communication tools could be used for feedback purposes.

Summary of Findings

The data from the teacher trainees' wikis demonstrate that online teaching skills do not develop in the linear order as presented in Compton's (2009) framework. As evident from the examples, the skill of framing a task integrates technological and pedagogical skills. These skills develop concurrently throughout the process of evaluation and re-evaluation of each of the participants' ideas and making the necessary changes to the task. Evaluation skills do not seem to develop separately from technological and pedagogical skills, but develop along with them and are the vehicle of teacher trainees' professional growth.

The situated learning model of teacher training also challenges Compton's (2009) framework in terms of classifying online teaching skills into levels. Since Compton builds her framework on the synthesis of CALL literature, her model is separated from the context in which they develop. Although online teachers need to have basic knowledge of language learning theories to be able to apply this knowledge in online teaching, they are not likely to develop this ability without hands-on experience with the technology in order to understand how a specific technology can facilitate language learning. Theorizing the development of online teaching skills outside of the teaching context leads to inaccurate understanding of the developmental processes that occur in teachers. For example, Compton includes a pedagogical skill of creativity in creating new online materials in the set of skills acquired later, at the expert level. However, this study shows that teacher trainees started the project with creating teaching materials and were mastering this skill during their pre-teaching stage. Similarly, creativity in facilitating online socialization is also acquired at the expert level in Compton's model; however, the teacher trainees in this study began to form this skill when constructing collaborative tasks and mastered it during the teaching stage.

The development of online teaching skills is also a spiral process because the skills developed in the pre-teaching stage are revisited and refined during the teaching stage. Since teacher training was situated in an authentic context, the development of the teaching skills occurred naturally from the formation of more general skill of framing the task to the more specific skills such as providing input and managing collaboration.

The findings of this study indicate that collaborative situated learning was a rather effective form of teacher training for the participants of the study. Since 3D VWs are complex systems that require understanding of how the environment and its tools are used for realization of pedagogical goals, it is difficult, time consuming, and practically impossible for novice teachers to explore the environment and to learn how to teach in such environment on their own. Teacher trainees' collaborative situated learning allowed for co-construction of their own model of the task and teaching practices in the 3D VW as a result of the joint activity and incorporation of socially spread knowledge. Since co-construction of new knowledge and transformation of individual practices into the shared practice is the goal of collaborative situated learning, the teacher training discussed in this study can be considered successful as it realized its pedagogical goal.

CONCLUSIONS

This study advocates for a two-staged spiral teacher-training model that consists of pre-teaching and teaching stages. As we learned from the teacher trainees' wikis, online teaching skill development starts at the pre-teaching stage when teachers are engaged in the development of teaching materials and testing them in the environment. However, the teaching stage is extremely important because only the skill of framing the task was developed during the pre-teaching stage. The other four skills began to develop during the pre-teaching stage and extended to the teaching stage. Despite the fact that teacher trainees raised the question of how to provide feedback to students during the pre-teaching stage, they could not learn how to do it because mastering of this skill required practicing this skill in the teaching context.

The study also suggests that collaborative situated learning was an effective method of teacher training, at

least for the participants of this study. Throughout the project, teacher trainees were able to incorporate peers' suggestions and borrow peers' ideas when developing tasks on wikis, to providing feedback and incorporating peers' feedback during the dry runs, to critically reflect on their own teaching sessions in journals, and to make necessary changes to their tasks after observing peers' teaching sessions and reading reflections in the journals. Their collaboration allowed them to develop 3D integrated skills and to create new products, language-learning tasks, during a short period of ten weeks of teacher training.

While this study is the first step towards identification of the skills required for teaching in 3D VW and understanding how these skills develop in an authentic context, the next step in this direction should be more detailed exploration of each of the integrated skills. Although this study provides positive results of the collaborative situated teacher-training process, the results of the study should be taken with caution because it focused on only one group of learners. More research is needed to observe whether this type of teacher training is equally effective for other groups of teacher trainees and whether the same online teaching skills consistently emerge across the learners and teacher training contexts.

APPENDIX. Transcription Conventions

Princess:	Voice-based utterances are typed in regular font
<i>Tree-house</i>	Utterances typed on the collaboration board are in <i>italics</i>
[yes	Square brackets indicate the onset of overlapping utterances
(then deletes)	Utterances in single parentheses indicate transcriber's comments
((use))	Utterances in double parentheses include transcribers best guess
bank-	Dash indicates interrupted utterances
(4.0)	A four-second long pause

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