Integrating Second Life into a Chinese language teacher training program: A pilot study

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Abstract: Second Life (SL), a 3-D Multi-User Virtual Environment, has been found beneficial to foreign language education because of its immersive and interactive environments. This cross-continental study explored feasibilities of using Second Life to provide field experiences to pre-service Mandarin teachers in a program of Teaching Chinese as a Foreign Language in Taiwan. This study also investigated pre-service teachers' insights of teaching Chinese in such a virtual environment, as well as the difficulties these teachers encountered when integrating Second Life in teaching Chinese. The study found that the more teaching experience the pre-service teachers gained in teaching Chinese in Second Life, the more positive an attitude they would develop toward adopting Second Life in teaching Chinese virtually, and in contrast, the less frustrations they would have for technical challenges when teaching in Second Life.

摘要：因 3-D 虚拟第二人生所提供互动式及沉浸式环境的特质已被许多研究证实有利于外语教学，本研究以跨国合作的模式设计融合第二人生及实境教学培训台湾的华语师资，同时调查学生教师对在网路虚拟实境教学的观感及其所遭遇的困难。结果发现若学生教师于第二人生的教学经验值增加，他们对于此类教学模式的态度就越正面，尤其是在技术上及教学上遇到的困难的时候。

Key words: Second Life, virtual learning environment, Chinese teacher training, Teaching Chinese as a Foreign Language

关键词：第二人生，虚拟世界，华语/中文/汉语教师培训，华语/中文/汉语作为外语教学

1. Introduction

Virtual reality (VR) is a combination of technologies which allow multiple users to interact with each other in a computer-simulated environment that can be a replica of the real world or an imaginary cyber world. Seventy-five virtual worlds existed in the Internet (Johnson, 2008, cited in Gregory & Tynan, 2009), for example, Second Life, World of Warcraft, the Sims 3, IMVU, and Active Workds, etc.. Since VR was adopted into education in West Danton High School in England in 1991, researchers and educators have investigated applications of VR technology from its potentials for general education to its integration to specific subject areas. Researchers found that, compared with traditional two-dimension interactive web tools, such as Skype, Google Doc, digital Whiteboards, and Google Wave, the three-dimension VR promotes more authentic and physical interactions, immersion, students' awareness of the target culture, knowledge construction, and learning (O'Brien & Levy, 2008; Von et al.,2001).

One of the emerging VR drawing increased attention is a 3-D virtual world—Second Life. Second Life was developed and launched in 2003 in the California-based Linden Research Lab (http://lindenlab.com). In this virtual world, replica of any objects in the real world can be built and operated by so-called "residents" or the users, through their own digital representatives—avatars. The avatars can fly, move, and walk, and quickly relocate on different islands, which are rich in graphic illustrations by using teleport functions. In addition, the avatars can communicate with other avatars by text or voice chat (Hislope, 2008; Schiller, 2009; Theodore, 2009). Because of these immersive, interactive, physical and graphic capabilities of Second Life, it has grown explosively to become the second best thing to a face-to-face meeting. Up to 2009, Second Life had 21,332 islands from over a 100 countries (Schiller, 2009). Back to 2007, Garner Inc. predicted that by the end of 2011, 80 percent of active Internet users will have an avatar in any of the virtual worlds, which indicates the era of virtual reality is upon us.

Because of Second Life capabilities for communication and interaction, as well as its affordance of immersive simulations, many companies and organizations have purchased and created their own virtual space, called islands in Second Life for various purposes including business, educational use, political use, and special group use. Many organizations have chosen Second Life to provide professional training, especially training that can be dangerous or simply impossible to do in the real world.

For example, some key IT companies including Cisco, Dell, and Samsung have built their learning and training virtual spaces in Second Life. In 2008, IBM's Academy of Technology held a Virtual World Conference and an annual meeting drawing over 200 participants. The virtual world training and conferences have proven to be a cost effective model. Children's Memorial Hospital in Chicago, Illinois has replicated its facilities to successfully provide disaster drills to train doctors, nurses, and other related staff for

emergence response planning. Because Second Life can engage learners in simulated experiential activities, "Second Life is the next realm of delivery for training" (http://www.secondlife.com).

Second Life also provides an arena for educators to seek innovative ways to provide engaging and constructive learning in virtual environments. Since Linden Lab released "Campus: Second Life" in 2004, more and more educational institutions have built their virtual campuses for teaching, learning, training, or advertising purposes. For educational use, USA Today reported that more than 300 universities have utilized Second Life as an educational tool, with some for distance education courses, and some for use by professors to supplement existing face-to- face courses (Sussman, 2007). A report in 2008 (Lester, 2008, cited in Gregory & Tynan, 2009) claimed there are approximately 1,000 educational institutions using Second Life in different ways to serve different needs. Such innovation can be easily found from literature and Second Life websites: Harvard law school and Harvard Extension School's Cyber One: Law on the Court of Public Opinion (Schiller, 2009), Ohio University's Nutrition Games, Healthinfo Island and VNEC (Virtal Neurological Education Centre) developed by University of Plymouth, UK (Boulos, et al., 2007), Second China from University of Florida, 3D Collaborative Learning owned by Graz University of Technology, Austria (Chang, et al., 2009). Many of the universities have their own Second Life virtual campuses such as Harvard, Princeton, Drexel, Ball State, Stanford, Ohio, and Bowling Green (Descy, 2008; Schiller, 2009). University of Central Florida has received a National Science Foundation grant to teach science and physics in Second Life (Cart & Elseth, 2009).

When adopting Second Life for education, pedagogical possibilities for extending traditional classroom activities and learning become enormous. Applications of Second Life in the classroom are as innovative as the virtual technology itself. Conklin (2007) suggested 101 uses for Second Life in the college classroom to encourage learning in a more collaborative and social way. The VR technology has proven to be a useful educational tool by studies over the decades in terms of promoted interactions, resources sharing, increased motivation, a sense of realism, the student-centered nature of interactions, identification with a target culture and reduction in anxiety levels (Billings, 2009; Bricken, et al., 1992; O'Brien & Levy, 2008; Shim, 2003).

However, among various applications of Second Life in education, conducting teacher training in this engaging virtual space is still a new territory that has not yet been thoroughly investigated. Foreign language teacher training, especially Mandarin Chinese language teacher training, in Second Life is even more sparse. Web technology has opened new horizons for teaching Chinese using computers and the Internet (Yao, 2009). Understanding how to use emerging technology to enhance teaching and learning in Chinese becomes essential in order to engage 21st century learners who are digital natives (Bennett, Maton, & kervin, 2008). This pilot study pioneered a Mandarin Chinese teacher training model which utilized Second Life as a platform allowing teacher education students in Taiwan to gain field experiences teaching Chinese to American students and to understand how to integrate emerging technology in teaching Mandarin as a foreign language. Based on surveys and an open-ended question (see Appendix), this

study investigated perceptions of pre-service teachers in a Teaching Chinese as a Foreign Language Program in Taiwan regarding using Second Life as a learning and teaching platform. This study adds to the understanding of benefits and drawbacks of using Second Life in teaching and learning Mandarin Chinese, and it also provides practical suggestions for integrating Second Life into a Mandarin Chinese teacher training program.

2. Related Studies

2.1 Teacher Training and Field Experiences

Tsui (2003) stated that teacher' knowledge is embedded in and developed through their reflective and personal daily practices. Teachers' knowledge includes five categories: knowledge of subject matter (subject disciplines and learning theories), curriculum (the structuring of learning), instruction (classroom routines and student needs), self (individual's characteristics), and knowledge of the milieu of schooling (the social structure of school). When discussing the relationship of these five categories of knowledge, Tsui stressed the dynamic features of the relationships: "teacher' knowledge shapes practices, but it is also shaped by the practices" (Tsui, 2003, p.46). Therefore, educators of Chinese teacher education argue that Chinese teacher training should include content knowledge, curriculum and instruction, and practical training (Chien, 2008).

Tsui (2003) also pointed out that the nature of teacher knowledge is situated in the specific context in which teachers operate. Teacher's knowledge can contextually develop as they respond to the specific context of the school and classroom setting in which they interact with students. Thus, providing pre-service teachers authentic teaching contexts to gain some field experiences is critical to developing teacher knowledge. Through field experiences, pre-service teachers can obtain first-hand experience through one-to-one encounters in classrooms, so that they may develop good teaching practices. For this reason, field experiences are frequently an integral part of courses in teacher education (Grable, Kiekel, & Hunt, 2010).

2.2 Teacher Education in Second Life

Despite the explosive use of Second Life in many aspects of life, the body of knowledge related to teacher education in the virtual world is very sparse. Two studies that addressed this topic applied a comparative approach to explore pre-service teachers' beliefs and field experiences that they developed in both the physical and virtual classrooms. Gregory and Masters (2010), in their pilot study exploring learning of different kinds of thinking skills (known as Six Thinking Hats), found that some students preferred the traditional face-to-face lesson; others could see the benefits of using a virtual world in the right circumstances. The researchers compared prospective teachers' beliefs and experiences regarding their learning and engagement in a virtual environment and those in a face-to-face situation. This comparison yielded a positive correlation to perceptions of using virtual world as a teaching and learning tool. This study suggested

that Second Life is a feasible environment for teacher training and real life activities can be duplicated or improvised in the virtual environment.

A strong argument for the need and possibility to conduct teacher training in the virtual world was presented by a group of researchers (Grable, et al., 2010). These researchers asserted that since doctors, pilots, and military staff can be trained virtually, teachers could also be trained through digital field placements. This assertion was aimed to solve a problem in the researchers' online teacher training degree program: the online program could not offer field experience courses. To solve this problem, the researchers (Grable et al., 2010) implemented distance learning technologies to their online secondary education teacher training courses. The technologies such as compressed interactive videos and a videoconferencing software that incorporates an interactive whiteboard and communication tools allowed pre-service teachers in secondary math, physics, business and Spanish to complete their field experiences in the virtual classroom. Four pre-service teachers' field experiences in a traditional thirty-hour field observation are compared to their virtual field experiences. The researchers compared the two types of field experiences in three domains: planning, classroom management, and instruction. Their study found that the students majoring in physics, business, and math showed a mixed attitude in the three domains no matter where their field experiences were gained. However, the students majoring in Spanish showed a more positive attitude in all three domains in their virtual field experiences than those in the traditional settings. These results suggested that the virtual environment was feasible for prospective Spanish teachers to obtain valuable field experiences.

A current study (Mahon, Bryant, Brown, & Kim, 2010) looked into a specific aspect of teacher training—using Second Life to enhance classroom management practice. The researchers created their management simulators of 30 middle school students, and used artificial intelligence methods to infuse the simulation with random student behavior that would arise in a real classroom. In this mixed method study, the researchers found that participating students perceived the simulation to be a useful learning experience because Second Life provided a creative and intriguing approach to studying classroom management skills. The real-like classroom setting and behavior simulators put pre-service teachers in the situation where they had to make culturally and linguistically appropriate responses to address those behaviors. A shared opinion observed from the above three studies indicated that, regardless of technical challenges, Second Life is promising a "non-judgmental, risk-free environment" (Gregory &Masters, 2010, p. 2) for pre-service teachers to practice their teaching skills.

2.3 Demand for Mandarin Teacher Training in Second Life

2.3.1 Positive Foreign Language Learning Experiences in Second Life

Before Second Life was launched, foreign language educators had applied other types of game-based virtual reality technologies to foreign language education for decades. Researchers agreed that VR can enhance foreign language learning (Salies, 2002; Schwienhorst, 2002; Von der Emde, et al. 2001). Von et al. (2001) identified pedagogical

benefits of using VR in foreign language learning in five aspects: (1) authentic communication and content, (2) autonomous learning and peer teaching in a student-centered classroom, (3) individual learning, (4) importance of experimentation and play, and (5) students as researchers.

Different from the game-based VR, Second Life is a multi-user-created cyber environment where people around the world carry out social interactions for certain purposes such as commerce, business, and education. This emerging 3-D virtual world allows immersive and interactive real-life communications with people around the world, thus bringing great benefits to foreign language education. Second Life has added new dimensions to second language study (Sweley, 2008).

Through visiting foreign islands, real communication with native speakers of target languages becomes highly possible and feasible for the foreign language learners (Swelley, 2008). Additionally, exchanging different cultures becomes attainable in Second Life (Hislope et al., 2008; Thompson & Garetty, 2009). For these reasons, an increasing number of language educators start to view Second Life as a tool for supplementing foreign language classes.

Some empirical studies have tested the effectiveness of teaching foreign languages in Second Life. Hislope, et al. (2008) reported the perceived benefits and drawbacks of using Second Life in her intermediate Spanish course in Spring 2008 as a way to promote more out-of-class contact with native Spanish speakers. Results of a survey with 20 open-ended questions administered to15 students showed both positive and negative experiences with learning Spanish in Second Life. Students liked interactive, creative, and gaming-like aspects of Second Life. The reported negative experiences with Second Life focused heavily on technical issues and the high learning curve of navigating in Second Life. Regardless of challenges, 13 of 15 students reported that Second Life could help them improve their comprehension of Spanish.

Wang et al. (2009) conducted an international cooperative study to investigate students' technology readiness for and their perception of using Second Life as a language learning platform, as well as students' perceptions of integrating Second Life into a Teaching English as a Foreign Language (EFL) program. Sixty one EFL learners in China met weekly with American partners to complete assigned learning tasks. This evaluation research showed that EFL learners positively perceived Second Life as a language learning tool, and they perceived the EFL program in Second Life to be interesting and successful.

Garcia-Carbonell et al. (2001) stated that in traditional classrooms, language teachers normally control the students' conversation frequency, topics and responding time; therefore, language input to promote communicative competency seemed very limited. Simulation and gaming, however, seem to provide a nice solution to the problem that lacks language exposure outside of the classroom.

2.3.2 Demand for Teaching in the Virtual Environment

One significant impact of advanced technologies on 21st century education is the increasing demand for teaching via alternative and innovative methods. Learners in the 21st century are digital natives (Bennett, et al., 2008), therefore teaching in the virtual environment via internet teleconferencing and other types of learning management system is one effective way to engage students. With the needs for qualified teachers, it is important that teacher candidates be exposed to alternative delivery methods to learn a different set of skills for future career opportunities. The effective use of technology in the classroom depends on teachers being familiar with the technological options that are available and suitable to particular learning goals. Therefore, it is necessary for teachers to develop some experiences with the technology by stepping into any classroom, virtual or traditional (Grable, et al., 2010).

The best situation for learning teaching skills is through teaching in the real classroom (Tsui, 2003). However, Chinese teacher training programs in Taiwan have faced a challenge for not being able to provide enough opportunities and environments for pre-service teachers to teach Chinese as a foreign language to non-native Chinese speakers. As a solution to this practical problem, Second Life is found to be feasible for pre-service Mandarin teachers to practice teaching to non-native Chinese speakers in a one-to-one format (Cheng, Zhan & Chen 2010).

2.4 Second Life Capabilities for Language Teacher Training.

Second Life allows almost unlimited imagination and imitations of reality. This affordance of Second Life technology makes it feasible to conduct teacher training in this virtual world. Specifically, Second Life offers a very immersive and interactive instructional context, along with various means for instructional design, communication, and teaching observation and reflection. All of these components in Second Life contribute to the effectiveness of language teacher training.

2.4.1 Instructional Context

Second Life users can build almost anything their skills allow and interact with objects and other residents from all over the world within the environment (Carter & Elseth, 2009). Depending on the learning objectives, Second Life classrooms can be built to illustrate an instructional context where specific language learning topics are presented by rich graphics and colorful objects to satisfy learners with different learning styles. The virtual avatar presence of teachers and students adds a real feeling of being in a class. In addition, avatars can fly, move, and walk as well as teleport to relocate at an instructional context in different islands within the environment. It can provide a friendly, appealing, and contextually relevant space for native speakers of a target language to interact with learners (Wang, et al., 2010).

2.4.2 Means for Instructional Design

Because Second Life is a user-generated virtual world with built-in tools for constructing and scripting, language teachers can create an immersive and interactive learning environment by using different instructional design strategies. Many instructional strategies commonly used in the traditional classroom are also available in Second Life. For example, depending on the needs for instructional activities, animations, audio or video clips, PowerPoint Presentation, note cards containing any information, words or phrases can be developed outside and easily be uploaded to Second Life. These materials can be attached to any object in Second life and retrieved with a simple mouse click. The micro-worlds allow users to interact with others and build objects within the environment, thus adding to the interactive nature of the world (Carter & Elseth, 2009).

2.4.3 Means for Communication

Communication in Second Life takes place via two avenues: text-based chat (can be asynchronous or synchronous) and live voice chat. The communication can be conducted individually or in a group format. Users can communicate verbally in real time, which adds another layer of authenticity to the text-based interaction. In addition to communications through text messages and audio conversations, avatars can also communicate with simple non-verbal gestures (e.g., waving, thumbs-up). These forms of communication allow language teacher to create an engaging and interactive learning environment that helps language learners practice speaking a target language, such as Mandarin Chinese, that many CFL learners have a very limited opportunity to hear, use, and practice in the real world.

2.4.4 Means for Observation and Reflection.

Second Life also offers capabilities to record events taking place within the environment. This allows teacher training programs to capture screen shots and to record entire lesson in Second Life. Teacher trainers and pre-service teachers can later review and reflect on their personal performances and interactions with others by watching their own recorded video clips in Second Life (Cheng, Zhan, & Chen, 2010).

2.5 Statement of Problem and Research Questions

Based on a review of the literature, researchers believe that virtual reality can be a very useful environment for Mandarin pre-service teachers to obtain some field experience and to learn special skills for teaching in the virtual environment. These special skills may be translated to teaching in not only other types of virtual environments but also in the classrooms. Yet, data-based research to support this belief is very limited. Three sets of questions triggered the researchers to conduct this collaborative study between two institutions, one in Taiwan and the other in the United States, with technical support from Institute for Information Industry (III), a non-profit information technology association in Taiwan. This pilot study pioneered conducting a Mandarin Chinese teacher training in the virtual world. In this study, a special virtual space the Virtual Living Lab

(the VLL) was built in Second Life by III, and the VLL is used as an instructional environment in which pre-service teachers design, develop, and deliver learning tasks tailored to learners of Chinese in the U.S. The research questions are:

1. How do Mandarin pre-service teachers perceive the Second Life as reflected in the Virtual Living Lab after training? Is there any difference of perceptions between their 1st time and 2nd time teaching?
2. How do Mandarin pre-service teachers perceive teaching Mandarin in a virtual environment? Do their perceptions change between 1st time and 2nd time teaching experiences?
3. What difficulties do Mandarin pre-service teachers encounter when teaching in the Virtual Living Lab?

The purpose of paper is to report results of the pilot study of integrating Second Life into a teacher training program. Based on surveys of objective items supplemented with one open-ended question, this study investigated how pre-service teachers of Mandarin Chinese in Taiwan perceived Second Life as a teaching platform. This study adds to the understanding of benefits and drawbacks of using Second Life in teaching and learning Mandarin Chinese, and it also provides practical suggestions for integrating Second Life into Mandarin Chinese curriculum.

3. Theoretical Framework

Researchers of the study believed that creating social and authentic interactions could enhance language production, promote communication and assist language acquisition in foreign language settings. Therefore, Communicative Language Teaching (CLT) and constructivism are adopted as the main theoretical frameworks of this study.

Communicative Language Teaching approach in a foreign language classroom enables students to communicate in the target language, and to actively negotiate meaning (Gass & Selinker 2008; Larsen-Freeman, 2000). One tenet of CLT approach requires a maximum use of target language in language teaching, thus bringing the following benefits to foreign language classrooms: (a) the more the students are exposed to the target language, the more they learn, (b) students' motivation is increased, and (c) higher exposure to the target language positively associated with student language proficiency (Turnbull, 2001). Second Life can provide such a high exposure to language learners who may not have access to native speakers of the target language in real life.

Constructivists believe that learning occurs through interactions in the learning environment rather than messages transmission from the instructors. It is through interaction that people construct meaningful knowledge (Mcdonough, 2001). Jonassen et al. (1995) pointed out that constructive environments involved four attributes: context, construction, collaboration and conversation. These four attributes, which also are key elements in Second Life, are interwoven in a learning process. Constructivism has been widely adopted to support Computer Assisted Language Learning (CALL). Some

examples included using e-mail, websites, and videoconferencing as venues to help learners to construct knowledge via interaction in the cyber space (Mcdonough, 2001). Beyond the functions of these tools for knowledge construction in the virtual world, Second Life allows learners to be "physically" situated in the virtual context where they can construct their linguistic and cultural knowledge through the authentic interaction with native speakers of the target language. As Rieber (1992) pointed out, visually based virtual environments are an extension of constructivist learning theories, and the virtual world is an immediate application of the infusion of constructivism into instructional design.

4. Method

4.1 Research Context – the Virtual Living Lab (VLL)[1]

The primary Second Life island/region for this study, the Virtual Living Lab, was an on-going construction island designed for Mandarin Language learning built by a non-profit association in Taiwan, Institute for Information Industry. The target users of the VLL were Mandarin learners in the United States. According to Institute for Information Industry (2010), the mission of this 3D virtual learning environment is to build up a culture-enhanced Mandarin language environment to best simulate real-life learning experiences. The islands, scenes, as well as specific objects in the Living Lab were built around common topics including an airport, duty free shops, hotels, restaurants, a night-time market, streets, and a subway station.

Figure 1: Airport and duty free shops
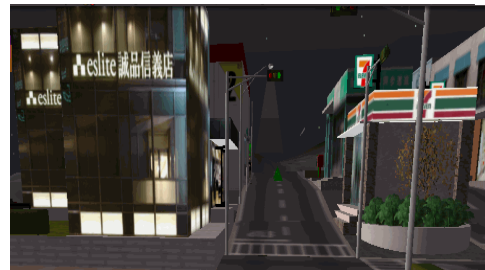

Figure 2: Night market

Figure 3: Hotel

Figure 4: Street and shops

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[1] http://slurl.com/secondlife/Virtual%20Living%20Lab/119/186/21.

Figure 5: Restaurants

Figure 6: Subway

4.2 Research Process

The literature suggested three essential elements contributing to the success of teaching and learning in Second Life: teacher presence in the virtual activities, training on Second Life skills, and the effectiveness of group activities (Wang et al., 2009; Wang & Braman, 2009). Based on these three elements, the research process of this study was divided into five stages as illustrated in Figure 7.
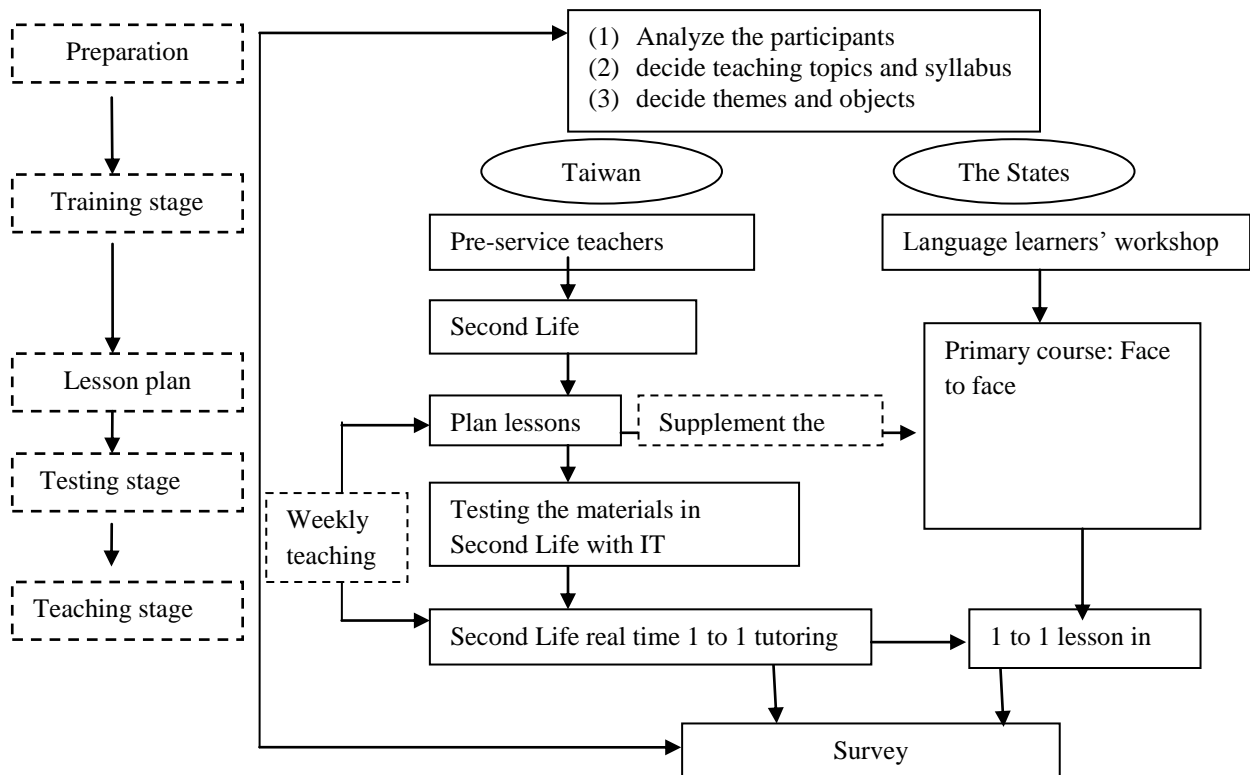

Figure 7: The research design

Preparation stage. During this stage, researchers first analyzed the Mandarin learners' language background and pre-service teachers' teaching background, and then decided the themes for Second Life activities. All the activities were integrated in the existing curriculum for the teacher training class and the Mandarin Chinese class. Based on the teaching and learning needs, the IT group built possible objects that could be used as instructional tools.   Since this cross-continental study involved three institutions located in two time zones with a15-hour difference, establishing a carefully planned schedule and matching the pre-service teachers in Taiwan and the Mandarin learners in the States were also very important tasks that were completed in the preparation stage.

Second Life training stage. Hislope, (2008) and Wang and Braman, (2009) all pointed out that in-class training on "getting around" in Second Life could reduce the frustration of users. Therefore, the two researchers arranged some in-class, hands-on activities to help pre-service teachers (6 hours total) and the Mandarin students (2 hours total) familiarize themselves with the Second Life environment and functions, such as registration, manipulating the avatar, teleporting to different locations, and chatting in text and voice. Pre-service teachers were expected to be more familiar with these functions because they were to direct the students to complete tasks in the virtual Mandarin class.

Lesson planning stage. Based on the themes and context (such as shopping, hotel reservations, food, and night-time market) in the Virtual Living Lab, the pre-service teachers designed the lessons and created tasks for their matched Mandarin students. All of the lessons matched the students' language levels referring to their textbook, *Integrated Chinese Level 2 Part 1*. Before teaching, the lesson plans were reviewed by the professor in Taiwan. Then, the pre-service teacher modified their lessons and delivered them in the VLL. Each of the lessons was taught twice to different Mandarin learners in different weeks.

Technical testing stage. Before meeting with Mandarin learners in the Virtual Living Lab, all of the pre-service teachers practiced teaching in the Living Lab to test their uploaded instructional PowerPoint slides, functions of objects, and functions of hardware, such as headsets, graphics display, and Internet connections. The technicians from III provided immediate assistance when problems occurred.

Virtual teaching stage. The teaching in the virtual world in this study was designed in a one-to-one format (one leading teacher and one student). Chung Yuan University requires undergraduate students to take a minimum of 36 hours of tutoring in order to satisfy the teaching training component in the program of study, so such training format enhanced students' professional knowledge of one-to-one tutoring. Researchers believe that the teacher training model involved in providing field experience was a better way to train pre-service teachers to prepare for authentic professional life. In the study, the pre-service teachers were undergraduate students who did not have much teaching experience, so their teaching skills were not matured enough to handle many of the unexpected issues that can arise in class. To help the participating teachers reduce their anxiety, the researchers grouped 5 to 6 pre-service teachers to teach one Mandarin learner.

Such group work was designed to reduce teaching anxiety and increase teaching effectiveness. Group members played different roles such as teachers, technicians or other roles that were needed in scenarios and tasks. When teaching a session, some of the members were teachers who took turns to provide instruction on vocabulary, grammar, or tasks. Some members acted as technicians to videotape the whole teaching session. Some members played specific roles needed in scenarios or tasks to assist learners in accomplishing the task. Each group taught two sessions to different students in different weeks. Each teaching session lasted about one hour. During the teaching hour, the class was videotaped and observed by the two professors. Technicians from III were also virtually present to provide technical support.

4.3 Participants

The study was implemented as a cooperative project between Taiwan and the United States. The target population of this study was a group of pre-service teachers in Taiwan. To administrate this study, in Fall 2009, the 3rd-year pre-service teachers from an undergraduate Mandarin Teacher Training Program in a mid-size private university in Taiwan were selected. Pre-service teachers who were junior standing or above were preferred because many of them had a certain level of tutoring credit hours or some teaching experience. Since group work could create more scenarios and reduce 'technology anxiety' for first time user of Second Life, the researchers grouped pre-service teachers for this project. Thirteen Mandarin learners (intermediate level) from a mid-size university in the United States were willing to participate in this international project, and accordingly, the sixty five pre-service teachers were divided into 13 groups (with 5-6 trainee teachers in one group) to match the 13 American students.

The research team consisted of one professor from the Teacher Training Program in Taiwan, one Chinese professor teaching the 13 American students, and a few technicians from a non-profit technology organization in Taiwan. The two professors also participated in this study as trainers of pre-service Mandarin teachers.

4.4 Instruments

A two-part survey was designed to solicit information about pre-service teachers' perceptions of the VLL as a teaching platform and their teaching experiences in using such a platform to teach during project implementation. The survey was carried out after each session of teaching Mandarin Chinese in the VLL. The survey included four sections: (1) demographic information (1 item), (2) attitudes toward *Virtual Living Lab* (9 items), (3) readiness for teaching in a virtual environment (12 items), and (4) one open-ended question. Demographic information only had one item asking for the name of the pre-service teacher's avatar, which was aimed to match two data sets from the survey which was distributed after each teaching session. Sections (2) and (3) were five-level-Likert- scale questions (strongly disagree=1, disagree=2, neural=3, agree=4, strongly agree=5). Survey items 5 and 8 were negative statements, indicating a reverse five-level-Likert-scale: "1= strongly agree" and "5=strongly disagree." The open-ended question, *"Have you met any difficulties in terms of technical and instructional issues?"* was to

collect qualitative data soliciting any challenges and difficulties the pre-service teachers encountered in their virtual teaching process. In order to investigate pre-service teacher' attitudes and perceptions in-depth, the survey was given in Chinese, and then was translated into English for the purpose of this paper.

4.5 Data Analysis

This study had a total of 65 participants who were in the Mandarin teacher training program in a university in Taiwan. Thirty nine participants completed two sets of survey. After data screening, these 39 participants were included in the data analysis. The collected data was run through SPSS for both descriptive and statistical analysis. The descriptive analysis looked into means, frequency and percentage of each item from survey section (2) (*the attitudes toward Second Life as reflected in the VLL)* and section (3) (*readiness for teaching in a virtual environment*). In order to investigate whether any changes occurred in pre-service teachers' perceptions of the VLL and their teaching experience in such an environment, a paired-*t* test was employed to compare the means of the teachers' first and second teaching sessions. Qualitative data from survey section (4) (the open-ended question) was analyzed by the two professors. During the analysis process, emerging themes regarding the difficulties were formed and frequencies of types of difficulties were counted (Punch, 2005).

4.6 Results

4.6.1 Results of Research Question # 1: How Do Mandarin Pre-service Teachers Perceive the Second Life as reflected in Virtual Living Lab After Training? Is There Any Difference in Perceptions Between Their 1st Time And 2nd Time Teaching?

Since this research group created the VLL, for instructional purposes, collecting the insights of the pre-service teachers was seen as crucial for its future improvement. The first research question in this study sought to fulfill this purpose. Table 1 presents results of the descriptive analysis and significance levels of paired-t tests which indicate changes in pre-service teacher's perceptions of the VLL as a teaching environment and of their experiences teaching in the Lab. The data showed that, when teaching the second lesson, about 17.9% more of the pre-service teachers found that they enjoyed using their avatar ($mean_1$=3.36, $mean_2$ =3.95, p<.05).

After the second session of authentic teaching, 26.5% more of the pre-service teachers strongly believed that the VLL offered an interesting setting for language communication ($mean_1$=3.54, $mean_2$=3.95, p<.05); 25.6% more of the teachers enjoyed chatting with other avatars in the VLL($mean_1$=3.13, $mean_2$=3.72, p<.05); 30.8% more of the participating pre-service teachers thought working with the gestures and actions of their avatars became easier ($mean_1$=3.00, $mean_2$=3.69, p<.05); about half of the pre-service teachers (48.1%) believed that the VLL was good for Mandarin teaching and learning ($mean_1$=2.97,$mean_2$=3.44, p<.05). However, after the second teaching session, even though 7.8% more of the pre-service teachers believed that the VLL offered great possibilities for teaching Mandarin Chinese, there was no significant difference in the

participating teachers' attitudes between the two teaching sessions ($mean_1$=3.54, $mean_2$=3.85, p>.05).

Survey item 5 (*I still cannot get use to the virtual environment*) and item 8 (*The features in Virtual Living Lab seem to be hard for me to manipulate*) were negative statements. Regarding these two negative statements, after teaching the second lesson, fewer pre-service teachers agreed to item 5 (15.4%) and item 8 (20.5%). Perceptions reflected in the responses to items 5 ($mean_1$=3.26, $mean_2$=2.51, p<.05) and item 8 ($mean_1$=3.28, $mean_2$=3.00, p<.05) showed significant differences between the first and second sessions of teaching. These results indicated that pre-service teachers gradually overcame the difficulties and challenges as they gained more experience.

Table 1 Results of the Differences in the Attitudes to Second Life as Reflected in the Virtual Living Lab

Items	1st Mean	%	2nd Mean	%	P value
1. Changing avatar's appearance is very enjoyable.	3.36	56.4	3.95	74.3	0.00*
2. Working on the gestures and actions of my avatar is easy to me.	3.00	38.4	3.69	69.2	0.00*
3. The virtual living lab offers an intenerating environment for language communication.	3.54	56.5	3.95	82.1	0.01*
4. I enjoy chatting with other avatars in the virtual living lab.	3.13	38.5	3.72	64.1	0.00*
5. I still cannot get use to the virtual environment.	3.26	48.7	2.51	15.4	0.00*
6. In terms of Mandarin learning, I believe virtual living lab offers great possibilities.	3.54	58.9	3.85	66.7	0.97
7. Virtual living lab is good for Mandarin learning.	2.97	33.3	3.44	48.7	0.04*
8. The features in virtual living lab seem to be hard for me to manipulate.	3.82	66.7	3.00	20.5	0.00*
9. Overall, I do enjoy time in this virtual living lab.	2.87	30.7	3.64	71.8	0.00
Mean	3.03		3.63		

*significance p<.05

4.6.2 Results of Research Question #2: How do Mandarin Pre-service Teachers Perceive Teaching Mandarin in a Virtual Reality? Do Their Perceptions Change Between the 1st Time and 2nd Time Teaching Experiences?

Teaching in a virtual reality environment is an innovative instructional delivery method, especially in the field of teaching Mandarin Chinese. The researchers believe that although this different teaching environment may develop a unique set of teaching skills, pre-service teachers still need fundamental professional knowledge, such as understanding the teaching objectives and teaching strategies such as when and how to correct students' errors. Therefore, some items in the survey could be common in other studies of teaching Mandarin Chinese in a traditional face-to-face situation.

As shown in Table 2, after teaching the second lesson, pre-service teachers' perceptions of teaching in the VLL had significantly and positively changed. 10.3% more of pre-service teachers believed that teaching in the VLL was as effective as teaching in a face-to-face environment ($mean_1=2.92$, $mean_2=3.47$, $p<.05$). 10 % more of the pre-service teachers believed their "teacher talk" was more appropriate for their student in the second lesson ($mean_1=3.46$, $mean_2=3.74$, $p<.05$). 10.2% more of the pre-service teachers came to better understand one-to-one format teaching ($mean_1=3.79$, $mean_2=3.4.13$, $p<.05$). In addition, 28.2% more of the pre-service teachers believed that, after teaching the first session, they came to be prepared for the unpredictable issues in the future class ($mean_1=3.38$, $mean_2=3.89$, $p<.05$), 23.1% more of the pre-service teachers believed they were qualified for teaching the VR class ($mean_1=3.05$, $mean_2=3.55$, $p<.05$), 5.1% more of pre-service teachers agreed that they had come to know more about how to evaluate their own teaching proficiency ($mean_1=3.28$, $mean_2=3.61$, $p<.05$).

Table 2 Results of Pre-service Teachers Perceptions toward Teaching in the Virtual Environment

Items	1st %	1st mean	2nd %	2nd mean	P value
I believe that teaching in a VR environment is as effective as teaching in a face-to- face environment.	41.0	2.92	51.3	3.47	.004*
I believe it is less stressful to teach in a VR environment than in a face-to-face environment.	43.6	2.79	23.1	2.71	.562
I know the objectives of this VR lesson very well.	74.4	3.82	82.1	4.05	.146
I am well-prepared for the 1st / 2nd VR lesson.	69.2	3.74	82.1	4.00	.067
I understand one-to-one format teaching.	79.5	3.79	89.7	4.13	.007*
I understand the teaching process of this lesson.	87.2	3.97	87.2	4.16	.128
I believe my "teacher talk" is appropriate for my student.	48.7	3.46	59.0	3.74	.010*
I know how to correct my student's errors	30.8	3.28	43.6	3.39	.378
I am well prepared for this class in terms of class content, questions, and examples.	74.4	3.77	79.5	4.03	.077
I have prepared for the unpredictable issues in the class.	48.7	3.38	76.9	3.89	.001*
I believe I am qualified for this VR class.	33.3	3.05	56.4	3.55	.001*
I know how to evaluate my own teaching efficiency.	48.7	3.28	53.8	3.61	.010*

* significance $p<.05$

However, regardless of the increased means, some aspects of pre-service teachers' perspectives of teaching in the virtual world did not show significant differences ($p>.05$). In specific, regarding item 2, 20.5% fewer of pre-service teachers thought teaching in the virtual world was less stressful than teaching in a face-to-face setting ($mean_1=2.79$, $mean_2=2.71$). Similarly, a high percentage of the pre-service teachers believed that they knew the objectives of both lessons (item3, $mean_1=3.82$, $mean_2=4.05$), but there was no statistically significant difference ($p>.05$). When asking the pre-service teachers whether they were well-prepared for both classes, 12.9 % more of them thought they were well-prepared in the second lesson (item 4, $mean_1=3.74$, $mean_2=4.00$), but there was no

significant difference between first lesson and second lesson ($p > .05$). A good number of pre-service teachers believed that they understood the process of their teaching in both sessions (item 6, $mean_1 = 3.97$, $mean_2 = 4.16$), and there was no significant difference ($p > .05$). The results of item 8 showed that a small number of the pre-service teachers ($mean_1 = 3.28$, $mean_2 = 3.39$) had sufficient confidence to correct students' errors, but there was no significant difference. Of course, since the pre-service teachers were all inexperienced teachers, such results were predictable. Item 9 showed that a good number of pre-service teachers believed that they were well prepared for teaching in terms of presenting class content, forming questions and providing examples ($mean_1 = 3.77$, $mean_2 = 4.03$) and there was no significant difference ($p > .05$).

4.6.3 Results of Research Question #3: What Difficulties Do Mandarin Pre-service Teachers Encounter When Teaching in the Virtual Living Lab?

Regarding difficulties that the pre-service teachers encountered at two times when teaching Chinese in the VLL two categories of difficulties emerged from the detailed qualitative responses to the third research question. The first category is related to technical challenges, and the second category is related to instruction.

4.6.3.1 Difficulties Encountered During the First Teaching Session

4.6.3.1.1 Technical Challenges

Technical problems were mentioned by many participants. Low Internet speeds and insufficient computer capacity were the most common problems. When these problems occurred in the VLL, these problems blocked out the users, reduced the speed of graphics display and PowerPoint slide shows, and froze the computer or audio effects. In the data, 17 participants addressed the problems associated with PowerPoint and audio effects, five participants had been blocked out, seven had difficulties with graphics display, and nine experienced situations where their computers froze. When teaching in Second Life, both teachers and students relied heavily on quality voice connections and high speed graphic displays to exchange information. If one user did not hear other users, the lesson was delayed for long periods or canceled. The following comments from pre-service teacher illustrate some of these problems.

> "the process of my lesson was serious delay due to the issues of displaying PowerPoint slides "(Participant ID #24).

> "the capacity of my computer was not sufficient to run [the VLL] in Second Life, so it was very easy to be blocked out or get my computer freeze while teaching" (Participant ID #25).

> "I can't hear the voice, so I could not communicate with others, but my speakers and microphone were running perfectly with other software" (Participant ID #28).

Using Power Point slide shows in Second Life is one of a number of instructional strategies used to transfer information, such as presenting new vocabulary and new sentence structures, or explaining exercises or tasks. The Internet bandwidth and computer visual card capacities may influence the speed of PowerPoint display in Second Life. Sometime, the pre-service teachers and students could not view the same slide at the same time. When this issue happened, a lot of pre-service teachers felt panic and they believed such problem affected the effectiveness of teaching. The following comments reflected this problem.

> *"my student and I could not view the same slide due to my poor computer"* *(Participant ID #53).*

> *"Second Life requires high capacity hard ware, my computer and school computers cannot run Second Life smoothly, a lot of graphics and PowerPoint sides cannot be displayed"(Participant ID #59).*

> *"the problem of displaying PowerPoint slides caused serious delay of the lesson"(Participant ID #37).*

4.6.3.1.2 Instructional Challenges

The instructional challenges faced by the pre-service teachers derived from three sources: the lack of the knowledge of the students' language proficiency level, undeveloped skills of how to clearly explain tasks to the students, and inability of how to communicate with the students in teacher's language. Before teaching, the pre-service teachers did not have opportunities to talk with their students. The teachers referred to the textbook used by the students to figure out the students' language proficiency level. Therefore, seven pre-service teachers mentioned that they were not sure about the language level of their students, even though they were given the copies of students' textbook. Due to the fact that some pre-service teachers either were not familiar with the textbook, or had very limited experience teaching Mandarin, their anxieties in the first time lesson were very high. Although this problem is a planning issue that is separate from the technology, this problem affected teaching results.

> *"my student's language level were better than I expected, our lesson seemed to be too easy to the student " (Participant ID #29).*

> *"I was not confident about the student's language level, so part of the content was too easy to my student and the usage of language from me seemed to be too hard" (Participant ID #25).*

4.6.3.2 Difficulties Encountered in the Second Teaching Session

4.6.3.2.1 Technical Challenges

After teaching the first class, the pre-service teachers developed some strategies to cope with technical issues and to improve their instruction. The responses to the open-ended question after the second time teaching showed that all of the teachers had made some progress. Regarding technical issues, four participants were temporarily blocked out by the system, three had difficulties viewing the graphics, three had problems displaying PowerPoint slides, four had computers freeze, ten had audio issues, and ten did not have any technical problems. Even though the same technical problems still occurred, the pre-service teachers understood they could solve the problem by some simple ways such as switching to computers with high speed internet connection or testing all possible technical devices before teaching. The following responses from the pre-service teachers provide details of how they coped with problems when they arose.

> *"for second class, most of the problems associated with software and hardware have not happened, because we have done millions of tests and got a nice computer" (Participant ID #15).*

> *"even though my account was blocked 10 minutes before class began, I got it back on time and the system was more stable than the one at the first class. We also used better computers and no audio problems. It became easy to communicate with the student…" (Participant ID #30).*

4.6.3.2.2 Instructional Challenges

Instructional issues in the second time teaching dramatically dropped. With experience from the first teaching session, a lot of the participants had a better idea of the students' language proficiency level, so they were more comfortable teaching the second lesson. Only two participants mentioned that they still had problems with instruction due to uncertainty about their students' language level.

> *"I still have difficulties to catch the language level of my student"*
> *(Participant ID #13).*

5. Discussions

This study found that using the VLL in Second Life as a platform for Mandarin teacher training in Taiwan is promising. This finding supports previous studies (Grable, et al., 2010; Mahon, Bryant, & Kim, 2010; Mullin, Beilke, & Brooks, 2007) which found that Second Life was a feasible and meaningful context to offer field experience in teacher education. The collaborative teacher training model of this study utilized a specially designed virtual space in Second Life (the VLL) to provide real teaching opportunities for pre-service Mandarin teachers in Taiwan to teach learners of Chinese in

the United States. Such field experience also served as a promising solution to solve a practical problem in Mandarin teacher training programs in Taiwan, where teaching practice normally has to be a mock dry-run because of the lack of target foreign students in real classrooms. The training model investigated in this study enabled pre-service Mandarin teachers to experience teaching target students abroad without even stepping out of their home campus.

The findings yielded from the surveys showed that teacher training in Second Life prepared participating pre-service Mandarin teachers for their profession in the following three aspects, which may help them better meet the demand for teaching digital natives in the 21st century to via different instructional delivery methods. First, through the training on integrating Second Life in virtual teaching, the pre-service teachers learned how to effectively use different applications in the virtual classroom. They became more skillful at using applications such as PowerPoint and audio software to enhance instruction and to engage students. Second, the pre-service teachers developed an awareness of the complexity of using technology in the classroom and learned how to cope with unpredictable technical and instructional issues that may not directly occur in technologically based instructional environment. They came to understand that to teach effectively in the virtual environment, or indeed using any kind of technology to teach, it was not enough to just have appropriate technical facilities such as a high speed Internet connection and powerful computers with high definition graphic cards. Before teaching takes place, it is necessary to test the hardware and software to assure interactive instruction. Third, the pre-service teachers developed positive attitudes toward using the emerging technology for teaching Chinese in virtual environments such as Second Life. This attitude will empower them to integrate new technologies in an innovative and meaningful way to enhance their teaching in the 21st century in which technology has become an integral component of teaching and learning.

The carefully planned virtual training not only helped the pre-service teachers grow in terms of their knowledge about integrating technology into teaching, more importantly, it helped them develop pedagogical strategies that would benefit their professional life in both virtual and physical situations. First, the virtual training helped the pre-service teachers develop self-confidence in teaching. Self-confidence may help these teachers to more actively interact with their students, teaching contexts, and teaching materials. The pre-service teachers came to understand that teaching in the virtual environment and in physical situations can be equally effective as long as teachers have clear instructional objectives and are prepared thoroughly for the lessons and for unpredictable issues.

Such results may be associated with two carefully planned stages of this research: *lesson planning stage and virtual teaching stage*. During the lesson plan stage, a group of pre-service teachers were required to prepare their lessons together and their lessons were further reviewed by the professor in Taiwan. During the virtual teaching stage, both professors in Taiwan and in the United States observed the entire class and provided immediate feedback on site at the end of each lesson for future improvement. With such an intensive training process, pre-service teachers improved very quickly in their teaching.

One very encouraging and important finding of this study is that, through the one-to-one teaching format, the pre-service teachers learned how to effectively communicate with students by using "teacher talk." Language teachers need to adjust their language use for instruction based on student language proficiency level, but it is a difficult task for teacher training if there is no authentic teaching takes place. Through the real teaching experience in the virtual environment, the pre-service teachers learned how to assist communication in the target language. They learned to use topics familiar to the students to stimulate language output; used more standard pronunciation and expressions to model language use; used simplified vocabulary and sentence structures to provide comprehensible input; carried out regular checks for understanding. The pre-service teachers might not be able to develop their teacher talk skills so quickly if they did not teach target students in a real class, even if the class was in the virtual world.

Last but not the least, an important finding of this study was that pre-service teachers learned how to self-evaluate the effectiveness of their teaching by observing responses from their students' achievement of their instructional objectives, and by reflecting the whole teaching process. This set of skills will help the pre-service teachers be able to analyze various factors contributing to the success of teaching.

6. Implications for Chinese Language Teacher Training

This study has echoed other studies which believed Second Life as a "worthwhile venue for virtual learning in teacher education" (Mahon, Bryant, Brown, & Kim, 2010, p. 131). In terms of pre-service language teacher training, this study has the following implications where teacher training is carried out in a virtual world.

1) Utilizing the virtual reality technology to provide an authentic teaching experience is an alternative and effective way for pre-service Chinese teachers in a Chinese-speaking environment to obtain valuable field experience. The authentic teaching experience gained in the virtual classroom can certainly help pre-service teachers understand what is going on in a real Chinese language classroom, thus helping them to develop strategies for solving technical and instructional problems as a result of the training.
2) Teaching and learning with technology as a tool can help pre-service teachers develop positive attitudes toward emerging technologies and help them better understand how to use technology to enhance instruction.
3) When conducting teacher training in a virtual world such as Second Life, "on site" observations and timely feedback from teacher trainers are crucial to training efficiency. The feedback and comments provided "on site" will help pre-service teachers develop contextualized knowledge so that they reflect on the weakness in their teaching for future improvement.

7. Limitations and Suggestions for Future Research

This study was a pilot study designed to pioneer conducting a Mandarin Chinese teacher training model in the virtual world. Although some findings are encouraging, this study reveals the following limitations in the research design and process, thus the findings may not be simply generalized to other situations where teacher training is conducted in a different virtual world.

1) Issues with the credibility and reliability of the survey: This study was a pilot study in which the two researchers created the survey to explore pre-service teachers' perceptions of teaching Chinese in Second Life. The credibility and reliability of the survey items were not tested. Therefore, the data from the survey may not fully reflect the attributes of teaching Chinese in the virtual world.
2) Issues with teaching improvement: In this study, the pre-service teachers taught the same class twice to different target students who had the same levels of language proficiency. This design did not allow the pre-service teachers to demonstrate their improvement in teaching different levels of students. In addition, the pre-service teachers only taught two hours in the virtual environment. Such a short time of teacher training may not be long enough to lead substantial improvement in teaching.
3) Issues with group teaching: This study arranged five to six pre-service teachers in one group. Although only one leading teacher taught the lesson to one American student, all other team members had to log in at the same time to assist the role-play during the instruction. Such design caused log-in problems. Second Life blocked out some users during the instruction. For future research, using computers with a stable internet connection with high speeds is suggested.
4) Issues with the VLL: As a Region within Second Life, the VLL has its agent limit. For example, a high number of avatars on a Region can significantly reduce the Region's performance. In addition, since the VLL is specially designed to promote teaching and learning Mandarin Chinese in a virtual world, the VLL also incorporated other types of technologies that may have influenced Second Life performance. For example, instead of using Second Life built-in PowerPoint Viewer, the VLL used Moodle, an open-source virtual learning environment) to upload and download PowerPoint slides. This type of file transfer may be slower than using the PowerPoint Viewer.

8. Conclusion

This study pioneered integrating Second Life into a Chinese teacher training program. The researchers developed a collaborative training model involving a Chinese teacher training program in Taiwan, an existing Chinese language course in the United States, and a technology institution in Taiwan. The three parties collaboratively created a virtual world for pre-service Mandarin Chinese teachers to gain field experiences. This study found that this training model benefited the participating pre-service Chinese teachers in Taiwan in many aspects. Particularly, through the virtual training, the pre-service teachers developed positive attitudes toward teaching in the virtual world, and

they also improved teaching strategies for effective instruction. This training model is worth further development through implementations to other Chinese teacher training programs which have the *need* for authentic teaching. The *real practical need* for using Second Life to enhance teacher training may break through the barriers between using Second Life and its challenges in terms of technical skills and instructional strategies for teaching in a virtual world.

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Appendix

Research Survey

Demographic Information
Second Life Avatar account: _____

Part 1: Attitudes Toward the Virtual Living Lab

1. Changing avatar's appearance is very enjoyable.	5	4	3	2	1
2. Working on the gestures and actions of my avatar is easy to me.	5	4	3	2	1
3. The virtual living lab offers an intenerating environment for language communication.	5	4	3	2	1
4. I enjoy to chat with other avatars in the virtual living lab.	5	4	3	2	1
5. I still cannot get use to the virtual environment.	5	4	3	2	1
6. In terms of Mandarin learning, I believe virtual living lab offers great possibilities.	5	4	3	2	1
7. Virtual living lab is good for Mandarin learning.	5	4	3	2	1
8. The features in virtual living lab seem to be hard for me to manipulate.	5	4	3	2	1
9. Overall, I do enjoy time in this virtual living lab.	5	4	3	2	1

Part 2: Readiness for Teaching in a Virtual Environment

I believe that teaching in a VR environment is as effective as teaching in a face-to- face environment.	5	4	3	2	1
I believe it is less stressful to teach in a VR environment than in a face-to-face environment.	5	4	3	2	1
I know the objectives of this VR lesson very well.	5	4	3	2	1
I am well-prepared for the 1st / 2nd VR lesson.	5	4	3	2	1
I understand one-to-one format teaching.	5	4	3	2	1
I understand the teaching process of this lesson.	5	4	3	2	1

I believe my "teacher talk" is appropriate for my student.	5	4	3	2	1
I know how to correct my student's errors	5	4	3	2	1
I am well prepared for this class in terms of class content, questions, and examples.	5	4	3	2	1
I have prepared for the unpredictable issues in the class.	5	4	3	2	1
I believe I am qualified for this VR class.	5	4	3	2	1
I know how to evaluate my own teaching efficiency.	5	4	3	2	1

Part3: Open-ended Question:
Have you met any difficulties in terms of technical and instructional issues?

_____
_____
_____
_____
_____
_____
_____
_____