

DOES SECOND LIFE IMPROVE MANDARIN LEARNING BY OVERSEAS CHINESE STUDENTS?

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The aim of this study was to determine the effectiveness of Second Life (SL) for improving the oral output of overseas Chinese students learning Mandarin Chinese (hereafter referred to as Mandarin). More than 1000 overseas Chinese students attend a university in northern Taiwan every year to learn Mandarin as a heritage language after graduating from high school in their own countries. These students strive to learn academically, but rarely actively speak Mandarin either inside or outside the classroom. This two-stage study evaluated the use of SL in improving their oral output. The focus of stage 1 was to confirm the potential of SL for promoting the oral output of overseas Chinese students in Mandarin language classes. Twenty overseas Chinese students learning Mandarin participated in this stage. In stage 2, 24 overseas Chinese students were taught 3 learning units in Mandarin in SL. Analysis of the results showed that learning Mandarin in an SL environment significantly increased the in-class oral output of those students. They also made significant improvements in oral performance and learning attitudes toward Mandarin.

Keywords: Virtual environment, Chinese as a Second Language, Mandarin, Task-Based Learning.

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INTRODUCTION

Chinese as a foreign language (CFL) has recently been emerging as a popular research topic and is of increasing interest in the educational market because of China's increasing economic influence and military capabilities (National Taiwan Normal University, 2010). There has also been a global change in attitudes toward learning Mandarin Chinese (hereafter referred to as Mandarin) (Lan, Kan, Hsiao, Yang, & Chang, 2013; Rhodes & Pufahl, 2009; TIME Asia, 2006). Mandarin is the official and most commonly spoken language in Taiwan (Wikipedia, 2014), which has become a popular country for learners of Mandarin as a second language (L2) from all over the world, and especially for overseas Chinese students. Mandarin is the official and most commonly spoken language in Taiwan (Wikipedia, 2014), which has become a popular country for learners of Mandarin as a second language (L2) from all over the world, and especially for overseas Chinese who are people of Chinese birth or descent who live outside the People's Republic of China and Republic of China (Taiwan). More than 100,000 overseas Chinese students have traveled from more than 100 countries throughout the world to enroll in Taiwanese universities to learn Mandarin since 1956 (Jiang, 2007).

The university where the author teaches (National Taiwan Normal University, NTNU) is an especially well-known institution that draws almost 2000 overseas Chinese students from many countries to learn Mandarin every year. Some of these students, from elementary to high-school age, join short-term (e.g., 6-week) courses, though the majority enroll in longer-term courses. After graduating from high school in their home country, they come to Taiwan to complete a 1-year Mandarin course provided by the college of International Studies and Education for Overseas Chinese at National Taiwan Normal University

(NTNU) to prepare themselves for entering a university in Taiwan.

My involvement in helping overseas Chinese students with academic learning has led to the identification of some of the challenges faced by these students. The greatest concern is their oral communication abilities. Most of the students tend to associate with other students from the same country of origin, and outside the classrooms speak their common first language rather than Mandarin. Regarding in-class behavior, these students maintain a passive attitude toward oral interactions. Speech within the classroom appears to come mostly from the teachers rather than from the overseas Chinese students. A lack of oral communication skills is likely to influence the academic achievements of these students on entering Taiwanese universities and their adaptation to life in Taiwan because they may not be understood by their teachers or peers (Hsu, 2007; Su, 2006).

These problems were approached in the present study using a two-stage design. The aim of the study was to enhance the Mandarin learning of overseas Chinese students by applying Second Life (SL), a multiuser virtual environment to Mandarin teaching. SL was chosen because of its potential for increasing the social interactions of foreign language (FL)/L2 learners (Deutschmann, Panichi, & Molka-Danielsen, 2009; Lan et al., 2013). The experiences obtained and lessons learned from the study will serve as a valuable reference base for improving language education for overseas Chinese students, and will add to the knowledge pool of research on teaching and learning FL/L2 in virtual worlds.

Mandarin Language Education for Overseas Chinese Students in Taiwan

The overseas Chinese students in Taiwan come from many countries via various entrance pathways. In those countries where Mandarin learning opportunities are provided, such as Malaysia, students use their Unified Examination Certificate (UEC) scores when applying to Taiwanese universities. The UEC is a standardized test specifically and only for independent high school students organized by The United Chinese School Committees' Association of Malaysia and the Examinations Bureau of The United Chinese School Teacher's Association of Malaysia. The UEC is available in two levels: Junior Middle and Senior Middle, which are further divided into Vocational and Regular. Junior Middle is for students who have completed the three years' junior education, while Senior Middle is for students who have completed the three years' education in science, art, or commerce. Test takers are awarded with the UEC (Wikipedia, 2011). Students from Japan and the Republic of Korea take the same entrance examinations as Taiwanese students, since the countries have schools that offer the same curricula Taiwan. In other countries where there are no Taiwanese schools, such as Singapore, Thailand, and the Philippines, students can complete the Overseas Composite Attainment Test which is an entrance examination for students in the areas mentioned above (University Entrance Committee for Overseas Chinese Student, 2014). How students are selected to different universities in Taiwan depend on their test scores. The test is based on local high school teaching materials while taking the real situations into consideration. Students from yet other countries, such as the USA, Canada, and the European countries, use their high-school grades to apply to Taiwanese universities since none of the aforementioned opportunities are available to them (Su, 2008).

In addition to these various entrance pathways, there is another opportunity for overseas Chinese students without a Mandarin qualification to enter Taiwanese universities: they may enroll in a 1-year immersive course provided by NTNU to learn Mandarin in addition to other materials that are taught in Taiwanese high schools. Upon completion of this course, the students can then apply to Taiwanese universities (Chen, 2009; Su, 2008). Those students who complete the 1-year immersive course were the target population for the present study. In addition to Mandarin, the students take other classes, such as mathematics, physics, chemistry, biology, and social studies, all of which are taught in Mandarin. For the Mandarin language classes, students usually learn to read modern Mandarin articles in the first semester and then learn to read classical Mandarin, such as “*倫語* (Confucian Analects)” in the following semester.

The learning workload is very heavy, not only because all subjects are taught in Mandarin, but also due to its high degree of difficulty. Since their academic achievement in this intensive course will determine their college education in Taiwan after its completion, the students strive to succeed in their academic learning, but rarely speak Mandarin actively neither inside nor outside the classroom setting, and usually maintain a passive attitude toward oral interactions in class (Hsu, 2007; Su, 2006). This is an exam-oriented course, and thus although the students' academic achievement has met the requirements to enter the universities in Taiwan, there is still room for improvement in their Mandarin oral communication skills. (Su, 2006; Sung, 2005; Yao, 2011). The lack of communication skills among these students will influence their academic learning and interpersonal interactions after entering university (Wu, 2005).

Given the increasing number of overseas Chinese students learning Mandarin as a heritage language (Curdt-Christiansen, 2006; He, 2006; He & Xiao, 2008), the above-mentioned problems encountered by overseas Chinese students in Taiwan are worthy of more attention from researchers and educators of Mandarin teaching and learning. In response to there being few studies that have focused on the identified gap between the practical research and the reality of Mandarin learning by overseas Chinese students, some inventive teaching approaches to enhance oral communication skills and intentions of engaging in oral communication should be proposed and investigated.

Second Life for Mandarin Teaching and Learning

Immersive virtual environments, such as SL, possess a unique and distinctive feature that fosters the realization of language educational purposes, something that is not easily achieved in an asynchronous web-based learning environment or even in a face-to-face learning situation. Hedberg and Alexander (1994), show that three-dimensional virtual environments provide learners with an interface in which users are able to directly control the objects in the context of the virtual world. The superior learning experience of SL increases “immersion and active learner participation,” (Hedberg & Alexander, 1994) and “social interaction” (Ellis, 1996), all the while being “authentic” (Lan et al., 2013), all of which are factors that are essential for successful language learning. Since 2006, this ability of SL to establish a community and assist the breaking down of barriers to communication, and to provide an immersive environment in which FL or L2 learners can become actively, collaboratively, and socially involved in authentic language learning activities has been drawing special attention from many FL/L2 researchers and educators (Chen, 2010; Cooke-Plagwitz, 2008; Godwin-Jones, 2011; Grant, 2010; Henderson, Huang, Grant, & Henderson, 2012; Hundsberger, 2009; Lan et al., 2013; Peterson, 2008; Stevens, 2006; Thorne, Black, & Sykes, 2009).

Regarding studies of Mandarin teaching and learning in SL, Chen (2010) suggested that the instructor needs to develop pedagogically sound tasks to motivate learners to want to learn. Henderson et al. (2012) found that SL improved the self-efficacy beliefs of CFL students with respect to engaging in tasks. In addition to the affective dimension, Lan and her colleagues (2013) found that CFL beginners behaved more actively and engaged in more inter-peer interactions—consequently improving their Mandarin performance—when they were involved in executing language tasks in SL.

In spite of the increasing interest in the potency and importance of SL in Mandarin teaching and learning, few studies have investigated the potential contribution of SL to the oral output and communication performances of overseas Chinese students. The effects of SL on Mandarin learning by overseas Chinese students were confirmed by answering the following questions:

1. How and to what extent does SL influence the in-class oral output of overseas Chinese students?
2. What are the effects of SL on the Mandarin language performances and learning attitudes of overseas Chinese students?

MOVING FROM THE CONVENTIONAL TO THE VIRTUAL CLASSROOM

As noted above, most overseas Chinese students enrolling in Taiwanese universities act passively in oral interactions in Mandarin language classes. Based on the positive evidence for CFL teaching in SL (Henderson et al., 2012; Lan et al., 2013), a two-stage action study was conducted to confirm the effects of SL on Mandarin learning by overseas Chinese students. Stage 1 focused on whether SL could effectively increase students' in-class oral output through comparing the results of students' oral output in two different learning environments- the conventional classroom versus SL. Once these potential effects have been confirmed, stage 2 focuses on the extent to which SL enhances the overseas Chinese students' performances and learning attitudes toward Mandarin by investigating their improvement in both Chinese oral communication performances and learning attitudes toward Chinese learning after they performed the Mandarin learning tasks in SL. The methods and results of each stage are described briefly below.

Stage 1: Confirming the Effects of SL on the In-Class Oral Output of Overseas Chinese Students

Participants

The participants in stage 1 were 20 overseas students of Chinese (mean age, 20.1 years; 10 males and 10 females), comprising 12 from Indonesia, 2 from Japan, and 6 from Vietnam. These students voluntarily enrolled in the study and were assigned to one of two groups via a random number generator: control (odd numbers) or experimental (even numbers). Each group was comprised of 10 overseas students of Chinese: six from Indonesia, one from Japan, and three from Vietnam. [Table 1](#) lists the detailed demographics data of the participant in Stage 1.

Table 1. *Stage 1 Participants' Demographics.*

	Experimental group (n=10)	Control group (n=10)
Age	19.1	20.8
Gender	F= 3; M= 7	F=4; M=6
Nationality		
Indonesia	6	6
Japan	1	1
Vietnam	3	3

Research design

The experimental design adopted for stage 1 involved the students in the control group learning Mandarin in a conventional classroom, while those in the experimental group learned in SL. Both groups were taught by the same instructor, learned identical material, and performed the same activities; the only difference between them was their learning environment. All of the teaching processes in both groups were recorded and analyzed to allow comparison of the differences in classroom talk during the lessons. Besides, the participating teacher was asked to write down her reflection on her teaching after each class.

Instruments

In-Class Interaction Analysis Scheme

The scheme used to analyze in-class interactions was a revised form of Moskowitz's FLint System (Moskowitz, 1971), as shown in [Appendix A](#). In the revised scheme, as in the original, there are two categories of classroom talking: teacher and student. New dialog types, however, were added to the original subcategories to incorporate the actual conversation transcripts obtained from the recorded videos.

Teaching Plans and Environments

Two teaching units were designed for stage 1, both of which involved task-based learning. The first focused on teaching overseas Chinese students how to order meals at a restaurant, while the aim of the second was to encourage students to choose a movie that all of the group members would like to go see together. Both teaching units were taught following an identical procedure, (described in the *Procedure* section). In addition, the teaching environments included conventional classroom and SL scenes: in the former, practical teaching aids were used to help students understand the authentic contexts in which the conversations were happening, while in the latter, virtual scenes were created to help students to immerse themselves in an authentic context. [Figure 1](#) shows the two classrooms used in stage 1.



[Figure 1](#). Two classrooms used in stage 1: conventional (left) and virtual (right).

Procedure

Before the treatment (i.e., teaching phase), the experimental group received training on operating SL for two hours, such as avatar moving (including walking, running, and flying), moving objects, and wearing and removing objects. After completion of the training, the two groups worked on two units of materials for two weeks: one unit per week for one hour each. To avoid disturbing the students' regular classes, the pilot Mandarin language classes were arranged during students' availability.

Each learning unit included two parts: basic skill training and task execution. For the basic skill training, new Mandarin words and sentence patterns were introduced to the students, who were then assigned missions to execute as individuals or as a group. During the task execution, the teacher played the role of a learning supporter to provide students with real-time assistance. For example, in unit one the students first learned the dishes and food items served in a restaurant, including *appetizer*, *main dish*, and *dessert*. They then worked in groups, first in small groups of three or four to discuss what combinations their restaurant should serve. They then role-played as customers and restaurant owners, in turn, to practice ordering meals and providing services at a restaurant.

During the treatment, all of the teaching processes and classroom talking were recorded and analyzed. The learning processes in SL were recorded via a free screen-recording software program (Fraps). In contrast, the learning processes in the conventional classroom were recorded via two digital video cameras. All of the recorded videos were then transcribed and analyzed by two decoders who focused both on the teacher and on the student speech in class, following the in-class interaction analysis scheme ([Appendix A](#)).

Results

The Spearman coefficient of concordance was computed from the decoded results obtained from the two decoders. The Pearson correlation was .948 (significant at the $<.001$ level). [Table 2](#) lists the decoding results plus the results from the chi-square analysis of the two teaching environments in the two teaching

units. The level of statistical significance was set at $p < .05$.

Table 2. Results of Video Decoding & Chi-Square Analyses of Two Environments in Two Teaching Units.

Teaching unit (U) and environment		Classroom talking									
		Teacher talking (%)					Student talking (%)				
		TI	TD	TC	SSp	SO	SSi	SCWO	SCNW O	SN	Chi- square
U1	Conventional classroom	12.5	47.32	0	23.66	8.04	1.79	3.57	.45	2.68	30.4***
	Second Life	10.26	35.38	1.03	12.31	37.95	1.54	1.54	0	0	
U2	Conventional classroom	19.25	38.82	6.21	21.43	4.97	1.24	5.90	1.00	1.24	15.2
	Second Life	11.93	41.56	4.94	24.69	15.23	1.23	.41	0	0	
U1&2	Conventional classroom	16.48	42.31	3.66	22.34	6.23	1.47	4.95	.73	1.83	18.7**
	Second Life	11.19	38.81	3.20	19.18	25.34	1.37	.91	0	0	

Notes * $p < .05$ ** $p < .01$ *** $p < .001$; TI= teacher talking (indirect influence); TD=teacher talking (direct influence); TC=teacher talking (command); SSp=student talking (specific response); SO=student talking (open-ended response); SSi=student talking (silence); SCWO=student talking (confusion, work-oriented); SCNW= student talking (confusion, non-work-oriented); SN=student talking (nonverbal)

As listed in Table 1, the percentage of students talking was much higher in SL than in the conventional classroom. Furthermore, much more open-ended student talking was observed in SL than that in conventional classroom. The chi-square analysis revealed a significant difference between the two environments: unit 1, $\chi=30.4$, $df=8$, $p=.000$; unit 2, $\chi=15.2$, $df=8$, $p=.055$; units 1 plus 2, $\chi=18.7$, $df=8$, $p=.016$.

The results obtained from the video analysis described above are in line with the teacher's reflection of her teaching, as follows:

Using more teaching resources, such as 'text chat,' and more linguistic input (e.g., teaching adjectives 'interesting') in SL would foster greater engagement by more students than using solely PPT in the conventional classroom.

The dialog taking place in SL is more effective and successful than the dialog in the conventional classroom, because students are immediately engaged in the real-life-like setting.

In contrast to these positive results, there were also some challenges in teaching Mandarin in SL. The greatest problem is that some of the functions provided in SL make it easy to disturb the teaching process. For example, it was found that students liked to fly around when doing some of the activities, such as the content introduction and group discussions. They also liked to keep running from one group to another, which sometimes introduced difficulties for the teacher during group discussions in SL; for example, one teacher said: "...Sometimes I was unable to group students in SL, so I decided to have each individual student work on their own..." This kind of task-structure-related problem was also observed by Chen (2010). In addition, some students were not efficiently engaged in the learning activities at the beginning

of the process, because they were not sufficiently familiar with the SL functions, as noted by the teacher:

...sometimes in SL, students were unfamiliar with the functions for buying and selling items when doing activities, so that they needed more time to catch up with the teaching activities...

Fortunately, these challenges did not hinder the overseas Chinese students from contributing to in-class oral conversations. Moreover, the above-mentioned challenges could be conquered through better task design and SL skill pre-training (Lan et al., 2013).

The potential of SL for promoting in-class oral output by overseas Chinese students was confirmed by the findings of this stage. However, in order to determine the real effects of SL on teaching Mandarin to overseas Chinese students, more attention needs to be paid to both the task design and to guidance, as well as to SL function training in order to avoid the identified challenges to the teaching process in SL.

Stage 2: Confirming the Effects of SL on the Performance of and Learning Attitudes Toward Mandarin of Overseas Chinese Students

The aim of stage 2 was to confirm the effects of SL on the performance of and learning attitudes toward Mandarin of overseas Chinese students in regular Mandarin language classes. The CUE model proposed by Lan and her colleagues (2013) was adopted in order to prevent the problems identified in the task-execution process, a well-structured task design based on the cognition (“C,” focusing on basic skill introduction), usage (“U,” focusing on individual task execution), and expansion (“E,” aimed at using Mandarin to execute cooperative task process). I anticipated that the performance and the learning attitudes of the students would significantly benefit by embedding Mandarin language classes in SL, but without the problems identified in stage 1.

Participants

One class of 24 overseas students of Chinese (2 from South Africa, 2 from Vietnam, and 20 from Indonesia; mean age 19.5 years) in NTNU participated in stage 2. Of these, only four had previous experience learning CFL before they arrive in Taiwan. The students were expected to acquire sufficient Mandarin language abilities, both written and oral, during the first year at university to prepare them for entrance to their target universities in Taiwan.

Research design

Both the performance of and learning attitudes toward Mandarin before and after the teaching process were assessed, as described in *Instruments*, using a quantitative approach. The collected data were analyzed via dependent-sample *t*-test to evaluate the improvements made by the students in both parameters due to the use of SL.

Instruments

Mandarin language learning-attitudes questionnaire

The questionnaire was revised according to studies by Dörnyei (1990, 1998), Schmidt (1996), and Wei (2007), and included three dimensions: affective (18 items), pragmatic (7 items), and educational context-related (8 items) as shown in [Appendix B](#). The responses to all of the items were on a 4-point Likert scale, from strongly agree (4) to strongly disagree (1). Furthermore, the affective dimension contained four sub-dimensions: pleasure experience (e.g., “I find great pleasure in learning Mandarin”), self-satisfaction (e.g., “learning Mandarin broadens my view”), goal-related (e.g., “I plan to continue studying Mandarin for as long as possible”), and self-concept-related (e.g., “my communication ability in Mandarin is good”). The pragmatic dimension measured the perceptions of learners’ gains in extrinsic benefits, such as taking an L2 for living better (e.g., “learning Mandarin is helpful for my future career”). The educational context-related dimension measured the attitudes of learners toward the learning atmosphere,

learning environment, and learning activities (e.g., “the language tasks of Mandarin lessons in SL are interesting and helpful”). In addition to the 4-point Likert scale, one open-ended question was included at the end of the questionnaire to allow students to express any ideas that were not covered by the aforementioned items.

Mandarin language oral performance online test

The aim of this test was to determine the communication abilities of the foreign students of Chinese, including two categories, each including 10 items: Mandarin words and grammar. All of the items were first confirmed by three content experts and then uploaded to an online test system developed by the author. In order to avoid the interference of unknown Mandarin characters, the test items included audio–picture pairs for listening comprehension and picture-recording for the oral component. Figure 2 shows an example of the test items used in stage 2.

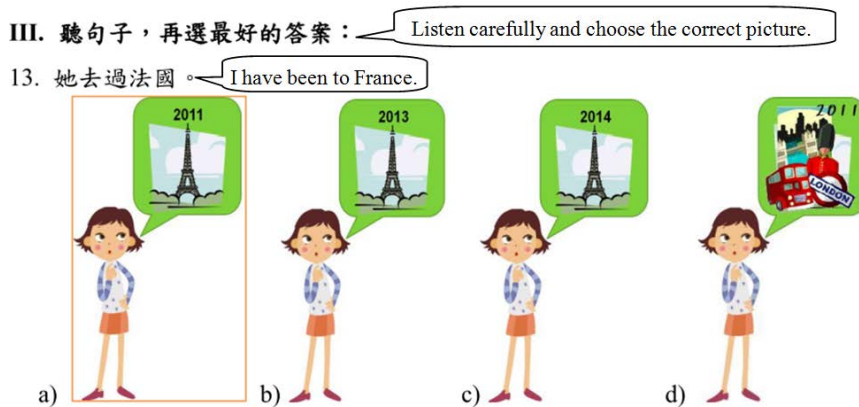


Figure 2. An example of the test items used in stage 2.

Teaching plans and environments

Three teaching units, described in detail below, were taught in stage 2, which were designed based on the CUE model proposed by Lan et al. (2013). The themes of the used units were asking directions (unit 1), arranging the room (unit 2), and visiting friends (unit 3). In addition, corresponding SL scenes were created to provide overseas Chinese students with authentic contexts. Taking unit 3 as an example, a gift store was created in SL (Figure 3) where the students could go to choose gifts for their friends.



Figure 3. A gift store in SL where students can buy gifts for friends.

Procedures

The duration of stage 2 was nine weeks, and 1 hour per week. Both the Mandarin performance test and Mandarin learning-attitude questionnaire were administered in the first week as a pretest. The students received training on the operation of SL during the second week. Some additional opportunities for SL practice were also provided before the Mandarin language classes started in the third week. Students practiced controlling their avatars and interacting with SL objects during their free time. After they acquired the operational skills needed for the class, the three units were taught from the third week, each for 2 weeks. Furthermore, all of the classes were arranged during the students' regular timetables. In the final week, both the Mandarin performance test and Mandarin learning-attitude questionnaire were re-administered as a posttest.

The teaching procedure of each unit followed the CUE model. For each unit, the “C” (cognition) and “U” (usage) parts were executed in the first week, while “E” (expansion) was executed in the second week. The procedure in unit 3, which involved visiting friends, is described in detail below as an example.

First, for “C,” students were taught the words and sentence patterns for describing object positioning, such as “書本在桌子上面 (the books are on the table)”, the quantities of objects, such as “我有五顆蘋果 (I have five apples),” and a perfect tense sentence, such as “我去過法國 (I have been to France).” Next, for “U,” students entered a room with food, soft drinks, and souvenirs. They were asked to guess in which room the host had eaten and where he had been before, based on what they saw in the room (see [Figure 4](#)).



Figure 4. The room used for “U” (usage) in unit 3.

Finally, for “E,” the students were grouped into small groups of four or five, and a gift-picking mission was assigned to each group. They were provided with some note cards with cues to complete the mission. Each group was asked to determine what gift and how much/many of them should be bought, and which friend they should visit. After all of the groups had reached a consensus, they went to the supermarket (see Figure 3) to buy the gifts, then went to visit the friend. Finally, the teacher rewarded the groups who successfully completed the assignment with a motorcycle as a prize (see Figure 5).



Figure 5. Motorcycles were given as a prize to students who successfully completed the assigned mission.

Results

Gains in the Mandarin oral performance test

The scores of both the Mandarin oral performance test and Mandarin learning-attitude questionnaire were collected and analyzed in Stage 2. The Mandarin oral performance test was administered online to all the participants before and after completion of the Mandarin language teaching course. Table 3 lists the means and standard deviations for the online Mandarin oral performance test plus the results of the *t*-test analysis. Five students were absent from the posttest because they were either unwell or had returned to their home country during the semester; therefore, the scores of 19 students were analyzed.

Table 3. Means and Standard Deviations (SDs) for Mandarin Oral Performance Test and *t*-test Analyses ($n=19$).

Test	Mean	SD	<i>t</i>
Pretest	29.68	14.32	-6.412*
Posttest	48.11	11.68	

Note: * $p < .05$ ** $p < .01$ *** $p < .001$

The overseas Chinese students made significant improvements after using SL as the learning environment for Mandarin ($t=-6.412$, $df=18$, $p=.000<.05$). Furthermore, the standard deviation was smaller at posttest than at pretest, which suggests that learning in SL reduces the inter-peer gaps in the Mandarin oral performances of overseas Chinese students.

Improvements in Mandarin language-learning attitudes

In addition to Mandarin oral performances, the attitudes of overseas Chinese students toward Mandarin learning were a focus of stage 2. Table 4 lists the scores on the 4-point questionnaire response scales obtained before and after the teaching activities. The same five students who were absent for the performance posttest were also absent for this posttest; therefore, the scores of the same 19 students were analyzed.

Table 4. Results for the Mandarin Learning-Attitude Questionnaire ($n=19$).

Dimension	Pretest		Posttest		<i>t</i>
	Mean	SD	Mean	SD	
Affective					
Pleasure experience	3.11	.38	3.13	.39	-.244
Self-satisfaction	3.18	.51	3.25	.46	-.552
Goal-related	3.04	.45	3.35	.41	-3.356*
Self-concept-related	2.87	.40	2.92	.28	-.506
Subtotal	3.04	.36	3.16	.28	-1.738
Pragmatic	3.24	.44	3.40	.39	-1.343
Educational context-related	2.86	.28	3.59	.46	-6.391*
Total	2.60	.26	3.21	.28	-10.514*

Note: * $p < .05$ ** $p < .01$ *** $p < .001$

The data in Table 3 indicate significant improvements in the total questionnaire scores of the overseas Chinese students ($t=-10.514$, $df=18$, $p=.000$). Regarding dimension-based comparisons, the affective dimension did not differ significantly between the pre- and posttest, but the goal-related subdimension was significantly improved at the posttest, which means that learning Mandarin in SL significantly increased the interest of the overseas Chinese students. The pragmatic dimension, however, did not differ significantly between the two tests. The score of the educational context-related dimension was significantly improved at posttest, which indicates that the students regarded the learning environment and activities in SL highly.

Despite the positive results, the low scores (pretest: 2.87, posttest: 2.92) in the self-concept-related (affective) subdimension were of concern to the author although the posttest score improved. This might have been due to the short learning period, amounting to only six hours, for learning the three units.

Regarding the students' responses to the open-ended question, no written responses were provided in the pretest, but some comments were collected at the posttest. These comments fell into three categories: (1) comments regarding SL as a Mandarin language learning environment, (2) the desire for more similar opportunities to learn Mandarin, and (3) complaints about the network connection quality. For the first category, all of the students' comments showed approval of the learning activities and the authentic contexts in SL. Some examples are as follows:

"I love to learn Mandarin in this way."

"To execute Mandarin learning missions in SL is very interesting and helpful. I can make improvement in my Mandarin language abilities."

"The basic one makes it easier to learn the themes such as clothes, house, etc."

"I think SL helped me to think in Mandarin and try to learn about its pronunciation. It also helps me to practice and think with others. It's interesting."

"Learning in SL is more interesting than in the conventional classroom. That's because only the teacher talked in the conventional classroom rather than the students."

As to the students' desire to learn, they expressed a hope for more Mandarin language classes running in SL, such as: "The time is too short. I want more." Some students not only expressed their desire for more SL classes, but also complained about the Internet connection sometimes being of poor quality. Some examples are as follows:

"SL is great, but the computers should be upgraded."

"It's actually fun to learn through this new environment, but due to the Internet speed we can barely feel the effect sometimes."

"Sometimes I could not successfully login to SL, which may be caused by the network connection. However, learning in SL is truly fun."

In summary, learning Mandarin in SL significantly improved the oral performances of and learning attitudes toward Mandarin of the international students of Chinese. It also inspired them to engage more in the language-learning activities and to orally interact with others.

LIMITATION AND CONCLUSIONS

According to the suggestions of Krashen (1981), Long (1996), and van Lier (1996), FL/L2 learners will only become fluent if they have opportunities to engage themselves in authentic linguistic social practices. In order to promote the oral outputs and interpersonal conversation skills of overseas Chinese students, SL was adopted for Mandarin language classes. The results obtained from stage 1 indicated that

overseas Chinese students behaved more actively in interpersonal interactions and talked more frequently in SL than in the conventional classroom. The strong desire to perform orally might be attributable to the ownership and personalized avatars provided in SL, as proposed by Peterson (2008), who stated that the use of personalized avatars supports users with a strong sense of immersion within virtual worlds and consequently enhances involvement, enjoyment, and interest in interactions.

The authentic environments in SL also provided overseas Chinese students with an essential context for enhancing the L2 comprehension process. Hadley (2001) suggests that language learning activities that provide relevant context should be helpful for activating the knowledge that students have of the world and the familiarity of the discourse structure. The activities executed in stage 2 were accompanied by authentic contexts for helping overseas Chinese students to comprehend when, where, and why the conversations happened. The significant improvement in Mandarin oral performance made by the students not only confirmed Hadley's argument, but it is also consistent with the research on applying SL in CFL teaching conducted by Lan et al. (2013). The results obtained from stage 2 also confirm the effects of SL in promoting the learning attitudes of foreign Chinese students toward the Mandarin language, and were in line with the English as a foreign language (EFL) research conducted by Wang and his colleagues (Wang, Song, Xia, & Yan, 2009), who found that students had positive attitudes toward SL as a learning platform for EFL learning and wanted to use it for EFL learning more often in the future.

The behaviors of the foreign Chinese students during the task-completion process revealed that the reorganized task structure based on the CUE model benefited them both when performing the individual and group tasks. Their attention was focused on the learning tasks and they produced useful output after completion. The findings confirm the importance of task structure for language learning suggested by many researchers, such as Chen (2010) and Jauregi and her colleagues (Jauregi, Canto, de Graaff, Koenraad, & Moonen, 2011).

In contrast to these positive results, the index of students' self-conception in Mandarin learning attitude remained lower than 3 on the 4-point scale at the posttest (score range: 2.4–3.4, average: 2.92). This result is not consistent with those of Henderson et al. (2012), who found that collaborative language lessons using SL results in a statistically significant increase in self-efficacy beliefs among students across a range of specific and general language skills. These discrepant results may be attributable to the very short learning period in the present study (only one hour per week for six weeks), and suggest that more effort is required to improve the self-efficacy beliefs of overseas Chinese students in concert with their proven performance improvements.

In addition to Mandarin learning-related issues, the problems caused by the Internet connection that hampered the teaching process were also an important concern of this study. A similar problem has also been encountered by other researchers using SL in language learning, (e.g. Chen, 2010 and Wang et al., 2009). Thus, it is clear that technological problems represent an important challenge for language educators and researchers attempting to help FL/L2 learners gain benefits from the use of virtual worlds. To deal with the problem, both learners' computer performance and bandwidth should be taken into account. Regarding the computer performance, computers equipped with independent Graphic Card have the potential to make SL run more smoothly. On the other hand, according to Linden Lab (<http://wiki.secondlife.com/wiki/Lag>), bandwidth generally needs a connection speed at least 500 kilobits per second (kbps) to adequately run SL, i.e. to execute basic operations of SL and, in fact, needs higher bandwidth to reduce Internet latency. However, based on the experiences learned from a later study conducted by the author, it is suggested that the researchers/instructors could simplify the structure of the architectures in SL, or have the learners check if their avatars put too many complex objects on them in order to reduce the Internet latency. In addition to the practical suggestions given above, another point worthy of greater attention and efforts from researchers is how to create a virtual context that possesses similar features to SL, as described above. Because of the small sample size, a short period for the experimental procedure, and the non-upgraded computer equipment used in this study, the research

results could become a general reference to the related research only after further investigation and evaluation.

In conclusion, SL was successfully applied to a Mandarin language course, yielding improvements in the oral output, performance, and learning attitudes toward Mandarin among overseas Chinese students. Future studies should attempt to confirm the effects of SL in promoting overseas Chinese students' self-conception and efficacy beliefs in the target language by expanding the experimental period and enrolling more participants.

APPENDIX A. In-Class Interaction Analysis Scheme (Revised From Moskowitz's Flint System)

Category	Code	Description
Indirect influence	1	Deal with feelings: In a nonthreatening way, accepting, discussing, referring to, or communicating understanding of past, present, or future feelings of students.
	2	Praises or encourages: Praising, complimenting, and telling students why what they have said or done is valued. Encouraging students to continue, trying to give them confidence. Confirming answers are correct.
	2a	Jokes: International joking, kidding, making puns, and attempting to be humorous, providing that the joking is not at anyone's expense. Unintentional humor is not included in this category.
	3	Uses ideas of students: Clarifying, using, interpreting, and summarizing the ideas of students. The idea must be rephrased by the teacher but still recognized as being a student contribution.
Direct influence	4	Asks questions: Asking questions to which an answer is anticipated.
	5	Gives information: Giving information, facts, own opinion or ideas, lecturing, or asking rhetorical questions.
	5a	Directs pattern drills: Giving statements that students are expected to repeat exactly, to make substitutions in, or to change from one form into another.
	6	Repeats a student's response verbatim: Repeating the exact words used by students.
	6a	Corrects without rejection: Telling students who have made a mistake the correct response without using words or intonations that communicate criticism.
	6b	Criticizes a student's response: Telling the student his response is not correct or acceptable and communicating by words or intonation criticism, displeasure, annoyance, or rejection.
	7	Gives directions: Giving directions, requests, or commands that students are expected to follow.
Student response	7a	Criticizes student behavior: Rejecting the behavior of students, trying to change unacceptable behavior, communicating anger, displeasure, annoyance, and dissatisfaction with what the students are doing.
	8	Specific response (individual): Responding to the teacher by an individual student within a specific and limited range of available or previously shaped answers. Reading aloud.
	8a	Specific response (combined): Combined response by all or part of the class.
	8b	Student repeats what the teacher demonstrates (individual): Student repeating what the teacher demonstrates or says.
	8c	Students repeat what the teacher demonstrates (combined): Combined repetition of

		what the teacher demonstrates or says by all or part of the class.
	9	Open-ended response: Responding to the teacher with the student's own ideas, opinions, reactions, and feelings. Providing one from among many possible answers that have been previously shaped but from which students must now make a selection. Initiating the participation.
	9a	Student-initiated questions: Asking open-ended questions based on what the teacher has said.
	9b	Student-initiated response: Responding to or giving comments to other students' responses.
	9c	Peer talking: work-oriented, clear interpeer talking.
	9d	Work-oriented response: More than one person at a time clearly responding to the teacher's open-ended questions.
Silence	10	Pauses in the interaction. Periods of quiet during which there is no verbal interaction.
Confusion	11	Confusion (work-oriented): More than one person at a time talking, so the interaction cannot be recorded. Students call out excitedly, eager to participate or respond, and concerned with task at hand.
	11a	Confusion (non-work-oriented): More than one person at a time talking, so the interaction cannot be recorded. Students talking out-of-order, not behaving as the teacher wishes, and not concerned with the task at hand.
Nonverbal	12	Laughter: Laughing and giggling by the class, individuals, and/or the teacher.
	n	Nonverbal: Nonverbal gestures or facial expressions by the teacher or the student that communicate without the use of words. This category is always combined with one of the categories of teacher or pupil behaviors.
Mother tongue	m	Use of students' native language by the teacher or students. This category is always combined with one of the other categories described above.

APPENDIX B. Mandarin Language-Attitudes Questionnaire

Dear Student,

Thank you for taking the time to complete this survey. Your feedback is important to us in helping understand learners' Chinese learning experience and how they feel while using Second Life to learn Chinese. The survey takes about 5-10 minutes of your time. All survey results will be used only for academic research purposes. Your answers will not affect how the teacher grades your progress.

Thank you again for your help.

你對中文學習的看法 Your Opinion of Chinese Learning

題目 Question	非常同意 Extremely Agree	同意 Agree	不同意 Disagree	非常不同意 Extremely disagree
我可以從學中文的過程中得到樂趣。 I find great pleasure in learning Chinese.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>

當遇到和課程中學習內容相似的情況時，我有信心能和說中文的朋友用中文溝通。 I have confidence to communicate with a Chinese friend in Chinese on topics similar to those covered in this class.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
說中文能讓我從事更好、更有趣的工作。 If I can speak Chinese, I can find more interesting and better jobs.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
中文課裡的任務活動很有趣，對我的中文能力也有幫助。 The language tasks in our Chinese lessons are interesting and helpful!	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
學習中文可以擴展我的視野。 Learning Chinese broadens my horizons.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我常常思考如何把中文學得更好。 I often think about how I can learn Chinese better.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
中文讓我成為更有競爭力的求職者。 Chinese will makes me more competitive in the job market.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我喜歡學中文。 I enjoy learning Chinese.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我覺得中文課裡的任務活動對於提高我的中文水準很有用。 I found the task-based lessons we have done were useful to improve my Chinese.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
如果我在中文課表現得很好，是因為我很努力。 If I do well in this course, it will be because I work hard.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我會盡全力學習中文。 I can honestly say that I really put my best effort into trying to learn Chinese.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我必須參加 TOCFL 或 HSK 之類的中文考試。 I have to take TOCFL, HSK, or other Chinese qualifying examinations.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我對中華文化、歷史及文學有興趣。 I am interested in Chinese culture, history and/or literature.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我和老師在中文課裡的互動很重要。 My interaction with the teacher in Chinese class is important to me.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我的中文溝通技巧不錯。	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>

My communication ability in Chinese is good. 我希望到臺灣或中國等說中文的國家旅行。 I would like to travel to a Chinese-speaking country, such as Taiwan or China.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
如果我被要求在中文課發言會覺得不舒服。 I feel uncomfortable if I am asked to speak in my Chinese class.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
在這個課程結束後，我會繼續學習中文，因為它對 我很重要。 After I finish this class, I will keep learning Chinese, because studying Chinese is important to me.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
能在符合真實語境的環境裡頭學習語言是有趣的。 It is fun to learn language in an authentic context & environment.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
學中文幫助我了解說中文的人和他們的生活方式。 Learning Chinese helps me understand Chinese-speaking people and their way of life.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
如果我會說中文，我就有更多因公參訪的機會。 If I can speak Chinese, I can travel more for official purposes.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我認為學習中文能讓我得到更好的教育機會。 I think learning Chinese will enable me to get a better education opportunity.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我覺得我的中文還不錯。 I think my Chinese is quite good.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我會盡可能地持續學習中文。 I plan to continue studying Chinese for as long as possible.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我在中文課的出席率很高。 My attendance in Chinese class is good.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
如果我在中文課堂上表現不好，是因為課程太難了。 If I don't do well in this class, it will be because the class is too difficult.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
我希望能和中文母語者用中文進行工作上的溝通。 I want to use Chinese to work and communicate with Chinese speakers.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
在匿名的學習環境裡，我不會擔心是否說錯中文。 In an anonymous environment, I am not afraid of making mistakes while speaking Chinese.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>

學習中文讓我覺得有成功感。 Learning Chinese makes me feel successful.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
學習中文對我未來的事業有幫助。 Learning Chinese is helpful for my future career.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
課堂中使用的詞彙很合適，既不會太多也不會太少， 不會太難也不會太簡單。 The vocabulary used in my Chinese class is appropriate. (neither too much nor too little; neither too difficult nor too easy)	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
符合真實語境的學習環境能幫助我把學到的語言技 巧和知識用到真實世界中。 Learning in a realistic context helps me transfer language skills and/or knowledge to the real-world contexts.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
在電腦教室中進行的中文任務課程有趣且對我有幫 助。 The language tasks of Chinese lessons in the computer lab are interesting and helpful!	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>
其他意見 Other Opinions and Comments				

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