วารสารอิเล็กทรอนิกส์
ทางการศึกษา

OJED, Vol. 14, No. 1, 2019. Article ID: OJED-14-01-002
Article Info: Received 5 March, 2019; Revised 11 April, 2019; Accepted 14 May, 2019

OJED
An Online Journal
of Education
www.tci-thaijo.org/index.php/OJED

ผลของการใช้รูปแบบการสอนการสื่อสารโดยใช้สื่อคอมพิวเตอร์ช่วยการฝึกการออกเสียง (CAPT) ที่ส่งผลต่อความสามารถการออกเสียงภาษาอังกฤษของนักศึกษาชาวจีนระดับปริญญาตรี

The effects of Communicative Framework Instruction using Computer-Assisted Pronunciation Training (CAPT) on English pronunciation ability of Chinese undergraduate students

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์ 1) เพื่อศึกษาผลของการใช้รูปแบบการสอนตามกรอบการสื่อสารโดยใช้สื่อคอมพิวเตอร์ช่วยการฝึกออกเสียง (CAPT) ในการตรวจสอบความสามารถการออกเสียงภาษาอังกฤษของนักศึกษาชาวจีนระดับปริญญาตรี 2) เพื่อศึกษาความคิดเห็นของนักศึกษาต่อรูปแบบการสอนตามกรอบการสื่อสารโดยใช้สื่อคอมพิวเตอร์ช่วยการฝึกออกเสียง โดยใช้ตัวอย่าง จำนวน 17 คน เป็นนักศึกษาชาวจีนระดับปริญญาตรี มหาวิทยาลัยสยามกำลังศึกษาในภาคเรียนที่ 1 ปีการศึกษา 2561 ทั้งนี้เครื่องมือที่ใช้ในการเก็บข้อมูล ได้แก่ แบบทดสอบการออกเสียงภาษาอังกฤษก่อนและหลังการทดลอง แบบสอบถามความคิดเห็นของนักศึกษา และคำถามการสัมภาษณ์แบบกึ่งโครงสร้าง สถิติที่ใช้ในการวิเคราะห์ คือ คะแนนเฉลี่ย ค่าเบี่ยงเบนมาตรฐาน และ Wilcoxon signed ranked test รวมถึงใช้การวิเคราะห์เนื้อหา ในส่วนของข้อมูลเชิงคุณภาพที่ได้จากการสัมภาษณ์ ผลการวิจัยพบว่า 1) คะแนนเฉลี่ยความสามารถในการออกเสียงภาษาอังกฤษก่อนและหลังการใช้รูปแบบการสอนของนักศึกษา มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ .05 2) นักศึกษามีข้อเสนอแนะเชิงบวกเรื่องการเรียนรู้การออกเสียง การช่วยพัฒนาทักษะการออกเสียง ความมั่นใจ การมีส่วนร่วม การเพิ่มโอกาสการเรียนรู้ทั้งในและนอกห้องเรียน ความร่วมมือในการเรียนรู้ การเรียนรู้แบบพึ่งตนเอง อย่างไรก็ตามนักศึกษาบางส่วนพบปัญหาด้านคุณภาพในการอัดเสียง เช่นกันกับเนื้อหาบางส่วนและการจัดสรรเวลา

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ISSN 1905-4491

Abstract

The study aimed 1) to examine the effects of the communicative framework instruction using CAPT on the English pronunciation ability of Chinese undergraduate students; 2) to investigate the opinions of students towards the communicative framework instruction using CAPT. The participants consisted of 17 Chinese undergraduate students at Siam University during the first semester of the 2018 academic year. The instruments used to collect data were a pronunciation pre-test and a post-test, a student opinion questionnaire, and semi-structured interview questions. The analyzed statistics computed from the data included the mean scores, standard deviation, and Wilcoxon signed ranks test; the qualitative data obtained from the interview were analyzed using content analysis.

The findings revealed that 1) there was a significant difference in students' mean scores at a significance level of 0.05 on the English pronunciation ability before and after the students' participation in the communicative framework instruction using CAPT; 2) students provided positive feedback on learning how to pronounce and improve pronunciation skills, self-confidence, engaging learning environments, more opportunities to learn inside and outside the classroom, cooperative learning, and learner autonomy. However, students did have problems regarding the App recording quality, as well as the materials and time allocation.

คำสำคัญ: กรอบการสื่อสาร / ความสามารถในการออกเสียง / การใช้สื่อคอมพิวเตอร์ช่วยการฝึกออกเสียง

KEYWORDS: COMMUNICATIVE FRAMEWORK / PRONUNCIATION ABILITY / COMPUTER-ASSISTED PRONUNCIATION TRAINING (CAPT)

Introduction

English pronunciation in the world today is crucial, and pronunciation is an indispensable skill needed in mastering a foreign or second language (Celce-Murcia, Brinton & Goodwin, 2000). Fangzhi (1998) stated that good pronunciation ability is a key in whether or not the message can be effectively transferred. Fraser (2000) stated pronunciation is the most important speaking skill, compared with others such as grammar, vocabulary and pragmatics, which is in line with Jenkins (2005). Not being able to produce intelligible pronunciation of words can be responsible for both frustration of communication and misunderstanding.

Researchers have identified that lack of exposure to the English-language environment and lack of phonetic coding ability will lead to pronunciation learning problems (Brown, 1992; Celce-Murcia et al., 2000; Kenworthy, 1987). Serttikul (2005) and Jarusan (1997) indicated that poor pronunciation learners, generally thought of as less experienced, have more language problems than those with good pronunciation, and that learners' opportunities to use English in daily life help develop pronunciation ability. In other words, pronunciation ability results from exposure to the language. On the other hand, Brown (1992) stated that phonetic ability can be called *phonetic coding ability*. With phonetic coding ability, learners may possess better listening skill to facilitate the learning of the target language (Bradlow, Pisoni, Akahane-Yamada, & Tohkura, 1997; Rochet, 1995). Therefore, they are capable of discriminating sounds more accurately and imitating sounds better than other learners. As a result, with more exposure to the English environment and better phonetic ability, learners may have fewer difficulties learning pronunciation.

Chinese students are no exception to these two problems. English pronunciation in Chinese is ignored under the educational system, where Chinese EFL students are commonly trained for reading and writing skills by the dominant Grammar-Translation method (Hu, 2002; Yu, 2001). Additionally, a number of researchers have reported linguistic varieties between English and Chinese. Jenkins (2000) proposed Mandarin Chinese features a strong preference for /CV/ syllable structure; therefore, Chinese learners are not familiar with English consonantal clusters, not to mention distinguishing or pronouncing these sounds. In addition, Li & Yuan (1998) indicated some common errors Chinese EFL speakers make, including the problems of substitution, deletion and insertion. Consonant sounds /l/ and /r/ are usually replaced by each other and cause misunderstanding. When Chinese speakers say "I like this world", the sentence may be mistaken as "I like this word", which gives rise to miscommunication.

Apart from the classroom face-to-face teacher instruction, some teachers employ Computer-Assisted Pronunciation Teaching (CAPT) to teach pronunciation. Neri, Cucchiarini, Strik & Boves (2002) proposed that if students want to learn pronunciation, ideally, they need to be guided by teachers' instruction, and to interact with native speakers. Teachers need to give intensive interaction and feedback on individual problems. However, it is very difficult to teach pronunciation in a large classroom. With the advance of modern technology, CAPT gives teachers a solution comprising a virtual native-speaker environment as well as a real-time feedback system. Many researchers have accepted the CAPT pedagogy advantages (Chun, 1989; Hismanoglu, 2006; Gilakjani & Sabouri, 2014; Peenington, 1988) since it provides students with a low anxiety environment where they may access the content without limits, receive immediate feedback from the Automatic Speech Recognition (ASR), and practice at their own pace. Neri et al. (2002) also indicated CAPT makes it possible to address individual problems for as long as students wish and at their own tempo, which reduces learning anxiety and allows students learning history to be traced in log-files; consequently, CAPT facilitates pronunciation teaching and learning.

Jones (1997) reported that language is ideally taught on the condition that it is being used for message transmission, which echoed Pennington and Richards (1986) who said that isolating pronunciation from communication is artificial. Celce-Murcia et al.(2000) proposed a communicative framework on English pronunciation teaching that follows the five core tenants of communicative language teaching (Celce-Murcia et al., 2000; Richards & Rogers, 2001), which are 1) language is best learned in various communicative settings; 2) classroom tasks and materials are supposed to reflect the goals and interests of the students and arouse their desire to communicate in the L2; 3) learning English actively and independently in groups to deal with meaning negotiation is the most effective way to acquire language ability; 4) preparing learners to express themselves in various communicative setting is the critical job of the learning syllabus; 5) making mistakes is a common process of language learning.

The communicative framework of Celce-Murcia et al. (2000) is designed based on the above five principles and divided into five stages:

1) Description and Analysis – illustration of how the new pronunciation features are articulated; 2) Listening Discrimination – identification of target features is focused on listening practice; 3) Controlled Practice – intensive oral production drills are employed to monitor the

pronunciation feature in real production; 4) Guided Practice – organized and structured communication exercises are carried out; 5) Communicative Practice – creative and meaningful language exchange activities are focused, and fluency is required. Authentic communicative practice arises in the fifth stage as long as the learners develop a solid foundation of the target sound features from the previous four stages.

Lord (2005) indicated that the majority of pronunciation research had focused on the contrastive analysis of the phonetic systems of a variety of languages, but only a few have given possible pedagogical implications for the second language field. Lee (2008), Lu & Jaw (2010), and Pi-hua T. (2015) utilized existing published pronunciation package on MyET database to do the experimental research on the effects of the software to university students, which provided empirical evidences on the value of using CAPT software for teaching English pronunciation. Some other studies focused on the CAPT programs and the relationship of the technology and the teachers (Lee, 2008; Wang, 2014). All the research received positive response on almost all aspects. There was, however, little research discussing the integration of instructional framework with CAPT on pronunciation teaching.

In the present study, the researcher designed an English pronunciation instruction model by adopting the communicative framework (Celce-Murcia et al., 2000) integrated with CAPT. Students were guided by the teacher in all five stages; CAPT was conducted in class in the 1st stage, description and analysis, as well as the 3rd stage, controlled practice. Additionally, the target features tasks were also assigned to be completed individually outside the classroom, followed by a review of log files. In addition to the feedback from the CAPT system, the teacher's explicit feedback was given in class as well, focusing on the most common errors. The study examined the effects of communicative framework instruction using CAPT on English pronunciation ability of Chinese undergraduate students. Meanwhile, the opinions of the participants were also investigated.

Objectives

The two research objectives were 1) to examine the effects of the communicative framework instruction using CAPT on the English pronunciation ability of Chinese undergraduate students; 2) to investigate the opinions of students on the communicative framework instruction using CAPT.

Methodology

Research Design

The study used a quasi-experimental single group design with a pre-test and a post-test of English pronunciation. The researcher analyzed the pre-tests and post-tests of English pronunciation quantitatively. In addition, content analysis was used to analyze the data from the semi-structured interview in respect of triangulating the data of the statistical analysis on the student opinion questionnaire.

Population and Participants

The population of this study was Chinese undergraduate students studying in a university in Thailand. The samples selected in this study were the third-year Chinese

undergraduate students majoring in the International BBA (Bachelor of Business Administration) program at Siam University, Bangkok. The English courses in the BBA program were designed to strengthen students' English ability across four language skills. In this study, communicative framework pronunciation instruction using CAPT was implemented to promote their English pronunciation ability in speaking skills. The study was carried out during the first semester of the 2018 academic year. Although the university is located in Thailand, the 17 participants were from 5 provinces and 1 autonomous region of mainland China. Accordingly, the student body in this university reflected geographic diversity. As to the dialect, 70% of the participants, 8 male students and 9 female Chinese students, speak Mandarin Chinese; the remaining 30% speak not only official Mandarin Chinese but other native dialects also.

Research Instruments

1) Instructional Instrument

In this study, a communicative framework instruction using MyET was developed as the instructional instrument to enhance English pronunciation ability. The lesson plans were constructed to cover 12 weeks. The class session was 90 minutes, once every week. There was a pre-test in the 1st week, followed by 5 designed units, taught from the 2nd to 11th weeks; each designed unit comprises 2 sessions, for a total of 180 minutes for each unit. In the 12th week, a post-test was completed by the students.

The 5 designed units were based on previous research on Chinese EFL pronunciation problems (Burri, 2015; Cruttenden, 2014; Deterding, 2006; Han, 2013; Ho, 2003; Li & Yuan, 1998; Li, Siniscalchi, Chen & Lee, 2016; Liang, 2014; Siqi & Sewell, 2012; Wenzhong, 1993; Zhang & Yin, 2009). In this study, the researcher selected from these studies the most significant features of Chinese EFL common pronunciation problems as the core contents, covering /l/-/r/; /v/-/w/; /θ/-/ð/; /eɪ/; /aʊ/, and suprasegmental features: stress and intonation respectively. Unit One discussed consonant substitution on /l/- /r/ and /v/-/w/. Unit Two was also for consonant substitution, /θ/ -/ð/. Both Unit Three and Unit Four explored diphthongs on, /eɪ/ and /aʊ/. Unit Five probed word stress and sentence stress, as well as intonation.

In designing the lesson plan, the communicative framework from Celce-Murcia et al. (2000) was adopted for the instructional design. Meanwhile, CAPT was integrated into the 1st stage to illustrate the sound articulation on the Sounds of Speech website (https://soundsofspeech.uiowa.edu/home), and into the 3rd stage, controlled practice, on MyET App.

The pronunciation samples on MyET App were made by different background English speakers. According to Jenkins (2000), a classroom with a wide range of English language input, such as pronunciations of speakers different from various backgrounds may raise the learners' ability. Her research also showed that intelligibility is easy for most speakers to reach when they receive a brief exposure to a variety of English. In this research, the materials recorded on MyET were made by English speakers of various backgrounds -- American, Chinese, European, Austrian, and African -- which means the materials provided a range of spoken English, not favoring certain type over another.

2) Research Instruments

Three research instruments -- English pronunciation tests, a questionnaire, and a semi-structured interview -- were used to collect the data. The content of the pronunciation tests was mainly based on the 5 designed units with a view to examining the effects of the instruction before and after. The pronunciation test consisted of not only minimal pairs, but also single sentences, dialogues, and paragraphs. Instead of isolated sound test, sentences, dialogues, and paragraphs were to elicit the test taker's natural pronunciation without feeling being tested. The vocabulary in the passage was frequently used in daily life to make sure the test takers read the passage easily and naturally (Liang Enli, 2014). Segmental features such as vowels and consonant and the suprasegmental features such as stress and intonation were assessed on the MyET ASAS (Automatic Speech Analysis System) in the percentage form. Meanwhile, the two pronunciation tests, pre-test and post-test, were identical to check the effects of the instruction.

The modified questionnaire (adapted from Prasarntong & Dennis, 2016) was comprised of two sections: Section I was for demographic information; Section II was 15 items to investigate students' opinions. For the qualitative data, a semi-structured interview was used to explore students' opinions towards the instruction. Four interview questions were used to explore the student's opinions on pronunciation improvement, MyET App, and the 5 stages in the communicative framework. The interview required the students to express their opinions about this instruction.

Each of the instruments was validated by three experts using IOC. The experts all agreed with the appropriateness of the instruments, except for the following: 1) two experts suggested systematically reorganizing the item sequence from easy to more difficult in the pronunciation test; 2) two experts suggested grouping the 15 questionnaire questions into 3 categories; 3) interview question 1 and question 4 were revised and rewritten. The researcher rewrote the parts, as suggested, after the validation. The instruments (except for the semi-structured interview questions) were also piloted with second-grade Chinese students in the International BBA program who were not in the sample group.

Research Procedure

The course was carried out over a 12-week period. The researcher, himself, was the teacher. Each session lasted for 90 minutes. To explore students' English pronunciation ability, the pre-test and post-test as pronunciation assessments were implemented in the first week and final week. After 10 weeks of the instruction of communicative framework using CAPT, the students' opinions were also investigated via the questionnaire and interview questions so as to triangulate the the students' opinions towards the use of communicative framework using CAPT. All the interviews were conducted in the same week (week 12). The 6 selected participants were singled out from the post-test high, mid, and low score groups, and were individually interviewed by the researcher in Chinese and English.

Data Analysis

To examine the effects of the communicative framework instruction using CAPT on Chinese undergraduate students' pronunciation ability, the researcher quantitatively analyzed

the pre-test and post-test scores using arithmetic mean, standard deviation, and Wilcoxon Signed Ranks Test to see if the difference in the scores was statistically significant at level of 0.05.

To answer the research question about Chinese students' opinions towards the communicative framework instruction using CAPT, the quantitative questionnaire data, as well as the qualitative data from the semi-structured interview, were analyzed. Mean scores and standard deviations of the questionnaire were calculated, and qualitative interview data were analyzed through content analysis after the recordings were transcribed. The researcher read the transcription for relevant keywords, phrases or sentences that match the categories to triangulate the questionnaire and interview data.

Results

The results can be presented in accordance with the two research objectives:

1) To examine the effects of the communicative framework instruction using CAPT on the English pronunciation ability of Chinese undergraduate students
2) To investigate the opinions of students on the communicative framework instruction using CAPT

In response to Objective 1, Table 1 shows the overall English pronunciation test score of all students

Table 1

Overall English pronunciation test score of all students

Pronunciation Test	Min	Max	Mean	*SD*	Median
Pre-test	49.02	83.83	70.54	7.57	72.39
Post-test	66.44	85.96	74.47	5.58	75.91

Note: n =17. Total score = 100

As shown in Table 1, the number of students was 17, and the total score of the test was 100 points. For the pre-test, the minimum score was 49.02, and the maximum score was 83.83. For post-test, the minimum score was 66.44, and the maximum score was 85.96. The mean score of the post-test, 74.47 (SD =5.58), was higher than that of the pre-test, 70.54 (SD = 7.57); meanwhile, the median score of post-test, 75.91, was also higher than that of the pre-test, 72.39. The improvement in scores showed the students' English pronunciation ability improved after the instruction.

To determine if the scores in the pre-test and post-test are statistically different, the Wilcoxon Signed Ranks Test was used. The result is reported in Table 2.

Table 2

Analysis of the pre-test and post-test scores of students using the Wilcoxon Signed Ranks Test

Ranks				
		N	Mean Rank	Sum of Ranks
post-test - pre-test	Negative Ranks	2^a	10.05	21.00
	Positive Ranks	15^b	8.80	132.00
	Ties	0^c		
	Total	17		

Note. a. post-test < pre-test.
b. post-test > pre-test.
c. post-test = pre-test.

Test Statistics ^{b}	
	post-test - pre-test
Z	-2.627^b
A symp. Sig. (2-tailed)	.009

Note. a. Based on negative ranks.
b. Wilcoxon Signed Ranks Test.

Table 2 shows that, out of 17 students, 15 students scored higher on the post-test than the pre-test. The results of the two tests were significantly different at .009 level ($p<0.05$). The effect size was calculated using the Wilcoxon Signed Ranks Test equation for a percentage variance measure of r, $r = Z/\sqrt{N}$ (Larson-Hall, 2010). It shows that the communicative framework using CAPT for English pronunciation instruction had significant effect on the results, as can be seen from the great difference between the two tests. In other words, the communicative framework using CAPT for English pronunciation instruction significantly improved the students' English pronunciation ability.

Additionally, the post-test results from all ten pronunciation dimension scores (except the /eɪ/ sound) were higher than those of the pre-test. In brief, the students' English pronunciation ability was significantly improved after receiving the communicative framework instruction using CAPT for English pronunciation ability.

With respect to Research Objective 2, both quantitative and qualitative analyses were employed. Quantitative results were obtained from the questionnaires of the 17 participants, from whom 6 interviewees were selected from the post-test high, medium and low score

groups to elicit their opinions on the communicative framework instruction using CAPT for English pronunciation.

Results from the questionnaire

The results are presented based on the three main categories of the questionnaire: 1) feedback on the design of the communicative framework instruction using CAPT for English pronunciation (Q1-Q6); 2) Opinions of the effects of MyET (Q7-Q10); 3) Feedback on the five stages in the communicative framework instruction using CAPT for English pronunciation (Q11-Q15). The questionnaire results are reported in Table 3.

The mean scores and standard deviations of the students' responses were calculated. For interpretation, mean scores of 4.0 and above are considered to reflect positive attitude, 2.6-3.9 reflect neutral attitude, and 2.5 or below shows negative attitude (Simsek, 2008).

The results demonstrated the opinions of the students towards the communicative framework instruction using CAPT for English pronunciation tended to be positive, with a grand mean score of 4.16. The mean score of all items were higher than 4.0 except statement 3: *I think taking the pronunciation instruction class was interesting,* which had the mean score of 3.76, and statement 4: *The pronunciation instruction class promoted me to try to communicate more with the others,* which had a mean score of 3.82.

Table 3

Student Opinion Questionnaire results

No	Statements	$\bar{x}$	*SD*
1.	I think the pronunciation instruction class promoted my activity participation more in the classroom.	4.12	1.05
2.	I think the pronunciation instruction class helped me to pay more attention to the teacher.	4.00	1.12
3.	I think taking the pronunciation instruction class was interesting.	3.76	1.25
4.	The pronunciation instruction class promoted me to try to communicate more with the others.	3.82	1.07
5.	The pronunciation instruction class made me learn how to pronounce new words correctly.	4.41	1.00
6.	Learning English pronunciation through the pronunciation instruction class improved my English pronunciation.	4.41	1.00
7.	MyET App promoted me to practice pronouncing more words.	4.18	1.07
8.	MyET promoted me to spend more time practicing pronunciation.	4.06	0.97
9.	MyET promoted me to finish and turn in assignment on time.	4.18	0.81

Table 3 (Cont.)

Student Opinion Questionnaire results

No	Statements	$\bar{x}$	*SD*
10.	MyET promoted me to learn English pronunciation by myself after class.	4.29	1.11
11.	The teacher's analysis and description on how to pronounce helped improve my English pronunciation.	4.29	0.85
12.	Listening to minimal pairs helped improve my English pronunciation.	4.24	0.75
13.	MyET assignments helped improve my English pronunciation.	4.29	0.85
14.	Calendar information gaps activity helped improve my English pronunciation.	4.29	0.69
15.	The Role play activity helped improve my English pronunciation.	4.12	1.05
	Grand Mean Score	4.16	0.98

Results from the interview

To explore the opinions of the students towards the communicative framework instruction using CAPT for English pronunciation, the data obtained from the interview were analyzed using content analysis. The interview required the students to express their opinions about this instruction. Table 4 shows the students' opinions towards the instruction using CAPT for English pronunciation in terms of the advantages and limitations of this instruction. The frequencies of keywords and key phrases in the content analysis are illustrated as follows:

In respect of the advantages, "Learning how to pronounce and improve pronunciation skills" was mentioned the most (*f = 26*) among the 5 advantages, followed by "developing self-confidence and creating engaging learning environments" (*f = 21*). "Providing more opportunities for learning inside and outside classroom" was mentioned the third most (*f = 16*). However, most of the interviewees mentioned the instability of the operation on this app (*f = 4*), and some interviewees identified problems with Stage 4, the guided practice stage (*f = 2*), as being the limitation of the communicative framework instruction using CAPT for English pronunciation.

Table 4

Students' opinions towards the communicative framework instruction using CAPT for English pronunciation

Students' Opinions	Frequencies of keywords/key phrases in the answer
Advantages	
1. Learning how to pronounce and improve the pronunciation Skills	26
2. Developing self-confidence and creating engaging learning environments	21
Students' Opinions	Frequencies of keywords/key phrases in the answer
3. Providing more opportunities for learning inside and outside Classroom	16
4. Building cooperative learning environments	8
5. Enhancing learner autonomy	5
Limitations	
1. Instability of the App recording quality	4
2. Problems in Guided Practice stage	2

Note. The total of frequencies of keywords / key phrases in the answer is 82

The semi-structured interview revealed that students had opinions about both advantages and limitations. The advantages of the communicative framework instruction using CAPT for English pronunciation ability included learning how to pronounce and improve pronunciation skills, developing self-confidence and creating engaging learning environments, providing more opportunities for learning inside and outside classroom, building cooperative learning environments, and enhancing learner autonomy. Some excerpts follow:

Excerpt 1

S 1: *"I found my overall pronunciation ability was upgraded. The feedback from the diagnostic report of MyET generalized my problems and identified my mistakes in details, which did improve my pronunciation a lot.*

Excerpt 2

S 1 : *" I have confidence now when speaking English. I think I may speak more standard English. I feel I like English more than before. I am more willing to talk in English now. Besides, writing role play script is really fun."*

Excerpt 3

S 5 : *"I think it is very convenient. I spend more time on English now because I can make good use of time whenever and wherever I go, as long as I have the Internet and when the environment is not too noisy."*

Although this study was conducted successfully and both of the research objectives were achieved, limitations were also elicited during the interview. Some students reported that instability of the App recording quality and problems with the guided practice stage were not good experiences when they were in the pronunciation learning process. Some excerpts follow:

Excerpt 1

S 2 : *" The recording quality is not stable due to the Internet or some elements of environment. I think I don't feel it accurate sometimes because I knew I did my job better compared with the previous recording.*

Excerpt 2

S 6: *"I feel it takes too much time to do the practice and some vocabulary is too hard for us. My partner can't pronounce well; I couldn't get the correct answer. I think time for this stage is not enough. I don't feel I learn more. It looks like a waste of time."*

Discussion

Discussion on the effects of the instruction

According to the statistical results, the participants' English pronunciation ability significantly improved, which is in alignment with previous studies (Chen, 2011; Liu, 2016) in which pronunciation instruction using MyET was found to have enhanced the students' pronunciation ability. Regarding the 10 pronunciation dimensions, the designed materials in this study focused on the most common pronunciation errors, including segmentals and suprasegmentals, for Chinese EFL learners, which are /l/, /r/, /v/, /w/, /θ/, /ð/, /eɪ/, /aʊ/, pitch, and stress (Burri, 2015; Deterding, 2006; Han, 2013; Ho, 2003; Li & Yuan, 1998; Liang, 2014; Siqi & Sewell, 2012; Zhang & Yin, 2009). After students received the communicative framework instruction using CAPT for English pronunciation ability, improvement was

demonstrated in all the dimension test results. Among the 10 dimensions, /w/ sound was the most improved one. However, the only regressive sound, /eɪ/, supported a previous study conducted by Wei (2010) showing that, in English diphthongs, the transition between the first and the second sound is slower and clearer than in Chinese diphthongs. Accordingly, it was found that students are likely to use Chinese /e/ to replace English /eɪ/ sound, and that it takes time to practice and achieve improved pronunciation as a result of students' first language interference (Derakhshan & Karimi, 2015).

Discussion on the opinions of the students

Analysis of data collected from the questionnaire and interview indicated that all participants agreed that they had learned how to pronounce and improve the pronunciation skills. They also stated that the instruction developed their self-confidence, created engaging learning environments (Chen, 2011), provided more opportunities for learning inside and outside the classroom (Lear, 2014), built cooperative learning environments (Pennington, 1999), and enhanced learner autonomy (Neri et al., 2002). Significantly, most interviewees mentioned they enjoyed the role play activity in the communicative stage. The activity provided not only engaging and positive learning environments but also more opportunities to exchange their ideas with others, confirming the findings of Wan (2017) that drama activities allow students to participate and express themselves so that they may be more involved and enjoy class more fully. Furthermore, this result also supported the findings of Baldwin and John (2012) that drama activity may help self-confidence, encourage cooperation, promote creativity, and enhance the ability of self-expression and independent learning.

However, some limitations, such as instability of the App recording quality and problems of the guided practice stage, were also reported in the interview,

The instability of the App recording quality is congruent with findings by Chen (2012) that the fairness of scoring system might bother students when using MyET. Levis (2007) also argued that CAPT programs do not always diagnose pronunciation errors precisely, which is consist with the results of this study. Meanwhile, Tsai (2006) stated that ASR (Automatic Speech Recognition) is quite sensitive to the variety of acoustic surroundings, speakers' voice quality, and the Internet quality, which might be responsible for a false recognition or lack of accuracy in error detection. Nevertheless, though some students experienced stability problems on the App, such as bad Internet connection or unsatisfying recording quality, they still developed positive attitudes towards the communicative framework instruction using CAPT for English pronunciation ability. One explanation for this might be that the students regard such problems as normal issues they regularly encounter when using Internet services. Most of them were familiar with using smartphones and accessing the Internet. They knew how to deal with situations when basic technical problems arose. Therefore, such problems did not really frustrate or annoy them, or even keep them away from the App or practice.

The content analysis of information obtained from the interviews revealed that two out of the six interviewees didn't really think the stage 4 of the instruction, the guided practice stage, was helpful. This result didn't correspond with the questionnaire result on item No. 14. There are three possible explanations for the inconsistency. First of all, more well-organized interview questions might probe more deeply into students' thoughts than those in the research questionnaire. For example: Q1. Which stage do you think needs improving most? Q2. Why do you think it needs improving? The first question elicited a specific target, and the second open-ended question probed real feeling from the students. Second, in the interview, students reported the material design in Stage 4 was not user-friendly. They stated that there was not enough time, and that materials were too numerous and too hard for them. Meanwhile, students themselves might have set goals for themselves that were higher than the teacher's expectations. Consequently, students felt a bit frustrated, lacking a sense of achievement. Finally, the interviewer provided a cozy sitting and chatted in a quiet classroom for the interview. In this type of comfortable, personal environment, students may have been willing to reveal more details to the interviewer (King, Horrocks & Brooks, 2018).

Recommendations

Pedagogical Implications

Pedagogical implications were drawn from the research findings and discussion. They are summarized as follows:

First, the material in Stage 4, guided practice, can be more carefully designed in terms of students' levels, the time allocation can be reconsidered, and the quantity of the sounds studied can be adjusted to fit the students' needs. Second, having developed the communicative framework instruction using CAPT for English pronunciation ability, lessons for other necessary pronunciation sounds can be developed and implemented for specific purposes based on this template. Third, to ensure the stability of recording quality, it is suggested that teachers be well trained and familiar with how to get better recording quality, and how to deal with the instability of the App recording quality. The teachers may spend some time beforehand consulting the App authorities to get relevant support on how to handle the frequent problems. In addition, it is suggested that students' feedback be collected, and trials on the App be undertaken to avoid possible problems, and so that students may do the recording stably and effectively. Finally, as diphthong /eɪ/ was found to be the only regressive sound in the 10 dimensions, alternative ways of teaching this sound should be further explored and discussed.

Recommendation for Further Research

The communicative framework instruction using CAPT for English pronunciation ability of Chinese undergraduate students can be further investigated in the future according to these given recommendations:

First, similar study could be conducted to investigate the effects of the treatment on English pronunciation ability and opinions of students in different background settings such as proficiency levels, regions, or nationalities. New learning activities or strategies on communicative learning can be further explored and employed in the instructional design.

Moreover, this study employed one-group quasi experiment design to investigate the effects of the communicative framework instruction using CAPT on English pronunciation ability of Chinese undergraduate students. Further study may add a comparison group to strengthen the design of the study and identify the differences in results between intervention group and control group. Additionally, student logs and classroom observation can be used as qualitative instruments to probe students' performance and opinions in more detail. Lastly, the number of students can be extended to examine further results. An increase in the number of participants in future research can also enhance the strength of the analysis, allowing researchers to see more significant differences in the effectiveness of intervention in the research study.

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