The Impact of Computer Assisted PronunciationLearning Program on Thai
University Students' Pronunciation Performance and Autonomous Learning Skill
ผลกระทบของการใช้โปรแกรมคอมพิวเตอร์ช่วยสอนออกเสียงภาษาอังกฤษต่อความ
สามารถในการออกเสียงภาษาอังกฤษและทักษะการเรียนรู้ด้วยตนเองของนิสิตไทย
ในมหาวิทยาลัย

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บทคัดย่อ

จุดประสงค์ของงานวิจัยชิ้นนี้จัดทำขึ้นเพื่อศึกษาผลกระทบของการใช้โปรแกรมคอมพิวเตอร์ช่วยสอนออก
เสียงภาษาอังกฤษต่อความสามารถในการออกเสียงภาษาอังกฤษและทักษะการเรียนรู้ด้วยตนเองของนิสิตไทยใน
มหาวิทยาลัยเริ่มต้นภาคการศึกษาซึ่งประกอบไปด้วย 17 สัปดาห์ นิสิต จำนวน 49 คนจากมหาวิทยาลัย
ศรีนครินทรวิโรฒที่ลงทะเบียนในรายวิชาสัทศาสตร์ภาษาอังกฤษ ถูกสุ่มเลือกเป็นกลุ่มทดลองและกลุ่มควบคุม นิสิต
ในกลุ่มทดลองเรียนออกเสียงภาษาอังกฤษโดยการเรียนผ่านการสอนออกเสียงแบบดั้งเดิมและการใช้โปรแกรม
คอมพิวเตอร์ในการช่วยสอนออกเสียงภาษาอังกฤษ ในขณะที่นิสิตในกลุ่มควบคุมนั้นเรียนออกเสียงภาษาอังกฤษ
โดยการเรียนผ่านการสอนออกเสียงแบบดั้งเดิมเท่านั้น การวิเคราะห์ข้อมูลเชิงปริมาณ ใช้ Independent sample
t-test เพื่อหาความแตกต่างของความสามารถในการออกเสียงภาษาอังกฤษของนิสิตระหว่าง 2 กลุ่ม และใช้ Pair
samples t-test เพื่อหาความแตกต่างของทัศนคติของนิสิตต่อโปรแกรมคอมพิวเตอร์ช่วยสอนออกเสียงภาษา
อังกฤษและทักษะการเรียนรู้ด้วยตนเอง และใช้ Multiple regressions เพื่อหาปัจจัยที่มีผลกระทบต่อทัศนคติ
ของนิสิตต่อโปรแกรมคอมพิวเตอร์ช่วยสอนออกเสียงภาษาอังกฤษ ส่วนการวิเคราะห์ข้อมูลเชิงคุณภาพใช้วิธีการ
วิเคราะห์เนื้อหา เพื่อนำมาวิเคราะห์ข้อมูลจาก การสัมภาษณ์และบันทึกการเรียนรู้ประจำสัปดาห์ของนิสิต จาก
การวิเคราะห์ข้อมูลพบว่า นิสิตในกลุ่มทดลองนั้นสามารถทำคะแนนออกเสียงภาษาอังกฤษได้ดีกว่านิสิตในกลุ่ม
ควบคุมในการสอบเก็บคะแนนหลังการทดลอง การเปรียบเทียบทัศนคติและทักษะการเรียนรู้ด้วยตนเอง ก่อน
และหลังการทดลองพบว่านิสิตมีทัศนคติที่ดีต่อโปรแกรมคอมพิวเตอร์ช่วยสอนออกเสียงภาษาอังกฤษ และยังมี
ทักษะการเรียนรู้ด้วยตนเองมากขึ้นหลังจากการใช้โปรแกรม ผลวิจัยที่สำคัญในงานวิจัยชิ้นนี้คือการเรียนออก
เสียงภาษาอังกฤษโดยการบูรณาการการเรียนผ่านการสอนออกเสียงแบบดั้งเดิมและการใช้โปรแกรม

คอมพิวเตอร์ในการช่วยสอนออกเสียงภาษาอังกฤษ พร้อมทั้งการเขียนบันทึกการเรียนรู้ของนิสิต นั้นช่วยพัฒนา ความสามารถในการออกเสียงภาษาอังกฤษและทักษะการเรียนรู้ด้วยตนเองของนิสิตไทยในมหาวิทยาลัย

คำสำคัญ โปรแกรมคอมพิวเตอร์ในการช่วยสอนออกเสียงภาษาอังกฤษ,ความสามารถในการออกเสียงภาษาอังกฤษ, ทักษะการเรียนรู้ด้วยตนเอง, ทัศนคติของนิสิต

Abstract

The purpose of this paper is to investigate the effect of the computer assisted pronunciation learning (CAPL) program on Thai university students' English pronunciation performance and autonomous learning skill. At the beginning of the semester of 17 weeks, forty nine Srinakharinwirot university students who enrolled in English Phonetics were randomly divided into an experimental group and a control group. Students in the experimental group studied pronunciation through the integration of the traditional teaching style and the CAPL program, while students in the control group learned pronunciation by the traditional teaching style only. An independent sample t-test was utilized to tabulate the significant differences in pronunciation performance between the two groups. Pair samples t-test was used to find significant difference in students' attitudes toward the CAPL program and autonomous learning skill. Multiple regressions were used to find the factors affecting students' attitudes toward the CAPL program. Some content analysis techniques were utilized to analyze the data of the semi-structured interview and students' weekly journal entries. The results show that at the end of the semester, students in the experimental group attained higher scores on the pronunciation proficiency test those in the control group, and students in the experimental group held more positive attitudes toward the CAPL program and gained higher autonomous learning skill. Gender is the only factor affecting students' attitudes towards the CAPL program. The key finding of this study is that learning pronunciation by integration of the traditional teaching style, CAPL program, and writing weekly journal entries can enhance pronunciation performance and autonomous learning skill of Thai university students.

Keywords Computer assisted pronunciation learning, pronunciation performance, autonomous learning skill, students' attitudes

Introduction

The ASEAN Economic Community (AEC), which will come into being on the 1st of January 2015, will use English as the international language in order to facilitate communication and strengthen economic development among its members. Thailand is one of the countries that realize the importance of learning English. Thus, there has been a shift in the English learning strategy from reading and writing to listening and speaking. It is probably that the basic means of human communication is oral; therefore the importance of pronunciation should be equally emphasized. As Wong (1987) stated, even when a non-native speaker's vocabulary and grammar are excellent, if their pronunciation falls below a certain threshold, they will be unable to communicate effectively. Hence, English pronunciation teaching has begun to be considered a vital skill for effective communication in English.

Scarcellaand Oxford (1994) stated that English pronunciation teaching should be instructed in all foreign language classes through a variety of activities. Thus, instructional technology has been developed to fill the demand for a variety of activities for pronunciation teaching such as multimedia and CAPL programs. In Thailand, CAPL is viewed as a learning tool for Thai English teachers for a number of reasons. Pronunciation teaching is viewed as a significant area of difficultly (as discussed below). Due to the fact that Thai English teachers are not English native speakers, they might not be able to pronounce all English sounds appropriately. Moreover, the nature of the Thai large class size classroom is that it includes a large number of students within the one classroom, therefore it is difficult for English teachers to deliver pronunciation corrections to all students during a sound production lesson (Wiriyachitra. 2001). The learners' difficulties in learning English pronunciation in Thailand are listed by Biyaem (1997) as: (1) the interference from mother tongue (Thai) in pronunciation, syntax and idiomatic usage; (2) unchallenging English lessons; (3) being treated as passive learners; (4) lack of opportunity to utilize English in learners' daily lives; and (5) lack of confidence to speak English with classmates.Moreover, there are many studies that report the benefits of CAPL software (Molholt. 1988; 1990; Harless; Zier; & Duncan. 1999; Holland; Kaplan; &Sabol. 1999; Kaplan; Sabol; Wisher; & Seidel. 1998; LaRocca; Morgan; &Bellinger. 1999; Eskenazi. 1999; Neri; Strik; &Boves. 2002; Butler-Pascoe; &Wiburg. 2003; Kim. 2006, as cited in Hismanoglu. 2011).Furthermore, Hismanoglu (2011) also reported the advantages of CAPL as being tireless and non-judgmental. Tireless means CAPL programs can assist English as Foreign Language (EFL) students on unlimited occasions. EFL students can practice any part of the teaching materials at

any time, and the system can offer other assistance as EFL students require it. It is also believed that CAPL programs can enhance learner-centeredness as they allow EFL students to study based on their own judgment, such as when selecting which function to learn first, and providing unlimited opportunities regarding how often they utilize it. EFL students are not onlythose who are able to obtain benefits from a CAPL program, but also teachers can gain benefits from employing a CAPL program in their pronunciation classes, as it can provide automatic and unlimited drill and practice for language learners. Drill and pronunciation practice in traditional classes are viewed by teachers as tiresome and time consuming (Wiriyachitra. 2001). Furthermore, it was reported that computer assisted pronunciation instruction could provide benefits that the traditional teaching class could not offer. Furthermore, utilizing a CAPL program in the EFL classroom could also enhance the autonomous learning skill of language learners. Pu (2009) reported that student autonomy is significantly increased under the instruction of a web-based Computer Assisted Language Learning (CALL) environment. Because CALL instruction is designed based on student-centeredness and independence, it could provide a rich environment where EFL students are allowed to control their language study in an effective way. Tuncok (2010) also reported the benefits of CALL in developing autonomous learning skill. CALL allows EFL students to engage in their language learning process by managing their learning based on their deficiencies and desires. It also allows them to learn language independently. EFL students are able to define their own language learning goals, decide to utilize learning materials at their own pace, and receive feedback to readjust their learning process according to correction and feedback provided from CALL. Thus, it assists EFL students in learning the target language autonomously.

Researchers have investigated the advantages of CAPL. However, little is known about its effectiveness in language learners' pronunciation performance, especially in a Thai university context. Moreover, Thai pronunciation teachers such as Janyasupab (1981), Chunsuvimol and Ronnakiat (2000), and Yangklang (2006) tried to improve only single English sound elements by utilizing their CAPL programs. However, focusing only one particular may not help Thai students to acquire intelligibility, which is a new goal of modern English pronunciation learning.Acquiring a native English accent is not a goal of English pronunciation learning in teaching English pronunciation currently. Kenworthy (1987) introduced the new goal of pronunciation learning, which is "intelligibility". Morley (1994) mentioned that the goal of pronunciation learning should be acquiring intelligibility. Thus, the goal of pronunciation shifted from acquiring near-native pronunciation to

intelligibility. Kenworthy (1987:13) defined intelligibility as "being understood by a listener at a given time in a given situation". Moreover, current research has provided insufficient empirical evidence about the influence of CAPL program towards autonomous learning skill of Thai EFL students in pronunciation learning, as language scholars tend to focus on overall language proficiency instead of concentrating on pronunciation skills where autonomous learning skill is required. Furthermore, it is believed that attitudes can affect a student's performance, cognition, emotion and proficiency when they learn with a computer or using CALL (Chiu. 2003). Attitudes toward CAPL could be either positive or negative, and they could produce a great impact toward further usage of CAPL programs. Negative attitudes to CAPL programs may detract from computer effectiveness (Wu.1997). Furthermore, there are some student's factors such as age, gender, major of study, years of studying English, CALL experiences that affect their attitudes toward CAPL program as reported by Tuncok (2010), therefore it is vital to examine students' factors affecting their attitudes towards CAPL program.

Hence, it is hoped that the utilization of a CAPL program could assist Thai university students in overcoming their English pronunciation problems, and assist them to acquire intelligibility. Moreover, it is also expected that the use of a CAPL program could activate autonomous learning skill of Thai university students and encourage them to manage their English pronunciation learning according to their needs and level. Lastly, it is believed that a positive attitude toward CAPL program could produce positive outcomes in pronunciation learning.

The present study

The effect of CAPL on Thai university students' English pronunciation performance, autonomous learning skill, attitudes toward the use of CAPL, and students' factors affecting their attitudes toward CAPL programs were investigated in this study. The study has the following research questions:

1)   Is there any significant difference in pronunciation performance between students who learn pronunciation by the integration of the traditional teaching style and CAPL programs and students who learn pronunciation by the traditional teaching style?

2)   Is there any significant difference in attitudes of students who learn pronunciation by the integration of the traditional teaching style and CAPL programs while, before and after utilizing

CAPL programs?

3)   Is there any significant difference in the autonomous learning skill of students who learn pronunciation by the integration of the traditional teaching style and CAPL programs while, before and after utilizing CAPL programs?

4)   Can age, gender, major of study, years of studying English, and CALL experiences affect students' attitudes in the experimental group toward CAPL programs?

Research Methodology

1)   Research Design

This study follows a quasi-experimental research design. The researcher equally divided the participants into a control and an experimental group. The control group learned pronunciation by utilizing a traditional teaching style. On the other hand, the experimental group learned pronunciation by a traditional teaching style together with the integration of CAPL programs.

2)   Instrumentation

In order to obtain data for answering each research question, four research instruments were utilized.The "Speexx" program is utilized as the first research instrument and integrated in the pronunciation learning of the experimental group. Moreover, the test in "Speexx" is also used as a pronunciation assessment test as evaluation from human beings might not be 100 percent consistent and reliable. CAPL's judgment on pronunciation performance is also bias-free.

The Phonetic Flash Animation (PFA) project from the University of Iowa will be used as the second research instrument as it can present information on the English language articulatory system and English language sound system in the form of motion pictures and clearly show how each English sound is articulated providing examples of English sounds, including both consonants and vowels.

A questionnaire is the third instrument used in this study. The questionnaire consists of three parts including students' demographic data, attitudes toward the use of CAPL, and autonomous learning skill. First, the demographic data is in the first part of the questionnaire in order to obtain students' personal information, and is used for analyzing factors affecting students' attitudes towards CAPL programs. The second and third parts consist of a Likert-type five-point questionnaire containing 28 items. The second part of the questionnaire involving the students' attitudes is adapted from the questionnaire of AbuSeileek (2007). The third part of the questionnaire is adopted

from Pu (2009). In terms of validity, the questionnaire was submitted to an expertise board comprised of three lecturers in the English language teaching field in order to examine the Index of Item Objective Congruence (IOC). The expertise board confirmed the relevance of all 28 items and all items obtained an IOC value over .50. Moreover, the questionnaire was piloted in October 2013 in order to examine the reliability. The questionnaire was randomly distributed to 14 fourth year students majoring in English and Education (English) and had experiences in utilizing CALL. After the selected samples answered the questionnaire, the data obtained were analyzed by the SPSS program.

A weekly journal entry is the fourth instrument used in this study. Students in the experimental group were assigned to write a weekly journal entry in order to examine their pronunciation learning. During the semester, pronunciation teacher used this information to assign extra exercises or to help students cope with problem sound(s) each week and traced students' participation to CAPL programs.

3) Population and sample

The population in this study is urban Thai university students who major in English and Education (English) from closed public universities. In this study, purposive sampling has been selected as the sampling criterion. Based on its accessibility, Srinakharinwirot University were chosen as the sample site. In sum, the sample of this study was 49 sophomore students from Srinakharinwirot University who major in English and Education (English).

4) Data collection

Data was collected quantitatively and qualitatively. Quantitatively, sophomore students from Srinakharinwirot University majoring in English were selected as the control group and Education (English) were selected as the experimental group. Both groups had their oral proficiency measured by the "Speexx" program test at the beginning of the semester in order to ensure that the participants of the study were at the beginning level of oral proficiency.The independent sample t-test was utilized to examine the difference of students' oral proficiency level between English and Education (English) major students. The result reveals that there is no difference in students' pronunciation performances between the experimental and control groups before utilizing the CAPL programs ($P < .05$). It can be concluded that all participants in this study are at the same level in English pronunciation performance.

Next, the selected participants enrolled in English Phonetics (EN291) as their major course requirement, and were free to enroll in any one of the three sections of English Phonetics being offered, depending on their timetable. The researcher was the teacher in all three sections. In the experimental group, students learned pronunciation by the integration of a traditional teaching style, "Speexx" program, and PFA project. They were required to write weekly journal entries to ensure their participation in utilizing CAPL programs during the semester and to report their progress in pronunciation learning to teacher; while students in the control group learned pronunciation by a traditional teaching style only. At the end of the semester, both groups took the "Speexx" program test to examine their progress in pronunciation performance. In addition, the questionnaire was distributed to students who were in the experimental group before and at the end of the semester to investigate their attitudes toward CAPL and their autonomous learning skill.

Qualitatively, students in the experimental group were assigned to write weekly journal entries during the semester in order to report their progress in pronunciation learning to the teacher each week. Therefore, teacher could use this information to assign extra exercises to assist students with their problem sound(s). Teacher could also use weekly journal entries to ensure students' participation in utilizing CAPL programs during the semester. Moreover, six students were randomly selected from the experimental group in order to attend a semi-structured interview to gather information that may not covered in the questionnaire and allow them to freely express their views toward CAPL programs.

5) Data analysis

An independent sample t-test was employed to compare participants' performances in the post-test scores between the control and experimental groups. The data analysis of students' attitudes toward CAPL programs was divided into two parts. In the quantitative part, a paired sample t-test was utilized to find the difference in students' attitudes before and after utilizing CAPL programs in the experimental group. In the qualitative part, the content analysis was applied to analyze students' responses from a semi-structured interview and students' weekly journal entries. A paired sample t-test was employed to investigate the difference in students' autonomous learning skill before and after utilizing CAPL programs in the experimental group. A multiple regression was employed to investigate whether students'factorssuch as age, gender, major of study, years of studying English, and CALL experiences affect students' attitudes toward the CAPL program in the experimental group.

Results

RQ1: Independent sample t-test was used to find the difference of pronunciation performances between students from the experimental and control groups, results can be seen in the following table.

Table 1

The Independent Sample t-test of the Post-Test of the Experimental Group and the Control Group

		M	SD	SE	F	t	df	p
Pronunciation score of English consonant	Experimental group	186.87	14.22	3.18	0.11	13.23	46	.000*
	Control group	125.12	16.95	3.2				

*P < .001.

The independent sample t-test in Table 1 reveals that there is a highly significant difference in students' pronunciation performances between the experimental and control groups (t = 13.23, p < .001); the experimental group (M = 186.87) scored higher than the control group (M = 125.12).

RQ 2 : Paired-samples t-test was utilized to find the difference in students' attitudes in the experimental group towards CAPL programs before and after utilizing the programs. The findings are presented in the next Table.

Table 2

Paired-sample t-test of students' attitudes towards CAPL programs

		Paired Differences					t	df	Sig. (2-tailed)
		M	SD	SE	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Statement 1	-2.2	0.834	0.186	-2.59	-1.81	-11.804	19	.000**
Pair 2	Statement 2	-2.15	0.813	0.182	-2.53	-1.77	-11.831	19	.000**
Pair 3	Statement 3	-0.55	0.999	0.223	-1.017	-0.083	-2.463	19	.024*
Pair 4	Statement 4	-1.2	0.894	0.2	-1.619	-0.781	-6	19	.000**
Pair 5	Statement 5	-1.9	0.641	0.143	-2.2	-1.6	-13.262	19	.000**
Pair 6	Statement 6	-1.35	0.813	0.182	-1.73	-0.97	-7.429	19	.000**

		Paired Differences					t	df	Sig. (2-tailed)
		M	SD	SE	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 7	Statement 7	-1.05	0.945	0.211	-1.492	-0.608	-4.972	19	.000**
Pair 8	Statement 8	-1.4	0.754	0.169	-1.753	-1.047	-8.304	19	.000**

*P < .05.

**P < .001.

Table 2 illustrates that differences exist in students' attitudes towards CAPL programs in the experimental group before and after the utilization of CAPL programs. The t-test was processed and the results reveal that there is a highly significant difference in students' attitudes towards CAPL programs before and after utilizing the programs (p < .001). Moreover, there is only one pair that was significant at p < .05, which is pair 3 (CAPL is interesting and useful).

To triangulate the quantitative part, a semi-structured interview and students' written journal entrieswere also analyzed.

Semi-Structured Interview Responses

There are many advantages of CAPL's instruction and activities. First, CAPL program could teach as a real teacher to provide required information for studying English pronunciation such as English speech models, feedback, correction, and motion pictures of consonant speech production. Second, the instruction of CAPL programs does not aim to teach pronunciation only; they could also help improve other skills such as listening skills. On the other hand, most of the students in the experimental group complained about the Speexx's reliability in delivering feedback. Moreover, one of the students preferred to have teacher guided instruction while he was practicing pronunciation with the program. In terms of the overall picture of CAPL programs and activities, students believe that programs could provide unlimited opportunities to learn English consonant pronunciation both inside and outside the classroom. They also realize that they are motivated to learn by the pro

grams, because the programs are interesting and innovative. Most students think that the program could assist them in avoiding the embarrassment of being judged by the teacher in pronunciation classroom practices. However, there is one major complaint of CAPL programs regarding their design, because the web-based design program requires a strong Internet signal. Thus, the effectiveness of the programs will decrease, when the Internet signal is low. Most of them suggest that the programs should be utilized in an offline application and CD instead because they would like to use the application offline with their smartphones. Lastly, one student prefers to learn pronunciation by listening to English songs instead of reading news.

Students' Journal in the Experimental Group

One hundred seventy seven journals were submitted from 20 students in the experimental group. Moreover,students in the experimental group spent around 20 minutes to 3 hours per session studying consonant pronunciation through CAPL programs, and most of them studied English consonant content. Furthermore, there were eight English consonant sounds that students could not pronounce correctly. They are /ʃ/ (13 students), /h/ (6 students), /ʒ/ (5 students), /ð/ (5 students), /tʃ/ (4 students), /r/ (4 students), /s/ (1 student), and /l/ (1 student). Thus, the most difficult English consonant sound perceived by the majority of students in the experimental group is /ʃ/.In terms of the difficulties while practicing the programs, it was noticed that there are two factors affecting the studying of English consonants, which are internal and external factors. There are three internal factors; the program itself, students' characteristics, and equipment used.In terms of external factors, there are two elements which affected students' performance, the Internet signal and the surrounding environment.

RQ 3: Paired-samples t-test was utilized to find the difference in students' autonomous learning skill in the experimental group before and after utilizing the programs. The findings are presented in the next table.

Table 3

Paired-Samples t-test of Students' Autonomous Learning skill

	Paired Differences					t	df	Sig. (2-tailed)
	M	SD	SE	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Statement 1	-1.900	.852	.191	-2.299	-1.501	-9.970	19	.000**
Pair 2 Statement 2	-1.400	.754	.169	-1.753	-1.047	-8.304	19	.000**
Pair 3 Statement 3	-1.850	.933	.209	-2.287	-1.413	-8.865	19	.000**
Pair 4 Statement 4	-1.450	.999	.223	-1.917	-.983	-6.493	19	.000**
Pair 5 Statement 5	-2.200	.834	.186	-2.590	-1.810	-11.804	19	.000**
Pair 6 Statement 6	-1.600	.940	.210	-2.040	-1.160	-7.610	19	.000**
Pair 7 Statement 7	-2.100	.912	.204	-2.527	-1.673	-10.299	19	.000**
Pair 8 Statement 8	-1.500	.761	.170	-1.856	-1.144	-8.816	19	.000**
Pair 9 Statement 9	-2.000	.973	.218	-2.456	-1.544	-9.189	19	.000**
Pair 10 Statement 10	-2.100	.788	.176	-2.469	-1.731	-11.917	19	.000**
Pair 11 Statement 11	-1.650	.933	.209	-2.087	-1.213	-7.906	19	.000**
Pair 12 Statement 12	-2.050	.686	.153	-2.371	-1.729	-13.358	19	.000**
Pair 13 Statement 13	-2.750	.550	.123	-3.007	-2.493	-22.356	19	.000**
Pair 14 Statement 14	-1.900	1.165	.261	-2.445	-1.355	-7.292	19	.000**
Pair 15 Statement 15	-1.700	1.031	.231	-2.183	-1.217	-7.373	19	.000**
Pair 16 Statement 16	-.550	.999	.223	-1.017	-.083	-2.463	19	.024*
Pair 17 Statement 17	-2.800	.768	.172	-3.159	-2.441	-16.310	19	.000**
Pair 18 Statement 18	-2.300	.923	.206	-2.732	-1.868	-11.139	19	.000**
Pair 19 Statement 19	-2.400	.821	.184	-2.784	-2.016	-13.077	19	.000**
Pair 20 Statement 20	-1.750	.910	.204	-2.176	-1.324	-8.596	19	.000**

*P < .05.

**P < .001.

According to Table 3, the difference exists in students' autonomous learning skill in the experimental group before and after the utilization of CAPL programs. The t-test was utilized, and it shows that there is a highly significant difference at the p < .001 in most pairs. However, there is only one pair in factor four that is significant at the p < .05, which is willingness of students in the experimental group to cooperate and learn together with classmates.

RQ 4 : Multiple regression was used to find the factors affecting students' attitudes towards CAPL programs. There are three predictor variables that have missing correlations and have been cut out from the analysis by the SPSS program; these variables are age, major of study and CALL experience. Thus, gender and years of studying English are only analyzed in multiple regression analysis. There is only one statement concerning attitudes towards CAPL programs that have a correlation with the predictor variable. In fact, a correlation is found between students' attitudes towards the interestingness and usefulness of CAPL programs and gender (p < 0.01). The findings are presented in the next table.

Table 4

Regression Analysis Predicting Students' Attitudes towards CAPL Programs (N = 20)

No.	Predictor variables	β	R^2	ΔR^2
1	Gender	.72	.47	.37

Table 4 reveals that gender affects students' attitudes towards the interestingness and usefulness of CAPL programs, accounting for 37% of the variance in students' attitudes towards the interestingness and usefulness of CAPL programs (F (3, 16) = 4.753, p < .01).

Discussion

Students' Pronunciation Performance between the Experimental and Control Groups

The CAPL programs which are perceived as material artifacts played a significant role in improving pronunciation learning of students in the experimental group. The role of CAPL programs in acting as a teacher is a vital key to enhance the zone of proximal development in pronunciation learning, because students in the experimental group could expand their potential to learn pronunciation successfully by the assistance of the programs (Vygotsky. 1978). According to the obtained data from the interview, CAPL programs can be perceived as "other" or real teacher instead of object that could assist students reach the second stage of constructing knowledge in the regula-

tion process (Lantolf; & Thorne. 2006). In addition, the fact that CAPL programs could act as agent could adjust the notion of social learning in the sense that cultural development of EFL learning in social level can occur by the combination of social and technology (Vygotsky. 1978). However, there is one sound that students could not acquire successfully which is /ʃ/. Students had difficulty pronouncing /ʃ/ because there might be some sounds that EFL learners could not acquire during the interlanguage phonology process, and they tend to substitute them with different sound as mentioned by Selinker (1972). However, based on the researcher observation, students in the experimental group misunderstood that the final position of the word vivacious is a voiced, not a voiceless, sound.

Students' Attitudes towards CAPL Programs

Students' attitudes towards CAPL programs has changed from uncertain to favorable which could be explained by the functionalist theory of attitudes from Katz (1938, as cited in Lindzey; & Aronson. 1985). This improved attitude occurred because students in the experimental group perceived CAPL programs as tools that could assist and benefit them in learning pronunciation; therefore their attitudes have changed to become favorable. Moreover, positive attitudes of students in the experimental group could be perceived as learned motivation that stimulates them to learn pronunciation (Wenden. 1998). Moreover, holding positive attitudes towards CAPL programs could assist students in the experimental group in accomplishing learning pronunciation as proved by the post-test scores on the pronunciation test (Ellis. 1997). Moreover, positive attitudes towards CAPL programs could develop students' willingness to utilize CAPL programs again for their pronunciation learning in the future (Almahboub. 2000, as cited in Chiu. 2003). Lastly, according to the students, there are both advantages and disadvantages of the feedback from the Speexx program that are relevant to the study of Pennington (1999). In terms of the advantages, feedback from the Speexx program could produce a stress-free environment for students in order to avoid bias and embarrassment from the pronunciation teacher and classmates while receiving feedback in front of the class. In terms of disadvantages, one student in the experimental group still has a problem interpreting feedback of the Speexx program.

Students' Autonomous Learning Skill

Encouraging students in the experimental group to take responsibility in all decision making through all aspects of their pronunciation learning by the utilization of the traditional teaching style and CAPL programs can develop autonomous learning skill (Holec. 1981). Based on the framework of developing autonomy in EFL learning from Littlewood (1996), students in the experimental group can develop autonomy as learners, because they are able to incorporate both the ability to participate in independent learning and the ability to utilize suitable learning strategies. Moreover, providing various pronunciation resources such as Speexx, PFA, and online dictionaries allow them to take greater control over the content and ways of language learning (Holec. 1981). Furthermore, the fact that students' autonomous learning skill has changed from moderately low to high at the end of the semester can be explained by Benson (2001), who mentioned that integrative applications such as web-based learning could stimulate exploratory learning and learner control and lead to the development of autonomy when it is integrated into the language classroom. In addition, CAPL programs could be viewed as Autonomous Technology-Assisted Language Learning (ATALL) in the sense that the programs are designed to be used with computers and the Internet for assisting students in learning language, and it can be integrated as a tool to supplement pronunciation exercises both inside and outside the classroom (Parach; et al. 2009). Lastly, there is one statement in the questionnaire that is significant at $P < .05$, which is willingness of students to cooperate and learn together with classmates. The reason that there is a small difference in students' willingness to cooperate and learn together with classmates before and after the utilization of CAPL is because the CAPL program can produce a stress-free environment in the classroom where students can privately receive non-judgmental feedback from the CAPL program; therefore they are willing to learn pronunciation together with their classmates from the beginning of the semester (Hismanoglu. 2011).

Factors Affecting Students' Attitudes towards CAPL Programs

It is reported that gender differences can predict students' attitudes towards CAPL programs. This finding is supported by the study of Tuncok (2010) who found that gender affect students' attitudes towards computer assisted language learning. However, there are some studies that have opposite results of students' gender differences in attitudes towards technology used in the classroom. First, Lai and Kuo (2007) found that 91% of male students tended to hold preferable

attitudes towards CALL in pronunciation class, while only 57% of female students hold preferable attitudes towards the CALL program. Second, Chiu (2003) also discovered that male students tend to hold more positive attitudes towards the CALL program than female students. The fact that male students tend to hold positive attitudes towards technology used in both studies can be explained by their technological experiences that assist them in feeling comfortable using the programs. However, male and female students in this study have similar CALL experiences, hence the results contradict the mentioned studies.

Conclusion

This study aims to investigate the effectiveness of CAPL programs towards Thai university students' pronunciation performance and autonomous learning skill. The results show that the CAPL programs played a significant role in improving pronunciation learning of students in the experimental group as Beatty (2003) mentioned that a good environment of technology-based learning requires different interfaces to conform to various learning styles that are compatible with different skills. Thus, when students in this study are involved in a technology-based learning environment, they can improve their pronunciation learning performance. Moreover, students' autonomous learning skill has been activated. It is because once students can evaluate their learning strategies and materials and take control of their study, their autonomous learning skill will be increased for assisting them to be able to learn pronunciation independently outside pronunciation classroom and to take control over the content of pronunciation learning (Holec. 1981). Furthermore, they also develop positive attitudes towards CAPL programs as the functional theory of attitude suggests by Katz (1938, as cited in Lindzey; & Aronson. 1985), hence students' attitudes towards CAPL programs has changed from uncertain to favorable. In sum, this study not only aims to compare the traditional teaching style and CAPL programs, but it also attempts to illustrate how CAPL programs and weekly journal entries are integrated into a pronunciation classroom as a supplemental tool for enhancing Thai university students' pronunciation performance and autonomous learning skill.

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The Questionnaire

THAI UNIVERSITY STUDENTS' ATTTIUDES AND AUTONOMOUS LEARNING SKILL

QUESTIONNAIRE

PART 1: DEMOGRAPHIC INFORMATION OF RESPONDENTS

INSTRUCTION: Check

Age: ☐ 18-20 ☐ 21-24

Gender: ☐ Male ☐ Female

Major: ☐ English ☐ Education (English)

Minor: ☐ Linguistics ☐ Communication   Othe ☐ _____ (specify)

Years of studying English: _____ years

Have you studied English via any Computer-Assisted Language Learning (CALL) tool before?

☐ Yes ☐ No

PART 2: ATTITUDES TOWARD ENGLISH PRONUNCIATION LEARNING PROGRAMS

INSTRUCTION: Items in this part are about attitudes toward learning the English pronunciation with CAPL program. Indicate your attitude toward each item by marking the place of the rating scale which most closely reflects your attitude at this time.

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. I can learn English on my own when using the CAPL programs such as Speexx					
2. The CAPL program is easy to use.					
3. The CAPL program is interesting and useful.					
4. The CAPL's activities and exercises are suitable and useful.					
5. The methods and techniques used in CAPL program instruction are effective in improving pronunciation learning.					
6. The feedback provided by the program is					

useful.					
7. I would like to use the program again in learning pronunciation.					
8. In general, the CAPL is good.					

PART 3: AUTONOMOUS LEARNING SKILL

INSTRUCTION: Items in this part are about autonomous learning skill. Indicate your attitude toward each item by marking the place of the rating scale which most closely reflects your attitude at this time.

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. I understand the course requirements and the class requirements.					
2. I am able to turn the teacher's teaching objectives into my own learning objectives.					
3. I feel I can keep up with the progress of the pronunciation course.					
4. Besides the class tasks and assignments, I will make my own study plan.					
5. I make my own study objectives according to my own situation.					
6. I adjust my study plan if necessary.					
7. I make a time plan to study English pronunciation.					
8. I set up my English pronunciation study objectives according to the EN 291 English Phonetics Syllabus.					
9. I adjust my pronunciation learning strategies if I find they are not suitable for me.					
10. I evaluate my pronunciation learning approaches in order to find problems of my pronunciation study.					

11. I change my pronunciation learning approach when I find it inappropriate.					
12. I am aware of whether my learning approaches are suitable to myself or not.					
13. I find opportunities to learn English pronunciation outside classroom.					
14. I try to take advantage of the pronunciation learning resources available.					
15. I try to use the new knowledge when I practice my English pronunciation.					
16.I try to cooperate and learn together with my classmates.					
17. I realize the pronunciation mistakes I have made during my study process.					
18. I know the reasons why I make pronunciation mistakes and will take actions to correct them.					
19. I check whether I have finished my study plan when I try to finish a pronunciation learning task.					
20. I check whether I have learned the previous knowledge when I try to finish a pronunciation learning task.					