CHAPTER IV
RESULTS AND DISCUSSION

In this chapter, there are two parts: the results of this study and the discussion. The first part is the results of the study and is shown as the effectiveness of the CAMP courseware, the results from pre-pronunciation test/post-pronunciation test and the results from the questionnaire. The second part is the discussion of these results.

1. Results of the study

1.1 Research question 1: What are the efficiency and the effectiveness index of the computer-assisted musical pronunciation courseware?

To answer research question number 1 The Efficiency and the Effectiveness Index of the Courseware results are shown in Table 4

After developing the courseware, it was tested at the standard criterion for the effectiveness of courseware at 80/80 (Chiewpimai, 1983). The first 80 means the effectiveness of the learning process and second 80 means the effectiveness of learning result.

Table 4 The effectiveness and the effectiveness index of the courseware

Types of trials	Number of students	Effectiveness Process (E1)/ learning result (E2)	Effectiveness index
1. One-to-one testing	3	71.25/ 65.42	0.38
2. Small group testing	9	80.68/70.83	0.41
3. Field group testing	30	83.57/91.33	0.86

The results in Table 4 show the effectiveness (E1/E2) and Effectiveness Index (E.I.). It was tested by one-to-one testing (1:1), small group testing (1:10), and field group testing (1:100). The results were analyzed according to effectiveness and effectiveness index. (See APPENDIX K on page 195)

1.1.1 One-to-one Testing (1:1)

The CAMP courseware was tested with three Management Sciences students who were not in the sample group. The reason for testing the program was to find any weak points. The result of the effectiveness analysis was 71.25/65.42 (E1/E2). The result revealed that some of the weak points of the test were in the text. The text should be enlarged. Some text had some misplaced words and misspellings. Furthermore, some speaking sounds of the native speaker were too fast. The website was too slow and had many errors when they accessed it. To improve the CAMP courseware, the researcher enlarged the text in the CAMP courseware and fixed some misplaced words. Moreover, native speakers were asked to record the sounds again. The effectiveness index of the one-to-one testing (1:1), when tried out with three students, was .38. For the effectiveness index, the results revealed that the effective index of one-to-one testing with three students was .38, which was lower than 0.50.

1.1.2 Small-Group-Testing (1:10)

The small-group-testing was conducted with nine students who were not in the sample group. The reason for this test of the program was also to find the weak points of the program and reduce errors. The result of the effectiveness analysis was 80.68/70.83 (E1/E2). The result revealed that the weak points of this trial still were about the text, the sound, and the design of the program. The space of the reading text was hard for the student to read. Some speaking sounds of the native speaker were too fast. Some audio sounds did not play when the corresponding material was shown on the screen. In addition, design of the CAMP courseware was not interesting to learn and the background color was not attractive. To improve the CAMP courseware, the researcher fixed some content on the screen and asked native speakers to record some audio sounds again. The background color was adjusted. The effectiveness index of the small-group-testing (1:10) when tried out with nine students was .41. The CAMP courseware was improved, then again tried out with nine

students. The effective index was .41 which was still lower than 0.50. This index, which is lower than .50, shows that the CAMP courseware still could not help the students to improve their learning.. The CAMP courseware was improved again.

1.1.3 Field-Group-Testing (1:100)

The revised computer courseware was used with 30 students in the sample group who studied in the Faculty of Management Sciences. The effectiveness was 83.57/ 91.33 which was higher than the standard criteria of effectiveness at 80/80 (Chiewpimai, 1983). This showed that the program was suitable to help the students acquire the knowledge about English suprasegmentals. The effectiveness index of the field group testing (1:100), when tried out with 30 students was .86. After that test, the CAMP courseware was used with the 30 students in the sample group. The effectiveness index was .86, which was higher than the criteria required of .80. This means that the CAMP courseware could help the students to improve their knowledge about English suprasegmentals.

1.2 Research Question 2: To what extent can computer-assisted musical pronunciation courseware help learners improve their knowledge of English word stress, sentence stress and intonation through music?

To answer research question number 2, the analysis of the pronunciation test results are shown in Table 5

The pre-pronunciation test and post-pronunciation test were constructed as listening test and speaking tests, which had a different order of test items. There was a listening test with 40 items worth 40 points and speaking test with 20 items worth 40 points. Before the tests were taken by the subjects, the tests were checked for validity by three experts in this area using the Index of Concurrency Formula. The subjects took a pre-pronunciation test before they began the lessons in the courseware. After they finished all the lessons, they took the post-pronunciation test. The scores of pre-pronunciation test and post-pronunciation test are shown in the table 5.

Table 5 Results of pre-pronunciation and post-pronunciation tests

No.	Pre-pronunciation test Scores			Post-pronunciation test Score		
	Speaking	Listening	Total	Speaking	Listening	Total
1.	21	20	41	40	36	76
2.	24	19	43	33	34	67
3.	22	24	46	40	36	76
4.	20	23	43	33	40	73
5.	22	22	44	35	39	74
6.	17	20	37	37	36	73
7.	23	22	45	39	36	75
8.	22	19	41	33	37	70
9.	20	19	39	33	38	71
10.	18	20	38	37	33	70
11.	18	24	42	35	38	73
12.	19	17	36	36	40	76
13.	23	22	45	37	35	72
14.	17	19	36	38	33	71
15.	21	17	38	36	36	72
16.	23	18	41	35	39	74
17.	23	17	40	33	35	68
18.	19	20	39	36	36	72
19.	24	24	48	37	38	75
20.	23	21	44	39	36	75
21.	22	20	42	37	38	75
22.	24	24	48	38	37	75
23.	24	18	42	39	34	73

Table 5 Result of pre-test and post-test scores (cont.)

No.	Pre-test Scores			Post-test Score		
	Speaking	Listening	Total	Speaking	Listening	Total
24.	20	20	40	36	35	71
25.	17	20	37	39	33	72
26.	24	19	43	38	40	78
27.	23	21	44	38	35	73
28.	22	18	40	38	37	75
29.	20	21	41	34	35	69
30.	17	24	41	39	39	78
$\bar{x}$	21.07	20.40	41.47	36.60	36.47	73.07
S.D.	2.41	2.00	3.22	2.22	2.10	2.72

The results of the pre-pronunciation test and the post-pronunciation test are shown in Table 5. Table 5 also shows that the mean score ($\bar{x}$) of the total pre-pronunciation test is 41.47 and the standard deviation 3.22. After using the CAMP courseware, the students had total post-pronunciation test mean scores higher than pre-pronunciation test mean scores at 73.07 and standard deviation also lower at 2.72. This shows that the students improved their knowledge after using the CAMP courseware.

Table 6 The progress of the subjects' pre-test and post-test

Pre-test/post-test	Mean ($\bar{x}$)	S.D.	t-test	P
Pre-test	41.4	3.2	49.04	* 0.00
Post-test	73.0	2.7		

* P <0.05

Table 6 shows a paired-samples test that was conducted to compare production and perception ability of English suprasegmentals before and after the students learned using the CAMP courseware. There was a significant difference in the scores for the pre-pronunciation test (M=41.5, S.D. =3.2) and post-pronunciation test (M=73.0, S.D. =2.7) condition; t = 49.04, p = 0.00. These results suggest that there is an effect on pronunciation ability of English suprasegmentals. Specifically, results suggest that when student learned the CAMP courseware about English suprasegmentals, their pronunciation ability increases.

Table 7 The progress of the subjects' pre-speaking test and post-speaking test

Pre-test/post-test	Mean ($\bar{x}$)	S.D.	t-test	P
Pre-speaking test	21.1	2.4	25.88	* 0.00
Post-speaking test	36.6	2.2		

* P <0.05

Table 7 shows a paired-samples test that was conducted to compare production ability of English suprasegmentals before and after the students learned the CAMP courseware in pre-speaking test and post-speaking test. There was a significant difference in the scores for pre-speaking test (M=21.1, S.D. =2.4) and post-speaking test (M=36.6, S.D. =2.2) condition; t = 25.88, p = 0.00. These results suggest that there is an effect on production ability of English suprasegmentals. Specifically, results suggest that when student learned the CAMP courseware about English suprasegmentals, their production ability increases.

Table 8 The progress of the subjects' pre-listening test and post-listening test

Pre-test/post-test	Mean ($\bar{x}$)	S.D.	t-test	P
Pre-listening test	20.4	2.2	31.96	* 0.00
Post-listening test	36.5	2.1		

* P <0.05

Table 8 shows a paired-samples test was conducted to compare perception ability about English suprasegmentals before and after the students learned the CAMP courseware in pre-listening test and post –listening test. There was a significant difference in the scores for pre-listening test (M=20.4, S.D. =2.2) and post-listening test (M=36.5, S.D. =2.1) condition; t = 31.96, p = 0.00. These results suggest that there is an effect on perception ability of English suprasegmentals. Specifically, results suggest that when student learned the CAMP courseware about English suprasegmentals, their perception ability increases.

1.3 Research Question 3: What are learners' attitudes toward the computer-assisted musical pronunciation courseware?

To answer this research question, data from the questionnaire were analyzed.

The Analysis of the Questionnaire Results

The questionnaire consisted of three parts which; personal information, student's experience, and student's attitude toward the CAMP courseware. (See APPENDIX L on page 199)

1.3.1 Personal Information

The students in this study were nine male students and twenty-one female students who study in the Faculty of Management Sciences. They were second-year students who passed the basic Business English course in the first semester of academic year 2010. Their majors were finance, accounting, management, and economics.

1.3.2 Student's Experience

The second part of the questionnaire was students' experience, which consisted of English experience, music experience, and computer experience.

1.3.2.1 English experience

To assess the student's English experience, they were asked questions about their grades in the Business English course from the previous semester, how long had they studied English, had they ever been abroad and why had they gone, In addition, they were asked if they had a chance to communicate with English native speakers and how they practiced their English outside of class? The

answers to each of these questions will be discussed below. For details results see Appendix L on page 199.

The results showed that three students in this study (10 percent) received As in the Business English course in previous semester while seven students (23.33 percent) received a B+. The majority of the students (12 or 40%) in this study received Bs. Five students (16.67 percent) received a C+ and only two students (6.67 percent) received a C, which was the lowest grade for the students in this group. These grades indicate that most of the students in this study had good English ability.

Question number two and three were asked about the student's experience going abroad. The results showed that only two students had been abroad; one student had been to America for a summer when he/she was young and another student went to Australia to travel with his/her family.

Question number four asked about the students chances to communicate with foreigners. The results showed that only three students had a chance to speak with foreigners outside class. This showed that only 10 percent of the students had a chance to practice speaking and listening with a English native speaker.

Question number five asked how the students practice their English outside class. This question could be answered with more than one answer, so the total of the amount is not 30. The results showed that 21 students or 31.82 percent of them liked to listen to music. 25 students, or 37.88 percent, enjoy searching websites about learning English. There were 18 students (27.27 percent) who watched English soundtrack movies and only two students, or 3.03 percent, who chatted with foreign friends.

In addition, the students were asked about their opinion about their knowledge of English suprasegmentals before and after they learn the CAMP courseware. The results show in Table 9. This question used a five-level scale from Likert (see Table 3 in Chapter 3 on page 34).

Table 9 How much you know about English suprasegmentals before and after using the CAMP courseware?

	5	4	3	2	1	$\bar{x}$	S.D.	Level
Before	0	0	15	7	8	2.23	0.84	Low
After	27	3	0	0	0	4.90	0.30	Very high

Table 9 shows that before the students learned the CAMP courseware, 15 students thought that they may have some knowledge about English suprasegmentals. There were seven students that thought they lacked knowledge about English suprasegmentals. There were eight students who revealed that they did have knowledge about English suprasegmentals. After they learned the CAMP courseware all students mentioned that they had higher knowledge about English suprasegmentals after they used the CAMP courseware. There were 27 students who had a very high level of knowledge and three students who had a high level of knowledge. These results revealed that most of the students in this study had higher self-confidence about their knowledge of English suprasegmentals

1.3.2.2 Music experience

This part of the questionnaire asked students about their music experience. There are four questions, which are: Do they play music?; If they play music, what kind of music instruments do they play?; Do they like to listen to music?; What kind of music do they like? The results from these questions about music experience show that there were 13 students (43.33 percent) who had experience playing a musical instrument. There were 17 students (56.67 percent) who did not play a musical instrument. Of those who played a musical instrument, there were twelve students who played guitar, five students who played piano, one student who played ukulele, one student who played kim (a Thai instrument), and one student who played Jake (a Thai instrument). There were 28 students (93.33 percent) who liked to listen to music while only 2 students (6.67 percent) did not like to listen to music. 21 students, or 43.75 percent, enjoyed listening to pop music. 13 students (27.08 percent) liked rock, 3 students (6.25 percent) liked rap, 4 students (8.33 percent) liked classical music, 3 (6.25 percent) liked jazz, and 2 (4.17) like reggae

(See Appendix L on page 199). These results showed that most of these university students enjoy listening to pop and rock, so they could use pop and rock to help them to learn English. They may have more motivation to learn with these musical styles. These results showed that many of this group of students had a chance to play a musical instrument. Most of them liked listening to music, so it can be assumed that they were familiar with the pitch and rhythm of music. The relationship of rhythm in music could help these students to acquire rhythm in speech easily.

1.3.2.3 Computer experience

The last part of questionnaire was questions about the students' computer experience. The three questions were: Have you ever used computer-assisted language learning or E-learning or Moodle?; Do you prefer to learn with e-learning?; and where do you use the computer? The results showed that there were 30 students, or 100 percent of students, who had a chance to use e-learning to learn in their own time. There were 28 students, or 93.33 percent, who preferred using e-learning while two students did not like to learn by e-learning course because they had a problem with their eyesight.

The last question was asked about where they can use the computer. The majority of them (16 students or 53.33 percent) used their own computer. There were seven students who used the computers that were provided at their dormitory. There were three students use the computers at the computer lab of their faculty. There were two students who used the computers at the library. One student used a computer at the computer center and other one student used an Internet Café.

1.3.3 Students' Attitude toward the CAMP Courseware

The attitude toward the CAMP courseware was tested by a 5-point scale of attitudes and their interpretations (see Table 3 and Table 4 in Chapter 3 on page 34).

The results of the students' attitude toward the CAMP courseware are divided into three parts, which are the design of the CAMP courseware, the contents of the CAMP courseware, and the satisfaction with the CAMP courseware. The results are shown in Table 10, 11, and 12.

Table 10 The results of the student's attitude toward the design of CAMP courseware.

Item						Analysis		Level
	5	4	3	2	1	$\bar{x}$	S.D.	
Part 1: The design of CAMP courseware.								
1. I can learn a lot in the lesson.	21	8	1	0	0	4.67	0.54	High satisfaction
2. Audio sounds are clear and appropriate.	17	7	6	0	0	4.37	0.80	satisfaction
3. Convenient to access.	8	7	12	3	0	3.67	0.98	satisfaction
4. The design of the program.	20	3	7	0	0	4.43	0.84	satisfaction

Table 10 shows the results of the students' attitude toward the CAMP courseware. In part one, there were four items. The students' attitude toward the design of the CAMP courseware revealed that the students had a high level of satisfaction. They felt they can learn a lot, which is shown by the mean score at 4.67 and S.D. at 0.54. This means that students have a high level of satisfaction in learning. Three items were satisfaction. They are satisfyied with the design of the program (mean score at 4.43), the audio sounds (mean score at 4.37), and how to access the CAMP courseware (mean score at 3.67).

Table 11 The results of the student's attitude toward content of the CAMP courseware

Item						Analysis		Level
	5	4	3	2	1	$\bar{x}$	S.D.	
Part 2: The content of the CAMP courseware.								
5. The explanation is clear.	22	8	0	0	0	4.73	0.44	High satisfaction
6. The sequence of the contents is appropriate.	27	3	0	0	0	4.90	0.30	High satisfaction
7. The CAMP has enough activities.	7	13	7	3	0	3.80	0.91	satisfaction
8. The lessons take suitable time to learn.	20	4	6	0	0	4.47	0.81	Satisfaction
9. Lyrics and kind of music are appropriate.	25	5	0	0	0	4.83	0.37	High satisfaction
10. Music and songs help to remember the content	27	3	0	0	0	4.90	0.30	High satisfaction

Table 11. There were six items in this part regarding the content of the CAMP courseware. They had a high satisfaction with the suitability of the music, for the content, and that the music could help them to remember the content (mean score at 4.90), the sequence of the contents (mean scores at 4.90), the lyrics and the kind of music were appropriate (mean score at 4.83), and the explanation was clear (mean score at 4.73). They were satisfied with the time being suitable to learn (mean score at 4.47) and the activities in each lesson (mean scores at 3.80).

Table 12 The results of the student's attitude toward the CAMP courseware

Item						Analysis		Level
	5	4	3	2	1	$\bar{x}$	S.D.	
Part 3: Satisfaction with CAMP courseware.								
11. I am satisfied with CAMP courseware.	23	4	3	0	0	4.67	0.65	High satisfaction
12. The lesson makes me feel comfortable to learn.	25	1	4	0	0	4.70	0.69	High satisfaction
13. Exercises and activities make me feel more confident.	15	10	5	0	0	4.33	0.75	Satisfaction
14. I want to learn in computer-assisted lesson.	24	2	4	0	0	4.67	0.70	High satisfaction
15. Suggestion.....								

The results from Table 12 were about the student's satisfaction toward the CAMP courseware. There were four items and one open-ended question which was asked about their suggestions about the CAMP courseware. The results show that they had high satisfaction with three items. The lessons made them feel comfortable to learn (9 mean score at 4.0). The students prefer to use the CAMP courseware, at the mean score at 4.67 and S.D. 0.65. They liked to learn by computer, at the mean score at 4.67 and S.D.at 0.70. Moreover, they were satisfied with the exercises and activities, with a mean score at 4.33 and S.D. at 0.75.

The last question of the questionnaire was the open ended question about the students' suggestions. While learning the CAMP courseware, they could contact the researcher or teacher by e-mail and Facebook. However, they still needed the teacher in person to answer in the difficult parts and to give suggestions. In addition, the content in the program should not be too much in each lesson. The students wanted to finish the lesson in a short period of time, such as one hour for each lesson. The content in the lesson could help them to generate the rules of pronunciation for the other words which they did not see in the program

In conclusion, the results showed that the students had positive attitudes toward the CAMP courseware. They felt comfortable learning English word stress, sentence stress and intonation by themselves on the CAMP courseware. With the use of music and songs, they think the CAMP courseware can help them to remember the stress and intonation patterns.

2. Discussion of the Results of the Study

In this section, the factors that effect the results of the study will be discussed. There are reasons why the CAMP courseware was effective.

2.1 The students in this study had a good English ability, which can be seen from the result of the questionnaire about their grades in the English course from the previous semester. The lowest grade was a C. This indicates that they had good English skills.

2.2 The students in this study had good musical experience, with nearly half of the students (43.33 percent) playing musical instruments. 93.33 percent of them liked to listen to the music.

2.3 They were familiar with learning lessons via e-learning. Every student had had a chance to use e-learning before use the CAMP courseware.

2.4 The students had a positive attitude toward e-learning.

2.5 They had a high satisfaction with the music and songs in this study as a means to help them learn stress and intonation.

2.6 The course pre-test conducted under controlled conditions, but the course post-test could not be controlled. The students finished the post-test on their own. This could be interpreted that they finished the course post-test by themselves or they did the test for too long a period of time. Care should be taken when generalizing the results.

2.7 From the results of this study, the post-test scores were statistically significantly higher than pre-test scores. Table 5 shows the post-test mean scores at 73.07, which is higher than the pre-test mean scores of 41.47. The T-tests confirm the significance of the score at p value lower than 0.05. The results show that the CAMP courseware helped students gain more knowledge about English suprasegmentals after they learn the lessons. For using computer material for teaching word stress and

intonation, the results were similar to the study from Chompuboot (2005), which was conducted using a program about teaching word stress and intonation for second-year English students. The Chompuboot study showed that those students could learn from a computer program and they also got post-test scores higher than the pre-test scores. Likewise, Hardison (2004) used a computer program to train the language students to learn second language stress. He found that the students could improve both suprasegmental and segmental aspects. The results from this study confirm that with the computer-assisted language learning technology, it is still necessary for language learners to learn and practice by themselves. The results from the questionnaire revealed that the students had positive attitudes to learning language from the CAMP courseware. The computer program motivated them to learn from their lessons. All the students in this study had a chance to learn lessons using e-learning and 28 students (93.33 percent) preferred learning from e-learning. These results support that they had positive attitudes to learning by e-learning so they could learn well using this program. (See Appendix L on page 199.)

2.8 Nearly half of the students in this study (13 students or 43.33 percent) play ed a musical instrument. Thus, it can be assumed that they were familiar with pitch. Most of them (28 students or 93.33 percent) preferred to listen to music in their spare time. These results revealed that their ears could be sensitive to changing pitch and rhythm. This information could support the idea about the relation of rhythm in speech and music. The results from the questionnaire about using music for teaching suprasegmentals revealed that music and songs, especially pop and rock, could help students to recognize the pitch of the stressed syllables and stress placement in sentence, and the importance of intonation pattern. This result was the similar to the study of Yasuyo (1988), who found that musical notes could help the students to understand English rhythm, which lead to the students understanding the intonation of the sentence. Similar to other studies, Soudon (2002) used jazz chant for teaching speaking. Fischler, (2005) used rap music for teaching stress. Various kinds of music in this study, such as pop, rock, and jazz chant, could be used for teaching word stress and intonation.

In conclusion, the results from this research show that the CAMP courseware can assist Business English students to acquire knowledge of and to be aware of

English suprasegmentals, which in this study are word stress, sentence stress, and intonation. One of the limitations of the program is that it could not provide immediate feedback to the students, though they could practice by listening. In addition, music and songs are interesting material for university level students to reinforce their memory of stress and intonation.