

CHAPTER III

RESEARCH METHODOLOGY

This research aims to construct computer-assisted pronunciation courseware using music to teach English suprasegmentals. In this section, the following topics are discussed: population and the sample group, research design, research instruments, data collection, and data analysis.

1. Population and the Sample Group

Population

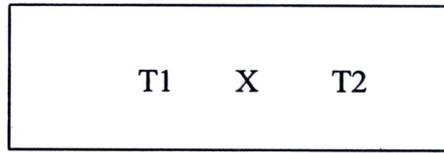
The population in this study was second-year business students who studied English in Management Sciences Faculty, Khon Kaen University. The reason for choosing second-year business students is that by the second year, students can be considered to have passed the English courses which are required by Khon Kaen University. The students are required to take English courses for 12 credits within two years. This research was conducted in the second semester of the academic year 2010. After graduation, students should be able to communicate in English with international business people and correct pronunciation is essential in this communication.

Sample Group

The sample group was 30 business students who studied in the Faculty of Management Sciences. They were a convenient sampling group to participate in the project in the second semester of the 2010 academic year.

2. Research Design

The research used the one-group pre-test/post-test design because this design can measure changes before and after a given treatment (Fraenkel, & Wellen., 1993, Seliger & Shohamy, 1995).



T1 = Pre-test

T2 = Post-test

X = Lessons in computer-assisted musical pronunciation courseware which were constructed by the researcher

3. Research Instruments

The research instruments in this study were the Computer-Assisted Musical Pronunciation (CAMP) Courseware which consisted of a pre-listening test, 10 lessons about English suprasegmentals, and post-listening test. The pronunciation test consisted of a listening test and a speaking test. The questionnaire was constructed by the researcher. The questionnaire was designed to elicit the learners' background and asked about their attitudes toward computer-assisted musical pronunciation courseware.

3.1 Computer-Assisted Musical Pronunciation Courseware

The objectives of the courseware were to stimulate the second year Management Science students to learn and to increase the awareness of the importance of English word stress, sentence stress and intonation. The courseware was an e-learning courseware which was divided into four main sections: pre-listening test, 10 lessons, post-listening test, and questionnaire. The students had to register to log in to the program. Then, they did the pre-listening test, which took about one hour. After that, they had to finish all ten lessons by themselves. Before each lesson, they did a unit pre-listening test. Following the unit pre-listening test, they received 10 lessons about English word stress or English intonation. When they completed the lesson, they listened to the songs which were provided to reinforce the content in each lesson. After they finished lesson, they did a unit post-listening test that was provided at the end of each lesson. When they finished all 10 lessons, they did a course post-listening test, which was a post-listening test and a questionnaire.

3.1.1 The Construction of the Computer-Assisted Musical Pronunciation

The computer-assisted musical pronunciation courseware consisted of pre-listening test, 10 lessons about English suprasegmentals, post-listening test, and a questionnaire. The construct of the CAMP courseware was as follows.

The content of each of the English suprasegmentals lessons were similar in design. Each lesson in the program was divided into three parts: the lesson, exercises about English suprasegmentals, and songs which were related to the content in lesson. The content of the English suprasegmentals was studied and analyzed in order to work out the necessary curriculum for the learners. The words and sentences were first selected and adapted from pronunciation course books and Business English textbooks (See APPENDIX A on page 73) using the researcher's experience. Then, the contents were approved by three teachers who teach Business English to select the possible problematic words for their learners (See APPENDIX B on page 77). Next, the researcher designed the course description, lessons plan, and the content of English suprasegmentals (See APPENDIX C on page 85). Pronunciation tests were constructed. After that, the content in each lesson was checked with experts in this area.

Music and songs in this study were written based on the correct pattern of word stress, sentence stress and intonation patterns by the researcher and a musician. Moreover, music and songs were written related to the content of each lesson. Music and songs in this research were composed in many different kinds of music styles in order to provide an engaging variety for students. While the students listened to the songs, they could sing along with the lyrics shown on the screen. The rhythm in the songs helped them to remember the primary stress in word stress, sentence stress and intonation patterns. Music helped them to relax and feel good while they were learning (See APPENDIX D on page 149).

To construct the program, a flowchart was prepared and then the story board was created. The structure of the CAMP courseware was the title, main menu, and menu of lessons. The lesson part consisted of content, exercise, and songs. See Figure 1 on the next page.

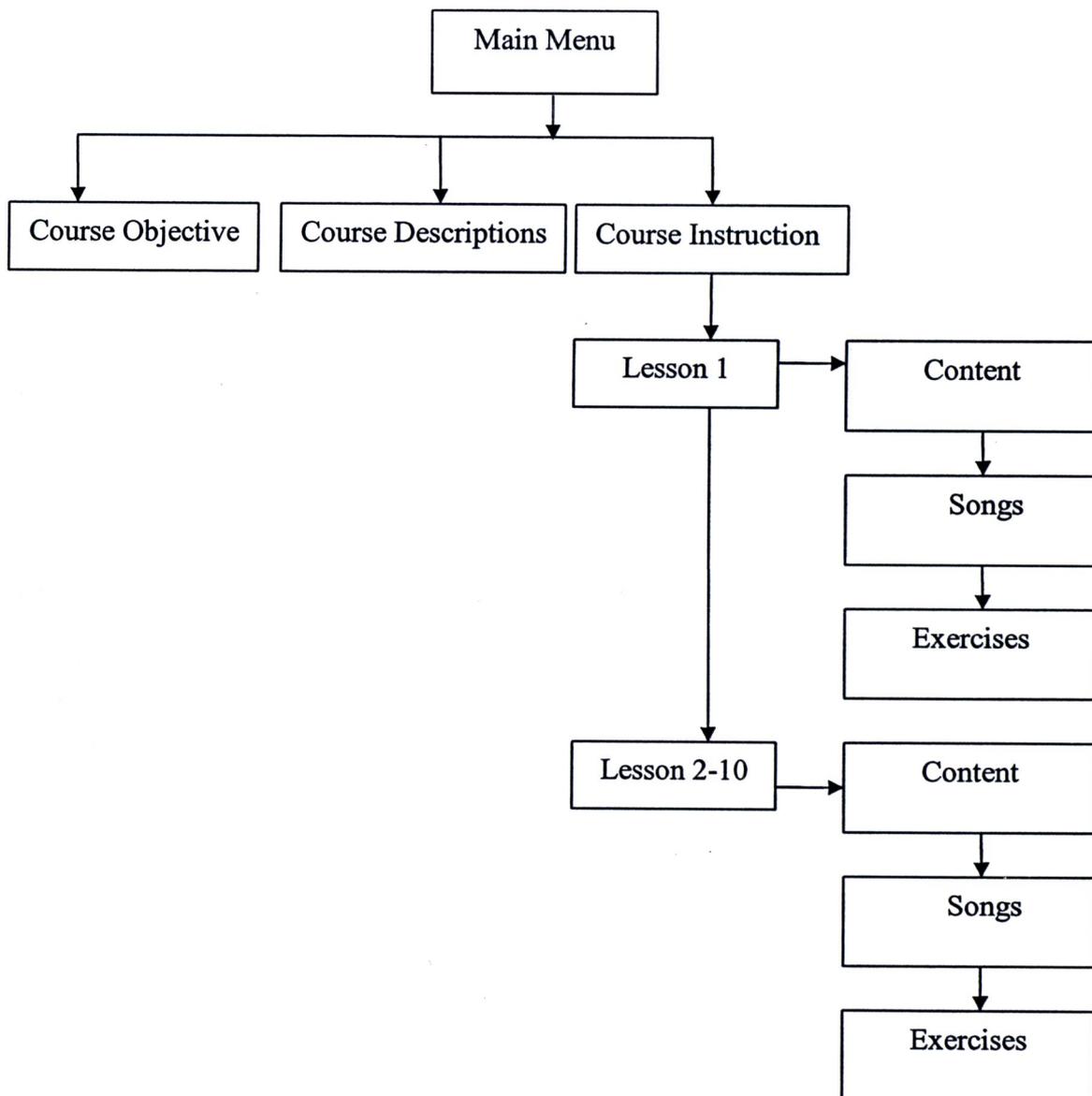


Figure 1 The CAMP courseware flowchart

After constructing the CAMP courseware, the researcher verified content validity. Then, the researcher tried out the material with subjects who were not in the sample group in this research.

3.1.2 Try Out

One-to-one trial (1:1)

The CAMP courseware was tested with three students who had the same characteristics as the sample group but were not subjects in the research. They were asked to use the CAMP courseware by using the website that had been established for the courseware. They finished the pre-pronunciation test, the contents of 10 lessons, and the post-pronunciation test. The one-to-one try-out was necessary to determine problems that might occur while using CAMP courseware. There were two items of data collected in this try out; tests scores and data from the interview. The tests scores from the three learners were analyzed by E1/E2 and E.I. to learn the effectiveness of the computer program. The students were interviewed about errors in the program and any difficulty they had when they used the program. The three subjects were interviewed by the researcher for about 20 minutes. They were asked three questions: *What are the problems that you found while using the CAMP courseware?*

What are the difficulties you had when you accessed the CAMP courseware?

Could you explain the errors you found?"

The researcher corrected the problems and improved the program based on results of the trial.

Small group trial (1:10)

Next, the researcher tested the improved CAMP courseware with nine students. Again, all of the students in this small group trial were not subjects of the research but they had the same characteristic as the sample group. They were asked to use the CAMP courseware by using the website. They finished the pre-pronunciation test, the full version of the contents in 10 lessons, and the post-pronunciation test. After they finished all lessons, the tests scores were analyzed by E1/E2 and E.I. to determine the effectiveness of the program. Furthermore, they were interviewed by the researcher about 30 minutes. The learners were asked the same interview questions as the 1:1 trial group. Problems discovered from the small group trial were used to further improve the program.

3.1.3 Field Study

Next, the researcher used the CAMP courseware with the actual test subjects. This field study was executed with 30 students. The researcher asked the sample group to use the program in the computer lab for two hours for the first time. The researcher explained how to use the program to the subjects. After orientation about how to use the program, they were asked to do the pre-pronunciation test, which was the pre-listening test, on the computer for 1 hour. After that, they did the pre-speaking test by recording their voices individually with the researcher. Following that, they learned the lessons on the CAMP courseware by themselves from wherever they could access the Internet. There was a problem with the server after the sample group finished learning in Lesson 5. The students were not able to access the online lessons. The researcher tried to create a new server but there was not enough time. As a result, the researcher decided to send Lessons 6-10 as attachment files via e-mail. After they finished all lessons, the students completed the post-listening test on the computer. They were asked to do post-speaking test with researcher. The results will be described in detail in the data collection section.

3.1.4 The Effectiveness of the Computer-Assisted Musical Pronunciation courseware

After the sample group finished the all lessons in the CAMP courseware, the researcher analyzed the effectiveness of the courseware by employing the following algorithm.

The statistics for finding the effectiveness of the program are $E1/E2$ (the efficiency) and E.I. (the effectiveness index).

$$E_1 = \frac{\sum x}{N} \times 100 \qquad E_2 = \frac{\sum F}{B} \times 100$$

E1 = the effectiveness of doing the unit listening test.

E2 = the effectiveness after studying (post-listening test).

N = the number of students.

$\sum x$ = the sum of the scores of the unit listening test that the students received.

A = the total scores of the 10 unit listening tests.

B = the total scores of the post-listening test.

$\sum F$ = the total scores the students received from doing the post-listening test.

The standard criterion for the effectiveness of the CALL program is 80/80 (Chiewpimai, 1983). The first 80 means the effectiveness of the learning process. The last 80 means the effectiveness of the learning result.

The effectiveness index (E.I) is as follows:

$$E.I. = \frac{(\textit{Posttest Scores}) - (\textit{Pretest Scores})}{(\textit{Maximum Possible Score}) - (\textit{Pretest Scores})}$$

The criterion of the effectiveness index is .05 and above.

3.2 Pronunciation test

The tests in this research were constructed as pronunciation tests, which assessed the students' perception and production of English suprasegmentals. The tests were a pre-pronunciation test and a post-pronunciation test, which were same tests. The pre-pronunciation test tested the students' pronunciation ability in both perception and production before using the computer-assisted musical pronunciation courseware. Subsequently, the post-pronunciation test was given when the students finished all lessons in the CAMP courseware. The scores from the post-pronunciation test were used to measure the progress of the students' perception and

production skills. If the post-pronunciation test score are higher than the pre-pronunciation tests score, it can be inferred that the CAMP courseware helped them to learn and become more aware of English suprasegmentals.

Perception was tested with listening tests. The listening tests were comprised of a pre-listening test, a unit listening test, and a post-listening test. The pre-listening test consisted of 40 items. The listening tests were multiple choice. In addition, the listening tests consisted of both word stress testing and intonation testing. The tests were given in the CAMP courseware so that the students could finish by themselves. (See APPENDIX E on page 157)

Production was tested by a speaking test which consisted of 20 items. The students read words with the appropriate stress and intonation patterns. Then they recorded their voices in a recorder. Both pronunciation tests were rated by two raters, a female and a male, who were trained in the rating criteria and who were American native English speakers. The final scores consisted of the two tests with the perception test accounting for fifty percent and the production test accounting for fifty percent. (See APPENDIX F on page 171)

3.2.1 The Rating Criteria

For testing the students' production ability about English suprasegmentals, they had to record their voices individually with the researcher. Then, the audio sounds for their voices were rated by the two American raters. The raters were trained for using the rating scale before rating the tests. The rating criteria were adapted from the speaking performance scale on the oral proficiency test for non-native teaching assistants at the University of California at Los Angeles (UCLA). In this research, only the pronunciation portion of the UCLA scale will be used. It is adapted as follows:

Table 1 Rating Criteria

	3=Excellent	2=Medium	1=Very poor
Pronunciation	Infrequent mispronunciation. Employs correct stress and intonation	Many mistakes, but speech is intelligible with effort.	Unintelligible.

(Celce-Murcia et al., 1996)

(See details APPENDIX G on page 165)

3.2.2 The Test for Validity

After the tests were constructed, the tests were checked for content validity by three experts who teach pronunciation courses. Following that evaluation, the tests were improved.

The test was again checked for content validity by three experts in this field (Taweerat, 1998). The researcher calculated the Index of Item Objective Congruence or IOC with the formula below:

$$IOC = \frac{\sum R}{N}$$

IOC = Index of Item Objective Congruence

$\sum R$ = sum of scores from experts' opinion

N = number of experts

After performing the IOC test (See APPENDIX H on page 179), the researcher calculated the Level of Difficulty and Power of Discrimination as well. (See APPENDIX I on page 183)

3.2.3 Level of Difficulty (P)

The level of difficulty of the test items which have correct answers and incorrect answers. The level of difficulty comes from how many students

received correct answers for each test item. The level of difficulty is between 0 and 1. The test items should have the difficulty between 0.2-0.8 (Suchirarat, 1997).

3.2.3.1 The level of difficulty is calculated from the number of students who received correct answer with the total of students

$$P = \frac{R}{N}$$

P = the level of difficulty

R = number of students who received correct answer

N = number of students tested

3.2.3.2 The level of difficulty which calculated from the number of students in the high ability group who received correct answer with the number of students in the low ability group who received correct answer

$$P = \frac{R_H + R_L}{N_H + N_L}$$

P = the level of difficulty index of item

R_H = number of students in high ability group who received correct answer

R_L = number of students in low ability group who received correct answer

N_H = number of students in high ability group

N_L = number of students in low ability group

3.2.4 Discrimination Power (R)

The test items should discriminate between the students from high ability and low ability. The scores of discrimination power are between -1 and 1

The discrimination power could be calculated the number of the students from high ability and low ability who received correct answer. The accepted test items should have discrimination 0.2 and above (Suchirarat, 1997).

$$r = \frac{R_H - R_L}{N_H \text{ or } N_L}$$

r = discrimination power index

R_H = number of students who received correct answer in high ability group

R_L = number of students who received correct answer in low ability group

N_H = number of students in high ability group

N_L = number of students in low ability group

3.3 Questionnaire

The questionnaire was constructed by the researcher. The questionnaire was designed to find out the subjects' demographic data, experiential information, and their attitude toward the CAMP courseware. The demographic data comprised of questions about students' gender, age, and education major. The students' experiential information comprised of questions about their English learning background, their English speaking experience, their musical experience, and their computer experience. In addition, there were questions asking about the students' attitude toward computer-assisted musical pronunciation courseware. The sample group was asked to answer the questionnaire after they had finished all of the lessons and post-pronunciation test, using an attachment questionnaire returned by e-mail. The questionnaire used Likert's rating scale method (Likert 1932 cited in Seliger & Shohamy, 1995). In addition to these three parts, there were open ended questions that asked the students to provide further necessary information and suggestions. (See APPENDIX J on page 187)

The questionnaire was analyzed by using five scales of attitudes and their interpretations as follows:

Table 2 Five scales of attitudes and their interpretations

Scale	Interpretation
5	High satisfaction
4	Satisfaction
3	Neither satisfaction nor dissatisfaction
2	Dissatisfaction
1	High Dissatisfaction

Following Srisa-ad (1992), the results were interpreted to find the mean frequency for each item as shown in Table 3:

Table 3 Interpretations of five scales of attitudes, mean, and their interpretations

Mean	Interpretation	Scale
4.51-5	High satisfaction	5
3.51-4.50	Satisfaction	4
2.51-3.50	Neither satisfaction nor dissatisfaction	3
1.51-2.50	Dissatisfaction	2
1.00-1.50	High Dissatisfaction	1

Before using the questionnaire with the test group, the questionnaire was approved by advisors. In addition, the questionnaire was used with a pilot group of nine students to discover any misunderstandings or problems. The data were analyzed using coefficient alpha of Cronbach (Kaewpradit, 1994).

$$\alpha = \frac{n}{n-1} \left[1 - \frac{\sum s_i^2}{s_t^2} \right]$$

- α = the coefficient of the reliability
 n = the number of items on the questionnaire
 s_i^2 = the variance of each item
 s_t^2 = the variance of the total score

4. Data Collection

Research data was collected during second semester of the 2010 academic year. The data was collected as described below:

The three students who were not in the sample group were asked to do the pre-pronunciation test, use the CAMP courseware, the take the post-pronunciation test. The data from these students were analyzed as the one-to-one trial of the computer program. Following this trial, nine students who were not in the sample group were asked to do the pre-pronunciation test, use the CAMP courseware, and take the post-pronunciation test. The data from the nine students were analyzed as the small group trial of the computer program. After this trial, the sample group was asked to do the pre-pronunciation test. The sample group was tested with the pre-listening test as a whole group in the computer lab. They were tested on the pre-speaking test by record their voices, reading the word stress, sentence stress and intonation individually with the researcher. The students registered and logged in to the CAMP courseware and learned each lesson about English suprasegmentals. As stated earlier, there were 10 lessons. Each lesson would take about one hour. The students went through the lessons at their own pace, which could be more or less than one hour per lesson. The students leaned the CAMP courseware via e-learning in Chapter 1 to 5. As mentioned earlier, at this time there was an error with the server of the website. The researcher solved this problem by sending Chapters 6 to 10 by e-mail. The students sent the files back to the researcher. After the students finished all of the lessons, they did the post-listening test to investigate the improvement of their knowledge about English suprasegmentals. The post-listening test was sent as an attached file by e-mail. The students could listen to the audio sounds as many times as they wanted in the post-listening test. This may have had an effect on the post-listening test scores, which were higher than pre-listening test scores. The questionnaire was completed after they finished all the lessons. They completed the questionnaire on the CAMP courseware. The questionnaire was sent as an attached file by e-mail. The procedure of data collection is shown in Figure 2 on next page.

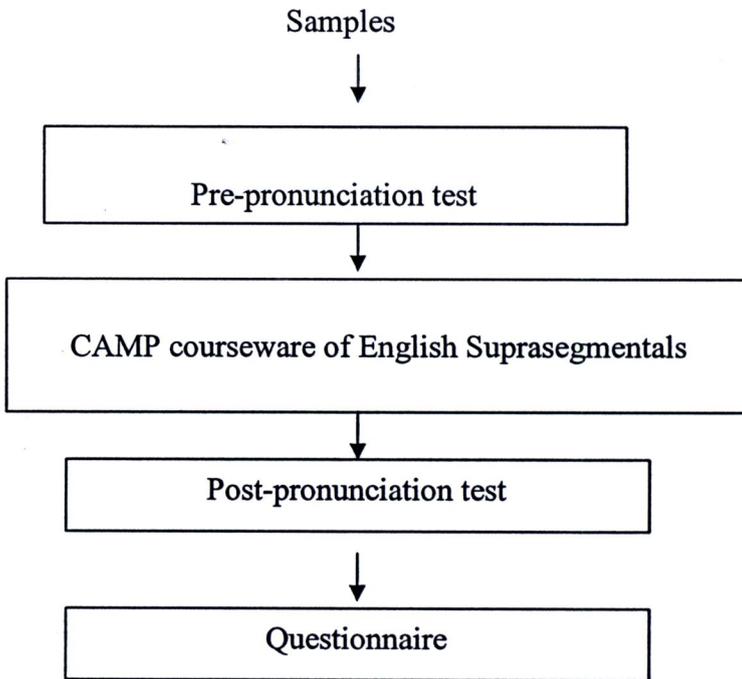


Figure 2 The Procedure of Data Collection

5. Data Analysis

Scores from the pre-pronunciation test and post-pronunciation test and were statistically analyzed by SPSS for mean, standard deviation (S.D.), and t-test. The pre-pronunciation test scores were analyzed to determine the students' ability before using the CAMP courseware. The post-pronunciation test scores were analyzed to see their progress

The information from the questionnaires was statistically analyzed for percentage, mean scores, and standard deviation (S.D.). Questions were asked to find the students' demographic data, experiential information, and their attitudes towards the in CAMP courseware. Information from the open-ended questions was analyzed qualitatively.