CHAPTER 5
SUMMARY, MAJOR FINDINGS, CONCLUSIONS, SUGGESTIONS, AND
RECOMMENDATIONS FOR FURTHER STUDY

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CHAPTER 5
SUMMARY, MAJOR FINDINGS, CONCLUSIONS, SUGGESTIONS, AND
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5.1 SUMMARY

Computer assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. It uses a combination of text, graphics, still images, animations, sound and video in the learning process. Presently, computer is widely applied in learning & teaching through out various curriculums. Most teachers study for new knowledge and improve new computer media that are more advance and high quality, which have many advantages over other kinds of educational media. As of now computer assisted instruction (CAI) had become very popular among teachers, instructors, and people interested in this field. In order to effectively apply computer assisted instruction (CAI) in the learning & teaching process the teachers or instructors must fully understand the characteristic of computer assisted instruction (CAI) so the best computer assisted instruction (CAI) can be provided to the students.

Using computer assisted instruction (CAI) as a course ware will benefit the students greatly since various techniques can be explained thoroughly including graphics work and able to search for various problem solving methods for implementing a website. The researcher foreseen that with the right step displayed through CAI the students will be able to see how website can be implement and what will be the obstacles along the way. The students can then learn to adapt to various problems and be able to solve problem professionally. The students can learn the lesson by themselves this will decrease the cost human resource and the work load of teachers. The computer assisted instruction (CAI) can also be use for demonstration and teaching in large classroom by connecting it to computer projector. This will also become an innovation for computer assisted instruction (CAI) development and improve the learning & teaching process further.

The present study was conducted to assess the effectiveness of computer assisted instruction (CAI) on learning achievement in career and technology subject for eleventh grade students.
Objective of the study

The purposes of the study were as follow:

(1) To study the effectiveness of Computer Assisted Instruction (CAI) on learning achievement (pretest-posttest) in career and technology subject for eleventh grade students and test the difference between the effectiveness of Computer Assisted Instruction (CAI) on learning achievement scores (pretest-posttest) in career and technology subject for eleventh grade students.

(2) To study the effectiveness of Computer Assisted Instruction (CAI) on learning achievement (knowledge and understanding, skills/performance and desirable characteristics) in career and technology subject for eleventh grade students in each unit of learning management plan.

(4) To study the eleventh grade students’ opinions pertaining to computer assisted instruction (CAI) title “Website Implementation by Namo WebEditor 5.5” and compare the mean scores of eleventh grade students’ opinions pertaining to computer assisted instruction (CAI) title “Website Implementation by Namo WebEditor 5.5” classified by sex of students.

Variables of the study

Two variables are there in the study as follow:

(1) Independent Variables

The learning management plan on career and technology subject under the title “Website implementation by Namo WebEditor 5.5” taught by the Computer Assisted Instruction (CAI).

(2) Dependent Variables

(2.1) The effectiveness of Computer Assisted Instruction (CAI) on learning achievement in career and technology subject for eleventh grade students

(2.2) The eleventh grade students’ opinions pertaining to Computer Assisted Instruction (CAI) in career technology subject title “Website implementation by Namo WebEditor 5.5”
Definition of the important terms

(1) Effectiveness

Effectiveness means the ability to accomplish a purpose; the power to be effective, the quality of being able to bring about an effect. It refers to the degree to which objectives are achieved and the extent to which targeted problems are resolved.

In the present study, effectiveness refers to the ability of computer assisted instruction (CAI) to accomplish a learning purpose in the career and technology subject for eleven grade students. This includes the power or the degree to be effective and the quality of being able to bring about the highest level of students’ learning achievement in knowledge and understanding, skills/performance and desirable characteristics.

(2) Computer Assisted Instruction (CAI)

Computer Assisted Instruction (CAI) is an educational medium or interactive tutorial technique in which instructional contents or activities are delivered by computer which is used to enhance education of students and served as an audio-visual device. Computer assisted instruction (CAI) contains the instruction which is designed to teach, guide, and test the student until a desired level of proficiency is attained. The students learn by reading the test material presented or by observing the graphic information displayed. They learn by interaction with the computer and appropriate feedback is provided.

In the present study, computer assisted instruction (CAI) refers to a form of learning that utilize computers, and is typically intended as a way to supplement traditional teacher-based learning. The researcher attempts to present this research on the effectiveness of computer assisted instruction (CAI) as a teaching tool, especially as it impacts on the learning achievement. Following the definition for computer assisted instruction (CAI) above, this study aims to find out whether or not CAI can be effectively utilized for teaching and the eleventh grade students’ learning achievement in career and technology subject.

(3) Learning achievement

Learning achievement refers to the real accomplishments in the students’ learning process i.e. knowledge and understanding, skills/performance and the ability to perform the desirable characteristics which derived from the computer assisted instruction (CAI) that can be measured by achievement tests, performance test and attitude or desirable characteristics test.
In the present study, learning achievement means the score obtained from the evaluation that came from the test of the subject before and after the teaching & learning procedure as well as the test in each unit of learning management plan. By employing the test form that measured the achievement of the teaching & learning, which is concerned to the knowledge and understanding, skills/performance and desirable characteristics that created from learning or receiving the proper teaching method and computer assisted instruction (CAI) in each instructional plan.

Therefore, the learning achievement means the scores obtained from the learning achievement test under the teaching & learning method through computer assisted instruction (CAI). The achievement test on the career and technology subject, title “Website implementation by Namo WebEditor 5.5” of eleventh grade students was created by the researcher, which was the multiple choice test with 4 options in the amount of 40 questions and is covering the measurement of knowledge, understanding, implementation, analysis, synthesis, and problem solving. This test also has been tested for the item analysis, which gave three kinds of information such as the discrimination, difficulty, and reliability. The learning achievement scores was analyzed in terms of mean (\( \bar{X} \)), standard deviation (S.D.), t-test (dependent).

(4) Effectiveness of computer assisted instruction (CAI) on the learning achievement

Effectiveness of computer assisted instruction (CAI) on the learning achievement refers to the ability of computer assisted instruction (CAI) to accomplish a learning purpose in the career and technology subject for eleven grade students. The learning achievement scores were obtained from the learning achievement test of eleventh grade students, before and after instructed by computer assisted instruction (CAI) in career technology subject under the title “Website implementation by Namo WebEditor 5.5”. This includes the power or the degree to be effective and the quality of being able to bring about the highest level of students’ learning achievement in knowledge and understanding, skills/performance and desirable characteristics.
Hypotheses of the study

There are 3 hypotheses in the study as follow:

(1) There will be no significant difference between the effectiveness of Computer Assisted Instruction (CAI) on learning achievement scores (pretest-posttest on knowledge and understanding) in career and technology subject for eleventh grade students.

(2) There will be no significant difference between the effectiveness of Computer Assisted Instruction (CAI) on learning achievement scores (pretest-posttest on skills/performance) in career and technology subject for eleventh grade students.

(3) There will be no significant difference between mean scores of eleventh grade students’ opinions pertaining to computer assisted instruction (CAI) title “Webstie Implementation by Namo WebEditor 5.5” classified by sex of students

Importance of the study

Secondary school teachers generally frustrate about their work load. Some of them may experience stress in dealing with large classes and some students come from disadvantaged or multicultural backgrounds. Accountability standards also may increase stress levels, with teachers expected to produce students who are able to exhibit satisfactory performance on standardized tests. Teachers are sometimes having over duties to perform outside the classroom.

Computer assisted instruction (CAI) has the potential to cope with the needs of individualized learning, cooperative learning and constructivist approaches. Rapid pace of improvement in computer technology and software development suggests that CAI will acquire the potential to change the state of traditional teaching learning process. To face the challenges of present and future, to compete the nations in this information age, every nation will have to enhance the quality of its education system, which is possible only by exploring the new dimensions and benefiting from latest means of communication.

Advanced countries are improving the quality of education by introducing innovations associated with technology including CAI. This study may encourage utilization of this innovation as effective mean of instruction in the career and technology subject of eleventh grade students.
The findings of the present research may be a source of encouragement for the widespread use of CAI in career and technology subject and in various subjects. This study may also be a source of inspiration for researcher to develop educational software and may give the idea about the weakness and strength of teaching and learning development, management of basic education learning procedures which can be applied to the effective learning standard to fulfill the objectives of the Basic Education Core Curriculum A.D. 2008.

Research design

To fulfill the purpose of the present research, Pre-Experimental research (single one group, pretest-posttest design) was employed to be the research design. In this design, one group of students (30 students) was used for the experiment.

Research instruments

The researcher designated the following research instruments:

1. The learning management plan on career and technology subject taught by the Computer Assisted Instruction (CAI) title “Website implementation by Namo WebEditor 5.5” of eleventh grade students.

2. The Computer Assisted Instruction (CAI) title “Website implementation by Namo WebEditor 5.5” of eleventh grade students.

3. The achievement test on career and technology subject taught by the Computer Assisted Instruction (CAI) title “Website implementation by Namo WebEditor 5.5” of eleventh grade students. There are three kinds of the learning achievement test: (a) learning achievement test on the students’ knowledge and understanding, (b) learning achievement test on the students’ skills or performance, and (c) learning achievement test on the students’ desirable characteristics.

4. The scale to evaluate the students’ opinions pertaining to the Computer Assisted Instruction (CAI) title “Website implementation by Namo WebEditor 5.5”.

Population and Sample of the study

Population of the present study was the 92 eleventh grade students of Saklee-Witthaya school, Pranakhon-sriayutthaya Province, Thailand. One class (30 students) of
eleventh grade students of Saklee-Witthaya school, Pranakhon-sriayutthaya Province, Thailand was selected to be the sample of the study. The random sampling was done through the slot drawing in order to select the students in the experiment. The experimental group of students would be instructed through the computer assisted instruction (CAI), with an application of the learning activities according to the learning management plan unit 1 - 7.

Procedure of experiment

The researcher divided the procedure of experiment into the following two stages:

1. The preparation stage: This is the stage of preparation of the readiness which consisted of the following steps:

   1.1) Prepare for the actual teaching: At this stage the researcher prepares the readiness actual experiment i.e. the learning management plan, computer, CAI materials, LCD projector, LCD screen, learning paper, supplementing exercise, test, etc.

   1.2) Students were tested (pretest) about the knowledge and understanding as well as the skills or performance on the career and technology subject regarding the CAI, title “Website Implementation by Namo WebEditor 5.5”

   1.3) Researcher herself supervised the students while receiving CAI and remained present in the computer laboratory all the time during treatment sessions.

   1.4) Researcher prepared herself according to the important roles of instructors i.e.:

      • Keep record of students’ progress
      • Keep students busy in purposeful activities by advising them to follow the instruction strictly
      • Observe the behaviour of each student in the class and keep record of his/her interest, sense of responsibility, self-discipline, creativity, avidity for learning, dedication and commitment to work etc.
      • Observe the important ability i.e. communicate ability, thinking ability, problem-solving ability, ability for applying life skills and capacity of technological application.
      • Maintain discipline in the class during treatment session
      • Help students if they had any problem with the usage of CAI programme
The treatment started in June 2010 and lasted for experiment after 9 week (that is at the end of August 2010).

(2) The experimental stage: This is the stage of experiment which consisted of the following steps:

(2.1) Researcher operated the teaching herself, using the learning management plan which conducted the learning activity through the Computer Assisted Instruction (CAI) title “Website Implementation by Namo WebEditor 5.5”

(2.2) Three steps of learning activities were used.

(2.2.1) Introduction: This step was to review background knowledge and imagination needed for a new knowledge and skills/performance. Teacher advises the students about the new instructional approach which is based on computer and programmed instruction material. Students are informed about the learning standard and learning expectations and motivate to success and achieve the goals with the CAI material.

(2.2.2) Teaching stage: This step was to give the basic knowledge about Website implementation by Namo WebEditor 5.5 programme to the students using Computer Assisted Instruction (CAI). Students gain experience from Computer Assisted Instruction (CAI): title “Website implementation by Namo WebEditor 5.5 and practice according to the worksheets insert in the CAI.

After studying Computer Assisted Instruction (CAI): title “Website implementation by Namo WebEditor 5.5 and practice according to the worksheets insert in the CAI, the students communicate to each other regarding the understanding as well as the method of problem-solving, the appreciation and efficient, the effective and ethical application of information technology, and the technological application for occupational development which gaining from Computer Assisted Instruction (CAI): Title “Website implementation by Namo WebEditor 5.5.

(2.2.3) Conclusion Stage: All of the students help together to conclude the learning experiences gain from Computer Assisted Instruction (CAI) title “Website implementation by Namo WebEditor 5.5 and practicing worksheets. Every one can share opinions and make appraisals on the knowledge, skill and attitude concerned to Computer Assisted Instruction (CAI): title “Website implementation by Namo WebEditor 5.5. In the final
stage of learning activity, the students summarize theses appraisals, in order to improve for further knowledge and understanding, skill/performance, method of applying information technology to facilitate creation of work or projects, appropriate method of working and earning living with morality efficiently/effectively/responsibility, and proper perception and attitude for future career.

(2.2.4) In the last unit (Unit 7) of the learning achievement plan, the students were tested (posttest) about the knowledge and understanding as well as the skills or performance on the career and technology subject regarding the “Website Implementation by Namo WebEditor 5.5”. The final activity, teacher evaluates the desirable characteristics of students.

Statistics used in the study

The data collected by the research instruments was analyzed according to the hypotheses. The following techniques of analysis of data and the statistical calculations were employed.

(1) In order to determine the level of learning achievement (pretest-posttest) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) title “website implementation by Namo WebEditor 5.5”, mean ($\bar{X}$), standard deviation (S.D.) and percentage (%) was employed.

(2) To test the difference between the learning achievements (pretest-posttest) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) title “website implementation by Namo WebEditor 5.5”, the t-test (dependent) was employed.

(3) In order to determine the level of learning achievement (Knowledge and understanding, skills/performance, and desirable characteristics) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) title “website implementation by Namo WebEditor 5.5”, mean ($\bar{X}$), standard deviation (S.D.) and percentage (%) were employed.

(4) To study the level of opinions of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) title “website implementation by Namo WebEditor 5.5”, mean ($\bar{X}$) and standard deviation (S.D.) were employed.
(5) To compare the difference between the mean scores of students’ opinions of eleventh grade students in career and technology subject pertaining to the computer assisted instruction (CAI) title “website implementation by Namo WebEditor 5.5” classified by student’s gender, t-test (independent) was employed.

(6) The 0.05 and 0.01 level of significance was considered satisfactory for the acceptance or rejection of null hypothesis.

(7) The frequency distribution, tables was prepared and placed in the report to present the data comprehensively.

5.2 MAJOR FINDINGS

The findings of the present study are as follow:

(1) The effectiveness of Computer Assisted Instruction (CAI) on pretest score of learning achievement (knowledge and understanding) in career and technology subject of eleventh grade students was at poor level whereas the effectiveness of Computer Assisted Instruction (CAI) on posttest score of learning achievement (knowledge and understanding) in career and technology subject of eleventh grade students was at excellence level.

(2) The effectiveness of Computer Assisted Instruction (CAI) on pretest score of learning achievement (skills/performance) in career and technology subject of eleventh grade students was at poor level whereas the effectiveness of Computer Assisted Instruction (CAI) on posttest score of learning achievement (skills/performance) in career and technology subject of eleventh grade students was at excellence level.

(3) The effectiveness of Computer Assisted Instruction (CAI) on learning achievement (desirable characteristics) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) was at excellence level.

(4) There was the significant difference between pretest and posttest score of learning achievement (knowledge and understanding) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI). The finding indicates the posttest score of learning achievement (knowledge and understanding) of eleventh grade
students in career and technology subject taught by computer assisted instruction (CAI) has greater value than that of the pretest score.

(4) There was the significant difference between pretest and posttest score of learning achievement (skills/performance) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI). The finding indicates the pretest score of learning achievement (skills/performance) of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) has greater value than that of the pretest score.

(5) The mean score of eleven grade students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Website Implementation by Namo WebEditor 5.5” in career and technology subject was at strongly agree level.

(6) There was no significant difference between mean scores of students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namo WebEditor 5.5” rated by boy and girl students which was tested by \( t − test \) (Independent). The students’ gender does not effect on the mean score of students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namo WebEditor 5.5”. Therefore, the mean score of boy students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namo WebEditor 5.5” has equal value with the mean score of girl students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namo WebEditor 5.5”.

5.3 CONCLUSIONS

From the results of the present study, it can be concluded that:

(1) Computer Assisted Instruction (CAI) proved as more effective method to enhance the learning achievement (knowledge and understanding, skills/performance, and desirable characteristics) in career and technology subject of eleventh grade students.

(2) Computer Assisted Instruction (CAI) does effect on the learning achievement as it tests for its significant difference between the pretest-posttest scores of learning achievements. The results of the analysis of data indicated the posttest score of learning
achievement of eleventh grade students in career and technology subject taught by computer assisted instruction (CAI) has greater value than that of the pretest score.

(3) The mean score of eleven grade students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Website Implementation by Namno WebEditor 5.5” in career and technology subject was at strongly agree level which indicated the satisfaction of students when they use Computer Assisted Instruction (CAI).

(4) There was no significant difference between mean scores of students’ opinions (boy and girl) pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namno WebEditor 5.5”. The mean score of boy students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namno WebEditor 5.5” has equal value with the mean score of girl students’ opinions pertaining to Computer Assisted Instruction (CAI) title “Webstie Implementation by Namno WebEditor 5.5”.

5.4 SUGGESTIONS

Results of the present study demonstrated that Computer Assisted Instruction (CAI) was an affective mode for knowledge and understanding, skills/performance, and desirable characteristics of eleventh grade students in career and technology subject. It was found that the students prefer Computer Assisted Instruction (CAI) lessons over the traditional presentation approach. They enjoy on days when Computer Assisted Instruction (CAI) lessons were used and they were happy to learn new material when the learn from Computer Assisted Instruction (CAI) lessons. Therefore, the suggestions for education implementation should be as follow:

(1) It is needed for Ministry of Education, school, and teachers to recognize the potential of computer for increasing the students’ learning achievement.

(2) Teachers of the present and future and educational authorities should make wise decisions about the use of Computer Assisted Instruction (CAI) to enhance quality of students’ learning and to maximize utilization of this exciting teaching and learning tool.

(3) It is needed to recognize that quality instructions can be taken if teachers pay attends on using Computer Assisted Instruction (CAI) for improving the students’ learning achievement. Teachers should be motivated to use a large number of educational software which is available at world wide webs. Schools can subscribe software by utilizing the internet facility or encourage teachers to construct Computer Assisted Instruction (CAI) for their teaching.
Ministry of education should emphasize that the potential of computer assisted instruction can be utilized to enhance quality of education at school level and should provide computer assisted instruction software for teachers.

Widespread use of computer assisted instruction requires a very high number of computers. Ministry of Education should provide adequate number of computers and software for schools.

Government should offer incentives for teachers who increase their proficiency in computer studies and contribute to enhance computer assisted instruction.

Teacher education institutions may start new programmes to produce computer programmers, engineers and analysts equipped with pedagogic skills. In-service teachers should be given computer literacy training through refresher courses. It is necessary to develop a culture for better utilization of computer in teaching–learning process.

Parents should encourage their children to utilize Computer Assisted Instruction (CAI) or other educational software available in the market.

Private sections may contribute the teachers to enhance in using of Computer Assisted Instruction (CAI) in schools and may also contribute to develop quality educational software.

New studies concerned to Computer Assisted Instruction (CAI) should be carried out in primary and secondary education in different subjects, lessons, class and school levels. New projects should be started to develop the Computer Assisted Instruction (CAI). In service training should be necessary for the teachers to use computers effectively and also they should have knowledge and skills about hardware and software.

5.5 RECOMMENDATIONS FOR FURTHER STUDY

For further studies, the research should be studies under the following problems:

1. There should be a research to determine the effectiveness of various types of Computer Assisted Instruction (CAI) for various subject areas and at different grade levels.
(2) There should be a comparison of effectiveness of Computer Assisted Instruction (CAI) with others teaching and learning approaches on learning achievement in different subject for various grade students.

(3) There should be a study of effectiveness of Computer Assisted Instruction (CAI) by other type of experimental research i.e. quasi-experimental research.

(4) There should be a study of the roles of school administrators in shaping the teaching and learning process using educational technology.

(5) There should be a study of impact of educational technology for improvement of students achievement and teachers’ performance.

(6) There should be a study of students’ perception on the Computer Assisted Instruction (CAI) approach.

(7) There should be an investigation of factors affecting on the utilization of Computer Assisted Instruction (CAI).

(8) There should be an investigation of the obstacles of constructing and sustaining Computer Assisted Instruction (CAI) for the current education situation.

(9) There should be an experimental study about the best practice on the utilization of Computer Assisted Instruction (CAI).

(10) There should be a project reviewing the interchange for development or utilization of Computer Assisted Instruction (CAI).