DEVELOPMENT OF SELF-INSTRUCTIONAL COMPUTER ASSISTED PROGRAM (SICAP) ON SCIENCE OF GRADE IX & ITS EFFECTIVENESS

ABSTRACT

Introduction

At present it is believed that the basic principle underlying the learning process is that all learners are capable of learning and also of self-development. The teaching and learning process of the present times aims at enabling learners to develop at their own pace and to maximize their potential. In Thailand, considerable efforts are being made to reform the learning process in the best interest of learners. Teachers are encouraged to develop their own teaching materials. Activities, experiments and hand-on experience are being emphasized in accordance with the needs of learners and the community. The teacher’s role in that of facilitator who assists learners to learn by themselves various activities are being organized to provide teachers with the knowledge relating to the learning of learners, classroom research and development of teaching methods.

The knowledge of science is very important for the learners because science connects them with both the worlds- the world of learning and the world of experience. It connects them with the life of the society with the wider world. The knowledge of science helps construct new ideas and expand intelligence in a variety of ways. The National Education Act of 1999 in Thailand has pared the way for major action to be taken so as to promote the utilization of technologies for the development of learning and teaching and instructional materials and other technologies for education and development of educational personnel and learners.

Technological growth in the present era of globalization has spurred social and economic changes worldwide. The computer can be made to help the curricular need of children by acting as a tutor, as a tool and also as a facilitator. The first application of computer in education came up with computer as a tutor as the computer program offers a learning experience to the child in one of the varieties of possible modes, which could be a drill and practice program, a simulation game or a statement of facts. Computer assisted programs are interactive and can illustrate a concept of science through attractive animation, sound and demonstration. These programs allow students to progress at their own pace and to work individually or for problem solving in a group. Self-instructional computer assisted program (SICAP) can provide innovative and interactive ways of
presenting material. Therefore, Self-instructional computer assisted program (SICAP) can be used as adjust to conventional teaching or as an independent means of self-instruction. The potentials of self-instructional computer assisted program (SICAP) and their effectiveness in science education are to be investigated in the present study.

**Statement of the problem**

“Development of Self-Instructional Computer-Assisted program (SICAP) on Science of Grade IX & its Effectiveness in Thailand”

**Objectives of the study**

1. To find out the higher level concepts from Biotechnology & Biodiversity topics from science for grade IX
2. To analyze the higher level concepts from Biotechnology & Biodiversity topics from science for grade IX
3. To develop Self-instructional computer – assisted program (SICAP) for students based on Biotechnology & Biodiversity topics of science grade IX
4. To test the effectiveness of Self-instructional computer – assisted program (SICAP).

**Research Hypothesis**

There is significant difference in the mean achievement scores obtained teaching of science by using Self-Instructional Computer – Assisted program (SICAP) instead of traditional method for grade nine students

**Null Hypothesis**

There is no significant difference in the mean achievement scores obtained teaching of science by using Self-Instructional Computer – Assisted program (SICAP) instead of traditional method for grade nine students

**Assumptions**

1. Teachers and students know how to operate computer.
2. Teachers use different teaching methods for teaching science.
3. Teachers use different innovative techniques for teaching science.
4. Students use computer and internet for work and references.
Scope and Limitations

Scope
This research is useful for all secondary English medium schools teachers, students of Grade IX in Thailand.

Limitations
1. The effectiveness of Self Instructional Computer Assisted program (SICAP) was based on total involvement of selected schools in Thailand.
2. The effectiveness of Self Instructional Computer Assisted program (SICAP) was based on response given by students to pre and post tests.
3. The researcher had no control on socio-economic status of Thailand and psychological factors.

Delimitation of the study
1. The students of Grade IX at Benchamratrungsarit II School from English medium with computer facility were population from study in Thailand.
2. This study was limited to the schools following content of science by the basic Education Core Curriculum A.D 2008 in Thailand.
3. The sample was delimited to one English medium School.
4. 345 students selected for survey and interview and 100 students selected for experiment (experimental group of 50 and control group 50 students.) of Grad IX student.
5. This study was limited to Biotechnology and Biodiversity topics from science subject of grade IX in sub-matter topics: (I) Biotechnology; (i) Genetic engineering, (ii) A genetically Modified Organisms GMOs, (iii) Cloning, (iv) Deoxyribonucleic acid DNA, (v) Benefits of Biotechnology, (vi) Public opinion on Biotechnology, (II) Biodiversity; (i) Definition of Biodiversity, (ii) Classification of Animal, (ii) Classification of Plants

A pilot study
The sample group was tested as pilot group with grade IX students studying the topics. They are not selected as the same experimental group and control group. These were three steps to try out. The first try-out has indicated in the pre-test (42.23%) and post-test scores (56.67%). The second tryout was of three students in a small group. The total score in the pre-test of all the three students was (41.3%) and in the post-test score (70.74%). The third try-out was conducted on the large group of ten students. The pre-test score of all the ten students was (42.23%) and post-test score (82.90%).
A. Students’ comment of SICAP tried out; (1) Individual trial; Changing of topic each unit too difficult because the closing of current topic before opening the program for studying the new content. (2) A small group trial; the content that are difficult and more than specification of learning and utilize time in understanding (3) Field group trial; the scores obtained from doing test may be incorrect

Pilot study-Suggestions; (1) The researcher has modified SICAP according to the suggestions given by the experts and research guide, (2) SICAP needs improvement that the content should be adjusted for clarity creating the interest in student and motivation in learning, and (3) In using program it is convenient, estimation if the result is appropriate which different, most importantly do the learners get an immediate feedback of their result

Methodology of the study

In design, used a mixed method of research is used that includes the survey method, the product-oriented method and the experimental method. The survey method is used to collect data for the preparation of designing tools and then to analyze the data collected. The product-oriented method is used for the construction and development of instructional media based on computer technology to prepare the self-instructional program for grade IX learners from the English medium secondary schools in Thailand. The experimental method is used to test the effectiveness of the designed tools and a comparison is attempted of the achievement score of the experimental group and the control group

Population and Sample

The population in this study is all teachers and the students who learn in the secondary schools of English medium Grade IX in Thailand. The fifty-sever are secondary schools of English medium in Thailand. The sample for this study is the students in science subject at Benchamaratrungsarit II School Grade IX in Thailand. The selection of the school based on purposive sample method. These are selected only 100 students by random sampling method. (Control group 50 students and experimental group 50 students).

Procedure

This research was divided into three stages;

1) Stage I (Survey method): - To find out & to analyze the higher level concepts from Biotechnology & Biodiversity topics from science for Grade IX.
2) **Stage II (Product-Oriented method):** - For development of Self-instructional computer – assisted program (SICAP) on Biotechnology & Biodiversity.

3) **Stage III (Experimenter method):** - Equivalent groups design - one control group & on experimental group: - To test the effectiveness of Self-instructional computer – assisted program (SICAP) on Biotechnology & Biodiversity

#### Tools to be used in the collection of data

**A: Research tools**

1. Questionnaires and interview: - For teachers & students. To find out & to analyze the higher level concepts of science subject
2. Pre-test and Post-test:- For students.
3. Self-instructional computer – assisted program (SICAP):- For students.

**B: Statistical tools**

1. Mean
2. Standard Deviation(S.D)
3. t-test

#### Finding and Conclusions of the study

**Objective No 1:** To find out the higher level concepts from Biotechnology & Biodiversity topics from science for grade IX and,

**Objective No 2:** To analyze the higher level concepts from Biotechnology & Biodiversity topics from science for grade IX

These are based on the responses to the questionnaires and the personal interviews by fifty-two science teachers and three hundred forty-five grade IX students from English medium secondary schools in Thailand. Both the teachers and students have positively responded to the use of new instructional tool of self-instructional computer assisted program (SICAP) is beneficial for teachers who need not tell their learners but will facilitate their learning. It is beneficial for students as they become free to choose their course and mode of learning.

**Objective No.3:** To develop Self-instructional computer – assisted program (SICAP) for students based on Biotechnology & Biodiversity topics of science grade IX

The study is based on the performance of the three try-out groups.

(a) The first try-out was conducted on individual students. Their scores show the improvement of mean scores by 14.44%.
(b) The second try-out was conducted on a small group of students. The improvement of mean scores of 29.44% is obviously remarkable.

(c) The third try-out was conducted on a large group of students. The improvement in mean scores of 40.67% is noticed.

The conclusion is that the SICAP is an effective tool both for teaching and learning.

**Objective No.4:** To test the effectiveness of Self-instructional computer – assisted program (SICAP).

The conclusion is based on the improvement in the mean scores of the experimental group and the control group. The experimental group was administered self-instructional computer assisted program (SICAP). The control group was instructed through the traditional method. In the case of the experimental group the improvement from the pre-test mean score (10.10) to the post-test mean score (24.54) is of 14.44 points. In the case of control group the improvement from the pre-test mean score (10.36) to the post-test mean score (21.70) is of 11.34 points. It is evident that there is additional improvement of 03.10 points in the performance of the experimental group. This leads to the conclusion of the study that students are enabled to learn on their own at their own pace, at their own convenience with as many repetitions, as many backward and forward movement and for practice, for exercises and for self-improvement through the computer technology assisted instructional media.

This leads to the validation of the hypothesis of the study which is the summary of the hypotheses of the present study; students of grade IX who learn through self-instructional computer assisted program (SICAP) have performed significantly better than those students who learn through traditional method. The hypothesis posited is validated and therefore the null hypothesis stand rejected and research hypothesis accepted.

Ms. Wilaiwan Wongjinda
(Ph.D-Students)

Dr. Rajashree Jaybhaye
(Research Guide)