THE EFFECTIVENESS OF COMPUTER - ASSISTED INSTRUCTION IN LEARNING SCIENCE

ONG ENG CHOON

UNIVERSITI UTARA MALAYSIA
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ABSTRACT

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Computer-Assisted Instruction (CAI) has become increasingly popular nowadays. As mentioned by many well-known CAI researchers, the CAI method uses mainly Interactive Multimedia Instruction (IMI) program via computers to impart knowledge to the students. Many programs and learning materials from Internet or those available on CD-ROMs are IMI materials.

How effective is CAI as a learning tool? It is the main focus of this study. This study also investigated whether the factor of gender and students' prior knowledge of computers influenced achievement and finally students' perception towards CAI. The study was conducted on a Form Two Science topic using CD-ROM program.

It involved 73 students from a secondary school in Temerloh, Pahang. The subjects learnt using CAI method via computer, replacing the existing traditional textbook method. Before the CAI sessions, students took a pretest. They also answered a questionnaire on students' perception towards CAI. After the CAI treatment, all the subjects sat for a posttest to assess the academic achievement. The students answered the questionnaire again to assess changes in perception towards CAI.

The results showed that CAI method significantly improved students' academic achievement. This study revealed that CAI method was effective in learning Science for the secondary school students. The results indicated that the effectiveness of learning through CAI was not affected by gender. There was also no significant difference in the perception of computers as a learning tool between boys and girls. There were significant results showed that there was an increase in students' perception towards the use of computers. The results also revealed that the students' prior knowledge of computers did not affect the achievement in CAI.

The findings suggest that future researches should focus on a longer duration of CAI sessions in order to obtain more reliable results. The present CAI sessions were only limited to 3 weeks. The implication of the study was that parents should make available PCs for their children, and likewise the Ministry of Education should equip schools with more PCs. This is because of the positive perception towards computers and CAI. However, it is recommended that more studies be conducted to assess the effectiveness of CAI on achievement in other academic subjects.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The usage of computers by the goverment and private sectors has increased since the introduction of the Pentium-based Central Processing Units (CPUs) computer in the 1990's. The effectiveness of computers in processing and updating database for the administration and the business sector make them more superior compare to manual processing. The rapid advances in computer technology and the subsequent widespread utilization of computers have had dramatic impact on all aspects of society including education. In addition, the ever-decreasing cost of computers and software has given rise to their increasing availability and application in schools. Therefore, this makes the use of computers in the education sector more and more popular.

Living in a technologically based information society has created new expectations regarding the education of students. These changing societal expectations, along with new research on how students learn, have challenged the traditional model of schooling. The new information and communication

technologies are heralded by many educators as exciting new conceptual tools that can promote students' active learning (Barron and Goldman, 1994). The powerful new Pentium-based microprocessors enable more interactive multimedia software or interactive multimedia instruction (IMI) on teaching and learning to be produced and used. IMI is defined as an instructional program intentionally designed in segments, coherent and auditory sequences in response to input provided by the learner (Schwier and Misanchuk, 1993).

With IMI, learning materials incorporating text, pictures, music and video clips give learners more interesting lessons compared to traditional 'chalk and talk' method in the classroom. However, IMI needs a higher capacity storage disk and greater processing power because of lots of graphics involved. However, with the advancement of new computer technology especially in the Pentium III-based system (multimedia enhanced) and application software, the prospect of using computers in education is enormous.

The Internet (International Network of Networks) has also become more and more popular with its latest educational resources for teachers and students. Students can study school subjects enriched with sound, voice and video direct from Internet. HIT (Hybrid Interactive Technology) is a newly developed technology that allows real-time interaction between students and the Internet via Web site (Subashini, 1999). The importance of Internet has encouraged many multimedia software programmers to use authoring tools to create more Web-based educational programs. Authoring tools such as Macromedia Authorware are gradually replacing other programming languages (Higdon, 1995).

The Ministry of Education has begun to equip selected schools such as the fully residential science schools with multimedia computers since the early nineties. The development of the Multimedia Super Corridor (MSC) for the commercial world and the scheduled implementation of 90 Malaysian Smart Schools clearly indicate the government's ambition to promote computer literacy to a new height. In January 1997, the Ministry of Education conceptualized the vision of the Malaysian Smart School. The students of Smart Schools were implemented the CAI method in the teaching and learning process. Conventional media was used in an integrated manner with high-technology media, such as computer-based teaching-learning materials (Smart School Conceptual Blueprint, 1997). Hence, the development of IMI for the implementation of Computer-Assisted Instruction (CAI) in Smart Schools has increased rapidly.

1.2 Statement of the Problem

The problem of this study was to determine the effectiveness of CAI in learning Science. The following questions were raised: Does the implementation of CAI improve the students' academic achievement? Is the achievement related to the gender, students' knowledge of computers and students' perception towards computers?