

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

Computers have been widely used by government sectors, private firms and individuals all over the world. Their usage have become part of our modern culture. With the advancement of new technology and application software, the prospect for education is enormous. Multimedia has enriched computer users with interactive texts, sound, graphics and video facilities. Recently the popularity of Internet (also called the Net) has brought us into a new era of telecommunication. The Net offers the latest educational resources for teachers and students. The use of electronic mail (e-mail) enables users to send and receive messages to friends or relatives all over the world. World Wide Web, on the other hand, brings one to a worldwide library of information resources, to a world of special interest discussion group, and enables one to upload and download files instantly.

New technologies have also brought new life to the term computer literacy. For the last three decades, it has gone through a few stages of changes. It has shifted emphasis from meaning 'knowledge of computer hardware and programming' in the seventies (Leuhrman, 1981) to that of 'awareness of or familiarity with computers' in the eighties (Scher, 1984; Kelman, 1984; Anderson & Klassen, 1981). Computer literacy was viewed as being familiar with a device that enhances one's ability to live in and cope with the modern world. In the same decade, this second definition of computer literacy expanded to include those who have knowledge and skills in application software such as word

processing, databases, spreadsheets, graphics, as well as understanding of computers to be used for complex problem-solving (Anderson, Klassen, and Johnson, 1981; Hunter, 1983).

In the nineties, the popularity of Internet and multimedia has had a drastic impact on computer education as more and more learning activities and information are being enriched with interactive sound, high resolution graphics and video which are accessible through the Net and multimedia. Higdon (1995) commented that the current emphasis on computer literacy did not go parallel with the direction which computer usage would take in the coming years. She pointed out that programming was less emphasised in computer literacy today. It has been gradually replaced by authoring tools.

Duckette (1994) in his investigation of various aspects of computer literacy from responses of computer educators in 12 countries stresses that there is a need to redefine the term computer literacy from its original programming basis to a more user-defined basis. He concluded from the results of his study that computer literacy must now be defined in terms of competencies, i.e., how the individual uses the computer.

Another similar definition of this new term can be obtained from the PC Webopaedia (1997, p.1) which defines computer literacy as: "...the level of expertise and familiarity someone has with computers. Computer literacy generally refers to the ability to use applications rather than to program".

In Malaysia the impact of the government's several computer technology projects has brought a new meaning to the term computer literacy. Besides taking steps to implement telecommunication in some selected schools and computer-in-education

projects in all schools throughout the country in the Seventh Malaysian Plan ("Dasar Komputer Kementerian", 1996; "Access to the Internet," 1995), the government has recently undertaken the development of the Multimedia Super Corridor (MSC) for the commercial world. With this new development, there is a greater and urgent need for the people to be computer literate. There is a need to create an information technology rich society. Hence computer literacy will also need to be redefined in accordance to the new requirements for the new environment.

## **1.2 Rationale of the Study**

There are very few studies relating to the measurement of Computer Competency (CC) in Malaysia at present. The earliest study of CC was carried out by the research team of RECSAM (Regional Educational Centre for Science and Mathematics) in a rural school and another in a teacher training college in 1986. From the survey results, they found that there were significant differences in the main CC score between computer club members and non- members on all four attitudinal subscales and five cognitive subscales of CC as measured by Minnesota Computer Literacy and Awareness Assessment (MCLAA) (RECSAM, 1986). Teoh (1989) in her research with 90 Form Four students from three secondary schools in the Klang district of Selangor using the Bahasa Malaysia version translated from MCLAA also gathered similar results: that is, 1) The level of computer literacy was low among the sample group; 2) The computer club members scored significantly higher than nonmembers in terms of knowledge of computers. The science stream students scored significantly higher than arts stream students in computer literacy level.

The computer literacy level measured by MCLAA emphasised more on BASIC programming. They had adopted the computer technology before 1990. With the introduction of new technologies such as Internet and multimedia into computer, the measurement of MCLAA is inadequate today. New measurements of computer literacy will have to include these two fields, that is, Internet and multimedia. For example, Delcourt and Kinzie (1993) and Ertmer, Evenback, Cennamo, and Lehman (1994) included compact-disc databases and electronic mail as items in their instruments for the measurement of attitudes and self-efficacy in computers. Twining (1995) in his instrument for measuring the levels of perception of computer competency also included a subscale of e-mail among 15 other subscales of computer literacy. His instrument was based on the questionnaire of Information Technology in Teacher Education (ITTE) produced by the UK Association.

This study proposes to measure the levels of perception of all of the 16 subscales listed in the questionnaire of ITTE except the two subscales of creation of music and robotic control. They are replaced by programming and use of Internet. The questionnaire used in this study also includes an additional subscale of the use of CD ROM titles. They are grouped into seven categories (refer to Section 1.4).

Another area of study is the gender differences in computer competency. Many educators reported that there existed gender differences in school academic performances. For example, Fennema & Carpenter (1981) and National Association of Educational Progress [NAEP] (1983) reported that as children continued their schooling, gender-related Mathematics achievement difference occurred more favorably for males in higher grades. Gender difference towards computer use may follow a similar pattern, as generally

boys' attitude towards computers are more positive (Nickell, 1987) or more confident (Zoraini, 1995a). Shashaani (1995) also reported that boys scored higher than girls for computer interest, indicating that they had more confidence in their ability to work with computers.

However, some educators hold a different view on this issue. Swadener and Jarrett (1986) argue that the gender difference is caused by factors of the combination of experience and dispositions. Levin and Gorden (1989) claim that prior exposure has a stronger effect than sex on attitudes toward computers.

In this proposed study, Subang Jaya Secondary School (SJSC) is selected because it is a coeducational school. Thus from the sample of Form Four students, this study will investigate whether there is any significant difference in seven categories of CC between boys and girls.

The studies on the relationship between socioeconomic status (SES) and CC may interest education authorities as the Ministry of Education has been promoting computer literacy in rural areas such as the Computer-in-Education (CIE) project launched in July 1992. (Hashim, 1996b) It is a well-known fact that high SES also associates with good home facilities. Nowadays computers have become useful learning tools at home. One can retrieve vast variety of information through World Wide Web (WWW) and also encyclopedia. They can also study school subjects enriched with sound, voice, pictures, and video designed in computer-based instructions (CBI) in a CD-ROM titles for learning. Their frequent use may help to improve their CC levels. However, there is at present hardly any study carried out to see the influence of SES on the student's CC based on the suggested definition of computer literature discussed latter in this chapter.

This study will investigate whether there is any significant difference between seven categories of CC and SES of two groups, namely, high SES and low SES.

Another area of study is the relationship of CC and ownership of home computers. As computers are becoming more affordable, many parents may be able to buy computers for their children. Underwood, Billingham, and Underwood (1994) reported that there are 18% of households in England and Wales who owned home computers according to the Registrar General's figures for 1987. File-Schaw (1986) and Mohamedali, Messre, and Fletcher (1987) reported that 50% of their sample children owned home computers. Martin (1991) found that this figure had increased to 71% in his 1988 survey. Though there are quite a number of studies on the percentage of ownership of home computers, yet in Malaysia data concerning the relationship of CC and ownership of home computers are hardly any. It is the intention of the researcher to find out whether the possession of home computers helps to improve the CC levels of the students.

In short, this proposed study attempts to find out the seven categories of computer competency (CC) i.e.

- a) computer basic skills
- b) word processing
- c) data management which includes data base and spreadsheet
- d) graphic
- e) programming
- f) internet usage
- g) multimedia

And it attempts to establish whether there is any significant differences between categories of computer competency and 1) gender; 2) their socioeconomic status (SES), and 3) ownership of computers.

### **1.3 Research Questions**

1. What are the students' computer competency (CC) levels in each of the following categories:
  - (1) basic skills
  - (2) word processing
  - (3) data management
  - (4) graphic presentation
  - (5) programming
  - (6) internet usage
  - (7) multimedia
2. Is there a significant difference in CC between
  - a) boys and girls
  - b) high and low SES students
  - c) owners and non-owners of computers?

### **1.4 Operational Definition**

#### **Computer Competency**

It is a measure of computer literacy. With the rapid advancement of computer technology today, Higdon (1995) suggested that educational policy and curriculum

designed in the 1980's around computer literacy should be redefined to incorporate society's changing expectation of the computer literate. Old definition should be adapted to include the new technologies of telecommunication and multimedia. This study will adopt Higdon's suggestion of new definition of computer literacy that includes these two fields. The Information Technology In Teacher Education (ITTE) Questionnaire produced by the UK Association will provide a basis for CC in this study . It is slightly modified into 17 subscales which can be grouped into the following seven categories. Each category comprises the items or subscales as shown below:

(1) Basic computer skills

- 1 load and run a computer program
- 2 prepare a new floppy disk for use
- 3 copy a disk or computer file

(2) Word processing

- 1 produce a page of text
- 2 rearrange the text
- 3 check spellings or find alternative words
- 4 produce a number of typefaces

(3) Data management skills of spreadsheet and databases

- 1 sort and select information (data)
- 2 manipulate lists or tables of numbers
- 3 produce graphs or charts

(4) Graphic presentation

- 1 produce or manipulate pictures



- 2 design something with graphic programs

(5) Programming

- 1 create or produce a program using any programming language

(6) Internet usage

- 1 send and receive messages such as e-mail and fax.
- 2 use a browser to retrieve information all over the world
- 3 capture data such as those from the Internet

(7) Multimedia

- 1 retrieve information from CD-ROM titles or other educational programs related to the learning or enrichment of English Language or Mathematics.

The modified categories above are based on those measured by the IT In Teacher Education (ITTE) questionnaire produced by the UK Association. It follows the 5-point scale of 1 (Unable) to 5 (Expert).

The mean score of each category of a subject of the sample is calculated from the average of the item means (5-point scale) under the category except the two categories which have only one item each, namely programming and multimedia. In these cases, the item mean is taken as the category mean.

### **Socioeconomic Status**

It is the level of family status based on the father's occupation. For Malaysian students, the father's occupation has been shown to be a reliable and valid indicator of the SES of the subject under study (Sarjit, 1973; Chiam, 1976; Yong, 1986; Siti Nor Yaakob, Ariffin Nopiah, Ahmad Hariza Hashim, Abdullah Al-Hadi Muhamed, and Anuar

Ahmad, 1990). The subjects will be grouped into the high SES and low SES based on the criteria stated in the Appendix A.

### **1.5 Significance of the Study**

The main purpose of this study is to find out the CC levels in seven categories of Form Four students in Subang Jaya National Secondary School (SMKSJ).

The results of the study will indicate which categories are popular and which categories are unpopular among student users. The results will also show to what extent they relate to gender, SES, and ownership.

This information will be useful to parents, teachers, educators, and especially those curriculum planners in the ministry of education preparing for the Computer-in-education Projects in the Seventh Malaysian Plan. The findings may provide useful data for planners to take appropriate measures to determine what categories of computer literacy to be implemented. Both unpopular and too popular categories may not be suitable for some schools in certain areas. Teachers who have some computer background, and particularly new teachers who have received training in computer literacy, may have a better understanding of the students' CC and provide better advice or guidance to them.

The results of CC and SES may be useful to education authorities so that consideration be given in terms of provision of computer facilities in certain social sectors. This may help elevate the uneven distribution of CC among students for different socioeconomic backgrounds.

Many parents, too, based on the results of this study, may consider whether to equip the home with computers for the sake of their children's enrichment in information technology.

Only a few studies (RECSAM, 1986, Tang, 1987, Teoh, 1989, Lim, 1991) have been undertaken to investigate CC among Malaysian students. However, computer technology has changed so much that the aspects of CC measured before 1991 that stressed very much on programming may not be applicable to information technology in school nowadays. The computer literacy today has extended to cover the usage of telecommunication and multimedia (Higdon, 1995). Thus this study can contribute towards the provision of relevant information of students' CC based on the latest information technology as future references for computer education researchers.

In short, in view of the government's decision to implement the computer project in all schools throughout the country in the next few years, there is a need to assess CC of students. The findings from this study will shed some light on the extent to which the students are computer literate or competent. The information obtained would be of help to educators and curriculum planners in providing a basis for future decision making regarding computer curriculum in schools.

## **1.6 Limitations of the Study**

This study is limited to only one school of Form Four students of Subang Jaya Secondary School in Subang Jaya. A large majority of these students come from well-to-do families. Therefore the results may not be representative of all schools in Malaysia.

Another limitation concerns the type of personal computers (PC) used in homes. There are many different features of PC's used which may be a limiting factor especially in the usage of commercial software. Some low-end PC's may not be equipped with CD-ROMs or Video graphic cards, which can enable large quantities of information to be accessed and with enhanced video graphic displayed on computer screens. Users who own high-end PC's with these extra features will have a greater advantage over the low-end users in information access and ease of learning CBL programs.