CHAPTER 3

METHODOLOGY

3.1 Introduction

It has been shown in Section 1.2 that research data showing the relationship between computer competency (CC) defined in Section 1.4 and 1) gender, 2) SES, and 3) computer ownership is very much lacking in Malaysia. The main purpose of this study is to find out the CC levels in each of the seven categories of computer literacy: 1) basic computer skills; 2) word processing; 3) data management; 4) graphics presentation; 5) programming; 6) Internet usage; and 7) multimedia, using a sample of Form Four students in Subang Jaya.

It also seeks to ascertain whether there are significant differences between the students' CC and 1) gender, 2) socioeconomic status (SES), and 3) ownership of computers.

3.2 The subjects

The subjects selected for this study were Form Four students of Sekolah Menengah Kebangsaan Subang Jaya (SMKSJ) [Subang Jaya National Secondary School]. Most of them have their own computers as they come from quite well-to-do families in the residential area of Subang Jaya and USJ. SMKSJ is a coeducational school. Thus the sample data chosen should provide a good mix of boys and girls. In addition, the students of SMKSJ come from a multi racial background, and therefore the sample data is not limited to one race only. As a result of these characteristics, the researcher felt that the data would be suitable for the purpose of this study.

Out of the total 219 survey subjects, only 186 completed the survey forms. In some cases, minor particulars such as the father's income is missing. The uncompleted forms totaling 33 respondents are because of the instruction in the questionnaire telling them that if they have never used computers before they are only required to fill up the first part of the questionnaire, i.e. background information, and leave the second part of the questionnaire, i.e. CC levels, blank. Thus the selected sample represents the group of students who have used computers before. The following tables representing students' background information were produced with the help of a statistics package, SPSS 7.5 for Windows.

3.2.1 Gender

Table 3.1 shows the frequency distribution of the subjects by gender. The sample of 186 subjects consists of 92 (49.5%) boys and 94 (50.5%) girls.

Table 3.1
Distribution of the Subjects According to Gender

Gender	Frequency	%
Boys	92	49.5
Girls	94	50.5
Total	186	100.0

3.2.2 Socioeconomic Status

Table 3.2 shows the distribution of the subjects according to SES. For the classification of students' SES into high and low groups, father's occupation is the main criterion for selection. Refer to Appendix A for detail of classification. In the sample of 186 subjects, there are 8 subjects who did not complete the father's occupation, leaving 178 valid cases for data analyses related to SES.

Table 3.2
Distribution of the Subjects According to SES

SES	Frequency	%
High	115	64.6
Low	63	35.4
Total	178	100.0

Table 3.2 shows that there are 115 (64.4%) students belonging to the high SES group and 63 (35.4%) students belonging to the low SES group.

3.2.3 Ownership

Table 3.3 shows the distribution of computer users according to Ownership. Among 186 students who have some computer knowledge and skills, 175 (94.1%) own home computers and 11 (5.9%) do not own computers (Table 3.3). This means that a great majority of computer users also own home computers.

Table 3.3
Distribution of Computer Users According to Computer Ownership

Ownership	Frequency	%
Yes	175	94.1
No	11	5.9
Total	186	100.0

However, the table was based on those who have some experience in using computers before. The total sample comprises 219 subjects. If we take into account the other 33 subjects who have not used computers before, the composition of computer owners and non-owners is different from the one shown above. If the total sample is considered, then there are 179 (81.7%) computer-owners and 40 (18.3%) non-computer-owners. Refer to Table 3.4

Table 3.4
Distribution of Computer Ownership of the Total Sample

Ownership	Frequency	%
Yes	179	81.7
No	40	18.3
Total	219	100.0

It should be pointed that out of the 179 computer owners (Table 3.4), 175 have used computers before (Table 3.3). The remaining 4 have never used computers before. On the other hand, out of the 40 non-computer owners (Table 3.4), 11 have used computers before (Table 3.3), the remaining 29 have never used computers before. Hence they are not required to complete the survey items in the second part of the questionnaire. Table 3.5 shows the distribution of computer experience (or use of computer before) and ownership.

Table 3.5
Cross-classification Table of Computer Experience by Ownership

Computer Experience	Ownership				Total
	Yes	%	No	%	
Yes	175	97.8	11	27.5	186
No	4	2.2	29	72.5	33
Total	179	100.0	40	100.0	219

The table shows that majority of computer owners (97.8%) know how to use computers compared to non-owners (27.5%).

3.3 Instrumentation

The instrument used in this study is a questionnaire which consists of the following two parts:

(1) Student Background Information

(2) Self-Rating Computer Competency Level

The first part was constructed by the researcher. It asks about the students' background information such as gender; race; SES experience in computers. The second part asks the student to self-rate his/her computer competency level. The questions here are mainly based on the instrument designed by the UK Association for Information Technology in Teacher Education (ITTE) . The ITTE questionnaire has been widely used in the UK to assess students' IT profile on entry to Initial Teacher Training (ITT) in recent years (David and Coles, 1993). The modified questionnaire, among other things, asks students to self-rate their competency on 17 aspects or subscales of CC on a scale of scores ranging from one (Unable) to five (Expert)

The ITTE questionnaire was also used by the researcher Twining (1995) who administered the questionnaire to 84 students on the primary Postgraduate Certificate in Education at Cheltenham & Gloucester College of Higher Education. (Twining, 1995, p.381). The instrument was slightly modified to make it more suitable and relevant to the sample study in the Malaysian environment. The first part of the questionnaire was constructed in the national language as far as the background information was concerned as all the students are fluent in the national language. However, the second part concerning computer literacy levels were in constructed English for clarity, as most of the computer terms among school children or in the market are in English.

3.3.1 Student Background Information

The first part of the questionnaire concerns the background information of the respondents. It required the subject to fill with a tick in check boxes corresponding to his/her gender; race; father's academic achievement in five levels from *Sijil Rendah Pelajaran* (S.R.P.)[Lower Certificate of Education (L.C.E.)] (Form III), *Sijil Pelajaran Malaysia* (SPM) [Malaysia Certificate of Education] (Form V), *Sijil Tinggi Pelajaran Malaysia* (STPM)/ [Malaysia High School Certificate (HSC)] (Form VI), Diploma, and University; father's salary in four scales from less than RM1500, between RM1,500 and RM2,999, between RM3,000 and RM5,000, and more than RM5,000. It required the respondent to indicate with 'Yes' or "No" whether he/she had ever operated a computer; owned a computer at home; had been a member of a computer club; and to state the father's occupation. It also asked the respondent to indicate his time spent from zero, less than one hour to more than one hour a week in each of the seven categories of computer skills mentioned above. For example, the respondent was required to mark with a tick in a suitable box under three subheadings: J, R, and T to show the duration of using the corresponding skill listed in an item:

   K: zero hour

   R: less than one hour a week

   T: more than one hour a week

An example of skills listed in an item is: 'install or load and run a computer program; format a new floppy disk for use; copy a disk or computer file'.

The purpose of asking the students to state the time spent is to check whether it agrees with the self-rating computer literacy levels which they have to marks in part II. For example, if a respondent had marked that he spent zero hour a week in word processing in part I and self-rated as high or expert in the corresponding item of word processing, his response is considered inconsistent and invalid.

Another example to check the consistency of the answer was to ask the respondent to state an example. In the item for asking the programming experience of the respondent, it instructed that if the respondent answered 'Yes' to this question, he had to give two statements or commands of the programming language he used. If he did not give any statements or commands at all, then his self-rating levels of programming which he marked in part II of Computer Literacy Levels would not be accepted should he rate himself as high or expert in programming level.

3.3.2 Self-rating Computer Literacy Levels

The second part of the questionnaire consists of 17 self-rating subscales (skills) which are grouped into seven categories as mentioned earlier in Chapter 2. The Likert 5-point scales are arranged under 5 characters K, R, S, T, and P based on the national language spelling:

K   -   Unable

R   -   Slightly able

S   -   Moderately able

T   -   Strongly able

P   -   Expert (Can help others confidently or be consultant to others)

Two examples of a self rating subscale are shown below:

    1) use a word processor to produce a page of text

    2) use a computer to send and receive messages such as e-mail or fax.

The second example is followed by a checked question of asking the respondent to give an example of any application program which he had used to send his/her e-mail or fax.

3.4 Calculation of Mean Category Scores

Based on the results of the survey, the frequency of the scores on the Likert scale and its corresponding mean of each 17 subscales (skills) was calculated using the statistical analysis package, SPSS 7.5 for Windows. The 17 mean scores were then grouped into seven categories as shown in Section 2.5. The mean of the mean scores of subscales in each category was then calculated to produce the category mean. If the category has only one item, for example, programming, then it is taken as the mean for the category. The analysed results were used to answer the first research question concerning the students' computer competency (CC) levels in the seven categories as stated in Section 1.3.

3.5 Socioeconomic Status

The SES of the subject was based on their father's occupation. In Malaysia, it has been found that the father's occupation is the best measurement of SES (Sarjit, 1973; Chiam, 1976; Yong, 1986; Siti Nor Yaakob et al., 1990). Other data which

was found to be essential to classify the SES of the subject was also considered, that is, the highest education level attained by the father.

The students in this study were categorised as either high or low SES based on the criteria given in Appendix A. For example, a subject who indicates that his/her father's is a businessman is then evaluated based on the father's education level. If the father's education level is college education and above, the subject will be placed in the high SES group. For students who listed their fathers as businessmen but they have less than college education, the students will be placed in the low SES group.

3.6 Pilot Study

A pilot study was conducted in the school mentioned above to collect the data. A Science teacher who has some computer skills was asked to administer the pilot test. She was briefed about the purpose of the survey; the meaning of the five-point scale and the instructions for filling the survey form by the researcher so that she could be of help to the students when some items were in doubt. A sample of 40 students in the pilot study were asked to mark items which they did not understand or were ambiguous about in addition to answering the items.

3.7 Data Collection

About a month after the pilot study, the corrected set of questionnaires were distributed to Form Four students in four science classes and two arts classes by three Form teachers. They were briefed in the school one day before the survey started. They were requested to help the researcher in the administration of the survey. The six classes are of average good academic performance. The instrument took 40

minutes to be completed by respondents. All the survey questions were conducted in two days for 6 classes. The subjects were told that all information would be kept confidential.