Computer Technology In Malaysia: Teachers' Background Characteristics, Attitudes And Concerns

Norhayati Abd. Mukti (Ph.D)
Department of Information Science
Faculty Teknology and Information Science
Universiti Kebangsaan Malaysia
Bangi, Selangor. Malaysia

E-mail: nam@sun1.ftsm.ukm.my,
Tel: 603-8292930
Fax: 603-8256732

Abstract

Providing latest computer technology, good facilities and training for teachers to use computers effectively in their classroom instruction is not sufficient. There are many other factors that need to be examined in order to ensure that teachers will use computer technology effectively in their classroom instruction. The main purpose of this study is to find out factors such as teacher's background characteristics, attitudes and concerns that relate to teachers' use of computer technology in their teaching. This study also attempted to discover whether teachers can be grouped based on their perceptions on the use of computers. This paper will also focus on the differences among teachers who used computer technology in their classroom practice. The results of the study showed that these factors that is teachers' background characteristics, attitudes and concerns showed a great significance in the degree of classroom computer usage.

1.   Introduction

1.1   Teachers Background Characteristics

1.1.1   Teachers' Computer Knowledge. In order to use an instructional tool such as the computer to achieve the goals of teaching and learning, teachers must have adequate knowledge about the computer. Summers (1988), in response to an "importance for teachers" questionnaire item, found that more than 99% of teachers rated the question about computer usage as "important" to application of computer usage, with more than 50% rating it as "very important". Summers also found that teachers who are computer literates have a very vague knowledge about computer usage.

Wilson (1990), in a study on the preparedness of teacher trainees to use computers in teaching found out that even though the majority of teachers studied expressed positive feelings about computers, 68% still felt that their knowledge regarding computer usage was inadequate. Bychowski, Deborah, Van and Ralp (1984), in their study on current classroom computer usage and computer knowledge, showed that most of the teachers surveyed did not feel that they possessed adequate knowledge on the aspects of computer technology, very necessary to effectively use computers in the classroom. Budin (1991) states that a meaningful approach to computer education must emphasize accurate teaching as well as computing. Teachers must be trained in computer education to make meaningful currirular decisions when using them in classroom.

1.2   Teachers' Attitutes. The success of any new educational program on computer technology depends strongly upon the support and attitudes of teachers involved (Woodrow 1991). For example, if teachers regards computers negatively or with suspicions, or believe that a new program (as it is being introduced) will not work successfully, the educational utilization of computers will be limited (Woodrow 1991). Many researchers found that if teachers believed or perceived proposed computer programs as fulfilling neither their own or their students' needs, they are likely to strongly resist not only all attempts to introduce such courses and technology into their schools, but also all offers or suggestions for retraining them to meet the challenges that the introduction of such programs would present.

As in the developed countries like the United States and United Kingdom, the Malaysian school system has began to introduce computers into the classrooms. Positive teacher attitude towards computing is critical if computers are to be effectively integrated into the elementary and secondary curriculum (Anderson 1984). Various research has found that in general, teachers students and others have positive attitudes toward computers. Dickey and Kherlopian (1987) reported that most teachers believe that the amount of computer experience has a positive effect on attitude toward computers. Hawkins (1984) indicated that negative reactions to computer experience come mainly from females. By contrast, Vermette, Orr, and Hall (1986) did not find significant differences between male and female teachers who responded to an attitude inventory. Becker (1985) reported that attitudes towards computers were not related to sex, age, or job level relationships among cooperative extension workers, but that these attitudes were related to perceptions of maths ability.

General teacher attitude plays an important role in the educational process (Muller, Husband, Christou & Sun 1991). Specifically, attitudes towards the use of computers need to be evaluated to successfully implement technological advancements into the classroom (Stevens 1982). The idea that attitude toward technology affects implementation success not only makes intuitive sense but appears repeatedly in the literature (Choo & Cheung 1990-91). A positive attitude has been shown in several studies to correlate to successful implementation of computer usage.

1.3   Teachers' Concerns. Various research suggests that much of the in-service activity is not optimally successful and useful because designers are not aware of, and do not consider, the existing developmental stage of the participants' attitudes, concerns, understanding and skills in relation to the innovation. To find out teachers' concerns about educational innovations, Fuller developed Stages of Concern Model. This model was used as a method of measuring and analyzing concerns of teachers pertaining educational innovations. The study revealed that teachers pass through a sequence of stages of concern: concerns that are completely unrelated to teaching, concerns related to teaching, but not about subject matter and/or students, concerns about the task or content matters, and eventually concerns about the impact of their teaching on the students. Hall's (Hall et al. 1979) Stages of Concern taxonomy on reaction to innovations can be described as the following:

- Stage (1) Awareness – coming into contact with computers and educational software
- Stage (2) Information – gathering facts about computers in the classroom
- Stage (3) Personal – concern with the impact of computers on self.
- Stage (4) Management – using computers in the classroom.
- Stage (5) Consequence – concern about the effect of computers on students and subject.
- Stage (6) Collaboration – interacting with other teachers using computers.
- Stage (7) Refocussing – refining classroom use of computers.

Hall assumed that if the content of a training program is related to the level of concern of the learner then there will be change in both the levels of concern and the attitude towards the innovation.

Wedman (1986) used the Stages of Concern questionnaire to measure the concerns of teachers at the beginning and the end of computing in-service course. He reported a high intensity of the lower level of concerns, Stages 1 (Awareness), 2 (Information) and 3 (Personal) at the beginning of the course; at the end an increase in the higher level concerns of Stages 5 (Consequence) and 6 (Collaboration); but little change in the lower concers. Wedman noted the unexpectedly low level of management concerns in both the pre- and post-measurements. He thought this might be due to the nature of the in-service itself, which did not involve participants in implementing computing in their classrooms, or because there was not sufficient time during the course for the problems of implement on to become apparent to the teachers.

In another study, Wedman measured teachers' concerns in relation to some different aspects of educational computing, in particular word processing, computer assisted instruction, computer managed instruction and interactive video. From the results of this study, Wedman hypothesizes that teachers see educational computing as a collection of several different innovations rather than as a single entity. This perception could hinder the effective integration of computing throughout the school curriculum, as teachers will think of computing as consisting of severall pieces rather than as one whole. This could lead, for example, to word processing being thought to fit only into a particular subject at a certain level, rather than being a general purpose tool for all appropriate levels and subjects.

2.0   Theoretical background

The theoretical framework guiding this study is based on studies carried out by Shavelson et al. (1984). Fullen et all (1987) and OTA. In this study only some factors related to the use of computers were examined. These factors are teachers background characteristics, attitudes and concerns as shown in Figure 1.1.
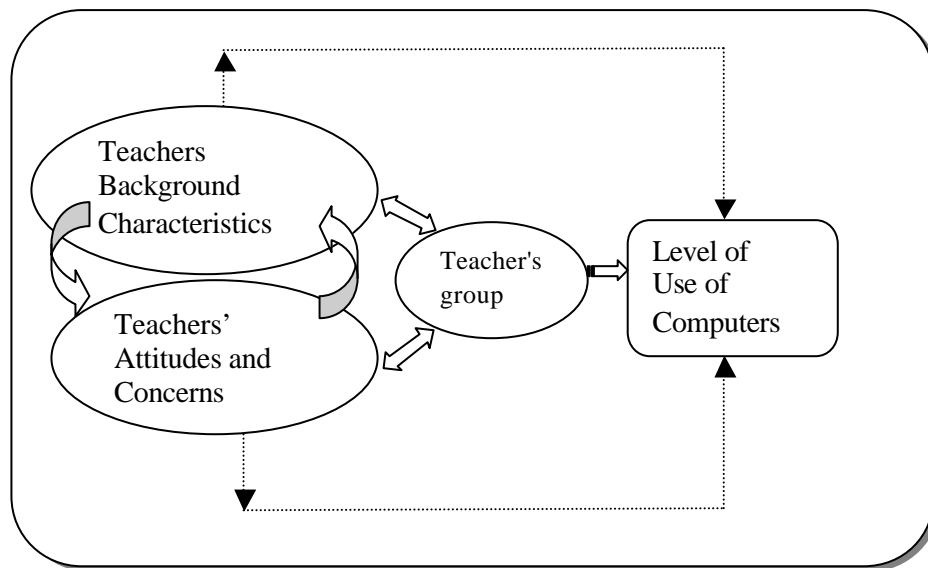
Figure. 1.1 :   Conceptual Framework

3.0   Purpose of Study
The purpose of this study is to look for groups of teachers. The purpose of looking for the groups is to provide a mean for identifying the contribution of these factors:

  i.   to find differences between groups of teachers in terms of their background charactersistics;

  ii.   to look for differences in teachers' attitudes and concerns toward the use of microcomputers in learning and teaching.

4.0   Methodology
Sample. All fifteen teachers from five schools (participated in the pilot study) who were teaching Computer-In-Education (CIE) volunteered in this study. These schools were from five rural school districts in the state of Selangor, Malaysia. All teachers participated in the in-depth interviews, and answered the questionnaires distributed to them. The wide range of economic classes, and ethnic groups as well as the fact that these schools were the first group of schools where the government had placed 20 – 30 microcomputers into the classroom, were the primary reasons for selecting these schools as samples of this study.

4.1   Data Collection.
The data collected and analysed were from these sources:

a.   *Questionnare administered to the CIE teachers*. The questionnaire consisted of a variety of different questions that dealt with teachers' background characteristics, teachers' attitudes, and concerns. The questionnaire were given prior to the interview. A common scale was used in the questionnaire and teachers were expected to rate each of the question provided.

b.   *In-dept interviews of CIE teachers using interview scheduels*. The interview consisted of both open and close-ended questions. For the close-ended questions, boxes are provided for the teachers to rate the scale. The open-ended questions provide respondents with an opportunity to express their feelings or ideas.

c.   *Laboratory Observation*. The researcher observed teachers using computer technology in the laboratory without any distraction form the reasearcher.

5.0   Data Analysis

In this study data were analysed using both simple statistical methods and more detailed analyses. The simple methods such as correlation and percentages were used to find simple relationship among the varaibles. For more detailed methods, the 3-D plot and Multimentional Scale (MDS) were used to see the interrelationship which could not be revealed by the simple analyses. Systat was used to create the 3-D plot, and SPSS was used for the MDS.

6.0   Findings

In this section, the discussion of the data analyses will be based on the following headings:

- Teacher Cluster
- Background Characteristics
- Attitudes and Concerns

6.1   Teacher Clusters.   It was found that from the simple analysis, the correlation matrix does not produce a clear structure or cluster of variables. In order to look at clusters of variables, a teachers'distance matrix method was used. To identify groups of teachers, a more complex analsysis was used. The MDS result of the variables from SPSS was put into the 3-D graphing selection of Systat to produce the plot. Figure 1.2 shows the 3-D plot of relationships among all the teachers. An examination of the plot shows that the teachers can be divided into two groups. A set of teachers was grouped at the upper left sector of the cube (labelled, D, E, G, K, M, and O followed by 1), and another set of teachers was at the lower right sector of the cube (labelled A, B, M, I, J, L, F and followed by 2). Teacher C, who was not labelled with number 1 or 2, seemed not to fit into either of the groups.
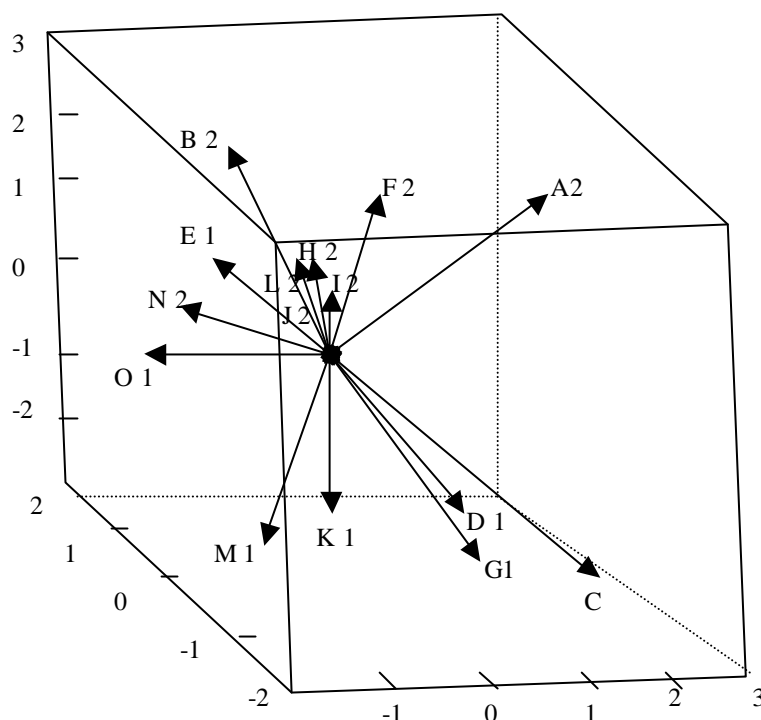

Figure 1.2 : 3-D Plot of Teachers

6.2   Background Characteristics. To understand the differences between the two groups of teachers, the distribution of teachers' background characteristics such as their age, teaching experience, experience teaching with computers, knowledge of programming language, amount of training attended, computer usage prior to training, and computer usage at home for individual teachers in each group were closely examined. The percentage of the distribution of variables for the teachers in each group was computed. Table 1.1 presents the results of the analysis. As seen from Table 1.1, several differences were found between the two groups of teachers.

As can be observed, teachers in group 1 were found to be more matured than teachers in group 2. About 83% of teachers in group 1 were in the age range of 26 – 35 years, in comparison to 50% of teachers in group 2. About 16.67% of teachers in group 1 were in the age range of more than 35 years. The percentage of teachers in this range was much higher for teachers in group 2, i.e. 32.50%. About 12.50% of teachers in group 2 were in the age range of 20 – 25% years, but none of the teachers in group 1 were in this age range.

Table 1.1 also shows that teachers in group 1 has more teaching experience in comparison to teachers in group 2. About 50% of teachers in group 1 has 1 to 5 years teaching experience, in comparison to teachers in group 2, which is 83%. As can be observed too, the percentage of teachers in the range of 11 – 15 years of teaching experience for group 1 is 32.50% which is about twice the percentage of teachers in group 2 (16.67%). About 12.50% of teachers in group 1 has 16 – 20 years of teaching experience, but none of the teachers in group 2 are in this range of teaching experience.

In terms of experience teaching with computers, it can be observed that about 12.50% of teachers in group 2 has less than three months' experience in teaching with computers, but none of the teachers in group 1 are in this range. About 25% of teachers in group 2 has less than one year's experience in comparison to about 33% in group 1. Aboud 33% of teachers in group 1 has three years' experience in comparison to group 2, which is about 32%.

In terms of BASIC programming language, it can be observed that teachers from group 1 are more knowledgeable in BASIC programming language (about 83%) than teachers in group 2 (only about 12.5%). The data collected shows teachers in group 1 learned computer programming in many different ways. Some of them have taken the advantage of the in-service training offered by the Ministry of Education, some have taken courses during their undergraduate studies, and some learned it on their own.

In terms of amount of training attended, Table 1.1 shows a very large difference between the two groups. About 66.67% of teachers in group 1 had attended in-service training, whilst only about 12.50% of teachers in group 2 had attended such in-service training. About 83% of teachers in group 1 had used computers prior to the training given by the Ministry of Education, in comparison to teachers in group 2 (62.5%). About 83% of teachers in group 1 have their own computers at home, and only 12.5% of teachers in group 2 posses their own computer.

Table 1.1 The Difference in Background Characteristics Between
Group 1 and Group 2 Teachers

Variable	Group 1 %	Group 2 %
Age		
20 – 25 years	0.0	12.50
26 – 35 years	83.33	50.00
>35 years	16.67	32.50
Teaching experience		
1-5 years	50.00	83.33
11 – 15 years	32.50	16.67
16 – 20 years	12.50	0.00
Experience teaching with computers		
Less than 3 months	0.0	12.50
Less than 1 year	33.33	25.00
2 years	33.33	25.00
3 years	33.33	32.00
Knowledge of BASIC programming language	83	12.5
Amount of in-service training attended	66.67	12.5
Used computer prior to training	83.33	62.5
Use computer at home	83.33	12.5

6.3 **Teachers' Attitudes.** For the attitude variables, the difference between the groups were examined. The results of the simple analysis (see Table 1.3) shows that there is a correlation between teachers' attitudes and the dependent variables, that is level of use. The distribution of the observed and perceived table also shows that the teachers' levels of interest toward the use of computers was less when compared with their levels of use between the groups. This is probably due to the poor support; both moral and technical provided to teachers by the school.

Results of the 3-D plots did not show any clear clusters because attitude statements are basically a set of questions dealing only with the amount of positive affect and negative affect. The attitudes scale are fundamentally one dimension. Since the plot did not give any interesting result, to analyse teachers' attitudes between the groups, scores for group 1 and group 2 were formed. The scores were added and a non-parametric, Kruskal-Wallis one-way analysis of variabce was used to see which group was positive or negative.

The results of the test (see Table 1.2) shows a very small difference between the two groups. It was found that teachers in group 1 had a higher rank sum (60.00) in comparison to teachers in group 2 (45.00). The result suggests that teachers in group 1 react more positively toward the use of microcomputers in their classroom instruction than do teachers in group 2. The more positive attitudes reflected in group 1 seem to correlate with this group of teachers' knowledge on the use of computers in their teaching and their more extensive use of computers in comparison to teachers in group 2. Teachers in group 1 used different approaches to the use of microcomputers and used more application software programs in their practice as compared to teachers in group 2, who used more isntrucitonal programs.

Table 1.2 Kruskal-Wallis One-Way Analysis of Variance

Group	Count	Rank Sum
1.000	7	60.000
2.000	7	45.000
Mann-Whitney U Test Statistic = 32.000, Probability Is 0.334		

The distribution of observed and reported dependent variables, that is level of use and other indicators such as confidence in the use of computers, teachers' computer knowledge, teachers' level of interest toward the use of computers, and integration of computers into subject matter were computed and results are shown in Table 1.3. As can be observed, the distribution of dependent variables shows radically different results, between what was observed by the researcher and what was actually reported by the teachers. From the research's observation, it was found that teachers were using the computers more than they thought. For instance, the researcher observed that teachers in group 2 who were less knowledgeable about computers generally used computers more than what they had reported. This is probable due to the fact that these teachers were not sure what their level of use really was. In terms of confidence in the use of computers, it was observed that teachers in group 1 were more confident in using the computer then what they had reported.

Table 1.3 The Distribution of Observed and Reported Dependent Variables (Level of Use) and Other Indicators

VARIABLE	GPI (%)	GP2(%)	GP1(%)	GP2(%)
Level of Use				
L	33.33	25.00	83.33	50.00
M	66.67	75.00	16.67	50.00
H	-	-	-	-
Confiden comput. Use				
L	-	12.50	-	12.50
M	33.33	62.50	83.33	75.00
H	66.67	25.00	16.67	12.50
Computer knowledge				
L	33.33	-	33.33	87.50
M	33.33	37.50	33.33	12.50
H	33.33	62.50	33.33	-
Integrated computer				
L	33.33	100.00	33.33	75.00
M	50.00	-	50.00	25.00
H	16.67	-	16.67	-
Level of interest				
L	-	-	-	12.50
M	66.67	25.00	50.00	25.00
H	33.33	50.00	50.00	62.500

Key: L – Low, M – Medium, H – High

Teachers in group 2 do not show much difference. In terms of computer knowledge, it was found that teachers in group 1 showed no difference between what was observed and what they had reported. As for teachers in group 2, they reported of very little knowledge about computers, but it was observed that they had made many positive attempts to use computers in their practices. In terms of integrating computers into the subject matter, it was found, that teachers in group 1 did not show any difference between what was observed and what had been reported by the teachers. However, it was found that teachers in group 2 did not integrate computers as much as what they had reported. This is probably because teachers in this group thought that integrating computers meant what they had learned was being applied in their teaching of the computer subject, which is totally differenct from the integrating computers into other subjects taught. Interms of teachers' level of interest towards the use of computers, it was found that the level of interest for both groups were less than their level of use. This is most probably because these teachers were not satisfied with support given to them such as training, financial, administrative, and technical support. All these factors and

others such as: other barriers tended to reduce their interest towards the use of the computers in teaching and learning.

7.0   Conclusion and implication
7.1   Findings on Teachers Background, Prior Knowledge, Feeling and Preparation in the Use of Computers.
In this section there is several discussion of separate findings related to the above heading.
Finding a:

Teachers who were less knowledgeable perceived that they needed more skills and adequate knowledge to implement computer technology in the classroom. Teachers felt that having basic knowledge of computers is insufficient to teach with computers in the classroom. They felt uncomfortable and under prepared to teach with computers.

This finding confirms the findings of a number of studies (Summers (1988), Bychowski, Deborah, Van and Ralp (1984), Gary (1988), and Wilson (1990)) that addressed teachers' computer knowledge in the use of computers in teaching.

This means that lcoal school districts need to take seriously teachers' concerns about their lack of computer knowledge and provide more in-service training and staff development programmes in the use of CIE.

Findings b:

Teachers who were knowledgeable in the sue of computers used computers at a technical level and integrated computers in their teaching of other subjects.

The finding in this study is consistent with the finding by Sheingold (1990). Knowledgeable and experienced teachers who had used computers for more than three years tend to use more application programs and less instructional or content specific programs.

As teachers gained experience in the use of computers and developed more practice, they tended to use less software that is related to specific content. Teachers feel more comfortable in making other choices of practice and use different approaches to the use of computers in their teaching.
Finding c:

Personal factors such as teachers' knowledge of the computer and external factors such as students grade levels and their ability levels influenced teachers' computing choices.

 These findings confirmed the findings of studies about computer use in schools by Plomp et al. (1990). Novak and Knowles 91991) in their review of studies of teachers' computing influences, found that there were external and internal factors influencing teachers' use of computers. External factors included students' characteristics such as grade levels and ability levels. For example, where there are students with low ability levels, teachers may choose to use drill-and-practice computer programs to reinforce basic academic skills. Internal factors include teachers' knowledge and understanding of computer software. For example, teachers who are familiar with the instructional software are more likely to include it in their instruction.

This means that having experience teaching with computers seems to be an important factor for effective use of computers. This implies that it takes time for teachers to be effective users of computers in their classroom instruction.

7.2   **Finding of Teachers' Attitudes and Concerns toward Computers**
Finding a:
> The more knowledgeable group of teachers showed a more positive attitude toward the use of microcomputers in classroom instruction despite the problems faced by teachers when using the computers.

The finding in the current study is consistent with findings in most of other studies on teachers' attitudes on the use of computers. For instance according to Woodrow (1991), the success of any new educational program on computer technology depends largely upon the support and attitudes of teachers involved. Many researchers found that teachers are likely to resist not only attempts but also suggestions for computer introduction if they perceived computer technology negatively.

It is clear that teachers in this study expressed positve feeling in the use of computer technology. Despite the fact that these teachers were facing problems with computers, they were generally willing to give a try. Positive teacher attitude towards computing is critical for computers to be effectively ssed and integrated into a school's currirulum.
Finding b:
> Teachers expressed many concerns related to the sue of computers. Some of the concerns wre related to tiem, software, and classroom management.

This finding is consistent with the findings in the reviewed literature. According to Sheingold (1990) and Plomp and Carleer (1987), teachers are the primary users of computers with children, and these teachers expressed many concerns about the use of computers that can enhance their teaching and students' learning. Among the concerns reported wre lack of software, lack of time and lack of trining on the use of computers.

For time-related concerns, the teachers studied expressed many different concerns. Some reported that they had to teach other subjects and o carry out other responsibilities, so they did not have enough time to prepare lessons and handouts for computer usage. They needed more time, especially when preparing lessons that were related to the use of computers, because teaching with computers was a new field to them. Some teachers reported that there was insufficient time for each child to have a turn at using the computer due to the machine's frequent breakdown. Teachers said that even though they were gicen two periods to teach, they found that it was difficult to complete the required material in the computer literacy unit with the specified amount of time. They also complained that there is insufficient time to complete required objectives and to use the computer. The most popular time-related concern that was frequently cited by the teachers was insufficient time for them to learn and master the computer, either by themselves or as a group.

For software-related concerns, some teachers reported that the level of software provided for them to teach was too sophisticated or their students. They would prefer to use less complicated software with their students at the introductory stage. Especially at the basic level, it is sufficient to expose the students with simple, easy-to-follow software. For instance, the teachers would prefer to sue a simpler word-processor than the one provided (wordPerfect).

For classroom-management concerns, the teachers studied, repeatedly said that it was quite difficult to maintain descipline while in the computer laboratory. Most of the teachers complained that there is no lab assistants to help them in the computer laboraoty. Thus teachers converyed many concerns related to the use of computers in teaching. This means that administrators should look more in depth regarding these concerns and take serious actions in order for teachers to able to sue CIE more effectively in learning and teaching.

References

Anderson, J., 1984. Computing in schools, Published by The Australian Council for Educational Research Limited.

Becker, J.W., 1985. Attitudes of Maine cooperative extension service personnel towards computerization Research in Rural Education, 2, 159-162.

Budin, H.R., 1991. Technology and the Teacher's role. Computers in the schools. Vol. 8, No. 1-3.

Bychowski et al., 1984. Computer Literacy and use among elementary classroom teachers. ERIC (ED 249938).

Choo, M.L., and Cheung, K.C., 1990-91. On meaningful measurement: Junior College pupils' anxiety towards computer programming. J. Educational technology systems Vol. 19 (4), p. 327-343.

Dickey, E., and Kherlopian, R., 1987. A survey of teachers of mathematics, science and computers on the uses of computers in grades 5-9 classrooms. Educational Technology, 27, 10-14.

Fullen et al., 1987. A conceptual plan for implementing the new Information technology in Ontario schools. Toronto: Ontario Ministry of Education.

Gary, M., 1988. The long interview. Newbury Park, CA: Sage Publications, Inc.

Hall et al., 1979. Microcomputers in the classroom: Focusing on the teacher concerns. Journal of educational research quarterly. Vol. 13, 1. Pp, 37-46.

Hawkins, J., 1984. Computers and girls: Rethinking the issues. New Yorks: banks Street College of Education, Center for Children and Technology. ERIC (ED 249922).

Sheingold, K. & Hadley, M., 1990. Accomplished Teachers-Integrating Computers into classroom practice. Center of Technology in Education. Bank Street Coolege of Education.

Summers, M., 1988. New Primary teacher trainees and computers: Where are they starting from? Journal of Education for teaching, Vol. 14, No. 2, pp. 183-191.

Novak D.I. & Knowles J.G., 1991. Beginning Elementary Teachers' use of computers in classroom instruction. Action Teacher Education. Summer, Vol. 8, No. 2.

Mueller, R.O., Husband, O.H., Christou, C., Sun. A., 1991. Preservice Teacher Attitudes towards Computer Technology: A Log-Linear Analysis. Mid-West Educational Researcher Vol. 4,2, P.23-27.

Office of Technology Assessment, 1988. Power on! New tools for teaching and learning. Washington DC; Press.

Plomp & J. Moonen (Eds.), 1990. Implemention of computers in education, International Journal of Education Research, 17(1), 19-34.

Stevens, D., 1982. Educator's perception of computer in education AEDS Journal 15, 1-15. Teacher Education Conference Bord, 1984. Teaching and learning with computers. Position paper. ERIC (ED248885).

Shavelson, R.J. et al., 1984. "Successful teachers' patterns of microcomputer-based mathematics and science instruction". The National Institute of Education.

Vermette, S., orr, R., and Hall, M., 1986. Attitudes of elementary school students and teachers towards computer education. Educational Technology, 26, 41 – 46.

Wedman, J., & Heller, M., 1984. Concerns of teachers about educational computing. AEDS Journal, 17, 31-40.

Wilson, B. 1990. The preparedness of Teacher Trainees for Computer utilization: The Australian and British experiences. The Journal of Education for Teaching, Vol. 16, No. 2.

Woodrow, Janice, E.J., 1991. Teachers' perceptions of computer needs. Journal of research on computing in education. Vol. 23. No. 4, pp 475-496.

Author's Bibliography

Dr. Norhayati Abd. Mukti has been working in the field of computer application and educational technology since 1989. She obtained her Master in Educational Systems Development and Ph.d in computer application and technology multimedia from Michigan State University, USA. Currently she is a lecturer in the department of Information Science, Universiti Kebangsaan Malaysia. Her field of interest are multimedia, software development and information technology.