

Chapter Four

RESULTS AND ANALYSIS

This chapter highlights the results obtained from the research, including the analysis of the fundamental sections in the questionnaire discussed earlier. In addition, the relevant information obtained from the interviews conducted are noted and integrated in the overall analysis.

Demographic Profile

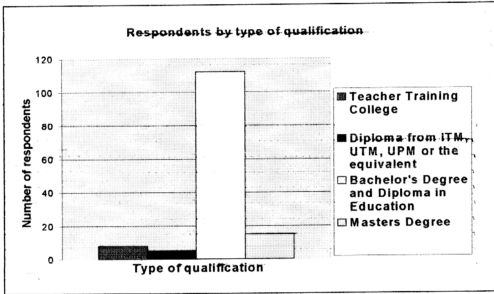
A total of 101 schools were surveyed, of which 70 schools responded, giving a total of 140 respondents. Of these, 45 (64%) were from Wilayah Persekutuan schools and 25 (36%) from Selangor schools.

Education Level

The various levels of education attained by respondents is depicted in the **Figure 4**. Of the total ($n=140$), 8% were college trained, 4% had a diploma from ITM, UPM, UTM or the equivalent, a majority of 82% were graduates with an accompanying diploma in education and 6% held post-graduate degrees, namely a Masters degree.

Figure 4

Highest Educational Level Achieved by Respondents

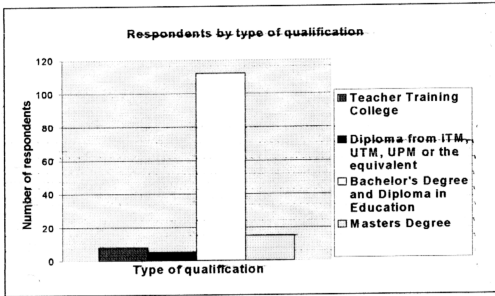


Teaching Experience

The teaching experience of respondents was measured by the number of years they served in the education service as a trained teacher. As seen in **Figure 5**, 15% of respondents had between 1 to 5 years of teaching experience, 11% had taught for between 6 to 10 years, 9% had between 11 to 15 years of teaching and 20% taught for between 16 to 20 years. A majority of them (45%) were highly experienced with over 20 years of teaching. This majority is comprised of the heads and assistant heads.

Figure 4

Highest Educational Level Achieved by Respondents

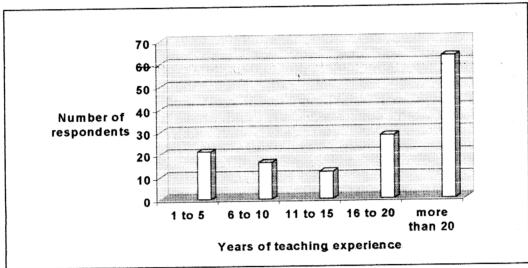


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Figure 5

Respondents by Number of Years of Teaching Experience



Gender Distribution

Table 3 show that the majority of respondents were females. They accounted for 87% (n=140) of respondents whilst the remaining 13% were males. Of the male respondents, 72% were either heads or assistant heads in their respective schools. There were only 28% males who were either the media or library teachers.

Table 3

Respondents by Gender

Position held	Number of teachers	
	Male	Female
Heads/Assistant Heads	13	57
Media/Library Teachers	5	6

Teaching Specialities and/or Professional Position

It was noted that a majority of 56% respondents were social science and/or Humanities teachers whilst 40% were math/science teacher. Only a mere 4% belonged to the group of physical education, sports and/or health teachers (See Figure 6a).

It was not possible to determine the exact number of heads and assistant heads that responded to this survey question, as some did not indicate their position held. However, 50 SRC media teachers and 25 SRC library teachers responded as indicated in Figure 6b.

Figure 6a
Respondents by Teaching Specialities

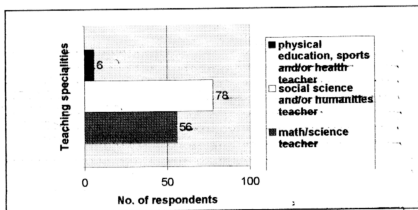
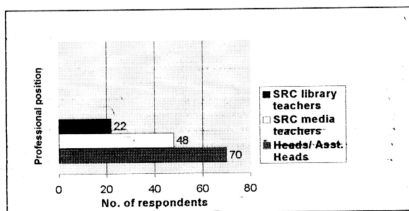


Figure 6b
Respondents by Professional Position

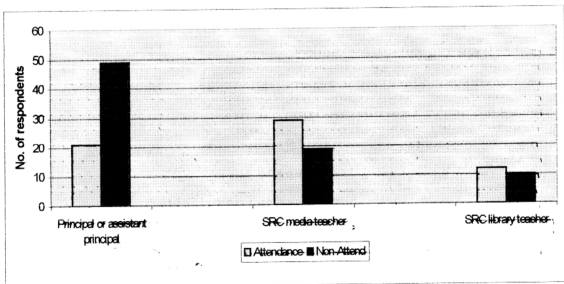


Attendance at IT Courses

An overall picture pertaining to the attendance of respondents at IT courses noted that only 44% (n=140) had such experience. The remaining 56%, of whom 63% (n=78) were principals or senior assistants, had never attended any course whatsoever. The SRC media and library teachers make up 66% (n=62) of those that attended courses whilst 34% were heads or assistant heads. This is depicted in **Figure 7**.

Figure 7

Respondents' Attendance at Courses Pertaining to IT (n=140)

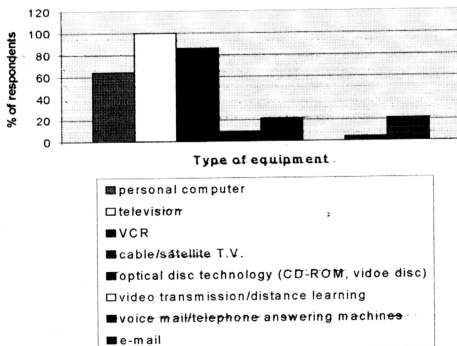


Equipment Availability in Respondents' Homes

The equipment available in respondents' homes was noted. **Figure 8** show that 100% of respondents had television sets whilst 86% had VCRs too. It was also noted that 64% had personal computers but only 21% had electronic mail and optical disc technology (i.e CD-ROM, video disc). A mere 9% had cable/satellite T.V. and 4% had voice mail or telephone answering machines.

Figure 8

Equipment/Capabilities Available in Respondents' Homes (n=140)

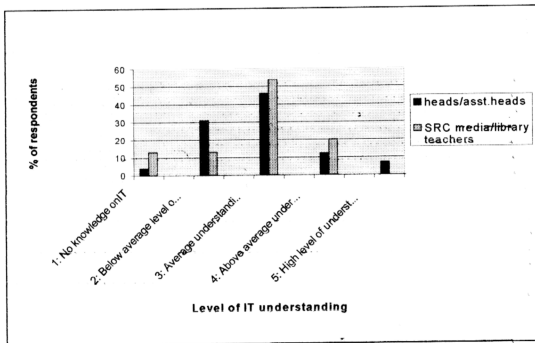


Understanding of IT

Respondents were requested to rank from 1 to 5 their present understanding of IT for use in education. The range given was from “No Knowledge” (ranked 1) on one extreme to “High Level of Understanding” (ranked 5) on the other. “Average Understanding” was ranked 3. The results obtained were analysed separately according to respondents’ professional position. It was found that 46% (n=70) of heads/assistant heads and 54% (n=70) of SRC media/library teachers had average understanding of IT. On one extreme, 4% of heads/ assistant heads and 13% of SRC media/library teachers had no knowledge of IT. Whilst on the other extreme, 7% of heads/assistant heads and 0% of SRC media/library teachers had high level of understanding of IT. **Figure 9** summarises the results.

Figure 9

Respondents’ Understanding of IT for Use in Education



Current Capabilities

This section analyses the current status of equipment and the utilisation of technology in respondents' schools. **Figure 10a** to **10e** illustrate the extent to which various tasks associated with the respondents schools' (n=70) current equipment capabilities have been accomplished. The type of responses was analysed based on "Average" (ranked 3), "Not at all" (ranked 1 & 2) and "To a very great extent" (ranked 4 & 5).

Figure 10a

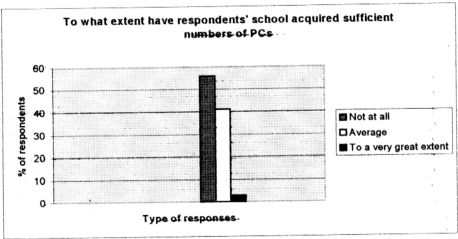


Figure 10b

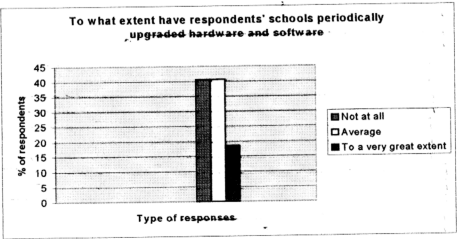


Figure 10c

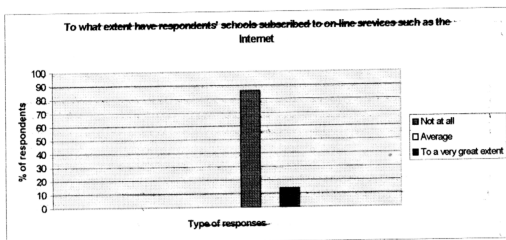


Figure 10d

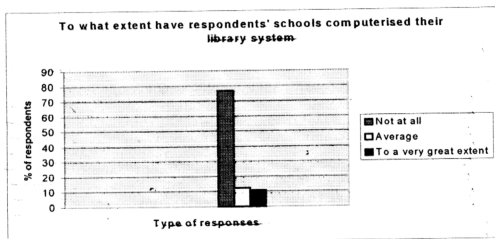
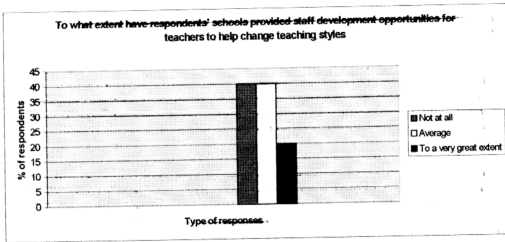


Figure 10e

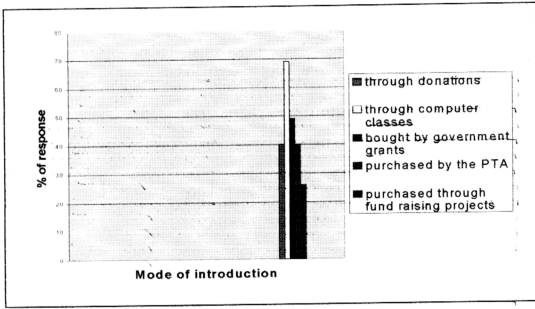


Introduction of Computers in Respondents' Schools

There were various ways in which computers were introduced to a respondent's school. All respondents marked more than one response to this question. **Figure 11** depicts the most common mode to introduce computers in school is through computer classes with a response of 69%. About 49% of respondent schools had computers bought by government grants, 40% claimed that the introduction of computers in their schools was through donations or purchased by the Parent-Teacher Association (PTA), whilst a mere 26% claimed that computers were purchased through fund raising projects.

Figure 11

Modes of Introduction of Computers in Respondents' Schools.

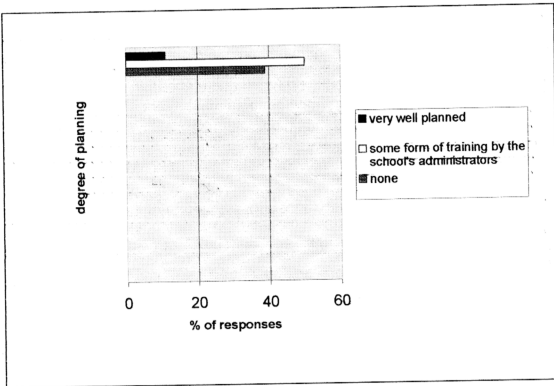


Planning for IT in Respondent Schools

In general, about half of the respondents (50%) claimed to have gone through some form of planing for the introduction of IT in their respective schools. As in **Figure 12**, 39% had no planning done whilst 11% planned very well for IT introduction.

Figure 12

Planning for IT in Respondents' Schools

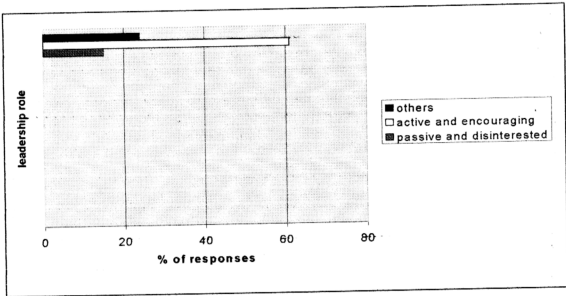


Leadership Role

More than 50% of respondents (n=140) noted that the head in their respective schools played an active and encouraging role in the introduction and implementation of IT. However, 15% felt that their heads of school were passive and disinterested whilst 24% gave "others" as a response. This is illustrated in **Figure 13**.

Figure 13

School's Leadership Role in IT Implementation

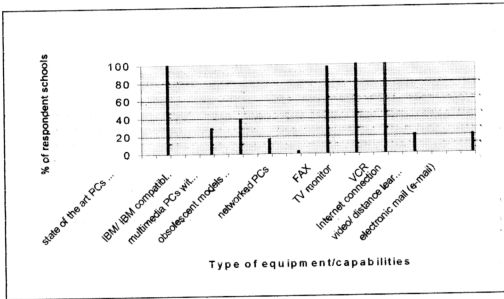


Equipment/Capabilities in Respondent Schools

Among the equipment/capabilities present in all respondent schools was state of the art PCs (e.g. 486IBM/IBM compatibles or the Pentium series), TV monitor and the VCR. FAX machines were present in 97% of schools (n=70) whilst 40% had multimedia PCs with CD-ROM features. Only 21% had Internet connection and electronic mail facilities. **Figure 14** summarises the current status of equipment/capabilities in respondent schools.

Figure 14

Current Equipment/Capabilities in Respondent Schools

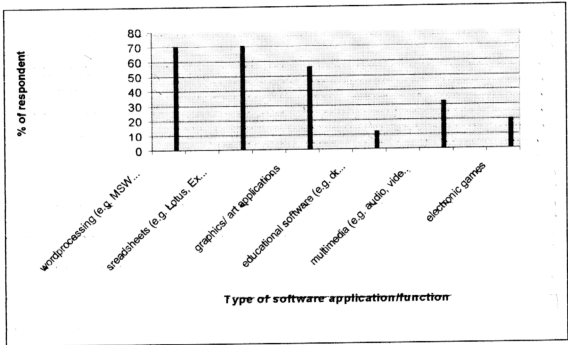


Software Applications/Functions in Respondent Schools

Regarding the software application available in respondents' school, it was found that 100% (n=70) had word-processing and spreadsheets. **Figure 15** also shows that only 80% had graphics/art applications, 46% had multimedia functions, 29% had electronic games and only 17% had educational software.

Figure 15

Software Applications/Functions in Respondent Schools



Effect of IT and the Information Superhighway on Schools/Communities

The perceptions of respondents regarding the effects of IT and the information superhighway on educational reform, student learning, schools, communities and teaching were surveyed. **Table 4** shows the response on the impact of IT and the MSC upon the education environment. About 72% of respondents felt that IT and the MSC would be beneficial to the education environment whilst 28% felt that the impact of IT and the MSC on the education environment would be detrimental.

Table 4

The Impact of IT and the MSC on the Education Environment

Responses	Percentage of respondents
Will be beneficial	72
Will be detrimental	28
Will have no effect	0

IT and the MSC – Beneficial or Detrimental

Respondents were required to state their opinion, whether beneficial or detrimental, IT and the MSC will be on various aspects of the education environment.

Among the aspects listed, respondents felt that IT and the MSC would be equally beneficial and detrimental on the role of parents, computer skills for students, critical thinking and problem solving skills, and the overall curriculum. Answers to the open-ended questions indicated that well-to-do parents could provide for the development of computer skills for their children whilst those who are poor will not be able to do so. Thus creating a gap between the “haves” and the “have-nots”. Students fortunate enough to have computers in their homes are at an advantage to those without. Review of related literature indicated that the development of critical thinking and problem solving skills for students could be enhanced with the presence of computers in their homes. With regard to administrative tasks, respondents felt that IT and the MSC would be extremely beneficial. Table 5 summarises the responses received.

Table 5

How Beneficial/Detrimental is IT and the MSC on the Aspects of the Educational Environment Listed Below

Aspects of the educational environment	Responses
a) the role of parents	equally beneficial and detrimental
b) computer skills for students	equally beneficial and detrimental
c) administrative tasks	extremely beneficial
d) critical thinking and problem solving skills	equally beneficial and detrimental
e) the overall curriculum	equally beneficial and detrimental

IT and Teaching

The perception of respondents regarding the potential effects of IT on teaching was noted in **Table 6**. Analysis showed that IT would be equally beneficial and detrimental on the reduction in the use of traditional lecture method in teaching. It is also seen as equally beneficial and detrimental in changing the role of teacher from disseminator of information to coach and facilitator, greater communication with colleagues in their field, reduction of student truancy and increasing monitoring of students' assignments and homework. Respondents felt that IT would be more beneficial than detrimental for the creation of electronic instructional resources and in providing students access to the best teachers, courses and schools regardless of geography.

Table 6

The Potential Effects of IT on Teaching

Aspects of teaching	Responses	% of responses
a) creation of electronic instructional resources	More beneficial than detrimental	86
b) reduction in the use of traditional lecture method	Equally beneficial and detrimental	74
c) change in the role of teacher from disseminator of information to coach and facilitator	Equally beneficial and detrimental	82
d) students' access to the best teachers, courses and schools regardless of geography	Equally beneficial and detrimental	68
e) reduction in student truancy	Equally beneficial and detrimental	54
f) increased monitoring of students' assignments and homework	Equally beneficial and detrimental	70
g) greater communication with colleagues in your field	Equally beneficial and detrimental	59

Who will Benefit?

Ideally, the implementation of IT and the MSC should be beneficial to all concerned. However, respondents expressed strong opinions on who will benefit from IT implementation and the MSC. **Table 7** shows that from a total of 140 respondents, a majority (43.3%) strongly disagreed that schools in the urban areas will benefit more as compared to schools in the rural areas. They also felt strongly against (36.0%,) the statement that schools with lower budget per student would benefit more from IT implementation and the MSC as compared to schools with a higher budget. Respondents (46.9%) felt that the economic status of students will

not have any bearing on who will benefit more from the process of IT implementation. However, a majority of respondents (31.7%) strongly agreed that disabled students and students with special needs will benefit more than other students.

Table 7

Who Will Benefit More from IT Implementation and the MSC

Statements	Majority of responses	% of response
a) schools in the urban areas than schools in the rural areas	Strongly disagree	89
b) schools with lower budget per student than schools with higher budget per student	Strongly disagree	77
c) disabled students/students with special needs than other students	Strongly agree	69
d) economically disadvantaged students than students who are relatively economically better off.	Strongly disagree	69

Obstacles to the Implementation of IT in Schools

Respondents were asked to pick five and rank, in order of likelihood, the factors they perceived as obstacles to the successful implementation and use of IT in schools. From **Table 8**, it is clear that a budgetary constraint was seen as the most important factor to impede the implementation process. The level of technical training/skills of teachers and administrators followed closely by insufficient instruments for students in classrooms were ranked second and third respectively.

The lack of appropriate software programs/available material was ranked fourth and the lack of incentives/compensation for educators was ranked fifth.

Table 8a

Factors Ranked as Most Likely to Impede the Effective Implementation of IT in the Education Sector

Factors	Ranking	Percentage of response
a) budgetary constraints	1	22.7
e) level of technical training/skills of teachers and administrators	2	17.7
f) insufficient instruments for students in the classroom	3	16.7
g) lack of appropriate software programs/available material	4	15.0
h) lack of incentives/compensation for educators	5	9.0
b) security of persons/school property	6	7.0
c) lack of student motivation to develop technical skills	7	6.9
e) student behavioural problems	8	5.0

Other Factors Foreseen as Inhibiting IT Implementation

Respondents were requested to list three factors, which they foresee as inhibiting the IT implementation process in their respective schools. It is duly noted that only 58% (n=140) of respondents contributed to this. Their responses are divided into various categories as listed below.

1. "Peopleware"

- a. The lack of trained personnel, teachers, support staff, maintenance staff, technicians.

- b. The lack of courses for heads of schools and schoolteachers.
- c. No exposure on IT for students and teachers.
- d. A great majority of students and teachers are computer illiterate.
- e. Lack of motivation amongst teachers.
- f. Teachers' workload increased.
- g. Lack of parental support especially from poor parents.
- h. Uneducated parents ignorant on IT.
- i. Students' attitude and interest.
- j. Students' different levels of knowledge on IT.

2. Accessibility

- a. Students' limited access to computers.
- b. Number of pupils per class is big.
- c. Red tape and tight restrictions in the use of school computers.
- d. Poor students have no PCs at home.

3. Planning

- a. No systematic planning for IT implementation.
- b. Time to train teachers
- c. No guidelines for IT implementation.
- d. Unstable electricity supplies.
- e. The curriculum is too exam oriented with no allowance for IT.

4. Leadership role

- a. The lack of support from the head of school.
- b. Head of school is computer illiterate.

5. Security

- a. The problem of computer virus causing frequent downtime on computer use.
- b. Adequate and suitable space to ensure safety of equipment.

Table 8b ranks the three most common factors which respondents foresee as inhibiting the IT implementation process in their respective schools.

Table 8b

Other Factors Foreseen as Inhibiting IT Implementation

Factors	Rank	% of response
a) lack of trained personnel, teachers, support staff, maintenance staff, technicians	1	70
b) lack of courses for heads of schools and schoolteachers.	2	48
c) the problem of compute virus causing frequent downtime on computer use	3	37

Successful Implementation and Use of IT in Schools

The perceptions of respondents regarding factors they foresee as contributing to the successful implementation and use of IT in schools is summarised in **Table 9**. As noted, respondents strongly agree 100% with all the factors listed.

Table 9:

Respondents' Perceptions of Factors that Determine the Successful Implementation and Use of IT in Schools.

Factors	Majority of response	% of responses
a) reducing non-teaching requirements of teachers to facilitate the learning and deployment of IT.	Strongly agree	100
b) restructuring of school curriculum to emphasise the role of electronic information and software tools	Strongly agree	100
c) the role of school leadership	Strongly agree	88
d) providing adequate equipment in the classroom	Strongly agree	92
e) providing for the security of school equipment	Strongly agree	78
f) training educators on the use and availability of IT and its applications for educators	Strongly agree	100
g) increasing the computer literacy of students	Strongly agree	78
h) developing quality educational software and programs	Strongly agree	96
i) increasing research on education and training applications of current and emerging technologies	Strongly agree	68
j) developing public and private partnerships to support IT in education	Strongly agree	72
k) increasing school budgets for educator training and IT maintenance	Strongly agree	74

Incentives/Requirements for the Implementation of IT in Education

Respondents' perceptions on the requirements and incentives to facilitate the successful implementation of IT in education were surveyed. Each respondent chose and ranked five most important incentives that they felt would accelerate the implementation and utilisation of IT in schools.

The training of educators in the use, availability and applications of IT was perceived as the most important incentive. Respondents felt that government grants/subsidies to implement IT in education was also an important and necessary incentive. The reduction of non-technical teaching requirement/workload of educators was ranked third whilst greater availability and affordability of educational software programs came fourth in the ranking. Respondents also felt that inexpensive access to telecommunications was necessary as it was ranked fifth. **Table 10** summarises the responses received.

Table 10:

Respondents' Ranked Perceptions of Incentives that Will Accelerate the Implementation and Utilisation of IT in Schools

Incentives	Ranking	Percentage of responses
b) training educators in the use, availability and applications of IT	1	20.3
c) government grants/subsidies to implement IT in education	2	16.7
d) reduction in non-technical teaching requirement/workload of educators	3	15.1
e) greater availability and affordability of educational software programs	4	13.3
f) inexpensive access to telecommunications	5	11.7
c) making educational technology a greater public priority	6	9.0
b) the establishment of pilot programs in select schools which will serve as technical models	7	7.3
a) greater availability of on-line information	8	6.6

Other Incentives to Hasten IT Implementation in Schools

Beside those listed in **Table 10**, 54% (n=140) of respondents identified other incentives that they perceive would facilitate to hasten the process of IT implementation in schools. The responses were:

1. An increase in government grants for the purpose of IT implementation in schools.
2. IT awareness and IT literacy of the public.
3. The role of the mass media in disseminating information regarding the benefits of IT.
4. Computer loans for all teachers.

5. Increasing the number of computers in schools.
6. Availability of technical support/computer assistant.
7. Establishing a unit/department that closely monitors and advises on IT development in schools at the district and zone levels.
8. Exposing students to IT at a younger age.
9. The encouraging role of school administrators.
10. Continuous in-service courses to enhance teachers' confidence on the use of IT.
11. Co-operation from the private sector through donations of state-of-the-art computers to schools.
12. A smaller class enrolment.
13. Classrooms that are secure and well equipped with state-of-the-art computers.
14. A special curriculum for teaching IT in schools.
15. Encouragement for teachers to visit schools/institutions of higher learning that have IT facilities.

Funding for IT

Regarding the funding for IT in schools, respondents' responses was summarised in **Table 11**. They strongly disagreed (86%) that the lack of funds did not influence IT implementation in schools. They also felt strongly against (78%) channelling funds for IT to other areas of education.

Table 11

Respondents' Perceptions Regarding Funding of IT in Schools

Statements (n=140)	Majority of responses	% of responses
a) The general status of information technology in schools is not attributable to a lack of funds.	Strongly disagree	86
b) Funds for information technology in schools could be better spent in other areas of education.	Strongly disagree	78

Conclusion

At a glance, the analysis of the data obtained indicated that, the factors viewed as affecting the implementation of IT by respondents were somewhat unrelated to one another. Some important issues such as the question of accessibility and security were not mentioned by a majority of the respondents. That of budget constraints too overshadowed the importance of planning for technology implementation.

The overall response received from both the states of Selangor and Wilayah Persekutuan were similar. However differences in responses between the two groups of respondents, namely the principals/senior assistants and the library/media teachers, were noted in certain aspects of the questionnaire.

For instance, despite the lower attendance of principals/senior assistants at IT courses as compared to that of library/media teachers, the claim for understanding IT for use in education were average for a majority of both groups of respondents. Perhaps this was related to the equipment available in respondents' homes. It was noted that more principals/senior assistants had state-of-the-art equipment including Internet access in their homes as compared to the library/media teachers.

Disagreement in opinions between the two different respondents of the same school with regard to the degree of planning for IT was detected. Some principals/senior assistants claimed that there was proper planning done before IT implementation. The response given by their library/media teachers was otherwise.

This related to the fact that the library/media teachers were new to the school and hence did not know about the planning done earlier.

A difference in response between the two groups with regard to the role of the schools' leadership in IT implementation was noted. A total of 56% of those that responded "others" to this question (See Figure 13) were library/media teachers. These library/media teachers stated that the principals/senior assistants were somewhat indifferent to the IT implementation process. They noted that there was neither encouragement nor objection from the school's leadership with regard to the technology implementation.

It was not possible to cross-tabulate the demographic data with findings from other sections of the questionnaire as a number of responses received were incomplete and did not indicate whether they were principals/senior assistants or library/media teachers.

The researcher's interview with the Principal Assistant Director of the State Educational Resource Centre noted three major points with regard to the implementation of IT in schools. They were: (i) the exact number of computer literate teachers were not known, (ii) no in-service IT or computer use in classroom teaching course for teachers have been instituted, (iii) the centre's future role as a major training ground for teachers in the use of IT for teaching and learning. The success of IT in schools may well lie in the ability of the relevant authorities to address adequately the three major points noted above.

The following chapter discusses the major findings of this research vis-à-vis other related study, notably regarding the main factors affecting the IT

implementation in schools. The chapter ends with a recommendation and conclusion of the study.