

PART II SURVEY FINDINGS

This section contains the results, analysis and findings of the questionnaires administered to principals, IT coordinators, teachers and students.

This section will analyze the following aspects that have been examined in the questionnaires:

- Access and Connectivity
- Learning and Teaching
- Teachers' Teaching with Technology
- School Policies and Implementation
- Support and the Community

CHAPTER 2.1 ACCESS AND CONNECTIVITY

This chapter describes the hardware and software infrastructure that was available in schools at early 2001. Indicators are presented with regard to the student:computer ratio, the quality of the available equipment, availability of peripherals, access to the Internet, availability of software and IT-based resources, IT-based learning opportunities, and home ownership of computers. The chapter presents results of the analysis on the four sets of questionnaires and the comparison with the SITES-M1 study, which address questions relating to access and connectivity.

2.1.1 Hardware

Student:computer ratio is a commonly used measure of IT provisions in schools. This ratio is calculated by taking the total number of students per school divided by the total number of computers that were available for the whole school. Table 2.1.1 summarizes the average student:computer ratios of schools at different levels.

Table 2.1.1 Mean Scores of Student:Computer Ratios

	N	Mean (SD)
Primary School	82	13.4 (7.4)
Secondary School	47	7.5 (3.7)
Special School	6	3.0 (0.6)

In the SITES-M1 study, the ratio at the primary level varied greatly across countries. Canada was the country with the most favorable ratio of 11:1 while Finland and Singapore all had ratios below 20:1. At the other end of the spectrum, Chinese Taipei, Hong Kong, Japan, Italy and Slovenia had ratios that were almost two to four times higher. At the lower secondary level, the highest availability was observed in Canada and New Zealand (8.8:1 and 10:1 respectively), with Singapore, Norway, Denmark and Finland following closely, all having ratios of less than 15. At the upper secondary level, a high level of computer availability was found in many countries. The highest availability was found in Norway and Singapore (the means were 5.8 and 7 respectively) while Canada, Norway and Singapore all had ratios below 10. In Hong Kong, the average ratios of 36:1 and 53:1 were found at the secondary and primary levels respectively.

When comparing the present study with the SITES-M1 results, a substantial improvement of IT provisions was found from 36:1 to 7.5:1 at the secondary level and from 53:1 to 13.4:1 at the primary level in recent years. It is apparent that higher provision of IT was found in secondary schools.

Another indicator of IT provisions is the power and sophistication of the IT infrastructure found in schools. Three important items of data in this regard were collected in the SITES-M1: the percentage of computers having powerful processors

(Intel Pentium+ or Mac103 and higher), percentage using Windows 95/98/NT or MacOS7.5 and higher and percentage of computers with multimedia capabilities. On all three items, Singapore and Hong Kong stood out to be the systems with the most powerful and sophisticated computers, all with percentages above 80% at all levels. For most other countries, the average percentage of computers that were suited for multimedia was about 50%, 40% and 25% at the primary, lower secondary and upper secondary levels respectively. It is interesting to note that in countries where the student:computer ratios were lowest, for example Canada, Norway and New Zealand, the percentage of multimedia suited computers were only around the international average or lower. The only exception in this respect was Singapore where both the quality and quantity of computer provisions were high.

Table 2.1.2 gives a detailed breakdown of the processing power and types of computers in Hong Kong primary and secondary schools. It is clear that PC computers (Pentium II or below) are the most popular computer systems used in both primary and secondary schools. In terms of number of computers, pilot schools obviously are the highest, and schools with extra funding, such as MMLC or ITC, are slightly higher than other schools.

Table 2.1.2 Number of computers in schools (ITC questionnaire, Q. 1a)

Secondary							
mean (SD)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
PC (CPU Pentium II or below)	139.3(82.9)	90.9 (47.8)	94.7(45.9)	75.6(56.3)	47.0(47.5)	61.2(67.0)	77.0 (62.4)
PC (CPU Pentium III or above)	91.5(118.3)	69.1(36.3)	44.2(32.0)	59.7(43.9)	42.2(34.2)	41.9(36.7)	54.8 (51.0)
Macintosh computer	8.7(9.9)	1.4(2.8)	10.7(21.3)	4.5(15.4)	2.6(7.2)	0.7(1.5)	3.8 (10.9)
Notebook computer	64.8(9.6)	37.8 (28.4)	32.8(16.4)	31.1(17.3)	32.0(31.3)	23.7(18.3)	33.5 (23.5)
Primary							
mean (SD)	Pilot	ITC	QEF	Others	Overall		
PC (CPU Pentium II or below)	58.8(49.1)	30.8(22.6)	22.9(25.5)	21.5(19.9)	25.2 (24.6)		
PC (CPU Pentium III or above)	39.3(38.7)	34.5(32.3)	48.2(32.8)	23.8(21.5)	29.8 (27.4)		
Macintosh computer	7.2(11.1)	0.0(0.0)	0.0(0.0)	0.0(0.2)	0.4 (2.9)		
Notebook computer	14.5(15.0)	8.2(4.5)	11.1(10.9)	8.1(6.9)	8.9 (7.9)		

Apart from the availability of computers, the present study also gathered information about the availability of the following types of peripherals: video projector, smartboard, scanner, data-logger, printer, writing-pad and CD-writer. Table 2.1.3

summarizes the availability of various peripherals in primary and secondary schools. In general, pilot schools have an exceptionally high availability of peripherals.

Table 2.1.3 Number of peripherals in schools (ITC questionnaire, Q. 1b)

Secondary							
*mean (SD)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Video-projector	35.7(15.2)	13.9(4.0)	14.7(10.8)	12.9(5.7)	9.7(4.6)	11.2(4.0)	14.4 (9.8)
Smartboard	1.2(1.0)	0.4(0.5)	0.2(0.4)	0.5(1.4)	1.5(4.4)	0.1(0.2)	0.6 (1.9)
Scanner	7.0(2.4)	12.2(11.4)	7.0(4.5)	7.0(2.9)	5.5(2.4)	6.1(3.3)	7.2 (5.2)
Data-logger	6.2(5.4)	2.8(4.3)	1.2(1.9)	1.4(3.1)	3.2(8.5)	0.1(0.2)	1.9 (4.6)
Printer	27.2(26.6)	21.2(13.1)	19.7(8.1)	21.2(10.1)	15.3(9.4)	17.2(7.8)	19.6 (12.1)
Writing Pad	23.7(45.5)	28.0(22.2)	22.0(17.3)	40.9(70.0)	20.9(16.0)	31.5(29.6)	29.9 (41.2)
CD-Writer	8.8(5.0)	5.6(2.4)	4.8(1.6)	4.7(2.1)	5.8(3.7)	5.8(4.9)	7.2 (12.5)

Primary						
*mean (SD)	Pilot	ITC	QEF	Others	Overall	
Video-projector	17.5(14.0)	5.7(3.0)	4.9(2.1)	3.6(1.4)	4.9 (4.7)	
Smartboard	0.2(0.4)	0.1(0.5)	0.1(0.3)	0.1(0.7)	0.1 (0.6)	
Scanner	4.3(3.1)	4.8(2.3)	4.8(1.9)	2.9(1.4)	3.6 (1.9)	
Data-logger	0.2(0.4)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0 (0.1)	
Printer	15.3(8.9)	13.5(6.0)	13.1(5.7)	9.9(4.1)	11.2 (5.3)	
Writing pad	42.2(59.8)	44.8(27.0)	50.6(26.7)	37.5(19.6)	40.8 (25.3)	
CD-Writer	4.7(5.1)	2.9(1.7)	3.4(4.5)	2.4(3.4)	2.7 (3.5)	

In the SITES-M1, out of the 10 types of peripherals (laser printers, CD-ROM drives, devices for disabled students, devices for digital image processing, color printers, CD-writers, graphic tablets, video projectors, scanners and LCD panels) surveyed, the relatively high availability of peripherals was found in Hong Kong schools, and Hong Kong had an exceptionally high availability of video projectors and LCD panels, both being above 50% for secondary schools, compared to the international averages of 30% and 15% respectively. Similarly, it is found that the video projectors are the most popular peripheral in both primary and secondary schools in the present study. It is probable that Hong Kong teachers are in favor of the presentation pedagogy.

Besides the quantity and quality of hardware, the location of computers in schools would also affect the kinds of teaching and learning activities that could be conducted. As can be seen in Table 2.1.4, computers were mainly located in computer rooms at both primary and secondary schools, which is similar to the results in the SITES-M1 study, however, a noteworthy observation is that some computers (average 10.3 in secondary and 4.2 in primary) are available in libraries,

suggesting that the awareness of the role and importance of information services in learning and teaching.

Table 2.1.4 Distribution of computers in schools (ITC questionnaire, Q. 2)

Secondary							
mean (SD)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Classrooms	10.8(16.8)	0.6(1.8)	0.0(0.0)	2.5(6.7)	0.0(0.0)	4.6(8.7)	3.0 (8.0)
Computer rooms	90.8(89.0)	44.8(12.1)	36.8(25.2)	43.2(15.2)	37.8(15.3)	47.2(29.2)	47.6 (35.3)
Special Rooms	15.7(21.9)	15.1(13.2)	5.0(4.2)	11.2(11.1)	10.4(6.7)	8.8(9.9)	10.7 (11.4)
Library	25.2(14.9)	9.1(5.8)	6.0(3.0)	10.6(10.3)	7.9(6.4)	8.1(7.0)	10.3 (9.6)
Staff room	23.2(29.2)	12.6(10.4)	5.8(3.2)	13.1(16.6)	7.6(3.9)	17.8(22.0)	13.7 (17.4)
Primary							
mean (SD)	Pilot	ITC	QEF	Others	Overall		
Classrooms	16.8(13.1)	7.4(11.5)	6.6(9.7)	5.0(9.1)	6.3 (10.1)		
Computer rooms	30.2(31.7)	30.7(15.2)	32.8(18.5)	26.6(12.3)	28.3 (15.1)		
Special Rooms	4.8(8.2)	0.3(0.7)	1.8(4.2)	0.7(2.1)	1.0 (3.1)		
Library*	12.8 (8.4)	4.2 (3.9)	4.6 (3.2)	3.4 (3.0)	4.2 (4.1)		
Staff room	9.0(5.1)	5.5(3.2)	8.3(12.5)	4.3(3.1)	5.3 (5.7)		

*Note that only 72 out of 112 primary schools have libraries.

2.1.2 IT-based Resources

In the SITES-M1 survey, the technology coordinators were asked to indicate which items out of a list of 21 types of software were available for teaching and learning purposes in their schools. Compared to other countries, Hong Kong schools had less variety in their software, most of which were designed for general use instead of subject-specific teaching purposes. It is thus not surprising that the majority of school principals and technology coordinators considered the lack of teaching and learning software the main obstacle in promoting the use of IT in education. The top three types of software available at the primary level were word processing, educational games and spreadsheet. At lower and upper secondary levels, word processing, spreadsheet and programming languages were available in most secondary schools. On the other hand, less than 10% of the schools reported that software for music composition, software for supporting microcomputer based laboratories, accounting and simulations were available.

Further to the investigation of the availability of software in schools in the SITES-M1, the present study examined two main types of IT-based resources used in

schools, namely software and web sites. In the student questionnaire (Qn 22), students were asked: Do your teacher use or let you use any software during lessons that you find useful? Table 2.1.5 shows the results of Qn 22. It is found that 41.8% of P6 students responded “yes” which is significantly higher than all secondary grades. Regarding the usage of the software, "teacher demonstration" is the most popular response reported by students at all levels. However, significant differences between the four grades were found in the usage of software. S4 students (73.1%) were the highest in "teacher demonstration", and P6 students were the highest in "creative activities", "assignments" and "games".

Table 2.1.5 Software found useful in lessons as perceived by students (Students' questionnaire, Q. 22)

N (%)	P6	S2	S4	S6	Chi-Square (3)
Yes	1619(41.8%)	898(39.4%)	747(34.2%)	605(36.2%)	39.5**
<i>If yes, please specify the use of the software</i>					
Teacher's demonstration	650(55.4%)	396(60%)	442(73.1%)	361(72.9%)	79.1**
Play games with students	341(29.1%)	86(13%)	58(9.6%)	35(7.1%)	179.2***
Assignments or tests for students	534(45.5%)	298(45.2%)	226(37.4%)	223(45.1%)	12.4**
Creative activities for students (writing, drawing)	582(49.6%)	300(45.5%)	200(33.1%)	138(27.9%)	91.3***

Note: *: sig < 0.05; **: sig < 0.01; ***: sig < 0.001

In the student questionnaire (Q 23), students were asked: Do your teacher recommend any websites to you that benefit your learning? Table 2.1.6 shows the results of Q 23. It is found that 63% of S6 students responded “yes”, which is significantly higher than all other grades. Regarding the usage of the web sites, "search reference materials" is the most popular response reported by P6(60.2%), S2(66.5%) and S4(65.6%) students, and "provide supplementary curriculum materials" is the most popular reported by S6(73.6%) students. However, significant differences between the four grades were found in the usage of web sites. S6 students were the highest in "provide supplementary curriculum materials" and "search reference materials", and P6 students were the highest in "provide information", "email", "obtain up-to-date information" and "on-line chat".

Table 2.1.6 Do your teacher recommend any websites to you that can benefit your learning?
(Students' questionnaire, Q. 23)

N(%)	P6	S2	S4	S6	Chi-Square (3)
Yes	2215(57.8%)	1005(44.7%)	995(45.9%)	1037(63%)	207.8***
<i>If yes, please specify the software and its usage</i>					
Provide supplementary curriculum materials	587(37.2%)	341(52.0%)	425(60.2%)	568(73.6%)	300.8***
Provide information (e.g. electronic library)	502(31.8%)	200(30.5%)	199(28.2%)	200(25.9%)	9.7*
Search reference materials	950(60.2%)	436(66.5%)	463(65.6%)	538(69.7%)	22.9***
Search for answers to questions	237(15.0%)	111(16.9%)	122(17.3%)	124(16.1%)	2.4 (ns)
Obtain up-to-date information	377(23.9%)	125(19.1%)	122(17.3%)	126(16.3%)	24.9***
E-mail	452(28.7%)	112(17.1%)	89(12.6%)	47(6.1%)	200.7***
On-line chat	215(13.6%)	38(5.8%)	48(6.8%)	55(7.1%)	52.4***

Note: *: sig < 0.05; **: sig < 0.01; ***: sig < 0.001

In the student questionnaire (Qn 24), students were asked, "Did you find any websites that can benefit your learning?" Table 2.1.7 shows the results of Qn 24, which is similar to Qn 23 in general. It is found that 44.4% of S6 students responded "yes", which is significantly higher than all other grades. Regarding the usage of the websites, "search reference materials" is the most popular response reported by students at all levels. However, significant differences between the four grades were found in the usage of websites. S6 students were the highest in "search reference materials" and "provide supplementary curriculum materials", P6 students were the highest in "obtain up-to-date information", "email" and "on-line chat".

Table 2.1.7 Did you find any web-sites that will benefit your learning? (Students' questionnaire, Q. 24)

N(%)	P6	S2	S4	S6	Chi-Square (3)
Yes	886(23.2%)	641(28.3%)	612(28.4%)	731(44.4%)	253.4***
<i>If yes, please specify the usage of the web-sites</i>					
Provide supplementary curriculum materials	203(32.3%)	157(36.8%)	220(47.2%)	308(55.7%)	75.8***
Provide information (e.g. electronic library)	240(38.2%)	171(40.1%)	195(41.9%)	205(37.1%)	2.8 (ns)
Search reference materials	361(57.5%)	274(64.2%)	322(69.1%)	427(77.2%)	54.0***
Search for answers to questions	138(22.0%)	88(20.6%)	101(21.7%)	147(26.6%)	6.2 (ns)
Obtain up-to-date information	231(36.8%)	140(32.8%)	169(36.3%)	145(26.2%)	17.8***
E-mail	202(32.2%)	137(32.1%)	109(23.4%)	82(14.8%)	58.6***
On-line chat	151(24.0%)	94(22%)	67(14.4%)	61(11%)	42.6***

Note: *: sig < 0.05; **: sig < 0.01; ***: sig < 0.001

More than 38% of students reported that their teachers did use software during lessons and more than 53% of students reported that their teachers did recommend web sites for their learning. This seems to indicate that the use of software and websites in teaching is becoming accepted by teachers. Nevertheless, it is important not to overlook the fact that the usage of software focuses on "teacher demonstration", indicating that teachers are in favor of the presentation or demonstration pedagogy.

2.1.3 Communication Facilities

Whether the computers in a school are connected to a local area network (LAN) or operated as stand-alone machines comprises another important aspect of the hardware infrastructure in a school. In the SITES-M1, most of the computers in Hong Kong schools were used in a stand-alone mode, with only 17%, 33% and 34% being connected to a LAN at the primary, lower secondary and upper secondary levels respectively. This is amongst the lowest in the international comparison, similar to those found in Thailand, France and Bulgaria. In Singapore, the percentage of networked computers was also low at both primary and lower secondary levels while at the upper secondary level, 69% of the computers were LAN connected. Canada, Chinese Taipei, Finland, Iceland, Israel and Slovenia have most of their computers in a network across all the population levels that participated in the survey. In the present study, most computers in primary and secondary schools are networked and equipped with different types of servers. Table 2.1.8 shows the distribution of different types of servers in various school groups. The results clearly indicate that file servers and Internet servers are common in both primary and secondary schools.

Table 2.1.8 Is the school equipped with the following servers? (ITC questionnaire, Q. 4)

Secondary							
N (%)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Internet server	6(100%)	6(75%)	4(66.7%)	13(86.7%)	5(50%)	10(58.8%)	44(71.0%)
E-mail server	2(33.3%)	3(37.5%)	1(16.7%)	6(40%)	1(10%)	4(23.5%)	17(27.4%)
DNS server	5(83.3%)	5(62.5%)	3(50%)	9(60%)	3(30%)	8(47.1%)	33(53.2%)
FTP server	4(80%)	6(75%)	3(50%)	10(71.4%)	2(22.2%)	8(47.1%)	33(55.9%)
File server	6(100%)	8(100%)	5(83.3%)	14(93.3%)	6(85.7%)	16(94.1%)	55(93.2%)
Primary							
N(%)	Pilot	ITC	QEF	Others	Overall		
Internet server	6(100%)	8(50%)	6(40%)	36(54.6%)	56(54.3%)		
E-mail server	2(33.3%)	4(25%)	5(33.3%)	21(31.8%)	32(31.1%)		
DNS server	3(50%)	3(18.8%)	6(40%)	21(32.8%)	33(32.7%)		
FTP server	4(66.7%)	5(31.3%)	5(33.3%)	22(34.9%)	36(36.0%)		
File server	6(100%)	16(94.1%)	14(93.3%)	48(72.7%)	84(80.8%)		

Access to the Internet provides new potentials for teaching and learning activities in schools. At the primary level, only 10% of the schools in Hong Kong had access to the Internet for instructional purposes and was the lowest of all countries participating in the SITES-M1 study, and over 80% of secondary schools indicated having access to the Internet for teaching and learning purposes. In the present study, 100% of the schools are connected and Table 2.1.9 shows the bandwidth of the connection in different groups of schools.

Table 2.1.9 What is the bandwidth of your connection? (ITC questionnaire, Q. 6)

Secondary							
N (%)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
56Kbps or below	0(0%)	0(0%)	1(16.7%)	0(0%)	0(0%)	1(5.9%)	2 (3.2)
56Kbps to 1Mbps	1(16.7%)	1(12.5%)	1(16.7%)	2(13.3%)	1(10%)	0(0%)	6 (9.7)
1Mbps and above	5(83.3%)	7(87.5%)	4(66.7%)	13(86.7%)	9(90%)	16(94.1%)	54 (87.1)

Primary

N(%)		Pilot	ITC	QEF	Others	Overall
Bandwidth	56Kbps	0(0%)	1(5.9%)	2(12.5%)	5(7.0%)	8 (7.3)
56Kbps<bandwidth	1Mbps	4(66.7%)	2(11.8%)	0(0%)	11(15.5%)	17 (15.5)
1Mbps< Bandwidth		2(33.3%)	14(82.4%)	14(87.5%)	55(77.5%)	85 (77.3)

The SITES-M1 also surveyed whether schools had their own homepages and the kind of information that could be found in the homepages. In Hong Kong, only 7% of the primary schools and 68% of the secondary schools had their own homepages on the WWW. With regard to the contents of the school homepages, the top three available information on the school homepage at the primary level were "information about the school", "special information for parents" and "results of student projects". In secondary schools, "information about the school", "announcement about events" and "special information for parents" were the most frequently available information on the homepage. While this content availability profile is similar to that found internationally, the results indicated that the school homepages in Hong Kong were less used for supporting teaching and learning activities than in other countries.

In the present study, 80% of the primary schools and 98% of the secondary schools have their own homepages (Table 2.1.10). Regarding the contents of the homepages, the top available information on the school homepages is "general information about the school" as reported by 100% of the schools at both primary and secondary level. In contrast to the SITES-M1 study, it is found that about 50% and 20-30% school homepages are used in relation to teaching and learning at secondary and primary levels respectively.

Table 2.1.10 Does your school have its own homepage on World Wide Web? (ITC questionnaire, Q. 8)

Secondary							
N(%)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Yes	6(100%)	8(100%)	5(83.3%)	15(100%)	10(100%)	17(100%)	61(98.4%)
<i>If yes, what has your school put onto the Web in terms of the type of information?</i>							
General information about the school (e.g. school history etc.)	5(100%)	8(100%)	5(100%)	15(100%)	9(100%)	17(100%)	59(100%)
Announcements about events	4(80%)	4(50%)	4(80%)	7(46.7%)	3(30%)	8(47.1%)	30(50%)
Announcements of up-to-date information (results of the sports day / Inter-school competition, etc.)	5(100%)	7(87.5%)	3(75%)	12(85.7%)	7(77.8%)	13(76.5%)	47(82.5%)
Curriculum material / reference materials (e.g. assignments, answers, notes)	5(100%)	5(62.5%)	4(80%)	6(42.9%)	3(30%)	6(35.3%)	29(49.2%)
Teachers and students discussion forum	3(75%)	5(62.5%)	2(40%)	6(42.9%)	6(66.7%)	7(41.2%)	29(50.9%)
Primary							
N(%)	Pilot	ITC	QEF	Others	Overall		
Yes	6(100%)	17(94.4%)	13(81.3%)	54(75%)	90(80.4%)		
<i>If yes, what has your school put onto the Web in terms of the type of information?</i>							
General information about the school (e.g. school history etc.)	6(100%)	17(100%)	13(100%)	53(100%)	89(100%)		
Announcements about events	3(42.9%)	6(40%)	2(16.7%)	23(44.2%)	34(39.5%)		
Announcements of up-to-date information (results of the sports day / Inter-school competition, etc.)	6(100%)	14(87.5%)	11(84.6%)	41(75.9%)	72(80.9%)		
Curriculum material / reference materials (e.g. assignments, answers, notes)	4(66.7%)	6(40%)	2(16.7%)	8(14.8%)	20(23.0%)		
Teachers and students discussion forum	3(50%)	5(33.3%)	6(46.2%)	14(28%)	28(33.3%)		

2.1.4 IT-related Learning Opportunities

Concerning the actual use of computers in school settings, IT coordinators were asked to report on the availability of computers for use by students in lessons and after school. Table 2.1.11 shows the number of computers available for students and the opening hours of the computer rooms after lessons. Obviously, the secondary schools provide more computers and time for students than the primary schools.

Table 2.1.11 Number of Computers available for students' access (ITC questionnaire, Q. 3)

Secondary							
mean (SD)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Number of computers available for use by students after lessons (e.g. recess, lunch, after school, holiday, etc)	149.5 (62.1)	58.5 (47.8)	36.2 (18.1)	62.7 (36.9)	43.9 (18.1)	51.4 (21.8)	61.9 (44.7)
Average opening hours of the computer rooms after lessons per week (including Saturday, Sunday)	39.8 (32.9)	13.2 (3.8)	12.9 (2.6)	17.3 (10.2)	18.5 (15.8)	11.1 (6.9)	17.0 (15.1)
Primary							
mean (SD)	Pilot	ITC	QEF	Others	Overall		
Number of computers available for use by students after lessons (e.g. recess, lunch, after school, holiday, etc)	65 (34.6)	34.8 (24.9)	22.2 (25)	18.8 (16.0)	24.4 (23.0)		
Average opening hours of the computer rooms available for use by students after lessons per week (including Saturday, Sunday)	9.5 (9.1)	6.4 (3.9)	5.7 (6.1)	4.7 (4.6)	5.4 (5.0)		

The survey also asked students to report on the application of computers in different subjects. Tables 2.1.12 and 2.1.13 show the application of computers in different subjects at primary and secondary levels respectively. The top three subjects in P6 are computer studies, general studies and Chinese, in S2 are computer studies, art and design and integrated science, in S4 are computer studies, Chinese and English, and in S6 are Chinese, English and physics. The findings indicate that computer studies, Chinese, English and science are common subjects applying computers more frequent.

Table 2.1.12 In the previous month, has IT been used in the teaching of the following subjects?
(Primary Schools) (Students' questionnaire, Q. 10)

N (%)	P6
Chinese	945(23.7%)
Putonghua	240(6.0%)
English	816(20.5%)
Art	568(14.3%)
Mathematics	901(22.6%)
Physical Education	152(3.8%)
General Studies	1268(31.8%)
Religion	120(3.0%)
Music	349(8.8%)
Computer Studies	3245(81.5%)

Table 2.1.13 In the previous month, has IT been used in the teaching of the following subjects?
(Secondary Schools) (Students' questionnaire, Q. 10)

N(%)	S2	S4	S6
Chinese/Chinese Literature	544(23.2%)	484(21.4%)	554(32.6%)
English/ English Literature	527(22.4%)	463(20.5%)	438(25.8%)
Putonghua	229(9.7%)	92(4.1%)	25(1.5%)
Art and Design	831(35.4%)	202(9.0%)	31(1.8%)
Computer Studies	1641(69.8%)	570(25.3%)	270(15.9%)
Chinese History	477(20.3%)	353(15.6%)	84(5.0%)
History	437(18.6%)	196(8.7%)	73(4.3%)
Music	626(26.6%)	229(10.2%)	72(4.2%)
Physical Education	173(7.4%)	162(7.2%)	73(4.3%)
Physics	57(2.4%)	371(16.4%)	373(22.0%)
Chemistry	47(2%)	239(10.6%)	349(20.6%)
Geography	575(24.5%)	460(20.4%)	239(14.1%)
Liberal Studies	104(4.4%)	40(1.8%)	108(6.4%)
Mathematics	323(13.8%)	456(20.2%)	135(8.0%)
Integrated Science	715(30.4%)	26(1.2%)	11(0.7%)
Home Economics	375(16.0%)	131(5.8%)	45(2.7%)
Religion	209(8.9%)	197(8.7%)	120(7.1%)
Biology/ Human Biology	43(1.8%)	397(17.6%)	242(14.3%)
Economics/Public Affairs/Business Studies	296(12.6%)	415(18.4%)	176(10.4%)
Engineering/Design/ Electronics/Technology	239(10.2%)	178(7.9%)	57(3.4%)
Social Studies/Psychology	165(7.0%)	29(1.3%)	23(1.4%)

Tables 2.1.14 and 2.1.15 present the perceived IT-related learning opportunities experienced by students. In the student questionnaire (Qn 11), students were asked: In the previous month, excluding computer studies lessons, how often did the teachers use computer during lessons? About one-third of the students responded "2-3 times a month" and over a quarter of the students answered "never". Further, students were asked: In the previous month, excluding computer studies lessons, how often did you use computer in the class? (Qn 12) Over half of the students answered "never" and only 18.4% of the students answered "2-3 times a month". This means that students perceived more time for teacher using computer than student using computer in the class. Furthermore, the opportunity for students to use computers in the class is relatively low as experienced by both primary and secondary students.

Table 2.1.14 In the previous month, excluding Computer Studies lessons, how often did the teachers use computers during lessons ? (Students' questionnaire, Q. 11)

N(%)	P6	S2	S4	S6	Overall
Nearly everyday	146(3.8%)	99(4.3%)	158(7.2%)	266(16.1%)	669(6.7%)
Never	1327(34.8%)	395(17.3%)	511(23.3%)	393(23.7%)	2626(26.4%)
2-3 times a week	456(11.9%)	552(24.2%)	413(18.9%)	319(19.3%)	1740(17.5%)
Once a week	710(18.6%)	528(23.2%)	318(14.5%)	216(13.0%)	1772(17.8%)
2-3 times a month	1179(30.9%)	706(31%)	790(36.1%)	463(27.6%)	3138(31.6%)

Table 2.1.15 In the previous month, excluding Computer Studies lessons, how often did you use computers during lessons? (Students' questionnaire, Q. 12)

N(%)	P6	S2	S4	S6	Overall
Nearly everyday	90(2.3%)	74(3.2%)	67(3.1%)	66(4%)	297(3.0%)
Never	2051(53.4%)	1114(48.6%)	1440(65.5%)	955(57.6%)	5560(55.7%)
2-3 times a week	382(10%)	240(10.5%)	192(8.7%)	111(6.7%)	925(9.3%)
Once a week	643(16.8%)	400(17.4%)	175(8%)	153(9.2%)	1371(13.7%)
2-3 times a month	672(17.5%)	465(20.3%)	323(14.7%)	373(22.5%)	1833(18.4%)

The present study tried to find out about the opportunities for the use of computer outside classroom. Students were asked whether teachers would require or encourage them to use computers to complete their homework or participate in different activities (Qn 19 & 20). From Table 2.1.16 and Table 2.1.17, the results seem to indicate that responses from the lower grade (P6 and S2) students in general are more positive than the upper grade students in Qn 19 and 20.

Table 2.1.16 Did your teacher do any of the following? (1 = never; 5 = always) (Students' questionnaire, Q. 19)

mean (SD)	P6	S2	S4	S6	F (df)
Require you to use computers to complete homework	2.5(1.3)	3.4(1.2)	2.9(1.3)	3.1(1.3)	258.0 (3,10069)***
Discuss computer issues with students	2.7(1.2)	2.7(1.1)	2.4(1.1)	2.3(1.0)	91.4 (3, 10066)***
Tackle computer problems/use computer to search for information with students	3.1(1.3)	3.0(1.2)	2.6(1.2)	2.6(1.2)	124.9 (3,10048)***

Note: *: sig < 0.05; **: sig < 0.01; ***: sig < 0.001

Table 2.1.17 Did your teacher encourage you to use computer to do the following outside lessons?
(1 = strongly discourage; 5 = strongly encourage) (Students' questionnaire, Q. 20)

mean (SD)	P6	S2	S4	S6	F (df)
Do homework	3.3(1.0)	3.7(0.9)	3.6(0.9)	3.7(0.8)	140.2 (3,10060)***
Extra-Curricular Activities	3.4(0.9)	3.4(0.8)	3.3(0.8)	3.3(0.7)	7.5 (3,10033)***
Shopping/Entertainment/ Recreation	2.7(1.0)	2.9(0.8)	2.9(0.8)	2.8(0.7)	29.3 (3, 10064)***
Communicate with friends/ classmates	3.3(0.9)	3.3(0.8)	3.2(0.8)	3.2(0.7)	8.2 (3, 10068)***
Make friends	3.2(1.0)	3.1(0.8)	2.9(0.8)	2.8(0.7)	74.1 (3, 10089)***
Learn new things	4.0(0.9)	3.8(0.8)	3.8(0.9)	3.9(0.8)	42.7 (3,10072)***
Participate in school administrative work	3.2(1.0)	3.3(0.8)	3.2(0.8)	3.2(0.7)	4.2 (3, 10057)**
Invest	2.0(1.0)	2.5(1.0)	2.5(0.9)	2.6(0.8)	225.0 (3, 10041)***

Note: *: sig < 0.05; **: sig < 0.01; ***: sig < 0.001

2.1.5 Home Ownership of Computers

In the SITES-M1 study, both teachers and students were asked whether they had a computer at home. The results found that 51% of P6 students, 72% of S2 students, 82% of S4 students, 91% of S6 students, 87% of primary school teachers and 91% secondary school teachers responded that they owned a computer at home. In contrast to the SITES-M1 study, the present study found that 80% of P6 students, 92% of S2 students, 95% of S4 students, 98% of S6 students, 97% of primary school teachers and 96% secondary school teachers responded that they owned a computer at home (Tables 2.1.18 & Table 2.1.19). Obviously, there is an improvement of home ownership of computers among teachers and students in general.

Table 2.1.18 Ownership of computers by teachers. (Teachers' questionnaire, Q. 10)

Secondary							
N (%)	Pilot	MMLC& ITC	MMLC	ITC	QEF	Others	Overall
Do you own a computer at home?	195 (95.6%)	379 (99%)	173 (94.0%)	417 (95.2%)	331 (95.7%)	574 (96.5%)	2069 (96.2%)
Is your computer at home connected to the Internet?	177 (96.7%)	344 (96.4%)	159 (96.4%)	372 (94.9%)	308 (96.9%)	515 (94.8%)	1875 (95.8%)
Primary							
N (%)	Pilot	ITC	QEF	Others	Overall		
Do you own a computer at home?	191(98.5%)	564(97.6%)	504(96%)	1726(97%)	2985(97.0%)		
Is your computer at home connected to the Internet?	180(94.7%)	518(94.9%)	464(95.1%)	1595(95.6%)	2757(95.3%)		

Table 2.1.19 Home access of computers for students (Students' questionnaire, Q. 4)

N (%)	P6	S2	S4	S6	Overall
Do you own a computer at home?	3147(80.3%)	2136(92.0%)	2137(95.1%)	1660(98.1%)	9080(98.2%)
Are you allowed to use the computer?	3019(97.2%)	2072(98.6%)	2080(99.1%)	1606(99.1%)	8777(93.3%)
Is it connected to the Internet?	2173(70.0%)	1781(84.0%)	1880(88.9%)	1534(93.2%)	7368(82.0%)

Respondents who answered that they owned a computer at home were further surveyed on the availability of Internet access at home. In the SITES-M1 study, among those students having a computer at home, 37% of P6 students, 49% of S2 students, 58% of S4 students, and 67% of S6 students further responded that they had access to the Internet at home. For teachers, 63% and 71% at primary and secondary school levels respectively of computer owning teachers indicated that they had access to the Internet at home. Comparing with the SITES-M1 study, a great improvement of the Internet access at home was found in the present study. Among those students having a computer at home, 70% of P6 students, 84% of S2 students, 89% of S4 students, and 93% of S6 students further responded that they had access to the Internet at home. For teachers, 95% and 96% at primary and secondary school levels respectively of computer owning teachers indicated that they had access to the Internet at home (Table 2.1.18 & Table 2.1.19).

2.1.6 Summary

It is clear that the hardware, software and networking infrastructure provisions in Hong Kong schools have been extremely improved in comparison to the results of the SITES-M1 study conducted in 1998. In the present study, both teachers' and students' home ownership of computers as well as Internet access are also enhanced.

In terms of number of computers, Pilot schools obviously are the highest, and schools with extra funding, such as MMLC or ITC, are slightly higher than other schools. However, in terms of the power and sophistication of the IT infrastructure including hardware and connection bandwidth, schools with extra funding are not necessarily more advanced. It is probably that the life-span of technology is short, and the schools with shorter history in using IT would benefit from the latest technology. This points to the importance of strategic planning in technology maintenance and purchasing.

To obtain a more comprehensive picture of “access and connectivity”, one should also look at how the infrastructure provisions relate to learning and teaching in schools. It is because the status of access and connectivity in schools reflects the priority and focus of the school leadership as well as the teachers' pedagogy.

It is important to note the following findings. Firstly, from the SITES-M1 to the present study, the video projectors, the peripherals necessary for whole class presentations, are found to be the dominant peripherals in schools. Secondly, regarding the usage of software, "teacher demonstration" is the common answer reported by the students at primary and secondary levels. Thirdly, regarding IT-related learning opportunities as experienced by the students, teacher used computer in lesson is more often than student. One reading of these findings would be the presentation-based or teacher-directed approach is a taken-for-granted pedagogy among Hong Kong teachers. This confirms the observation made in the SITES-M1 study - "Hong Kong schools placed greater emphasis on the traditionally important paradigm rather than the emergent paradigm" (Law et al., 1999; p.56). To effect the "paradigm shift", teachers should have to give more opportunity for student access than technology use limited to presentation or demonstration.