

## **CHAPTER 2.2 LEARNING AND TEACHING**

In this section, the evaluation will concentrate on the reported experience of students in using computers in classroom in all subjects other than the subject of computer. The study will follow the same grouping of the schools established in Chapter 1.2 and divide the schools into secondary and primary schools for separate analysis.

### **2.2.1 Impact on Learning and Teaching**

Students' IT competence affects their ability to take part effectively in teaching and learning activities that make use of IT. On the other hand, such competence may also be part of the learning outcome desired from IT use in the school curriculum. In the SITES-M1 study, it was found that a relatively high percentage of students at all the four levels (P6, S2, S4 and S6) indicated that they had competence in basic computer operations. Similarly, in the present study (Q8), we found students at all levels also indicated their competence in basic computer skills, furthermore, the competence in using Internet has been greatly improved.

In the student questionnaire, Q10 asked whether the teachers had used IT in lessons other than computer classes within the past month. From this question, we could find out the number of subjects in a school that had used computers within the specified period of time assuming that the usage of computers in the classroom is closely related to learning with IT<sup>1</sup>. Here, the unit of analysis is a class. If computers had been used in a subject, the students should be able to report it. We then established a simple majority rule for the decision. We accepted certain subject had used computer in class only when 50% or more students within the same class indicated so. There were a few cases which had about 45% students making the claim but were rejected by us. If those 45% or so students are correct, which we doubt, the simple majority rule may have a possible 5% error.

### **2.2.2 Computer Usage in Secondary Schools**

An academic subject is classified as a computer-using subject if more than 50% of students said that this subject had been taught using computers in the past one month, and the results are exhibited in Table 2.2.1. In this study, one class was sampled from Secondary 2, 4 and 6 in each of the sampled secondary schools. If all schools returned the questionnaires for all three classes, some schools do not have all the 3 levels, the total number of classes will be three times the number of sampled schools. The table shows that, within the academic subjects, Chinese Language has the highest usage (39 out of 190 classes, 20.5%) among other subjects in

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<sup>1</sup> Although the students are studying the specified subjects using IT, it is expected that the students will pick up the skills and knowledge of IT in the process. Using IT as a means of learning may turn out to be an effective way of learning IT itself.

computer, followed by English Language (31 classes, 16.3%), Geography (28 classes, 14.7%,) and Physics (25 classes, 13.2%,). Arts and Design, Chinese History and EPA (Economics) also have a 2 digit percentage, and their respective percentage are 11.6% (22 classes), 11.6% (22 classes) and 10% (19 classes).

The use of computers in subjects varies according to different levels of classes. Both Chinese and English Language/Literature have a low 2 digit percentage at all three levels, S2, S4 and S6, and their respective percentage are 18.8% & 17.2% in S2, 15.9% & 11.1% in S4 and 27% & 20.6% in S6. Computer is more frequently used in Physics than the other science subjects, and the respectively percentage for S4 and S6 are 19.1% and 20.6%. Among the Social Science subjects (Geography, EPA and Chinese History), although the percentage of computer-using in classrooms is not low, the usage is more concentrated in the lower levels. The subject that has the highest rate of computer usage (34.4% in S2) but is only offered at the lower secondary level is Art and Design.

Table 2.2.1 Secondary schools: Subjects by form

Student/(q10b – collapsed at class-level)	Secondary 2		Secondary 4		Secondary 6		Total	
	N	(%)	N	(%)	N	(%)	N	(%)
Chinese/Chinese Literature	12	(18.8)	10	(15.9)	17	(27.0)	39	(20.5)
English/ English Literature	11	(17.2)	7	(11.1)	13	(20.6)	31	(16.3)
Art and Design	22	(34.4)	0	(0.0)	0	(0.0)	22	(11.6)
Chinese History	10	(15.6)	10	(15.9)	2	(3.2)	22	(11.6)
History	10	(15.6)	3	(4.8)	1	(1.6)	14	(7.4)
Physics	0	(0.0)	12	(19.1)	13	(20.6)	25	(13.2)
Chemistry	0	(0.0)	4	(6.3)	12	(19.1)	16	(8.4)
Geography	12	(18.8)	11	(17.5)	5	(7.9)	28	(14.7)
Mathematics	4	(6.3)	8	(12.7)	1	(1.6)	13	(6.8)
Integrated Science	17	(26.6)	0	(0.0)	0	(0.0)	17	(8.9)
Biology/Human Biobgy	0	(0.0)	9	(14.3)	3	(4.8)	12	(6.3)
Economics/Public Affairs/Business Studies	6	(9.4)	9	(14.3)	4	(6.3)	19	(10.0)
Total no. of classes	64	-	63	-	63	-	190	-
Mean no. of subjects using computers per class	1.6		1.3		1.1		1.4	

N = Number of classes

Table 2.2.2 Secondary schools: Subjects by type of schools

Student/(q10b – collapsed at class-level)	Pilot		MMLC & ITC		MMLC		ITC		QEF		Others	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Chinese/Chinese Literature	10	(55.6)	1	(3.7)	3	(16.7)	15	(33.3)	4	(13.3)	6	(11.5)
English/ English Literature	8	(44.4)	3	(11.1)	1	(5.6)	6	(13.3)	5	(16.7)	8	(15.4)
Art and Design	4	(22.2)	2	(7.4)	0	(0.0)	6	(13.3)	7	(23.3)	3	(5.8)
Chinese History	2	(11.1)	1	(3.7)	3	(16.7)	5	(11.1)	6	(20.0)	5	(9.6)
History	5	(27.8)	0	(0.0)	0	(0.0)	4	(8.9)	2	(6.7)	3	(5.8)
Physics	4	(22.2)	4	(14.8)	4	(22.2)	5	(11.1)	5	(16.7)	3	(5.8)
Chemistry	4	(22.2)	1	(3.7)	0	(0.0)	4	(8.9)	4	(13.3)	3	(5.8)
Geography	7	(38.9)	1	(3.7)	3	(16.7)	3	(6.7)	5	(16.7)	9	(17.3)
Mathematics	3	(16.7)	3	(11.1)	0	(0.0)	1	(2.2)	2	(6.7)	4	(7.7)
Integrated Science	3	(16.7)	2	(7.4)	0	(0.0)	6	(13.3)	3	(10.0)	3	(5.8)
Biology/ Human Biobgy	3	(16.7)	1	(3.7)	0	(0.0)	2	(4.4)	2	(6.7)	4	(7.7)
Economics/Public Affairs/Business Studies	5	(27.8)	0	(0.0)	2	(11.1)	3	(6.7)	3	(10.0)	6	(11.5)
Total no. of classes	18	-	27	-	18	-	45	-	30	-	52	-
Mean no. of subjects using computers per class	3.2		0.7		0.9		1.3		1.6		1.1	

N = Number of classes

When comparison is made among the different categories of schools in the sample (Table 2.2.2), the Pilot Schools, which have the longest engagement in using IT for teaching and learning and the highest ICT infrastructure and resource support from the government, have the largest reported computer usage percentage in almost all the academic subjects. This suggests that the penetration of IT in the Pilot schools is much deeper. The pattern of usage in the other categories of schools is unclear. Schools with ITC and/or MMLC do not have a higher reported percentage of computer usage in subjects than the other schools. If Pilot Schools are excluded, the QEF schools have four, English (16.7%), Art and Design (23.3%), Chinese History (20%), & Chemistry (13.3%), out of 12 listed subjects with the highest percentage of students reporting computer usage. This is followed by the “Other” category of schools which have three subjects reported with the highest percentage, and these subjects are: Geography (17.3%), EPA/Economics (11.5%), and Biology (7.7%). The nature of questionnaire survey does not allow us to investigate the quality of classroom learning activities in these computer usage lessons. The finding seems to suggest that even without additional support from ED, individual schools could create an impact on adopting computer in the classrooms and QEF has a contribution.

A related question on computer usage in subjects is to understand what kind of teaching method has been employed in these lessons. While it is acceptable that teachers need time for explanation and demonstration, it is desirable that sufficient time be given to students, either individually or as a group/project, to engage in computer activity in class. We believe students learn better in this way. It is this evidence we are looking for.

In applying the above understanding to the situation, Table 2.2.3 shows that, as reported by the teachers, Pilot schools do not come out better than other categories of schools in the teaching method in computer usage. More than half of the class time is used for teacher explanation or demonstration. Less than half of the time is given to students for computer activity, and even less time is for group/project activity. We crosschecked this finding with students’ views on the same question. The answer is slightly different (Table 2.2.4). Here the students reported that in the Pilot schools, teachers spent more time in explanation and demonstration than the other category of schools, but spent less time in their own or on group activities. A further examination among the six pilot schools (Table 2.2.5) comparing both teachers’ and students’ views shows that variation did exist among these schools. The Table shows that in the first two schools the teachers reported that they spent comparatively less time on explanation and demonstration and allowed students more time for their own activities and group work. Their views are largely supported by the students’ report.

Table 2.2.3 Teachers' view on time allocation for computer usage during lessons

Teacher/q17d*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Explanation/demonstration	190	3.0	(1.0)	352	3.2	(1.0)	169	3.2	(1.1)	446	3.4	(1.0)	312	3.3	(1.0)	513	3.3	
Student work	150	2.2	(1.2)	275	2.4	(1.1)	131	2.1	(1.1)	332	2.0	(1.1)	222	1.8	(1.0)	371	2.0	(1.1)
Group work	143	1.8	(1.0)	247	1.8	(1.0)	119	1.5	(0.8)	313	1.6	(0.9)	226	1.7	(1.0)	359	1.6	(0.9)

\*1=never, 5=all the time

Table 2.2.4 Students' view on time allocation for computer usage during lessons

Student/q18d*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Explanation/demonstration	621	3.7	(1.2)	823	3.3	(1.3)	530	3.5	(1.3)	1,414	3.6	(1.3)	917	3.5	(1.3)	1,595	3.4	(1.4)
Student work	615	2.4	(1.2)	816	2.4	(1.2)	520	2.2	(1.2)	1,399	2.3	(1.2)	901	2.1	(1.1)	1,592	2.1	(1.1)
Group work	616	1.9	(1.0)	819	2.1	(1.2)	526	1.8	(1.1)	1,409	1.9	(1.1)	909	1.9	(1.1)	1,580	1.8	(1.0)

\*1=never, 5=all the time

Table 2.2.5 Use of computers in classes by pilot schools

Teacher/q17d, Student/q18d*	School 2340			School 2384			School 2403			School 2358			School 2360			School 2333		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Teachers' view																		
Explanation/demonstration	19	2.6	(0.8)	25	2.9	(1.0)	33	2.9	(1.0)	45	3.1	(1.1)	40	3.2	(1.0)	28	3.4	(1.1)
Student work	18	2.8	(1.1)	23	2.7	(1.2)	23	2.1	(1.0)	36	2.0	(1.1)	30	1.9	(1.1)	20	2.0	(1.4)
Group work	18	1.9	(0.8)	22	2.2	(1.3)	27	2.0	(0.8)	32	1.7	(1.0)	28	1.6	(1.0)	16	1.4	(0.8)
Students' view																		
Explanation/demonstration	99	3.0	(1.1)	131	3.6	(1.3)	99	4.0	(0.9)	101	3.9	(1.1)	107	3.7	(1.1)	84	4.1	(1.1)
Student work	98	3.0	(1.2)	131	2.8	(1.4)	99	1.9	(0.9)	101	2.4	(1.1)	106	2.3	(1.1)	80	1.8	(1.0)
Group work	99	2.4	(1.3)	129	1.8	(0.9)	100	2.0	(0.9)	101	1.9	(1.1)	106	1.7	(0.9)	81	1.6	(0.8)

\*1=never, 5=all the time

Although students of the Pilot Schools reported higher percentage in computer usage in most subjects, the learning method in these schools did not differ substantially from others. Probably due to this, while students mostly agreed with the listed learning results and learning methods in Table 2.2.6 & 2.2.7, Pilot schools do not have higher means over the other category of schools on the learning outcome. On the contrary, some other category of schools such as the MMLC + ITC come out higher in means in some items.

Student from the Pilot schools reported that their teachers often asked or encouraged them to use computer in homework, worked with them in solving computer problems, and in extra-activities and other issues than the other category of schools (Table 2.2.8 & 2.2.9).

Table 2.2.6 Students' perception of learning gain using IT

Student/q18b*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Enhanced academic knowledge	643	3.9	(0.7)	840	3.8	(0.8)	545	3.7	(0.9)	1,465	3.8	(0.8)	932	3.8	(0.9)	1,614	3.8	(0.8)
Enhanced computing techniques	641	3.3	(1.0)	837	3.5	(1.0)	535	3.3	(1.1)	1,462	3.4	(1.0)	929	3.3	(1.1)	1,610	3.4	(1.0)
Enhanced data processing ability	643	3.3	(0.9)	838	3.5	(0.9)	542	3.3	(1.0)	1,459	3.4	(1.0)	924	3.3	(1.0)	1,610	3.4	(0.9)
Enhanced creativity	638	3.2	(0.9)	833	3.3	(0.9)	539	3.2	(1.0)	1,457	3.3	(1.0)	919	3.1	(1.0)	1,611	3.3	(0.9)
Enhanced communication and expression ability	640	3.1	(0.9)	832	3.2	(0.9)	536	3.1	(1.0)	1,456	3.2	(0.9)	920	3.1	(1.0)	1,613	3.1	(0.9)
Learnt how to cooperate with others	638	3.2	(0.9)	833	3.4	(1.0)	534	3.2	(1.0)	1,449	3.3	(1.0)	921	3.3	(1.0)	1,609	3.2	(0.9)
Enhanced interest in learning	639	3.8	(0.8)	844	3.7	(0.9)	545	3.7	(0.9)	1,465	3.8	(0.9)	931	3.7	(0.9)	1,620	3.7	(0.9)
Enhanced active learning strategies	639	3.3	(0.9)	837	3.4	(0.9)	548	3.4	(1.0)	1,464	3.4	(0.9)	931	3.3	(1.0)	1,613	3.4	(0.9)
Increased confidence	640	3.0	(0.9)	841	3.2	(0.9)	543	3.1	(1.0)	1,463	3.1	(0.9)	925	3.1	(1.0)	1,619	3.1	(0.9)
Increased learning efficiency	638	3.5	(0.8)	839	3.5	(0.9)	547	3.5	(0.9)	1,464	3.5	(0.9)	925	3.5	(0.9)	1,617	3.5	(0.9)
Broadened my social circle	636	3.0	(1.0)	835	3.1	(1.0)	539	3.1	(1.1)	1,458	3.1	(1.0)	919	3.0	(1.0)	1,604	3.1	(1.0)
More interactions with the outside world, and broadens my horizons	638	3.4	(1.0)	831	3.4	(1.0)	538	3.3	(1.1)	1,451	3.4	(1.0)	918	3.3	(1.1)	1,602	3.4	(1.0)

\*1=strongly disagree, 5=strongly agree

Table 2.2.7 Students' perception of most satisfying classroom experience using IT

Student/q18e*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Taught us much new knowledge	634	3.7	(0.8)	847	3.6	(0.9)	539	3.5	(0.9)	1,464	3.6	(0.9)	939	3.5	(1.0)	1,631	3.5	(0.9)
Provided drills and practice exercises by using computers	635	3.1	(1.0)	842	3.2	(1.0)	535	2.9	(1.1)	1,450	3.0	(1.1)	937	2.9	(1.1)	1,605	3.0	(1.1)
Provided suitable teaching materials and activities, thus enhancing the understanding of knowledge	634	3.6	(0.8)	842	3.5	(0.9)	533	3.4	(0.9)	1,458	3.5	(0.9)	931	3.4	(0.9)	1,611	3.4	(0.9)
Provided opportunities for creative work, which in turn allows me to learn from it.	633	3.1	(0.9)	842	3.2	(1.0)	533	3.0	(1.1)	1,458	3.1	(1.0)	933	3.0	(1.0)	1,616	3.0	(1.1)
Let us analyze problems and search for information in small groups	632	3.1	(1.0)	837	3.1	(1.1)	530	2.9	(1.1)	1,449	3.0	(1.1)	930	3.0	(1.1)	1,595	3.0	(1.1)

\*1=strongly disagree, 5=strongly agree

Table 2.2.8 Students' view on learning process

Student/q19*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Require you to use computers to complete homework	644	3.7	(1.0)	884	3.4	(1.2)	569	2.7	(1.3)	1,508	3.3	(1.2)	986	3.0	(1.2)	1,698	2.9	(1.2)
Discuss computer issues with students	645	2.6	(1.0)	887	2.7	(1.1)	569	2.3	(1.2)	1,514	2.6	(1.1)	986	2.4	(1.1)	1,700	2.4	(1.1)
Tackle computer problems/use computers to search for information with students.	645	3.0	(1.2)	883	2.8	(1.2)	569	2.6	(1.3)	1,505	2.8	(1.2)	981	2.7	(1.2)	1,698	2.7	(1.2)

\*1=none, 5=all the time

Table 2.2.9 Students' view on teacher encouragement

Student/q20*	Pilot			MMLC&ITC			MMLC			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Do homework	647	3.9	(0.8)	882	3.7	(0.9)	565	3.5	(0.9)	1,508	3.7	(0.8)	980	3.6	(0.8)	1,696	3.5	(0.8)
Extra-Curricular Activities	641	3.5	(0.8)	881	3.3	(0.8)	565	3.3	(0.8)	1,504	3.3	(0.8)	979	3.2	(0.8)	1,686	3.3	(0.8)
Shopping/ Entertainment/ Recreation	644	2.9	(0.7)	888	2.9	(0.8)	566	2.9	(0.8)	1,510	2.9	(0.7)	982	2.9	(0.8)	1,702	2.9	(0.8)
Communicate with friends/ classmates	646	3.3	(0.8)	886	3.3	(0.8)	567	3.2	(0.8)	1,514	3.3	(0.7)	982	3.2	(0.8)	1,696	3.2	(0.8)
Make friends	645	2.9	(0.8)	888	3.0	(0.9)	570	3.0	(0.8)	1,512	3.0	(0.8)	985	2.9	(0.8)	1,700	2.9	(0.8)
Learn new things	643	4.0	(0.8)	885	3.9	(0.9)	567	3.7	(0.9)	1,511	3.9	(0.8)	982	3.8	(0.9)	1,703	3.8	(0.9)
Participate in school administrative work	643	3.3	(0.8)	887	3.2	(0.8)	567	3.2	(0.8)	1,515	3.3	(0.8)	983	3.2	(0.8)	1,700	3.2	(0.8)
Invest	642	2.5	(0.8)	885	2.4	(0.9)	559	2.6	(0.9)	1,502	2.5	(0.9)	979	2.5	(0.9)	1,696	2.5	(0.9)

\*1=strongly discourage, 5=strongly encourage

Compared with the other category of schools, more students from the Pilot schools:

- rated their teachers with higher computer level (36.1% of Pilot school students believe their teachers' computer competency are high to very high against some 28% of the rest, Table 2.2.10);
- reported that their teachers had introduced useful software and websites to them (49.7 % and 61.5% in the Pilot schools against some 35% & 48% of the other category of schools, Table 2.2.11 and 2.2.12);
- reported that they looked for useful websites themselves for learning purpose (43.9% against some 31% of the rest, Table 2.2.13), &
- acquired ICQ habit (68.6% against some 60% of the rest, Table 2.2.14) and their purpose is for communication with friends and discussion of homework (84.7% and 39.9% against some 80% & 26% of the rest, Table 2.2.14).

Table 2.2.10 Teachers' competency in computers

Student/q21	Pilot		MMLC&ITC		MMLC		ITC		QEF		Others	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Very high	25	(3.9)	37	(4.2)	19	(3.3)	47	(3.1)	29	(2.9)	49	(2.9)
High	207	(32.2)	254	(28.8)	142	(25.0)	386	(25.5)	226	(22.9)	444	(26.0)
Normal	349	(54.4)	484	(54.9)	342	(60.1)	912	(60.3)	594	(60.2)	1028	(60.1)
Low	45	(7.0)	78	(8.8)	35	(6.2)	107	(7.1)	88	(8.9)	139	(8.1)
Very Low	16	(2.5)	28	(3.2)	31	(5.5)	61	(4.0)	49	(5.0)	49	(2.9)

Table 2.2.11 Students' view on the use of software during lessons

Student/q22		Pilot		MMLC&ITC		MMLC		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
	Yes	318	(49.7)	345	(39.2)	181	(32.3)	557	(37.3)	342	(35.0)	543	(32.2)
	No	322	(50.3)	535	(60.8)	379	(67.7)	936	(62.7)	636	(65.0)	1145	(67.8)
Purposes	Teacher s' demonstration	181	(66.5)	151	(58.5)	90	(68.2)	306	(68.2)	196	(73.1)	294	(72.8)
	Play games with students	24	(8.8)	26	(10.1)	17	(12.9)	33	(7.3)	30	(11.2)	50	(12.4)
	Assignments or tests for students	136	(50.0)	122	(47.3)	53	(40.1)	180	(40.1)	109	(40.7)	156	(38.6)
	Creative activities for students (writing, drawing)	126	(46.3)	121	(46.9)	35	(26.5)	162	(36.1)	86	(32.1)	117	(29.0)
	Other	32	(11.8)	32	(12.4)	16	(12.1)	64	(14.3)	30	(11.2)	58	(14.4)

Table 2.2.12 Students' view on websites recommended by teachers for learning

Student/q23		Pilot		MMLC&ITC		MMLC		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
	Yes	391	(61.5)	424	(49.1)	218	(39.0)	784	(53.4)	485	(49.7)	780	(46.9)
	No	245	(38.5)	440	(50.9)	341	(61.0)	684	(46.6)	490	(50.3)	883	(53.1)
Purposes	Provide supplementary curriculum materials	200	(64.9)	164	(58.4)	87	(57.6)	368	(65.5)	224	(63.6)	313	(61.3)
	Provide information (e.g. electronic library)	99	(32.1)	92	(32.7)	37	(24.5)	142	(25.3)	95	(27.0)	141	(27.6)
	Search reference materials	219	(71.1)	175	(62.3)	84	(55.6)	375	(66.7)	253	(71.9)	342	(66.9)
	Search for answers	60	(19.5)	63	(22.4)	17	(11.3)	83	(14.8)	52	(14.8)	85	(16.6)
	Obtain the latest information	48	(15.6)	59	(21.0)	20	(13.3)	96	(17.1)	69	(19.6)	85	(16.6)
	E-mail	31	(10.1)	51	(18.1)	8	(5.3)	64	(11.4)	46	(13.1)	52	(10.2)
	On-line chat	18	(5.8)	30	(10.7)	7	(4.6)	39	(6.9)	21	(6.0)	27	(5.3)
	Other	26	(8.4)	26	(9.3)	9	(6.0)	46	(8.2)	20	(5.7)	29	(5.7)

Table 2.2.13 Students' view on websites searched by themselves for learning

Student/q24		Pilot		MMLC&ITC		MMLC		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
	Yes	280	(43.9)	270	(31.2)	143	(25.5)	463	(31.4)	329	(33.9)	526	(31.8)
	No	358	(56.1)	595	(68.8)	418	(74.5)	1014	(68.7)	642	(66.1)	1130	(68.2)
Purposes	Provide supplementary curriculum materials	110	(48.0)	86	(47.5)	44	(41.5)	142	(42.9)	124	(51.0)	189	(50.5)
	Provide information (e.g. electronic library)	95	(41.5)	84	(46.4)	30	(28.3)	120	(36.3)	105	(43.2)	146	(39.0)
	Search for reference materials	179	(78.2)	118	(65.2)	64	(60.4)	235	(71.0)	177	(72.8)	260	(69.5)
	Search for answers	52	(22.7)	47	(26.0)	25	(23.6)	71	(21.4)	60	(24.7)	84	(22.5)
	Obtain the latest information	50	(21.8)	73	(40.3)	33	(31.1)	117	(35.4)	79	(32.5)	109	(29.1)
	E-mail	44	(19.2)	46	(25.4)	20	(18.9)	80	(24.2)	60	(24.7)	80	(21.4)
	On-line chat	30	(13.1)	36	(19.9)	17	(16.0)	50	(15.1)	41	(16.9)	50	(13.4)
	Other	26	(11.4)	33	(18.2)	15	(14.2)	38	(11.5)	39	(16.1)	42	(11.2)



Table 2.2.14 Students' view on ICQ habit

Student/q25		Pilot		MMLC&ITC		MMLC		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
	Yes	441	(68.6)	524	(59.0)	330	(57.9)	928	(61.5)	608	(61.7)	980	(57.7)
	No	202	(31.4)	364	(41.0)	240	(42.1)	581	(38.5)	377	(38.3)	719	(42.3)
Purposes	Communicate with friends that you already know	372	(84.7)	409	(78.7)	244	(74.6)	752	(82.0)	497	(82.2)	782	(79.9)
	Understand the latest trends	61	(13.9)	82	(15.8)	52	(15.9)	112	(12.2)	102	(16.9)	155	(15.8)
	Make friends	219	(49.9)	288	(55.4)	179	(54.7)	450	(49.1)	353	(58.4)	530	(54.1)
	Other	15	(3.4)	32	(6.2)	18	(5.5)	40	(4.4)	44	(7.3)	67	(6.8)
	Chat with friends/ classmates	376	(85.7)	396	(76.2)	255	(78.0)	751	(81.9)	499	(82.5)	784	(80.1)
	Discuss homework with classmates	175	(39.9)	141	(27.1)	93	(28.4)	252	(27.5)	153	(25.3)	253	(25.8)

### 2.2.3 Computer Usage in Primary Schools

The situation in the primary schools is similar to the secondary schools with some variation. Table 2.2.15 shows that among the four categories of primary schools, Pilot schools have the greatest proportion of classes which used computer in the six listed subjects. For instance, for Mathematics, 85.7% of pilot schools have been using computers in teaching whilst for the other groups, this figure is between 13.2% to 17.7%. Apart from pilot schools, there is no clear pattern in the remaining category of schools. When we split the primary schools into those which used computer in (and before) 1998 and those that didn't, we see that (Table 2.2.16) within schools with longer computer usage, the Pilot schools have a much higher percentage in the use of computer in all the listed subjects. Pilot schools aside, the percentage of QEF schools in three subjects (English, Mathematics and Music) are the highest. Among the non-computer using schools, the situation is very different (Table 2.1.17). The figures of most subjects are very low. The fact that two pilot schools have not been using computers for teaching in 4 of the 6 subjects is disappointing.

Table 2.2.15 Primary schools (computer and non-computer using schools): subjects by use of computers

Student/(q10a – collapsed at class-level)	Pilot		ITC		QEF		Other	
	N	(%)	N	(%)	N	(%)	N	(%)
Chinese	3	(50.0)	5	(26.3)	3	(17.7)	13	(16.9)
English	3	(50.0)	3	(15.8)	3	(17.7)	11	(14.3)
Art	2	(33.3)	2	(10.5)	1	(5.9)	10	(13.0)
Mathematics	5	(83.3)	3	(15.8)	3	(17.7)	11	(14.3)
General Studies	4	(66.7)	11	(57.9)	5	(29.4)	17	(22.1)
Music	3	(50.0)	2	(10.5)	2	(11.8)	2	(2.6)
Total no. of classes	6	-	19		17		77	
Mean number of subjects using IT per class	3.3		1.4		1.0		0.8	

N = Number of classes

Table 2.2.16 Computer using primary schools: subjects by use of computers

Student/(q10a – collapsed at class-level)	Pilot		ITC		QEF		Other	
	N	(%)	N	(%)	N	(%)	N	(%)
Chinese	3	(60.0)	4	(30.8)	2	(16.7)	5	(17.2)
English	3	(60.0)	2	(15.4)	3	(25.0)	4	(13.8)
Art	2	(40.0)	1	(7.7)	1	(8.3)	2	(6.9)
Mathematics	4	(80.0)	3	(23.1)	3	(25.0)	6	(20.7)
General Studies	3	(60.0)	7	(53.9)	4	(33.3)	8	(27.6)
Music	3	(60.0)	2	(15.4)	2	(16.7)	1	(3.5)
Total no. of classes	5	-	13	-	12	-	29	-
Mean number of subjects using IT per class	3.6		1.5		1.3		0.9	

N = Number of classes

Table 2.2.17 Non-computer using primary schools: subjects by use of computers

Student/(q10a – collapsed at class-level)	Pilot		ITC		QEF		Other	
	N	(%)	N	(%)	N	(%)	N	(%)
Chinese	0	(0.0)	1	(16.7)	1	(20.0)	8	(16.7)
English	0	(0.0)	1	(16.7)	0	(0.0)	7	(14.6)
Art	0	(0.0)	1	(16.7)	0	(0.0)	8	(16.7)
Mathematics	1	(100.0)	0	(0.0)	0	(0.0)	5	(10.4)
General Studies	1	(100.0)	4	(66.7)	1	(20.0)	9	(18.8)
Music	0	(0.0)	0	(0.0)	0	(0.0)	1	(2.1)
Total no. of classes	1	-	6	-	5	-	48	-
Mean number of subjects using IT per class	2.0		1.2		0.4		0.8	

N = Number of classes

On the issue of teaching methods used in the computer classes in the primary schools, we are looking for whether students are given more time in using the computer themselves. Table 2.2.18 shows that from the teachers' perspective, there is no marked difference among the different category of schools in the time spent in class. About half of the class time is used for explanation and demonstration, with less than half of the class period for students individual or group work. However, the students reported slightly differently (Table 2.2.19). Among the four categories of schools, the ITC schools give slightly more time for teachers' explanation and for students' group work using the computer.

Table 2.2.18 Teachers' views on time allocation for computer usage during lessons

Teacher/q17d*	Pilot			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Explanation/ demonstration	191	3.1	(1.0)	540	3.2	(1.0)	477	3.3	(1.0)	1,471	3.2	(1.0)
Student work	162	2.4	(1.1)	453	2.3	(1.0)	391	2.2	(1.0)	1,194	2.2	(1.1)
Group activity	157	1.8	(1.0)	422	1.6	(0.8)	369	1.6	(0.8)	1,119	1.6	(0.9)

\*1=never, 5=all the time

Table 2.2.19 Students' views on time allocation for computer usage during lessons

Student/q18d*	Pilot			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Explanation/ demonstration	207	3.2	(1.1)	587	3.4	(1.1)	533	3.3	(1.1)	2,354	3.3	(1.1)
Student work	208	2.5	(1.3)	584	2.7	(1.1)	526	2.8	(1.1)	2,330	2.6	(1.1)
Group activity	211	2.2	(1.3)	583	2.4	(1.2)	522	2.2	(1.2)	2,328	2.1	(1.2)

\*1=never, 5=all the time

Table 2.2.20 shows that the variation among the students from different category of schools on learning outcome is very little. But Table 2.2.21 shows that on the encouragement given by teachers to use computer outside classroom, ITC schools are slight better in percentage than the rest of schools in almost all the listed area. On class activities (Table 2.2.22), the Pilot schools have slightly higher percentage on some items (teachers teach me more computer knowledge; teachers let me learn from creative work, and let me do group work) than the rest of schools.

Table 2.2.23 shows that more students from the Pilot schools believed the computer competency of their teachers were high, and the percentage of the Pilot, ITC, QEF and Others schools are 68.1%, 58.6%, 57.1% and 53.1 % respectively.

Table 2.2.20 Students' view on learning results I

Student/q18b*	Pilot			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Enhanced academic knowledge	216	4.2	(0.7)	613	4.1	(0.9)	560	4.0	(0.8)	2,440	4.0	(0.8)
Enhanced computing techniques	216	3.9	(1.0)	607	4.0	(1.0)	560	4.0	(0.8)	2,426	4.0	(0.9)
Enhanced data processing ability	214	3.7	(1.0)	610	3.8	(0.9)	565	3.8	(0.9)	2,432	3.8	(0.9)
Enhanced creativity	214	3.6	(1.0)	606	3.7	(1.0)	562	3.7	(1.0)	2,416	3.6	(0.9)
Enhanced communication and expression ability	213	3.4	(1.1)	607	3.4	(1.0)	560	3.4	(1.0)	2,423	3.4	(1.0)
Learnt how to cooperate with others	214	3.8	(1.0)	603	3.6	(1.1)	559	3.7	(1.0)	2,407	3.7	(1.0)
Enhanced interest in learning	216	4.1	(0.9)	610	4.1	(0.9)	561	4.1	(0.9)	2,441	4.1	(0.9)
Enhanced active learning strategies	216	3.8	(1.0)	604	3.7	(1.0)	562	3.7	(1.0)	2,429	3.7	(1.0)
Increased confidence	216	3.4	(1.1)	611	3.4	(1.1)	564	3.4	(1.0)	2,424	3.3	(1.0)
Increased learning efficiency	214	3.8	(0.9)	606	3.8	(1.0)	562	3.7	(0.9)	2,425	3.7	(0.9)
Broadened my social circle	213	3.4	(1.2)	601	3.4	(1.1)	557	3.5	(1.0)	2,413	3.4	(1.1)
More interactions with the outside world, and broadened my horizons	216	3.8	(1.1)	601	3.7	(1.1)	560	3.8	(1.0)	2,402	3.8	(1.0)

\*1=strongly disagree, 5=strongly agree

Table 2.2.21 Students' view on teacher encouragement

Student/q20*	Pilot			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Do homework	214	3.5	(1.1)	614	3.5	(1.0)	569	3.3	(1.0)	2,499	3.2	(1.0)
Extra-Curricular Activities	213	3.5	(0.9)	613	3.5	(0.9)	564	3.4	(0.9)	2,495	3.3	(0.9)
Shopping/ Entertainment/ Recreation	214	2.4	(1.0)	612	2.8	(1.0)	570	2.8	(1.0)	2,491	2.7	(1.0)
Communicate with friends/ classmates	214	3.2	(1.1)	616	3.3	(1.0)	567	3.4	(0.9)	2,495	3.3	(0.9)
Make friends	213	3.0	(1.1)	617	3.1	(1.0)	568	3.2	(0.9)	2,506	3.2	(0.9)
Learn new things	215	4.0	(1.0)	616	4.1	(0.9)	566	4.1	(0.9)	2,498	4.0	(0.9)
Participate in school administrative work	214	3.1	(1.3)	611	3.4	(1.0)	566	3.4	(0.9)	2,484	3.2	(0.9)
Invest	215	1.7	(0.9)	615	2.0	(1.1)	567	2.0	(1.1)	2,492	2.0	(1.0)

\*1=strongly discourage, 5=strongly encourage

Table 2.2.22 Students' view on learning results II

Student/q18e*	Pilot			ITC			QEF			Others		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Taught us much new knowledge	215	4.2	(0.8)	606	4.0	(0.8)	559	4.0	(0.8)	2,413	4.0	(0.9)
Provided drills and practice exercises by using computers	215	3.5	(1.2)	605	3.6	(1.0)	555	3.7	(1.0)	2,398	3.6	(1.0)
Provided suitable learning materials and activities in order to enhance the understanding of the content	216	4.0	(0.8)	597	3.8	(0.9)	557	3.8	(0.8)	2,400	3.7	(0.9)
Provided opportunities for creative work, which in turn allows me to learn from it.	214	3.8	(0.9)	599	3.6	(1.0)	556	3.7	(1.0)	2,401	3.6	(1.0)
Let us analyze problems and search for information in small groups	213	3.8	(1.1)	593	3.5	(1.1)	551	3.5	(1.2)	2,382	3.3	(1.2)

\*1=strongly disagree, 5=strongly agree

Table 2.2.23 Teachers' competency in computers

Student/q21	Pilot		ITC		QEF		Others	
	N	(%)	N	(%)	N	(%)	N	(%)
Very high	46	(21.6)	95	(15.5)	63	(11.5)	246	(9.9)
High	99	(46.5)	264	(43.1)	250	(45.6)	1072	(43.2)
Normal	63	(29.6)	225	(36.8)	214	(39.0)	1057	(42.6)
Low	2	(0.9)	17	(2.8)	14	(2.5)	49	(2.0)
Very Low	3	(1.4)	11	(1.8)	7	(1.3)	56	(2.3)

On whether teachers have used useful software in class, whether they have introduced students to useful websites, and whether students themselves found useful websites, students from Pilot and ITC schools are higher in percentage than the other category of schools in giving positive answer to these questions (Table 2.2.24 to 2.2.26). On the question of using ICQ, slightly more Pilot school students (29.3% as compared to some 23% of the rest schools) have acquired such a habit (Table 2.2.27).

Table 2.2.24 Students' view on the use of software during lessons

Student/q22		Pilot		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)
	Yes	117	(47.4)	297	(48.0)	191	(34.3)	1014	(41.4)
	No	130	(52.6)	322	(52.0)	366	(65.7)	1433	(58.6)
Purposes	Teacher s' demonstration	62	(62.6)	140	(63.1)	68	(49.3)	380	(53.2)
	Play games with students	15	(15.2)	70	(31.5)	35	(25.4)	221	(30.9)
	Assignments or tests for students	45	(45.5)	108	(48.6)	58	(42.0)	323	(45.2)
	Creative activities for students (writing, drawing)	51	(51.6)	121	(54.5)	69	(50.0)	341	(47.6)
	Other	15	(15.2)	42	(18.9)	32	(23.2)	148	(20.7)

Table 2.2.25 Students' view on websites recommended by teachers for learning

Student/q23		Pilot		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)
	Yes	154	(63.1)	377	(61.7)	291	(52.7)	1393	(57.5)
	No	90	(36.9)	234	(38.3)	261	(47.3)	1031	(42.5)
Purposes	Provide supplementary curriculum materials	43	(33.8)	89	(34.5)	82	(38.1)	373	(38.2)
	Provide information (e.g. electronic library)	37	(29.1)	101	(39.1)	77	(35.8)	287	(29.4)
	Search reference materials	83	(65.3)	158	(61.2)	122	(56.7)	587	(60.1)
	Search for answers	20	(15.8)	44	(17.1)	36	(16.7)	137	(14.0)
	Obtain the latest information	34	(26.8)	70	(27.1)	46	(21.4)	227	(23.2)
	E-mail	35	(27.5)	64	(24.8)	56	(26.1)	297	(30.4)
	On-line chat	20	(15.7)	54	(20.9)	24	(11.2)	117	(12.0)
	Other	24	(18.9)	67	(26.0)	52	(24.2)	186	(19.0)

Table 2.2.26 Students' view on websites searched by themselves for learning

Student/q24		Pilot		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)
	Yes	66	(31.0)	183	(30.0)	99	(17.7)	532	(22.1)
	No	147	(69.0)	427	(70.0)	460	(82.3)	1871	(77.9)
Purposes	Provide supplementary curriculum materials	16	(28.1)	29	(24.4)	29	(35.4)	129	(34.8)
	Provide information (e.g. electronic library)	18	(31.5)	53	(44.5)	27	(32.9)	142	(38.4)
	Search reference materials	35	(61.4)	71	(59.7)	45	(54.9)	210	(56.8)
	Search for answers	10	(17.6)	30	(25.2)	17	(20.7)	81	(21.9)
	Obtain the latest information	25	(43.8)	38	(31.9)	29	(35.4)	139	(37.6)
	E-mail	27	(47.4)	38	(31.9)	22	(26.8)	115	(31.1)
	On-line chat	13	(22.8)	27	(22.7)	24	(29.3)	87	(23.5)
	Other	15	(26.3)	27	(22.7)	25	(30.5)	99	(26.8)

Table 2.2.27 Students' view on ICQ habit

Student/q25		Pilot		ITC		QEF		Others	
		N	(%)	N	(%)	N	(%)	N	(%)
	Yes	64	(26.1)	144	(23.4)	144	(25.4)	555	(22.6)
	No	147	(60.0)	472	(76.6)	424	(74.7)	1934	(78.8)
Purposes	Communicate with friends that you already know	40	(56.3)	70	(49.0)	89	(61.8)	318	(58.4)
	Understand the latest trends	14	(19.7)	35	(24.5)	36	(25.0)	134	(24.6)
	Make friends	44	(62.0)	93	(65.0)	88	(61.1)	372	(68.2)
	Other	2	(2.8)	8	(5.6)	5	(3.5)	17	(3.1)
	Chat with friends/classmates	44	(62.0)	74	(51.8)	85	(59.0)	324	(59.4)
	Discuss homework with classmates	14	(19.9)	18	(12.6)	33	(22.9)	97	(17.8)

## 2.2.4 Comparing the computer-using with the non-computer-using primary schools

We saw earlier in Table 2.2.16 and 2.2.17 that in the use of computer in subjects, the Pilot schools that used computer in (and before) 1998 differed from those did not. Hereunder we see further that the two groups of schools are different in some ways.

Table 2.2.28 to 2.2.29 show that, comparing with their counterpart from the non-computer using schools, more students from the Pilot primary schools that had experience in using computer back in 1998:

- a) rated higher the computer competence of their teachers then their counterparts and the respectively percentage is 73.1% against 18.8% (Table 2.2.28);
- b) reported their teachers
  - let them use useful computer software in class, and the respective percentage is 55% against 10.8% (Table 2.2.29, A);
  - introduced them to helpful websites for their learning, and the respective percentage is 74.2% against 22.7% (Table 2.2.29, B); and
  - they have found some useful websites themselves, and the percentage is 32.6% against 10.8% (Table 2.2.29, C).

Table 2.2.28 Teachers' competency in computers

Student/q21	Pilot schools			
	Non-computer using schools		Computer using schools	
	N	(%)	N	(%)
Very high	3	(4.7)	43	(23.6)
High	9	(14.1)	90	(49.5)
Normal	18	(28.1)	45	(24.7)
Low	0	(0)	2	(1.1)
Very Low	2	(3.1)	2	(1.1)

Table 2.2.29 Comparing students' view on non-computer-using and computer-using pilot primary schools

Student/q22,q23,q24	Non-computer-using schools		Computer-using schools	
Students' view on the use of software during lessons	N	(%)	N	(%)
Yes	7	(10.8)	100	(55.0)
No	25	(38.4)	82	(45.0)
Students' view on websites recommended by teachers for learning	Non-computer using schools		Computer using schools	
	N	(%)	N	(%)
Yes	15	(22.7)	132	(74.2)
No	17	(25.8)	46	(25.8)
Students' view on websites searched by themselves for learning	Non-computer using schools		Computer using schools	
	N	(%)	N	(%)
Yes	7	(10.8)	59	(32.6)
No	25	(38.5)	122	(67.4)

### 2.2.5 Summary

When we start this section, we want to see how readiness has an impact on the use of computer in school and readiness is defined as the time engagement in IT and the amount of resources obtained. The findings suggest that in both the primary and secondary schools, the longer exposure and engagement in computer usage is helpful to students in building up a habit of using IT in school and life. The picture is less clear on resources. In the secondary schools, while the Pilot schools that are given the largest resources still have an edge over others in computer usage in subjects, it is less certain among the other category of schools. Within the non-pilot schools, those which have support from QEF, and those which do not have outside support do not perform noticeably worse than those schools which have MMLC, ITC or both. In the primary schools the scene is very different. When measured in the computer usage in subjects, both the Pilot and ITC schools performed better than those that do not have ED support. Unlike the secondary schools, the differences between the Pilot and ITC primary schools are small.

One interesting phenomenon is that although there are clear behavioral differences in computer usage among students of different category of schools, we do not see a marked difference in their attitude. One could of course argue that internalization of a value takes a long while. After all, the exposure to computer usage in Hong Kong schools is relatively short. A more plausible reason which is supported by the findings in this study is that although there is quantitative difference in computer usage, the teaching method in the different classrooms is very similar. There has not been, in our view, a paradigm shift in IT teaching and learning as advocated in the governmental five-year strategy (Education and Manpower Bureau, 1998).