CHAPTER 2.3 TEACHERS' TEACHING WITH TECHNOLOGY

This chapter evaluates issues related with the application of IT in the teaching practices of teachers at the classroom level. Specifically, it refers to two aspects that are crucial to the successful implementation of IT in teaching. Firstly, it examines the technical competence of the teachers; secondly, the perceptions and practices of teachers in the deployment of IT in teaching is examined.

To this end, teacher professional development efforts are crucial to the improvement of the technical competence of the teachers and to lead teachers to understand and undergo the paradigm shifts involved in the productive use of IT in education. A preliminary review of the current mechanism used in the evaluation of the teachers' IT competence, based on the preparation and review of an "IT Portfolio", will also be made.

2.3.1 Teachers' Competence and Attitudes

It can be seen from table 2.3.1 that currently about 60% of the teachers at both the secondary and primary levels have been using IT in teaching non Computer Studies subjects. In particular, it can be seen that a greater proportion of the teachers in the pilot schools have been using IT in their teaching than their counterparts in other schools, and that, in general, secondary school teachers have been using IT in teaching more than their counterparts in primary schools. This trend can be seen further from table 2.3.2, where we examine the proportion of teaching time spent using IT as reported by the teachers. It should be noted that 46% of the teachers in secondary schools and 64% of the teachers in primary schools have been using IT for 5% or less of their teaching time – again the difference between pilot schools and non-pilot-schools is quite evident. For instance, only 27% of the teachers in pilot secondary schools have been using IT for 5% or less of their time, whilst for other categories of schools this figure hovers between 40 and 55% - quite a significant difference. For primary schools, this is still true – the figure for pilot schools is 37.1%, whilst for other schools this figure lies between 58.8 and 69.3%. This reflects the great difference in the IT implementation in pilot schools compared with other categories of schools.

Table 2.3.1 Percentage of teachers using IT in teaching (except for Computer Studies) (Teachers' questionnaire, Q. 16)

Primary					**Secondary**						
Pilot N= 216	**ITC N= 564**	**QEF N= 514**	**Other N= 1672**	**Overall N= 2966**	**Pilot N= 186**	**MMLC & ITC N=373**	**MMLC N= 178**	**ITC N= 440**	**QEF N= 332**	**Other N= 575**	**Overall N= 2084**
86.6	72.2	64.8	49.3	59.07	80.11	70.78	59.55	66.14	62.35	54.43	63.82

$?^2(3) = 180.0$, *** $?^2(5) = 53.9$, ***

Table 2.3.2 The proportion of teaching time spent using IT by teachers (Teachers' questionnaire, Q. 20)

Secondary

%	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
<5%	27.1	44.2	52.1	41.3	47.8	54.6	46.2
5-14%	24.6	28.4	27.1	30.8	26.8	25.4	27.4
15-24%	21.1	14.3	9.4	13.8	14.8	9.9	13.3
25-50%	20.1	8.0	6.8	9.6	6.4	6.8	8.7
>50%	7.0	5.0	4.7	4.6	4.2	3.3	4.5

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
<5%	37.1	58.8	62.6	69.3	64.0
5-14%	37.6	28.3	25.8	22.0	24.9
15-24%	16.1	8.8	8.1	5.9	7.5
25-50%	5.9	2.3	3.3	2.1	2.6
>50%	3.2	1.8	0.2	0.8	1.0

We have also evaluated the teachers' self-proclaimed competence in various aspects related to the application of IT in teaching. The results shown in table 2.3.3 shows that whilst teachers in general feel confident – indeed, most confident – about basic information technology skills, such as word processing, use of spreadsheets, presentation software and internet usage. However, the teachers were least certain about their competence in their understanding of advanced multimedia design and webpage production. In all of the cases seen below, it can be seen that, in general, the teachers in pilot schools are more confident than the others regarding their grasp of such skills. In particular, the difference is most apparent in the case of their understanding of how to "integrate IT into teaching and learning" - an aspect that is crucial to the adoption of the new learning paradigms.

Table 2.3.3 Please indicate the level that you have reached in applying information technology in the following aspects (5=completely mastered; 1=don' t know) (Teachers' questionnaire, Q. 19a)

	Primary						Secondary							
Skill	**Pilot**	**ITC**	**QEF**	**Other**	**Overall**	**F**	**Pilot**	**MMLC & ITC**	**MMLC**	**ITC**	**QEF**	**Other**	**Overall**	**F**
1	4.3 (0.6)	4.3 (0.7)	4.2 (0.7)	4.2 (0.7)	4.2 (0.7)	3.9	4.5 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	2.3*
2	4.1 (0.7)	4.0 (0.8)	3.9 (0.9)	3.9 (0.8)	4.0 (0.8)	4.7**	4.2 (0.7)	4.1 (0.7)	4.0 (0.8)	4.0 (0.8)	4.0 (0.7)	4.1 (0.7)	4.1 (0.7)	1.9
3	3.5 (1.1)	3.5 (1.1)	3.2 (1.2)	3.2 (1.1)	3.3 (1.1)	10.4***	3.7 (1.1)	3.6 (1.0)	3.3 (1.2)	3.4 (1.1)	3.3 (1.1)	3.5 (1.1)	3.5 (1.1)	4.4***
4	3.1 (1.2)	3.2 (1.2)	2.9 (1.2)	2.9 (1.2)	3.0 (1.2)	9.6***	3.4 (1.1)	3.3 (1.1)	2.9 (1.3)	3.1 (1.2)	3.1 (1.2)	3.1 (1.2)	3.1 (1.2)	5.0***
5	3.7 (1.1)	3.8 (1.0)	3.7 (1.1)	3.7 (1.1)	3.7 (1.1)	1.4	4.1 (0.9)	3.9 (1.0)	3.8 (0.9)	3.8 (1.0)	3.7 (1.0)	3.8 (1.1)	3.8 (1.0)	4.7***
6	4.1 (0.8)	4.0 (0.9)	3.9 (0.8)	3.9 (0.9)	3.9 (0.9)	4.1	4.2 (0.6)	4.0 (0.7)	3.9 (0.7)	4.0 (0.8)	3.9 (0.9)	3.9 (0.9)	4.0 (0.8)	5.2***
7	4.0 (0.8)	3.8 (0.9)	3.7 (0.9)	3.6 (1.0)	3.7 (1.0)	14.9***	4.0 (0.7)	3.8 (0.8)	3.7 (0.8)	3.8 (0.8)	3.7 (0.8)	3.7 (0.9)	3.8 (0.8)	5.2***

*: significance < 0.05; **: significance < 0.01; ***: significance < 0.001

Skills

1: Word processing, spreadsheet, presentation software, and Internet usage skills
2: Advanced word processing, spreadsheet, and presentation software skills
3: Multimedia and web page design
4: Advanced multimedia and web page design
5: Basic operations of a computer network
6: Usage of educational software
7: Integration of ICT into teaching and learning

However, it can also be seen from the above, in comparison with the results of SITES M1, which was conducted in 1998, that there has been a great improvement in the IT competence of the teachers since the implementation of the government' s 5-year strategy on IT in education (Law et al, 1999). In 1998, it can be seen that apart from word processing skills, the vast majority of teachers feel that they have not been adequately trained on various aspects of IT in education. This is clearly an improvement over previous results.

In parallel with the abovementioned question, the teachers were asked for their views on the importance of the abovementioned seven strands in their teaching activities. Table 2.3.4 is a summary of their responses. Again, whilst the differences are not as clear, it is clear that teachers place most importance in general on basic information technology skills, followed closely by the usage of teaching software. Aspects of multimedia and website design were considered the least important skills. It is noteworthy that, in 1998, the aspects for which teachers considered were the most important as areas that required further training was the application of multimedia (ibid).

Table 2.3.4 Please indicate the importance of the following skills to teachers
(Teachers' questionnaire, Q. 19b)

	Primary						Secondary							
Skill	**Pilot**	**ITC**	**QEF**	**Other**	**Overall**	**F**	**Pilot**	**MMLC & ITC**	**MMLC**	**ITC**	**QEF**	**Other**	**Overall**	**F**
1	4.2 (0.6)	4.2 (0.6)	4.0 (0.7)	4.1 (0.7)	4.1 (0.7)	7.1***	4.3 (0.7)	4.1 (0.7)	4.2 (0.6)	4.2 (0.6)	4.2 (0.6)	4.2 (0.6)	4.2 (0.6)	1.6
2	4.0 (0.6)	3.9 (0.7)	3.8 (0.7)	3.9 (0.7)	3.9 (0.7)	4.1**	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	0.6
3	3.6 (0.8)	3.5 (0.9)	3.4 (0.9)	3.4 (0.8)	3.4 (0.9)	5.0**	3.5 (0.9)	3.4 (0.9)	3.4 (0.9)	3.4 (0.9)	3.4 (0.8)	3.5 (0.9)	3.5 (0.9)	1.6
4	3.4 (0.8)	3.3 (0.9)	3.2 (0.9)	3.2 (0.9)	3.3 (0.9)	3.2*	3.3 (0.9)	3.2 (0.9)	3.2 (0.9)	3.2 (0.9)	3.2 (0.9)	3.3 (0.9)	3.2 (0.9)	1.5
5	3.7 (0.8)	3.9 (0.8)	3.8 (0.8)	3.8 (0.8)	3.8 (0.8)	2.3	4.0 (0.9)	3.8 (0.9)	3.8 (0.8)	3.7 (0.8)	3.8 (0.8)	3.8 (0.9)	3.8 (0.9)	2.9*
6	4.2 (0.6)	4.2 (0.6)	4.1 (0.6)	4.1 (0.7)	4.1 (0.6)	3.6*	4.1 (0.6)	4.0 (0.6)	4.1 (0.6)	4.0 (0.6)	4.1 (0.6)	4.1 (0.6)	4.1 (0.6)	1.1
7	4.2 (0.6)	4.0 (0.7)	4.0 (0.7)	4.0 (0.7)	4.0 (0.7)	6.9***	4.1 (0.8)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	3.9 (0.7)	4.0 (0.7)	3.9 (0.7)	1.7

*: significance < 0.05; **: significance < 0.01; ***: significance < 0.001

Skills

1: Word processing, spreadsheet, presentation software, and Internet usage skills
2: Advanced word processing, spreadsheet, and presentation software skills
3: Multimedia and web page design
4: Advanced multimedia and web page design
5: Basic operations of a computer network
6: Usage of educational software
7: Integration of ICT into teaching and learning

2.3.2 The Most Satisfying Experience in IT-enabled Teaching As Perceived by Teachers

Teachers were asked in their questionnaire various questions about their most satisfying experience in teaching using IT for that academic year. We can see that for primary schools, the subjects that were named most included General Studies, Chinese, English and Mathematics (c.f. Table 2.3.5).

Table 2.3.5 Subject content of the most satisfying IT-enabled lesson (Primary Schools)
(Teachers' questionnaire, Q. 17a (1))

Subject (%)	Pilot N= 192	ITC N= 555	QEF N= 498	Other N= 1585	Overall N= 2830
Chinese	40.3	30.6	35.7	28.2	30.9
English	35.4	31.9	35.9	27.0	30.1
Mathematics	37.5	30.8	31.1	26.8	29.1
Computer	24.5	20.0	31.9	25.1	25.3
General Studies	44.8	41.8	43.0	37.9	40.0
Music	18.8	12.1	17.1	10.6	12.6
Putonghua	4.2	5.4	5.4	3.3	4.2
Art	18.8	11.4	12.9	13.3	13.2
Physical Education	2.6	3.2	2.6	3.0	3.0
Religion	1.6	2.7	3.4	4.4	3.7

For secondary schools, the subjects that were mentioned most were English, Chinese and Mathematics, as indicated in table 2.3.6. This is not a surprising result, considering the fact that they are the core subjects in the primary and secondary school curricula.

Table 2.3.6 Subject content of the most satisfying IT-enabled lesson (Secondary Schools)
(Teachers' questionnaire, Q. 17a (2))

Subject (%)	Pilot N= 187	MMLC & ITC N=352	MMLC N= 168	ITC N= 422	QEF N= 309	Other N= 515	Overall N= 1953
Chinese/Chinese Literature	16.0	13.9	14.3	13.0	9.1	14.0	13.2
English/English Literature	10.2	14.5	12.5	17.3	10.4	15.1	14.0
Putonghua	3.7	4.5	3.0	2.4	3.2	3.5	3.4
Art and Design	6.4	6.8	4.2	5.2	4.9	5.8	5.6
Computer	8.6	11.1	11.9	11.4	10.7	10.5	10.8
Chinese History	11.8	8.0	7.7	7.1	9.7	9.5	8.8
History	6.4	4.3	4.2	6.2	6.8	5.4	5.6
Music	2.1	3.4	1.2	2.1	4.2	3.5	3.0
Physical Education	1.6	2.8	4.2	3.1	2.9	2.1	2.7
Physics	4.8	4.0	5.4	7.3	6.5	5.2	5.6
Chemistry	3.7	4.0	3.6	5.7	6.8	5.0	5.0
Geography	5.3	4.0	7.1	5.0	8.1	7.0	6.0
Liberal Studies	1.1	1.7	1.2	1.9	2.6	2.1	1.9
Mathematics	18.7	11.4	8.9	11.1	6.5	11.7	11.1
Integrated Science	6.4	7.4	4.8	7.3	9.4	7.6	7.4
Home Economics	2.1	1.1	1.8	1.4	2.9	2.5	2.0
Religion	6.4	1.7	1.8	0.5	3.2	3.7	2.7
Biology/ Human Biology	4.8	5.1	4.8	3.8	6.8	5.6	5.2
Economics/ Public Affairs/ Business Studies	7.0	7.7	8.9	8.3	6.5	7.8	7.7
Engineering/ Design/ Electronics/ Technology	0.5	8.0	1.2	5.0	0.6	2.1	3.3
Social Studies/ Sociology/ Pyschology	0.0	2.0	4.2	2.8	1.0	2.5	2.2
Others	3.2	5.1	6.0	2.6	3.6	4.5	4.0

They were asked if people other than members of the class were involved in the teaching of this lesson. Table 2.3.7 indicates that in the vast majority of these lessons other teachers in the same school were involved; however, it was rare for people outside of the school to be involved, including members of other schools, to be involved. It suggests that most of these classes were conducted with the assistance of a second teacher for a class without outside participation.

Table 2.3.7 Other participants in IT-enabled classes (Teachers' questionnaire, Q. 17c)

	Primary					**Secondary**					
Other party (%)	**Pilot N= 48**	**ITC N= 195**	**QEF N= 161**	**Other N= 491**	**Overall N= 895**	**Pilot N= 32**	**MMLC & ITC N=79**	**MMLC N= 22**	**ITC N= 76**	**QEF N= 52**	**Other N= 91**	**Overall N= 352**
Teacher in the same school	70.8	84.1	78.3	84.1	82.3	37.5	74.7	59.1	63.2	53.8	54.9	59.7
Teacher in other schools	2.1	4.1	3.7	3.1	3.4	0.0	1.3	4.5	1.3	5.8	7.7	3.7
Student in the same school	20.8	9.7	12.4	7.3	9.5	56.3	20.3	31.8	31.6	32.7	30.8	31.3
Student in other school	0.0	0.0	0.6	0.2	0.2	0.0	1.3	0.0	0.0	3.8	2.2	1.4
People outside school	6.3	2.1	5.0	5.3	4.6	6.3	2.5	4.5	3.9	3.8	4.4	4.0

It can be seen from the time allocation in these lessons – as shown in table 2.3.8 – that the teachers are still in favour of a presentation or expository pedagogical approach. In particular, it can be seen that for both primary and secondary school students, on average more than half the teaching time of the IT-enabled lessons considered most satisfying was spent on the lecture and demonstrations of the teacher; whereas only a small part of the time was spent on students' individual work using IT, and even less on group work using IT. However, it should be noted that for secondary schools, it seems that there are significant differences in the time allocation of lessons, the pilot schools and those schools with both a multimedia learning centre and an IT coordinator seem to have a smaller proportion of IT-enabled teaching time devoted to lectures and the teachers' demonstrations and a larger proportion of time devoted to leaving the students to work with computers either individually or in small groups; for primary schools, such differences have been found to be statistically insignificant, indicating that there is a greater uniformity in pedagogy among school groups in the primary sector.

Table 2.3.8 How much time was allocated to the following activities in the lesson in question 17? (1 = never; 5 = all the time) (Teacher's questionnaire, Q. 17d)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	3.0 (1.0)	3.2 (1.0)	3.2 (1.1)	3.4 (1.0)	3.3 (1.0)	3.3 (1.1)	3.3 (1.0)	3.5 (5, 1976) **
2	2.2 (1.2)	2.4 (1.1)	2.1 (1.1)	2.1 (1.1)	1.8 (1.0)	2.0 (1.1)	2.1 (1.1)	10.3 (5, 1475) ***
3	1.8 (1.0)	1.8 (1.0)	1.5 (0.8)	1.6 (0.9)	1.7 (1.0)	1.6 (1.0)	1.7 (1.0)	3.3 (5, 1401) **

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	3.1 (1.0)	3.2 (1.0)	3.3 (1.0)	3.2 (1.0)	3.2 (1.0)	0.9 (3, 2675) (ns)
2	2.4(1.1)	2.3 (1.0)	2.2 (1.0)	2.2 (1.1)	2.2 (1.1)	3.6 (3, 2196) (ns)
3	1.8 (1.0)	1.6 (0.8)	1.6 (0.8)	1.6 (0.9)	1.6 (0.9)	2.3 (3, 2063) (ns)

1. Teachers' explanation/demonstration
2. Students' individual work using IT
3. Students' group work using IT

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

This corroborates with the fact that the most commonly deployed computer software and peripherals in schools are presentation software and projectors, which suggests that direct teaching pedagogy was often used (c.f. Table 2.3.9). In turn, this links in with the finding that the most commonly found peripheral found in schools is the video projector, as reported in chapter 2.1. We find that there is no significant change in the teaching pedagogy since 1998, when it was found that there was a very high score for the whole class progression teaching paradigm compared with the score for the student centred learning paradigm (ibid). The main change has been the fact that the presentations are now enhanced using IT, and the change in teaching practices has in reality been minimal.

Table 2.3.9 Software and peripherals used in IT-enabled lessons (Teachers' questionnaire, Q. 17e)

	Primary		Secondary	
	N	(%)	N	(%)
Teaching software developed internally	802	(30.30)	266	(13.64)
Drill and practice software	502	(18.96)	205	(10.51)
Projector (e.g. Video projector)	1136	(42.92)	1074	(55.08)
Electronic musical instrument	111	(4.19)	76	(3.90)
Digital video equipment (e.g. Digital camera/Video camera)	127	(4.80)	172	(8.82)
Other	53	(2.00)	54	(2.77)
Simulation software	209	(7.90)	198	(10.15)
Database software	49	(1.85)	59	(3.03)
Printer	312	(11.79)	235	(12.05)
Browser (e.g. I.E., Netscape)	645	(24.37)	612	(31.38)
Presentation software	1437	(54.29)	1068	(54.77)
Graphics/Multimedia software	344	(13.00)	269	(13.79)
Scanner	326	(12.32)	262	(13.44)
Homepage design software	203	(7.67)	203	(10.41)
E-mail/ICQ software	91	(3.44)	74	(3.79)
Visualizer	180	(6.80)	163	(8.36)
Computer experimental equipment (e.g.Microcomputer-based laboratories, Data logger)	10	(0.38)	64	(3.28)
Spreadsheet	143	(5.40)	141	(7.23)
Word processing software	407	(15.38)	342	(17.54)
Drawing devices	184	(6.95)	100	(5.13)

The teachers are found to still perceive their role as the provider of new knowledge and the provision of materials and activities for the purpose of the enhancement of the understanding of knowledge – in essence, an extension of the direct teaching paradigm (c.f. table 2.3.10). In contrast, they did not really perceive their role to be that required of the new student centred learning paradigm – that of a facilitator guiding students to find out about information themselves,

leaving students with the ownership of the new-found knowledge. This can be perceived from the relatively low scores for the roles of the provider of "opportunities for creative work" and to allow students to analyze problems and search for information.

Table 2.3.10 Did you consider the following to be your main role(s) in that lesson? (Teachers' questionnaire, Q. 17f)

mean (SD)	Primary		Secondary	
	N		N	
(1) To teach new knowledge	2673		1964	
(1=Strongly Disagree, 5=Strongly Agree)	4.2	(0.6)	4.2	(0.6)
(2) Provides suitable teaching materials and activities and hence enhance the understanding of knowledge	2674		1965	
(1=Strongly Disagree, 5=Strongly Agree)	4.2	(0.6)	4.2	(0.6)
(3) Provide opportunities for creative work in order that students can learn from it.	2588		1898	
(1=Strongly Disagree, 5=Strongly Agree))	3.5	(1.0)	3.4	(1.0)
(4) Let the students analyze problems and search for information in small groups	2586		1900	
(1=Strongly Disagree, 5=Strongly Agree)	3.2	(1.1)	3.2	(1.1)
(5) Provides drills and practice exercises by using computers	2592		1873	
(1=Strongly Disagree, 5=Strongly Agree)	3.2	(1.1)	2.9	(1.1)

It can also be seen from table 2.3.11 that the main changes that teachers perceived were that of the enhancement of IT knowledge and that of changes in the teaching mode. Since, as noted above, we can infer from the actions and the perceived role of the teacher that there have been no substantial change in the teaching mode and practices in reality, the teachers do not have a clear understanding of the substance of the change in teaching modes required in order to take full advantage of the vast improvements in access and connectivity (c.f. section 2.1)

Table 2.3.11 The changes perceived by teachers in that lesson. (Teachers' questionnaire, Q. 17g)

mean (SD)	Primary		Secondary	
	N		N	
(1) Enhanced cooperation between teachers	2610		1864	
(1=Strongly Disagree, 5=Strongly Agree)	3.5	(0.9)	3.1	(0.9)
(2) Enhanced IT knowledge	2666		1935	
(1=Strongly Disagree, 5=Strongly Agree)	3.9	(0.7)	3.9	(0.8)
(3) Changed the role of teachers	2644		1928	
(1=Strongly Disagree, 5=Strongly Agree)	3.7	(0.7)	3.6	(0.8)
(4) Change of altitudes towards the integration of ICT into teaching	2627		1906	
(1=Strongly Disagree, 5=Strongly Agree)	3.7	(0.7)	3.5	(0.8)
(5) Change of relationship with students	2625		1917	
(1=Strongly Disagree, 5=Strongly Agree)	3.4	(0.8)	3.2	(0.9)
(6) Change of teaching mode	2495		1792	
(1=Strongly Disagree, 5=Strongly Agree)	3.9	(0.6)	3.8	(0.7)

The learning outcomes that teachers expect would be found in their most satisfying lesson echoes what has been said about there being no substantial changes in the pedagogy deployed by teachers. Table 2.3.12 illustrates this in that they considered their main role to be that of

enhancing the understanding of academic knowledge and the students' interest in learning. This approach, and the significant difference between that and such goals as the enhancement of creativity, confidence, communication and expression abilities, as well as interactions with the outside world, is further evidence for the inference made above that the teachers paid significantly more importance to the teaching of subject matter compared with learning skills such as creativity, and communication and expression skills.

Table 2.3.12 What teachers expect the students to have achieved as outcomes (Teachers' questionnaire, Q. 17h)

mean (SD)	Primary N		Secondary N	
(1) Enhance the understanding of academic knowledge (1=Strongly Disagree, 5=Strongly Agree)	2695 4.0	(0.6)	1975 4.0	(0.6)
(2) Enhance computer techniques (1=Strongly Disagree, 5=Strongly Agree))	2638 3.4	(0.9)	1904 3.2	(1.0)
(3) Enhance creativity (1=Strongly Disagree, 5=Strongly Agree)	2635 3.3	(0.9)	1905 3.2	(0.9)
(4) Enhance communication and expression abilities (1=Strongly Disagree, 5=Strongly Agree)	2632 3.2	(0.9)	1900 3.1	(0.9)
(5) Enhance the ability to cooperate with others (1=Strongly Disagree, 5=Strongly Agree))	2601 3.2	(0.9)	1876 3.0	(0.9)
(6) Spend too much time on computers which lowers the ability to communicate with others (1=Strongly Disagree, 5=Strongly Agree)	2600 3.1	(0.9)	1888 3.1	(0.9)
(7) Spend too much time on computers and hence neglect academic work. (1=Strongly Disagree, 5=Strongly Agree)	2581 2.7	(0.9)	1871 2.7	(0.9)
(8)Enhance interest of learning (1=Strongly Disagree, 5=Strongly Agree)	2697 4.0	(0.5)	1983 3.9	(0.6)
(9)Enhance active learning strategies (1=Strongly Disagree, 5=Strongly Agree)	2642 3.8	(0.7)	1916 3.5	(0.7)
(10)Increase confidence (1=Strongly Disagree, 5=Strongly Agree)	2633 3.4	(0.7)	1916 3.2	(0.8)
(11)Increase learning efficiency (1=Strongly Disagree, 5=Strongly Agree)	2644 3.7	(0.7)	1889 3.6	(0.7)
(12)More interaction with outside, broaden horizon (1=Strongly Disagree, 5=Strongly Agree)	2613 3.1	(0.8)	1888 2.9	(0.9)
(13)More interactions with the outside world and hence be exposed to unsuitable material. (1=Strongly Disagree, 5=Strongly Agree)	2462 3.1	(0.9)	1782 3.0	(0.9)

2.3.3 Teacher Development

It can be seen from table 2.3.13 that most teachers have participated in some form of training scheme related to IT techniques. For teachers in secondary schools, school-based training seems to be the most popular scheme, whilst for teachers in primary schools training provided by the eight training organizations designated by the Education Department, as well as those provided by the Education Department itself. These figures are much higher than those at 1998, when these values were typically around 20-30%. (ibid)

Table 2.3.13 Participation in different types of training schemes on computing techniques (Teachers' questionnaire, Q. 21 (a))

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	Chi-square (df=5)
1	39 (50.6)	124 (61.7)	41 (47.7)	122 (56.7)	112 (64.0)	178 (60.3)	616 (58.7)	9.8 (ns)
2	37 (51.4)	165 (63.9)	43 (55.1)	134 (61.8)	134 (66.3)	244 (68.3)	757 (65.0)	14.1*
3	45 (58.4)	129 (61.7)	42 (52.5)	147 (62.8)	92 (60.5)	191 (62.8)	648 (61.2)	3.4 (ns)
4	89 (71.8)	168 (66.9)	68 (61.8)	228 (72.2)	121 (67.6)	238 (66.1)	912 (68.1)	6.0 (ns)
5	15 (36.6)	44 (35.8)	12 (24.5)	35 (29.2)	24 (28.6)	31 (19.1)	161 (27.8)	11.9 *
6	26 (46.4)	46 (37.1)	15 (30.0)	59 (40.7)	42 (41.2)	85 (42.5)	273 (40.3)	4.1 (ns)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall	Chi-square (df=3)
1	75 (51.4)	288 (66.5)	256 (68.8)	874 (72.0)	1493 (69.0)	6.7 (ns)
2	56 (41.2)	296 (70.0)	286 (71.0)	1004 (75.1)	1642 (71.4)	25.1***
3	68 (47.9)	236 (63.8)	199 (61.4)	711(67.4)	1214 (64.2)	5.1 (ns)
4	93 (58.5)	273 (65.5)	229 (64.3)	660 (64.8)	1255 (64.3)	0.6(ns)
5	18 (20.7)	70 (31.1)	54 (28.7)	205 (34.4)	347 (31.7)	3.6 (ns)
6	28 (28.5)	94 (39.3)	81 (38.6)	296 (43.8)	499 (40.7)	3.0 (ns)

1. In-service training courses organized by the Education Department
2. Courses provided by the eight designated training organizations
3. Courses provided by other institutions/organizations
4. School-based training courses (excluding in-house training organized by (2) or (3))
5. Online self-learning courses organized by the Education Department for teachers (e.g. HKeducationCITY.net)
6. Refresher courses, experience-sharing groups and workshops organized by the Education Department

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

However, it should be noted that the teachers have found online self-learning modes of training to have been most useful, and for in-house training programs to have been least useful. In particular, in pilot secondary schools where the perceived competence of the teachers in IT skills is greater than those of other schools, the value of in-house training seems to have been lower than those of other groups. (Table 2.3.14)

Table 2.3.14 The usefulness of various training schemes on computing techniques as perceived by teachers (1 = Not useful; 3 = Very useful) (Teacher's questionnaire, Q. 21a)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	2.1 (0.7)	2.1 (0.5)	2.2 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	2.1 (0.6)	1.8 (5, 987) (ns)
2	2.2 (0.6)	2.0 (0.6)	2.2 (0.6)	2.1 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	3.7 (5, 1125) **
3	2.1 (0.7)	2.0 (0.6)	2.2 (0.6)	2.0 (0.6)	2.0 (0.6)	1.9 (0.6)	2.0 (0.6)	5.5 (5, 1025) **
4	1.7 (0.6)	1.9 (0.6)	2.0 (0.6)	1.8 (0.6)	1.9 (0.6)	1.8 (0.6)	1.8 (0.6)	4.0 (5, 1301) ***
5	2.4 (0.6)	2.2 (0.6)	2.4 (0.7)	2.3 (0.6)	2.2 (0.7)	2.3 (0.7)	2.3 (0.6)	1.3 (5, 562) (ns)
6	2.2 (0.6)	2.1 (0.6)	2.4 (0.6)	2.2 (0.5)	2.2 (0.6)	2.2 (0.6)	2.2 (0.6)	2.0 (5, 657) (ns)

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	2.0 (0.5)	2.0 (0.5)	2.0 (0.5)	1.9 (0.5)	2.0 (0.5)	5.3 (3, 2081) (ns)
2	2.0 (0.5)	2.0 (0.6)	2.0 (0.5)	1.9 (0.6)	1.9 (0.6)	13.2 (3, 2232) *
3	1.9 (0.6)	2.0 (0.6)	2.0 (0.6)	1.9 (0.6)	1.9 (0.6)	10.8 (3, 1839) (ns)
4	1.8 (0.6)	1.8 (0.6)	1.9 (0.6)	1.9 (0.6)	1.9 (0.6)	4.2 (3, 1894) (ns)
5	2.2 (0.7)	2.1 (0.7)	2.2 (0.6)	2.2 (0.6)	2.2 (0.6)	2.5(3, 1064) (ns)
6	2.1 (0.6)	2.2 (0.6)	2.1 (0.7)	2.1 (0.6)	2.1 (0.6)	10.1 (3, 1191) *

1. In-service training courses organized by the Education Department
2. Courses provided by the eight designated training organizations
3. Courses provided by other institutions/organizations
4. School-based training courses (excluding in-house training organized by (2) or (3))
5. Online self-learning courses organized by the Education Department for teachers (e.g. HKeducationCITY.net)
6. Refresher courses, experience-sharing groups and workshops organized by the Education Department

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

Comparatively fewer teachers have been participating in courses related to the integration of IT in the school curriculum, as indicated in table 2.3.15, and of those that have been attending them, most secondary school teachers have been attending school-based training courses related to this topic, whilst primary school teachers tend to have been attending courses provided by the eight training organizations designated by the Education Department. This reflects particularly in primary schools the comparative importance placed in staff development on the technical aspects of the use of IT in education compared with the pedagogical changes required to integrate it into IT.

Table 2.3.15 Participation in different types of training schemes regarding the integration of IT into the curriculum (Teachers' questionnaire, Q. 21 (b))

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	Chi-square (df=5)
1	22 (41.5)	85 (49.7)	30 (47.6)	84 (50.9)	61 (53.0)	106 (50.0)	388 (49.8)	2.1 (ns)
2	23 (42.6)	114 (60.0)	23 (39.0)	89 (52.4)	102 (64.6)	172 (62.5)	523 (57.7)	21.6 ***
3	37 (55.2)	89 (55.3)	27 (44.3)	98 (53.8)	69 (57.5)	137 (58.1)	457 (55.3)	4.1 (ns)
4	74 (71.2)	128 (63.4)	50 (58.8)	162 (65.3)	90 (63.8)	182 (63.6)	686 (64.4)	3.5 (ns)
5	12 (31.6)	35 (32.7)	10 (23.3)	26 (24.5)	21 (28.8)	27 (20.9)	131 (26.4)	5.3 (ns)
6	21 (43.8)	34 (32.4)	11 (25.6)	46 (36.2)	34 (39.1)	64 (38.8)	210 (36.5)	4.7 (ns)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall	Chi-square (df=3)
1	52 (44.1)	190 (60.1)	175 (59.5)	568 (58.7)	985 (59.5)	1.8 (ns)
2	38 (34.5)	216 (63.3)	192 (61.7)	706 (67.0)	1152 (63.4)	18.2**
3	45 (40.2)	163 (55.1)	139 (53.5)	470 (57.2)	817 (54.8)	2.1(ns)
4	72 (51.1)	206 (59.9)	166 (58.9)	447(55.6)	891 (56.7)	3.6 (ns)
5	15 (18.3)	53 (27.2)	37 (22.8)	148 (28.1)	253 (26.2)	2.3 (ns)
6	20 (23.8)	68 (33.5)	64 (34.8)	217 (37.2)	369 (35.0)	2.1 (ns)

1. In-service training courses organized by the Education Department
2. Courses provided by the eight designated training organizations
3. Courses provided by other institutions/organizations
4. School-based training courses (excluding in-house training organized by (2) or (3))
5. Online self-learning courses organized by the Education Department for teachers (e.g. HKeducationCITY.net)
6. Refresher courses, experience-sharing groups and workshops organized by the Education Department

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

Again, in general on-line learning modes have been found to be most useful by the teachers regarding training on the integration of IT into the curriculum.

Table 2.3.16 The usefulness of various training schemes on curriculum integration of IT as perceived by teachers (1 = of very little help; 3 = helped a lot) (Teacher's questionnaire, Q. 21b)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	2.2 (0.7)	2.1 (0.6)	2.2 (0.7)	2.1 (0.7)	2.2 (0.6)	2.1 (0.6)	2.1 (0.6)	0.8 (5, 745) (ns)
2	2.3 (0.6)	2.1 (0.6)	2.2 (0.7)	2.1 (0.6)	2.1 (0.6)	2.0 (0.6)	2.1 (0.6)	2.0 (5, 880) (ns)
3	2.0 (0.7)	2.1 (0.6)	2.3 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.7)	2.0 (0.6)	1.6 (5, 805) (ns)
4	1.9 (0.6)	2.0 (0.6)	2.1 (0.7)	1.9 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	2.1 (5, 1033) (ns)
5	2.3 (0.6)	2.3 (0.6)	2.4 (0.7)	2.3 (0.6)	2.2 (0.6)	2.3 (0.7)	2.3 (0.6)	0.5 (5, 481) (ns)
6	2.3 (0.7)	2.2 (0.6)	2.4 (0.7)	2.2 (0.6)	2.2 (0.6)	2.2 (0.6)	2.2 (0.6)	1.3 (5, 558) (ns)

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	2.0 (0.6)	2.1 (0.6)	2.1 (0.6)	2.0 (0.6)	2.0 (0.6)	3.7 (3, 1593) (ns)
2	2.1 (0.6)	2.1 (0.6)	2.1 (0.6)	2.0 (0.6)	2.0 (0.6)	9.7(3, 1761) (ns)
3	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	2.0 (0.6)	1.2 (3, 1452) (ns)
4	1.8(0.6)	1.9 (0.6)	1.9 (0.6)	2.0 (0.6)	2.0 (0.6)	11.8 (3, 1529) (ns)
5	2.1 (0.6)	2.2 (0.7)	2.2 (0.6)	2.1 (0.6)	2.1 (0.6)	2.0(3, 942) (ns)
6	2.1 (0.6)	2.2 (0.6)	2.1 (0.6)	2.1 (0.6)	2.1 (0.6)	5.0 (3, 1027) (ns)

1. In-service training courses organized by the Education Department
2. Courses provided by the eight designated training organizations
3. Courses provided by other institutions/organizations
4. School-based training courses (excluding in-house training organized by (2) or (3))
5. Online self-learning courses organized by the Education Department for teachers (e.g. HKeducationCITY.net)
6. Refresher courses, experience-sharing groups and workshops organized by the Education Department

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

It is noteworthy that, as seen from table 2.3.17, despite the proliferation in IT training courses, most secondary school teachers have been learning their IT knowledge mainly by self learning. However, the most important source of IT knowledge for primary school teachers is attendance in courses.

Table 2.3.17 What is your main source of IT knowledge? (Teachers' questionnaire, Q. 22)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
Attendance in courses	30 (20.7)	69 (23.9)	25 (15.8)	121 (37.6)	70 (29.9)	130 (30.8)	445 (28.3)
Colleagues/ friends	52 (35.9)	84 (29.1)	59 (37.3)	71 (22.0)	69 (29.5)	130 (30.8)	465 (29.6)
Self-learning	63 (43.4)	135 (46.7)	73 (46.2)	126 (39.1)	95 (40.6)	161 (38.2)	653 (41.6)
Others	0 (0.0)	1 (0.3)	1 (0.6)	4 (1.2)	0 (0.0)	1 (0.2)	7 (0.4)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
Attendance in courses	57 (33.1)	180 (45.2)	167 (45.1)	569 (49.4)	973 (46.6)
Colleagues/ friends	48 (28.0)	115 (28.9)	109 (29.5)	320 (27.9)	592 (28.3)
Self-learning	44 (25.6)	101 (25.4)	94 (25.4)	275 (23.9)	514 (24.6)
Others	1 (0.6)	2 (0.5)	0 (0.0)	8 (0.7)	11 (0.5)

It is noteworthy (from table 2.3.18) that the most preferred training mode for teachers is workshops and demonstration sessions, and that the least preferred mode of training is that of conferences and seminars. It reflects the comparative importance placed by the teachers on the development of their knowledge on the technical aspects of IT compared to those on the pedagogical approaches that need to be taken, which is more often than not the subject of conferences and seminars.

Table 2.3.18 Out of the following learning modes, which would you like to participate in most? (Teachers' questionnaire, Q. 23)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
Courses	82 (40.8)	178 (45.3)	76 (40.0)	203 (43.2)	147 (41.6)	247 (39.8)	933 (41.9)
Lesson observations	30 (14.9)	51 (13.0)	16 (8.4)	60 (12.8)	52 (14.7)	76 (12.3)	285 (12.8)
Seminars/Conferences	25 (12.4)	48 (11.7)	13 (6.8)	46 (9.8)	26 (7.4)	61 (9.8)	217 (9.7)
Games/ Simulations/ Role play	16 (8.0)	44 (11.2)	18 (9.5)	62 (13.2)	49 (13.9)	62 (10.0)	251 (11.3)
Workshops/ Demos	165 (82.1)	276 (70.2)	139 (73.2)	358 (76.2)	278 (78.8)	462 (74.5)	1678 (75.3)
Tutorials	30 (14.9)	66 (16.8)	33 (17.4)	89 (18.9)	56 (15.9)	121 (19.5)	395 (17.7)
Experience-sharing meetings	49 (24.4)	64 (16.3)	27 (14.2)	75 (16.0)	63 (17.8)	96 (15.5)	374 (16.8)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
Courses	86 (39.0)	281 (48.2)	265 (50.9)	906 (52.3)	1538 (50.3)
Lesson observations	30 (13.6)	97 (16.6)	79 (15.2)	264 (15.3)	470 (15.4)
Seminars/Conferences	20 (9.0)	51 (8.7)	47 (9.0)	153 (8.8)	271 (8.9)
Games/ Simulations/ Role plays	39 (17.6)	138 (23.7)	93 (17.9)	328 (18.9)	598 (19.6)
Workshops/ Demos	137 (62.0)	437 (75.0)	366 (70.2)	1277 (73.7)	2217 (72.5)
Tutorials	22 (9.9)	93 (16.0)	76 (14.6)	272 (15.7)	463 (15.2)
Experience-sharing meetings	24 (10.8)	70 (12.0)	55 (10.6)	223 (12.9)	372 (12.2)

It can be seen from table 2.3.19 that teachers regard their colleagues – in particular (in Secondary Schools) the School Colleagues especially Computer Studies teachers – to be their most important source of help regarding IT. In particular, the media appears to be rarely used by teachers in both sectors as a source of help.

Table 2.3.19 When you face difficulties regarding IT, to whom would you turn to for help? (Teachers' questionnaire, Q. 24)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
Friends	75 (35.5)	147 (36.8)	73 (38.0)	175 (36.2)	174 (46.9)	276 (43.5)	920 (40.2)
Media (e.g. TV programs, magazine, etc.)	6 (2.8)	12 (3.0)	9 (4.7)	14 (2.9)	5 (1.3)	16 (2.5)	62 (2.7)
Colleagues	166 (78.7)	285 (71.4)	141 (73.4)	353 (73.1)	256 (69.0)	456 (71.8)	1657 (72.3)
Computer Studies teachers	107 (50.7)	169 (42.4)	71 (37.0)	238 (49.3)	156 (42.0)	285 (44.9)	1026 (44.8)
The Internet	28 (13.3)	55 (13.8)	32 (16.7)	68 (14.1)	38 (10.2)	82 (12.9)	303 (13.2)
IT Coordinator	68 (32.2)	147 (36.8)	48 (25.0)	202 (41.8)	141 (38.0)	214 (33.7)	820 (35.8)
Technician from the Technical Support Service (TSS) team	53 (25.1)	111 (27.8)	36 (18.8)	142 (29.4)	123 (33.2)	204 (32.1)	669 (29.2)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
Friends	105 (46.1)	324 (54.0)	292 (54.5)	1059 (59.4)	1780 (56.6)
Media (e.g. TV programs, magazine, etc.)	7 (3.1)	24 (4.0)	16 (3.0)	59 (3.3)	106 (3.4)
Colleagues	136 (65.4)	421 (70.2)	373 (69.6)	1212 (68.0)	2142 (68.1)
Computer Studies teachers	102 (44.8)	276 (46.0)	227 (42.4)	911 (51.1)	1516 (48.2)
The Internet	24(10.5)	75 (12.5)	43 (8.0)	206 (11.5)	348 (11.1)
IT Coordinator	75 (32.9)	294 (49.0)	213 (39.7)	627 (35.2)	1209 (38.4)
Technician from the Technical Support Service (TSS) team	31 (13.5)	163 (27.2)	141 (26.3)	455 (25.6)	790 (25.1)

The most common source of IT knowledge from the media, however, is that of newspaper features, as shown in table 2.3.20. In comparison, news forums appear to be the least used media source of IT knowledge.

Table 2.3.20 Do you often obtain IT knowledge from the following sources? (Teachers' questionnaire, Q. 25)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
Newspaper features	93 (48.7)	192 (53.0)	79 (45.4)	184 (43.3)	180 (53.7)	296 (52.2)	1024 (49.9)
Computer magazines	88 (46.1)	142 (39.2)	75 (43.1)	154 (36.2)	130 (38.8)	208 (36.7)	797 (38.8)
Television programs	59 (30.9)	113 (31.2)	44 (25.3)	125 (29.4)	101 (30.1)	204 (36.0)	646 (31.5)
On-line e-zines	43 (22.5)	116 (32.0)	49 (28.2)	129 (30.4)	76 (22.7)	148 (26.1)	561 (27.3)
News forums	6 (3.1)	13 (3.6)	6 (3.4)	16 (3.8)	12 (3.6)	23 (4.1)	76 (3.7)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
Newspaper features	81 (37.5)	270 (48.6)	239 (48.4)	886 (53.7)	1476 (50.6)
Computer magazines	72 (33.4)	194 (34.9)	182 (36.8)	579 (35.1)	1027 (35.2)
Television programs	48 (22.3)	180 (32.4)	156 (31.6)	589 (35.7)	973 (33.4)
On-line e-zines	72 (33.4)	191 (34.4)	154 (31.2)	523 (31.7)	940 (32.2)
News forums	9 (4.2)	22 (4.0)	20 (4.0)	52 (3.2)	103 (3.5)

It can be seen from table 2.3.21, moreover, that computers are still used most by teachers for the preparation of teaching materials and least for conducting action research and the participation of collaborative projects with other schools.

Table 2.3.21 Teachers' use of computers in their teaching work (Teachers' questionnaire, Q. 26)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	Chi-square (df=5)
1	160 (84.2)	295 (83.3)	136 (76.4)	381 (83.7)	278 (81.3)	470 (81.0)	1720 (81.9)	6.2 (ns)
2	156 (84.3)	270 (78.7)	113 (68.5)	332 (77.6)	236 (73.3)	422 (76.2)	1529 (76.6)	15.3 **
3	85 (66.9)	144 (59.3)	56 (52.8)	171 (60.4)	116 (52.3)	231 (59.8)	803 (58.7)	9.5 (ns)
4	69 (55.2)	72 (37.3)	36 (36.4)	95 (38.5)	67 (33.7)	422 (78.2)	1529 (76.6)	15.3 **
5	122 (73.5)	175 (62.7)	68 (54.0)	217 (64.8)	155 (60.1)	239 (56.9)	976 (61.6)	18.8 **
6	38 (38.0)	44 (24.6)	26 (27.7)	60 (28.0)	42 (24.1)	54 (19.3)	264 (25.4)	15.2 **
7	111 (70.3)	136 (54.8)	57 (48.3)	190 (59.7)	147 (60.5)	221 (55.8)	862 (58.2)	17.1 **
8	23 (27.4)	37 (22.6)	14 (17.5)	48 (24.9)	30 (18.6)	45 (17.7)	197 (21.0)	6.8 (ns)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall	Chi-square (df=3)
1	130 (64.7)	369 (72.9)	314 (71.9)	974 (71.0)	1787 (70.9)	1.9 (ns)
2	124 (62.6)	366 (72.6)	294 (68.7)	932 (67.4)	1716 (68.6)	4.4(ns)**
3	75 (51.7)	254 (64.1)	194 (57.1)	565 (53.0)	1088 (55.9)	6.2 ***
4	28 (24.4)	89 (30.1)	72 (25.6)	214 (25.1)	403 (26.1)	1.2 (ns)
5	95 (56.9)	264 (61.8)	216 (57.6)	646 (54.3)	1221(56.6)	5.1*
6	34 (27.8)	74 (26.5)	50 (19.4)	128 (15.5)	286 (19.2)	9.7 ***
7	57(40.7)	158 (46.2)	91 (32.5)	278 (30.6)	584 (35.0)	12.4 ***
8	32 (28.3)	60 (23.2)	50 (19.8)	172 (21.3)	314 (21.9)	2.7*

1. Preparing teaching notes/course materials
2. Searching information and new pedagogical methods/teaching materials, etc.
3. Discussing with other teachers on teaching and learning matters
4. Managing and delivering and collecting tests from students
5. Designing classroom activities/assignments that require the use of IT
6. Using the Internet to carry out collaborative project work with other schools
7. Using email to discuss and communicate with students
8. Action Research

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

The teachers perceive that their main training need at present is to learn how to communicate and discuss with students over email. This is evidently a newfound need, indicative of the changes in IT infrastructure, access and connectivity over the past few years. In 1998, this need was not too evident (ibid). However, the lack of requirements for training on the design of classroom activities using IT as well as that of collaborative projects with other schools over email echoes the priorities and views of the teachers illustrated above. Indeed, compared with the results of SITES Module 1 (ibid), the perceived need for training in skills related to the integration of IT into the classroom curriculum is comparatively reduced.

Table 2.3.21 Teachers' perceived need for training in various applications of IT in education (3 = desperately needed; 1 = not needed) (Teachers' questionnaire, Q. 26)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	2.1 (0.7)	1.9 (0.7)	1.8 (0.7)	1.9 (0.7)	1.9 (0.7)	2.0 (0.7)	1.9 (0.7)	3.0 (5, 1869) **
2	1.8 (0.7)	1.7 (0.7)	1.6 (0.7)	1.7 (0.7)	1.7 (0.7)	1.7 (0.7)	1.7 (0.7)	1.0 (5, 1799) (ns)
3	2.0 (0.7)	1.9 (0.7)	1.8 (0.8)	1.9 (0.8)	1.8 (0.8)	1.9 (0.7)	1.9 (0.7)	1.5 (5, 1210) (ns)
4	1.8 (0.7)	1.6 (0.7)	1.6 (0.7)	1.6 (0.7)	1.5 (0.7)	1.6 (0.8)	1.6 (0.7)	1.9 (5, 1104) (ns)
5	1.6 (0.7)	1.5 (0.7)	1.5 (0.7)	1.5 (0.7)	1.5 (0.6)	1.5 (0.7)	1.5 (0.7)	1.9 (5, 1460) (ns)
6	1.7 (0.8)	1.5 (0.7)	1.6 (0.8)	1.5 (0.7)	1.5 (0.7)	1.5 (0.7)	1.5 (0.7)	1.3 (5, 971) (ns)
7	2.3 (0.7)	2.1 (0.8)	2.0 (0.8)	2.1 (0.7)	2.1 (0.8)	2.1 (0.8)	2.1 (0.8)	2.1 (5, 1361) (ns)
8	1.6 (0.8)	1.6 (0.7)	1.6 (0.7)	1.6 (0.7)	1.5 (0.7)	1.6 (0.7)	1.6 (0.7)	0.5 (5, 881) (ns)

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	1.8 (0.7)	1.8 (0.7)	1.8 (0.7)	1.7 (0.7)	1.7 (0.7)	1.9 (3, 2276)(ns)
2	1.6 (0.6)	1.6 (0.7)	1.5 (0.7)	1.5 (0.6)	1.5 (0.7)	4.4 (3, 2274) (ns)
3	1.9 (0.8)	1.7 (0.7)	1.8 (0.8)	1.7 (0.7)	1.7 (0.7)	6.2 (3, 1689) ***
4	1.5 (0.6)	1.5 (0.7)	1.5 (0.7)	1.4 (0.6)	1.5 (0.7)	1.2 (3, 1442) (ns)
5	1.5 (0.6)	1.4 (0.6)	1.4 (0.6)	1.3 (0.6)	1.4 (0.6)	5.1 (3, 1993) **
6	1.6 (0.7)	1.4 (0.6)	1.4 (0.6)	1.3 (0.6)	1.4 (0.6)	9.7 (3, 1404) ***
7	2.0 (0.8)	1.9 (0.8)	1.8 (0.8)	1.7 (0.8)	1.8 (0.8)	12.4 (3, 1558) ***
8	1.5 (0.6)	1.4 (0.6)	1.4 (0.7)	1.4 (0.6)	1.4 (0.7)	2.7(3, 1346) *

1. Preparing teaching notes/course materials
2. Searching information and new pedagogical methods/teaching materials, etc.
3. Discussing with other teachers teaching and learning matters
4. Managing, delivering and collecting tests from students
5. Designing classroom activities/assignments that require the use of IT
6. Using the internet to carry out collaborative project work with other schools
7. Using email to discuss and communicate with students over email
8. Action research

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

2.3.4 Teacher Assessment

Table 2.3.22 illustrates the proportion of teachers who have handed in portfolios of various levels. It can be seen from those figures that the proportion of teachers handing in portfolios – especially at the Intermediate and Upper Intermediate levels. As well as this, significantly more secondary school teachers have been submitting their IT portfolios, especially at the higher levels of achievement. The submission figures submitted by the principals (tables 2.3.23, 2.3.24) corroborate with the evidence outlined in table 2.3.22.

Table 2.3.22 Portfolio submissions (Teachers' questionnaire, Q. 18, 18a)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	Chi-square (df=5)
	167 (80.7)	353 (88.0)	178 (95.7)	405 (85.3)	280 (76.7)	515 (83.3)	1898 (84.3)	41.1 ***
If yes, at what level?								
BIT	82 (51.6)	270 (78.5)	159 (93.5)	271 (67.9)	253 (93.4)	420 (83.8)	1455 (78.9)	163.5 ***
IIT	70 (44.0)	83 (24.1)	20 (11.8)	122 (30.6)	20 (7.4)	91 (18.2)	406 (22.0)	111.3 ***
UIT	15 (9.4)	5 (1.5)	0 (0.0)	23 (5.8)	2 (0.7)	6 (1.2)	51 (2.8)	55.4 ***

Primary

N (%)	Pilot	ITC	QEF	Other	Overall	Chi-square (df=3)
	148 (67.6)	483 (83.4)	442 (84.5)	1403 (81.5)	2476 (81.4)	7.9 *
If yes, at what level?						
BIT	134 (76.6)	371 (78.3)	416 (95.9)	1249 (93.2)	2170 (89.6)	87.9 ***
IIT	14 (8.0)	123 (25.9)	26 (6.0)	198 (14.8)	361 (14.9)	76.5 ***
UIT	7 (4.0)	20 (4.2)	3 (0.7)	26 (1.9)	56 (2.3)	17.5 ***

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

Table 2.3.23 Submissions of IIT Portfolios (Principals' questionnaire, Q. 35)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
0-<20%	2 (50.0)	3 (50.0)	4 (100.0)	6 (50.0)	5 (55.6)	6 (35.3)	26 (50.0)
20-<40%	0 (0.0)	0 (0.0)	0 (0.0)	2 (16.7)	3 (33.3)	3 (17.6)	8 (15.4)
40-<60%	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (11.1)	3 (17.6)	4 (7.7)
60-<80%	1 (25.0)	0 (0.0)	0 (0.0)	2 (16.7)	0 (0.0)	0 (0.0)	3 (5.8)
80-<100%	1 (25.0)	2 (33.3)	0 (0.0)	1 (8.3)	0 (0.0)	3 (17.6)	7 (13.5)
100%	0 (0.0)	1 (16.7)	0 (0.0)	1 (8.3)	0 (0.0)	2 (11.8)	4 (7.7)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
0-<20%	3 (60.0)	8 (57.1)	6 (35.3)	44 (72.1)	61 (62.9)
20-<40%	0 (0.0)	3 (21.4)	6 (35.3)	9 (14.8)	18 (18.6)
40-<60%	2 (40.0)	1 (7.1)	1 (5.9)	2 (3.3)	6 (6.2)
60-<80%	0 (0.0)	1 (7.1)	1 (5.9)	3 (4.9)	5 (5.2)
80-<100%	0 (0.0)	0 (0.0)	1 (5.9)	1 (1.6)	2 (2.1)
100%	0 (0.0)	1 (7.1)	2 (11.8)	2 (3.3)	5 (5.2)

Table 2.3.24 Submissions of UIT Portfolios (Principals' questionnaire, Q. 35)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
0-<20%	2 (50.0)	2 (50.0)	2 (66.7)	4 (50.0)	8 (88.9)	10 (66.7)	28 (65.1)
20-<40%	2 (50.0)	1 (25.0)	0 (0.0)	4 (50.0)	1 (11.1)	3 (20.0)	11 (25.6)
40-<60%	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
60-<80%	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.7)	2 (4.7)
80-<100%	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.7)	1 (2.3)
100%	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.3)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
0-<20%	4 (100.0)	11 (84.6)	7 (58.3)	39 (86.7)	61 (82.4)
20-<40%	0 (0.0)	1 (7.7)	3 (25.0)	4 (8.9)	8(10.8)
40-<60%	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)	1 (1.4)
60-<80%	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
80-<100%	0 (0.0)	0 (0.0)	0 (0.0)	2 (4.4)	2 (2.7)
100%	0 (0.0)	1 (7.7)	1 (8.3)	0 (0.0)	2 (2.7)

Different schools have their own groups responsible for assisting the principal with the assessment of IT portfolios. Quite often this is the task of the IT group or the IT coordinator, although it is also relatively common for this to be handled by a special working group in secondary schools (c.f. table 2.3.25).

Table 2.3.25 Who helps you with evaluating IT Portfolios? (Principals' questionnaire, Q. 36)

Secondary

N (%)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall
Working group	0 (0.0)	0 (0.0)	1 (25.0)	3 (30.0)	0 (0.0)	3 (20.0)	7 (14.9)
Group i/c Technology	4 (100.0)	2 (40.0)	0 (0.0)	5 (50.0)	2 (22.2)	10 (66.7)	23 (48.9)
Designated teacher	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.1)
Technology coordinator	0 (0.0)	1 (20.0)	1 (25.0)	2 (20.0)	2 (22.2)	2 (13.3)	8 (17.0)
A Vice-Principal	0 (0.0)	2 (40.0)	0 (0.0)	0 (0.0)	4 (44.4)	0 (0.0)	6 (12.8)
Nobody	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	1 (11.1)	0 (0.0)	2 (4.3)

Primary

N (%)	Pilot	ITC	QEF	Other	Overall
Working group	0 (0.0)	0 (0.0)	1 (6.7)	4 (6.9)	5 (5.4)
Group i/c Technology	3 (60.0)	2 (14.3)	6 (40.0)	26 (44.8)	37 (40.2)
Designated teacher	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.7)	1 (1.1)
Technology coordinator	1 (20.0)	9 (64.3)	6 (40.0)	20 (34.5)	36 (39.1)
A Vice-Principal	1 (20.0)	0 (0.0)	0 (0.0)	1 (1.7)	2 (2.2)
Nobody	0 (0.0)	2 (14.3)	2 (13.3)	5 (8.6)	9 (9.8)

The teachers consider themselves in general to be satisfied with their portfolios; they conceded that they have had help from family and friends and support from the school during their preparation of their IT portfolios, as seen from table 2.3.26. However, they tend to disagree that their students or that the Education Department have supported them in this pursuit. Principals both in primary and secondary schools were satisfied with the portfolios submitted by the teachers (table 2.3.27).Principals in general would tend to agree with the statements, and they in general consider that it is a good tool for assessing the IT competence of teachers, as well as being a good way of improving the IT competence of teachers.

Table 2.3.26 Teachers' views on the IT Portfolio (1 = strongly disagree; 5 = strongly agree)
(Teachers' questionnaire, Q. 18b)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	3.7 (1.1)	3.6 (1.0)	3.7 (1.1)	3.7 (1.1)	3.5 (1.1)	3.6 (1.0)	3.6 (1.1)	2.1 (5, 1859) (ns)
2	3.9 (0.8)	3.8 (0.7)	3.5 (0.9)	3.8 (0.8)	3.6 (0.8)	3.8 (0.7)	3.8 (0.8)	7.8 (5, 1845) ***
3	3.6 (1.0)	3.6 (0.9)	3.6 (1.0)	3.6 (1.0)	3.5 (1.0)	3.6 (1.0)	3.6 (1.0)	0.7 (5, 1833) (ns)
4	2.2 (1.0)	2.0 (0.8)	1.9 (0.8)	2.0 (0.9)	2.1 (0.9)	1.9 (0.8)	2.0 (0.9)	3.6 (5, 1811) **
5	2.1 (0.9)	2.3 (1.0)	2.1 (1.0)	2.2 (1.0)	2.3 (1.0)	2.3 (1.0)	2.2 (1.0)	2.8 (5, 1821) *
6	3.9 (0.7)	3.8 (0.6)	3.7 (0.8)	3.8 (0.7)	3.8 (0.7)	3.8 (0.7)	3.8 (0.7)	2.0 (5, 1834) (ns)
7	3.5 (0.7)	3.4 (0.8)	3.2 (0.8)	3.4 (0.8)	3.3 (0.8)	3.3 (0.8)	3.3 (0.8)	3.8 (5, 1828) **
8	3.4 (0.9)	3.4 (0.9)	3.2 (0.9)	3.3 (0.9)	3.3 (0.9)	3.4 (0.9)	3.4 (0.9)	1.6 (5, 1833) (ns)

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	3.6 (1.0)	3.8 (1.0)	3.7 (1.0)	3.7 (1.0)	3.7 (1.0)	1.6 (3, 2445) (ns)
2	3.8 (0.7)	3.8 (0.8)	3.8 (0.7)	3.7 (0.9)	3.7 (0.8)	4.4 (3, 2432) *
3	3.7 (0.8)	3.8 (0.9)	3.7 (0.9)	3.8 (0.9)	3.8 (0.9)	1.7 (3, 2429) (ns)
4	2.1 (0.8)	2.1 (0.9)	2.0 (0.9)	1.9 (0.8)	2.0 (0.8)	6.0 (3, 2400) ***
5	2.3 (0.9)	2.4 (1.0)	2.4 (1.0)	2.5 (1.0)	2.4 (1.0)	3.2 (3, 2395) *
6	3.8 (0.6)	3.7 (0.7)	3.7 (0.7)	3.8 (0.7)	3.8 (0.7)	2.1 (3, 2412) (ns)
7	3.6 (0.7)	3.5 (0.7)	3.5 (0.8)	3.6 (0.7)	3.5 (0.7)	1.1 (3, 2421) *
8	3.5 (0.8)	3.6 (0.8)	3.5 (0.9)	3.5 (0.8)	3.5 (0.8)	1.4 (3, 2424) (ns)

1. I feel stress whilst preparing my portfolio
2. The school supported me whilst I was preparing my portfolio
3. Whilst I was preparing my portfolio my colleagues, friends and/or family have helped me
4. Whilst I was preparing my portfolio my students have helped me
5. Whilst I was preparing my portfolio the Education Department has helped me
6. I am satisfied with the portfolio that I have submitted
7. I think that my principal takes IT portfolios seriously
8. The portfolio helps me to reflect upon the application of IT

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

Table 2.3.27 Principals' views on the IT Portfolio (1 = strongly disagree; 5 = strongly agree) (Principals' questionnaire, Q. 38)

Secondary

Mean (SD)	Pilot	MMLC & ITC	MMLC	ITC	QEF	Other	Overall	F (df)
1	4.2 (0.5)	4.0 (0.0)	4.2 (0.5)	4.0 (0.5)	3.8 (0.4)	4.0 (0.5)	4.0 (0.4)	0.8 (5, 48) (ns)
2	3.5 (1.0)	4.2 (0.4)	4.2 (0.8)	3.8 (0.4)	3.8 (0.4)	3.6 (1.1)	3.8 (0.8)	0.9 (5, 47) (ns)
3	4.2 (0.5)	4.0 (0.6)	4.4 (0.6)	3.8 (0.4)	3.8 (0.6)	4.0 (0.6)	4.0 (0.6)	1.1 (5, 48) (ns)
4	4.2 (0.8)	4.2 (0.4)	4.2 (0.5)	3.9 (0.3)	4.1 (0.6)	4.0 (0.7)	4.1 (0.6)	0.3 (5, 46) (ns)
5	3.4 (0.9)	4.0 (0.6)	4.0 (0.7)	3.7 (0.5)	3.7 (0.5)	3.6 (0.8)	3.7 (0.7)	0.7 (5, 48) (ns)

Primary

Mean (SD)	Pilot	ITC	QEF	Other	Overall	F (df)
1	4.2 (0.4)	4.1 (0.5)	4.0 (0.5)	3.9 (0.5)	3.9 (0.5)	1.8 (3, 96) (ns)
2	4.0 (0.0)	3.9 (0.4)	3.7 (0.8)	3.8 (0.7)	3.8 (0.6)	0.6 (3, 97) (ns)
3	4.2 (0.4)	3.9 (0.7)	3.8 (0.7)	4.0 (0.5)	4.0 (0.6)	1.4 (3, 96) (ns)
4	4.0 (0.0)	4.3 (0.5)	3.9 (0.6)	4.1 (0.6)	4.1 (0.6)	1.1 (3, 97) (ns)
5	3.7 (0.5)	3.8 (0.8)	3.7 (0.9)	3.7 (0.7)	3.7 (0.7)	0.0 (3, 97) (ns)

1. I am satisfied with the portfolios that have been submitted by the teachers
2. I place great importance on the portfolio
3. The portfolio gives teachers a chance to reflect upon questions regarding the application of IT in teaching
4. The portfolio helps teachers to improve on the qualities that teachers need in using IT
5. The portfolio is an effective tool for reflecting the qualities that teachers have in using IT

2.3.5 Summary

Regarding level of IT skills and competence, teachers in both primary and secondary schools have the highest score in "word processing, spreadsheet, presentation software and Internet usage skills" and the lowest score in "advanced multimedia and web site design". However, in terms of importance, they indicate "word processing, spreadsheet, presentation software and Internet usage skills" as the most important and "advanced multimedia and web site design" as the least important skills for teachers. This finding indicates that Hong Kong teachers have the basic competence in IT skills, and they also perceived their importance to the teaching. However, teachers have reservation in the importance of the advanced technical IT skills to the teaching.

In the most satisfying experience reported by the teachers, the involved subjects are Chinese, English, General Studies and Mathematics in primary schools; and Chinese, English and Mathematics in secondary schools. The major teaching approach is explanation and demonstration, and the presentation software and video projectors are used. Teachers in these lessons perceive their role as "to teach new knowledge" and "to provide suitable teaching materials". They also perceive two major changes initiated in these teaching activities: enhanced IT knowledge and change of teaching mode. They expect students would enhance their understanding of academic knowledge and interest of learning. It seems that the knowledge-transmission model is deep-rooted among teachers. This leads to the challenge of the promotion of "paradigm shift" in pedagogy.

In teacher development, the most preferred mode of training is "workshops and demonstrations" and the least preferred mode is "conferences and seminars". About half of the teachers obtain IT knowledge from newspaper features. Over 70% of the teachers indicate that their use of computers in teaching is mainly preparing teaching notes and course materials. Teachers also indicate that they desperately need to learn how to communicate with students over email, nevertheless, the need to learn how to use the Internet to carry out collaborative project work with other schools is relatively low. Teachers are in general satisfied with their portfolio assessment and they can manage to get help from friends and family as well as support from their school. It is perhaps not surprising that teachers would like the training model of workshops and demonstrations. It is because research indicates that teachers tend to teach as they are taught (McBeath, 1995). In order to change this long established teaching-learning habit, we need to

integrate teachers' teaching with teachers' training in our planning of the teacher development strategy.