OECD/CERT ICT PROGRAMME

A Case Study of ICT and School Reform at School 4

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Overview

Description of School

1. Located within a neighbourhood (suburban) heartland, School 4 started off in 1945 as a Chinese-medium primary school. Over the years, the school took in secondary pupils and in 1986, it embraced English as its medium of instruction. In 1990, the school separated into a primary and secondary school and School 4 (the secondary school) was born. As a neighbourhood school it attracted largely average ability pupils from the nearby housing estate. However, a change in Principal in 1991 laid the path for the development of School 4 (S4) to what it is today. This Principal said that his goal for the school was to be the best school in Hougang, then the best in the North Zone and then in Singapore.

1. Since then, not only has School 4's declining enrolment been reversed, it has achieved higher academic results than might be expected given the academic profile of the school's pupils. The majority of School 4 s pupils, 97.8% who sat for the GCE O level examination in 1999, were eligible for admission into Junior Colleges, Pre-University Schools and Polytechnic and 2.2% for ITE. (S4 Online Info Centre). An appreciative alumni and local community are willing to donate thousands of dollars to the school; and its leadership core has often been invited to share their successful experiences with other school leaders in Singapore. For example, the Head of the IT Department (HOD/IT) shared S4 Online at the HOD IT tea session organised by IT Training Branch, the Ministry of Education (MOE), last year.

1. Today, School 4 is a trail blazer for a cluster of schools that was created with the view to maximise the use of resources (Admin 1, 8 May 2000). In January 2001, School 4 became an autonomous school[1], joining 18 other Singapore schools. The school was selected based on the fact that it had good processes in place which will enable it to continue to develop good educational results and outcomes in the widest sense for all the students . (Rear Admiral Teo, Minister of Education ChannelNews Asia 21 July 2000)

ICT in the School

1. School 4 embarked on Singapore s Masterplan for IT in Education (MPITE) in 1997 as a Phase 1 school. The school has since made a name for itself as a school that has a well-planned ICT programme and innovative practices using IT. One of these practices won the highest prize in the Hewlett-Packard Innovation in Information Technology Award in 2000.

1. When the school first began using ICT, its focus was on the use of CD-ROMs for teaching and learning. Since then, the use of ICT has been extended to the administrative areas of the school. The use of ICT in teaching and learning has also shifted from the use of CD-ROMs to an emphasis on the creation of content using web-based technologies, for example the Online Writing Studio.

1. In the school's 1998 ICT Plan[1], one of the goals stated was "to establish networking among local and overseas schools to create a real and connected learning environment." In the same document, we see the genesis of a plan to move towards web-based technologies, as there are plans to train teachers and students to be conversant with the Internet. In their 1999 ICT Plan[1], the shift in emphasis to web-based technologies is even more apparent. For example, one of the goals of the school's staff development

plans was to "to engage all teachers in Web Publishing training." In addition pupils are to create "class webs". In their 2000 ICT Plan[1], it was indicated that IT Foxes (a selected group of ICT-savvy teachers) were to be trained to become Network and Web administrators and 5 webs for teaching and learning would be developed. In their 2001 ICT Plan[1], IT Foxes were to be engaged in Open-Tools training and be further trained in Network and Web administrators and 7 webs for teaching and learning would be developed under the school web.

The Reform

1. Our study of School 4 focuses on an important reform that has taken place, which is the promoting of administrative excellence through the use of web-based technologies. We will take an in-depth look at S4 Online a web-based tool used by the school to streamline its administrative processes. Examples of administrative processes are booking of rooms, tracking of student attendance, fault reporting/maintenance and budgeting.

The Past
History of Reform

1. School 4 was among the first secondary schools in Singapore to use technology for teaching and learning in 1997. The teachers used IT resources such as CD-ROMs for their lessons. In the following 2 years, the school s ICT plans shifted towards the use of web-based technologies for teaching and learning. In addition, in 1998, the school leadership came out with the idea to build an electronic online system to streamline administrative tasks.

1. The idea to use web-based technologies to do administrative tasks was initiated by the former HOD/IT. The key personnel in the school leadership (Principal, Vice Principal, Heads of Departments) strongly supported the idea. There were two objectives. First, School 4 hoped that ICT would increase efficiency in the performance of administrative tasks. Second, the school hoped that the increased use of ICT would lead to greater confidence and competence in its use. This would facilitate its use in teaching and learning processes. (Teachers 1 & 2, 16 Jan 2001 & Admin 2, 31 Jan 2001).

1. Under the leadership of the former HOD/IT, a group of ICT-savvy teachers formed a think-tank and brainstormed the features of the electronic system. They also got ideas from other teachers during some of these brainstorming sessions. (Admin 3, 20 Dec 2000). The former Technology Assistant did the programming for the system and the system was called S4 Online A few teachers tested the beta version of S4 Online and after several modifications by the ICT Trainer, the system was officially used within the school in 1998.

Support

1. The Principal was the main supporter of the project. According to the ICT Trainer, the Principal was all the way behind the reform and has the kind of vision, that brings about the total change in the school. (22 December 2000). He helped to create a warm, accepting and inviting environment where people dare to try new ideas . (ICT Trainer, 22 December 2000).

1. Existing ICT infrastructure was further enhanced. For example, LAN points were provided at every teacher s table in the staffroom to increase greater accessibility to the Internet. In addition, every teacher was provided with a notebook computer (This is beyond the standard MOE provision). The Principal sourced for funding and brought in expertise from various technology companies and tertiary institutions, for the purpose of training and technical support.

1. The Principal, together with his Heads of Departments, identified 2 ICT-savvy teachers from each department and appointed them as IT foxes . These teachers were eager to explore how ICT could enhance teaching and learning. The Administration, the ICT Trainer and the teachers interviewed agreed that IT foxes were willing to share and teach the others and helped to create a learning culture among the teachers in School 4.

1. The IT foxes conducted the initial introductory training sessions for all teachers on the use of the features of S4 Online, with help from the ICT Trainer. Subsequently there were in-house training, and handholding sessions whereby ICT-savvy teachers coached other teachers, and cluster sharing. The training was done in stages and it initially involved a few ICT-savvy teachers from each department. The training helped them understand and exploit the features of S4 Online e.g. S4 Online Venue, S4 Online Fix It. These teachers later became the experts among the rest and were able to handhold the others.

Barriers

1. The early users of S4 Online were mainly from the Mathematics and the Science departments, with the exception of a teacher from the English department. There was also a group that was hesitant to use technology. According to the Administration, ICT Trainer and 2 teachers interviewed, they were generally those approaching retirement age and teachers teaching Home Economics and Mother Tongue Languages.

1. Some of the non-teaching staff e.g. Science laboratory technicians, administrative officers, were noted to be unwilling to use S4 Online initially (for administrative purposes). In the opinion of Teacher 2 (16 Jan 2001), it could be because these people were senior (in terms of age) and they needed longer time to help them adjust to a new system of doing things.

1. The unavailability of applications on S4 Online when the server was down, increased some teachers apprehension about going online. Admin 3 and the ICT trainer commented that these teachers needed more time to get used to the administrative processes, which have gone web-based. Some even needed constant reminders and help on how to perform certain administrative tasks. All teachers interviewed felt crippled when they could not access information on the server or when the network speed is slow.

1. The ICT trainer took on the task of maintaining and upgrading S4 Online. This was a challenge because there were not many people in School 4 who were competent enough to do programming.

1. Some of the barriers e.g. staff reluctance were overcome through in-house training, handholding sessions and cluster sharing. Some teachers were sponsored to attend external (ICT-related) courses and shared their learning upon completion of the courses. In addition, other teachers were identified and invited to learn about programming, to further develop and maintain S4 Online

The Present
Description of Reform

1. School 4 s reform is the promotion of administrative excellence through the use of a web-based tool, S4 Online. As put by Teacher 2 who was involved in its conception, the intention of S4 Online is to make use of technology to take over some of the tasks that are done either on paper or has to be done manually in order to cut down on the amount of paperwork. (16 Jan 2001).

1. S4 Online comprises a backend Microsoft ACCESS 97 database with Active Server Pages. Presently, it comes in two versions S4 Online Internet & S4 Online Intranet. Where the reform is concerned, it is the Intranet version that contains the administrative functions and it is accessible only from the school s 600 LAN points.

1. The S4 Online Intranet provides a one-stop platform for teaching and non-teaching staff to do the following administrative processes using a range of features: they can log in their attendance (S4 Online Login), check upcoming school events (S4 Online Calendar) and important announcements (S4 Online Announcements), book venue for lessons in computer labs and special rooms (S4 Online Venue), monitor student attendance (S-Tracker, S4 Online CCA), report faulty equipment (S4 Online Fixit) and view budget-expenditure (S4 Online Budget).

1. Newer features, being implemented on a pilot basis, are an electronic record book (S4 Online Recordbook) and an electronic survey (S4 Online Form). The Science and Mathematics departments tested the first version of S4 Online Recordbook to give input for the forthcoming second version. For S4 Online Form, the IT department piloted the first version and is currently embarking on the 2nd phase. The resulting version will allow teachers to create, conduct & analyse their own electronic MCQ-tests.

Positive Impact

1. All interviewees generally agreed that the reform has led to administrative efficiency and effectiveness in the school. Teacher 1 remarked that after a while everybody recognises that if there is a certain procedure, I need to follow, a certain form I need to get or you know, certain things I need to get done , S4 Online is the channel to get it from. (16 Jan 2001).

Convenient Dissemination of Information

1. All interviewees agreed that S4 Online has resulted in greater awareness and interest among staff and pupils of school events and happenings. Teacher 1 commented:

because teachers got to log in, log out everyday from, through the S4 Online features, I think it has become a very important tool to streamline information and to put whatever is important before the teachers ...the moment they log in, they know, they read the announcements... (16 Jan 2001)

1. Likewise, the pupils, through S4 Online, are reminded of important dates like the examination dates or sports day (Pupil 2, 16 Jan 2001) or they know of activities organised for them like interactive games and competitions (Teacher 1, 16 Jan 2001).

Easy Retrieval & Collation of Data

27. Three of the four teachers interviewed agreed that S4 Online Venue was effective in eradicating duplication in bookings of rooms. As expressed by Teacher 3:

...previously we have to refer to this big log book for us to see which room is available for booking and all that, and we do not know who has booked the room but now with this thing online and we can see the schedule for the entire month and then you can see who booked the room, which date the room is available. (31 Jan 2001).

28. Both the ICT trainer and Admin 3 indicated that S4 Online Venue makes it easy to collate data on usage of special rooms etc. The ICT trainer said:

...to know how often this particular room is being booked, how much it s being utilised and how much IT lessons the teacher has actually conducted based on room booking, ...you can get the result by punch of a button. (22 Dec 2000)

1. Where the use of S4 Online S-Tracker is concerned, a study conducted by the school in early 2000 showed that it reduced the cumulative-time of 150 minutes in retrieving statistical-figures on student attendance to a mere 5 minutes. As Admin 2 said, ...which school wouldn t think that the student tracker is a good program. At the press of a button, I can even trace back, you know, one year ago, what is the number of absentees, who has the most number of days absent and who give problem, this and that. (31 Jan 2001). This feature is currently being used by several schools in the cluster.

1. The pupils interviewed appreciated that the information captured by S4 Online Login allows them to check whether the teachers are still in school as the school is too big for them to go round and look for the teachers.

Promoting ICT culture

31. According to Admin 3, the reform has greatly helped to promote the ICT culture in the school . He believed that, without the reform:

we will take a longer time to jump start the IT Masterplan in our own school. Teachers will take a longer time. I m not saying that we will never be able to implement the IT Masterplan successfully. I m jut talking about the speed, you know, the pace... (20 Dec 2000)

32. The ICT trainer noted that Xinmin teachers became generally more confident, less fearful of ICT and more willing to learn ICT. This viewpoint is echoed by Teacher 2:

I think now with this web based technology thing going on in the school, ...it has sort of pushed you to work upon it [conquer the fear of using computers] so I would say that the staff here, they are after 2 years, 1 year plus, 2 years, they are quite used to using computer to do their daily work especially administratively so they become not so, you know, phobia, having a phobia for computer so I think it helps to develop them as well so they might, you know, cultivate some interest subsequently in using computers in other areas... (16 Jan 2001)

1. In addition to fostering an ICT culture in the school, the reform has also promoted a culture of transparency and openness among the different departments. Teacher 2 commented that everything is published on the web, the budget is also published on the web, you know what other CCAs (Co-Curricular Activities) are getting, how much they re spending so I think openness and transparency is promoted . (16 Jan 2001)

34. S4 Online has become part and parcel of everyday school life. The reform has helped to promote the use of ICT in the school, whether for administration or for teaching and learning. It has changed the mindset of the staff and they see the use of ICT as a norm. As teachers who were directly involved in the reform agree,

...it [the reform] has actually cultivated quite a different mindset, you ll find that in our school even now, some of the more senior staff as of age, they are not that afraid anymore of using computers so that it is something really positive and have come out of it and you find that any newcomers or new staff who joined us, ...they will also sink into the culture of using the IT, so this is in a way promote the use of IT in various aspects of the

school environment... (16 Jan 2001).

Negative Impact

35. According to Admin 3 and ICT Trainer, the school is crippled when the server is down or when there is no electricity. This is reiterated by all 4 teachers interviewed who found it frustrating when S4 Online is not accessible for administrative tasks like booking of rooms.

36. Teacher 3 indicated that there could be a communication breakdown when teachers do not access S4 Online on time to read the information posted. Also, teachers are inconvenienced when some features of S4 Online are not accessible from home e.g. S4 Online Record Book.

1. A few of the pupils interviewed commented that using S4 Online S-Tracker demanded more from them as they had to indicate the class attendance in both the S-Tracker and in their class diaries. The S-Tracker complemented rather than replaced the conventional marking of hard copies of class registers provided by MOE.

Hypothesis 1

Technology is a strong catalyst for educational innovation and improvement, especially when the World Wide Web is involved. The rival hypothesis is that where true school-wide improvement is found, technology served only as an additional resource and not as a catalyst, that the forces that drove the improvements also drove the application of technology to specific educational problems.

1. The rival hypothesis is valid for this case study as we found evidences that strong leadership and supportive culture are the two vital forces that drove the reform.

The Driving Forces

1. From the school s history, it is clear that the school has benefited from the good leadership of two Principals in succession. The previous Principal first initiated reforms to raise the popularity and the academic results of the school[1] while the present Principal nurtured further reforms by encouraging innovation and creativity. The reforms were non-ICT related in the beginning and later moved on to include the use of ICT.

1. The present Principal, who has a clear vision of his school s goal, supported the reform by sourcing for money and ensuring that there was enough money to upgrade teachers ICT skills, buy equipment and services. He enhanced the existing ICT infrastructure to support the use of web-based technologies, by putting more LAN points in the staff room, to increase accessibility to the Internet. Organisational structures were put in place to support the school s ICT reforms, such as having a team of IT foxes to spearhead the school s ICT plan, and employing an in-house ICT trainer for staff and student development. Besides providing training for teachers on the use of S4 Online, the ICT Trainer maintains the server and does programming to upgrade the electronic system.

1. All the teachers and administrators interviewed agreed that there is a strong supportive culture pervasive amongst staff and also from the administration. Teachers are willing to share and learn from one another during formal and informal meetings. This supportive culture is instrumental in promoting a positive mindset towards innovation, giving teachers and pupils a safe environment to develop and experiment with new ideas, whether these are ICT related or otherwise.

1. Technology, in this case study, is simply a resource used to achieve one particular goal of the school-

administrative excellence. For the reform to take place, strong leadership and the supportive culture that promotes innovation and risk-taking are the main driving forces.

Hypothesis 2

The diffusion of the innovation/improvement (and therefore of ICT) followed the traditional diffusion pattern for innovations, as outlined by Rogers (1995). The rival hypothesis is that technology functions differently from traditional innovations and therefore different diffusion patterns occur.

1. Where adoption of the reform is concerned, it does not follow the traditional diffusion pattern outlined by Rogers. A top-down approach is taken for the implementation of S4 Online. All teaching and non-teaching staff came on board at the same time, willing or not, because S4 Online became the only option available for them to perform administrative tasks like booking of venues and signing in/out. As put succinctly by the ICT Trainer,

We actually burn the bridge after they ve crossed it, there s no other way of booking, no other way of, you know, doing the same old process in the past except through IT so they got no choice (laughter) and somehow they manage to adopt it and they find that they can t do without IT today...(22 Dec 2000).

1. When it comes to using web-based technologies for teaching and learning, that is, the creation of web-based learning resources, Rogers traditional diffusion pattern is followed. At the same time, the diffusion pattern follows the Adopter-Based (Instrumentalist) theory[2], which focuses on the human and interpersonal aspects of innovation diffusion. School 4 views their teachers as the ultimate force of change.

1. First, the champions who pushed for the creation of web-based learning resources are the teacher who developed the Online Writing Studio, the in-house ICT trainer, and the HOD/IT. The early majority include the Chinese department teachers who started a Chinese version of Online Writing Studio, the IT Foxes and the teachers from the Mathematics and Science departments who are very keen to build up web resources for their subjects. Generally, the early adopters are young, possess advanced ICT technical skills and they are convinced that ICT can add value to teaching and learning. The teachers from the Humanities department can be considered as laggards. They have not started creating their own web resources as they are more comfortable with using existing Internet resources.

Hypothesis 3

Successful implementation of ICT depends mostly upon staff competence in the integration of ICT into instruction and learning. This hypothesis assumes that teachers mediate ICT applications when they are successful, and that ICT s academic value relates positively to teacher competence. The rival hypothesis is that the school technological infrastructure and student ICT competence rather than staff competence determine ICT implementation outcomes.

46. For the purpose of this case study, ICT implementation in School 4 refers to the creation of web-based resources by teachers for instruction and learning. This is currently the school s emphasis for ICT integration. According to Admin 3 (20 Dec 2000), the goal is to have about 50% of the teachers create their own web-based teaching resources and web sites by year 2002. It might be too premature to gauge whether the implementation of ICT, as defined earlier, is successful. It follows then that Hypothesis 3 and the rival hypothesis could not be proven.

47. However, it is evident that School 4 strongly believes that staff competence is crucial to ensure that it achieves its goal of creating customised web-based teaching and learning resources. To raise staff competence

in terms of creating web-based resources, the school has embarked on a planned 3-year teacher development programme. By 2002, at least 75% of the teachers will be trained on the use of web editing programmes (Admin 3, 20 Dec 2000). Last year, the IT foxes were trained in Frontpage 98.
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48. There are already some early indicators of success in creating customised web-based teaching and learning resources. An example is Online Writing Studio, an interactive website of writing activities and lessons created by one English teacher. This sparked the creation of a Chinese version that the Chinese teachers are presently working on.

Hypothesis 4

 Gaps in academic performance between high and low ability students will not increase when all students have equal access to ICT. The rival hypothesis is that equal access to ICT will lead to high ability students increasing the performance gap with low ability students

49. Neither hypothesis 4 nor its rival could be proven. Within the school, although there was equitable ICT access outside of classroom lessons, low ability pupils, which for the purpose of this study come from the Normal (Technical) stream, had more access to computer use through the Normal (Technical) Computer Programming Applications course which amounted to additional hours of access. It follows then, that the assumption of equal access does not apply for this school. By access we are referring to access within the school premises only as the study did not include data of ICT access at home or in public places. However, it must be pointed out that the highly structured and packed curriculum in a normal school day would not allow for too much free time to enjoy the right to equal ICT access by either ability group.

50. Academic performance in this study is taken to extend beyond test and examination grades to include observable behaviours like increased student teamwork for project work, more creative [class] presentations , and use of relevant materials from the Internet to support the presentations (Teachers 1 & 2, 16 Jan 2001). In interviews with Admin 2 and Teachers 1 and 2, it was noted that only pupils who were motivated and disciplined benefited more from using web-based technologies and showed an increase in academic performance as defined earlier. These interviewees pointed out that such pupils could be found in both the higher and lower ability groups. Beyond equal access, affective factors of motivation and discipline play a part in determining academic performance.

Hypothesis 5

The use of ICT will lead to the same or higher academic performance. The alternative hypothesis is that ICT use will lead to a lowering of academic standards.

51. For the purpose of this study, academic performance encompassed indicators such as pupils grades, skills and processes. It must be noted that due to the importance accorded to the GCE O Level Examinations, which assesses learning through the traditional pen and paper mode, the use of ICT in learning is still very much an extra rather than integral to instruction. There was no conclusive evidence that the use of ICT would lead to the same or higher academic performance. Although Teachers 1 and 2 (16 Jan 2001) observed that some pupils who had used Internet resources produced more creative presentations of their projects , the same teachers noted that there was no noticeable impact on the academic results.

1. Whether ICT was useful to enhance academic performance also varied from subject to subject. Pupils interviewed did remark that for subjects such as Geography and Science, technology helped to illustrate concepts (16 Jan 2001) more clearly and effectively. However, there was no evidence whether performance in these subjects improved or not. Similarly, the alternative hypothesis could not be proven for lack of concrete results of any detrimental effects of ICT use on academic standards. Notwithstanding that, a common perception prevailed, as shared by Teachers 3 and 4 (31 Jan 2001) that for final-year pupils, time spent on ICT would be better spent on examination drills in preparation for the major examination. This was borne out by the practice of excusing teachers of these pupils from working on targets set by the school for the number of IT-based lessons.

Projection to the Future

53. With the heavy investment made in terms of infrastructure and staff training, the likelihood of the reform remaining and continuing is high. As it stands, S4 Online has digitised many of the administrative procedures and the school administrative system would be crippled without it as mentioned by 4 of the 6 interview sources. There are also concrete plans to upgrade the server in the school so that S4 Online will run even better. Both the Principal and ICT Trainer vouched that there was full financial support for such upgrading plans.

54. For instruction, S4 Online is now being further developed for instructional purposes such as the promotion of literary expression through the Writers Circle, for feedback collection through surveys, and for more academic departments to upload their lessons.

55. For administrative purposes, targets have been set to fully integrate the many different programs, e.g. pupil profiling into S4 Online and to further develop S4 Online s features, e.g. S4 Online Form. To support these new features, the school acquired its own server to increase S4 Online s capability and security. Plans are also afoot to increase the present technical support staff strength from 4 to 5 to help service the Online System.

1. As to the transferability of the school s reform to other schools, the Principal and other key staff noted that other schools have not been too eager to replicate the reform despite the school s openness in sharing its web-based technologies. Reasons given ranged from financial limitations to perceived staff resistance. The strongest reason seems to be the difficulty in replicating a school culture that is innovative, and is nurtured by school leaders with a clear vision of what technology can do to smoothen administration so that teaching and learning can be better served.

Appendix A

The research team from the Ministry of Education comprised the following 4 members:

Foo Seau Yoon (Leader)	Senior IT Instructor
Cassie Fan (Assistant Leader)	IT Training, Educational Technology Division
Joy Lee	
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Summary of time spent at School

Contact Period	Date(s)
First contact	27 Nov 2000
Data collection period	20 Dec 2000 - 31 Jan 2001
Follow-up contact (e.g. verification of data)	May 2001
Total number of hours spent on interviews	12 hours
Total number of hours spent on classroom observations	Nil
Demonstration of S4 Online by ICT Trainer	3 hours

Summary of data collected

Type & Quantity of Data	Average time spent	People involved
3 Interviews	2 hours per interview	2 administrators and 1 ICT Trainer
3 focused group discussions	2 hours per discussion	4 teachers and 6 pupils
Analysis of S4 Online	4 hours	Research Team

Legend of Data Sources

Admin 1	Cluster Superintendent (OECD Pilot Study Interview)
Admin 2	The Principal
Admin 3	The Head of Department for IT
ICT Trainer	ICT Trainer who is closely involved in the reform
Teachers 1 & 2	Teachers who are closely involved in the reform
Teachers 3 & 4	Teachers who are not closely involved in the reform
Pupils 1 to 6	Pupils

Estimate of Average time spent per person on coding, analysis and writing

Coding	9 hours
Analysis and Cross Analysis	24 hours
Writing the report	2 weeks

Appendix B

OECD/CERI ICT PROGRAMME Total Surveyed : 60
ICT Practices Survey for Teachers at School 4 (Figures are in percentages)

A How comfortable are you with using a computer to do each of the following?
Ratings: 1 - Very Comfortable 2 - Comfortable 3 - Somewhat comfortable 4 - Not at all comfortable

		1	2	3	4
1	write a paper	57	33	8	2
2	search for information on the World Wide Web (WWW)	42	36	20	2
3	create and maintain web pages	8	12	30	50
4	use a data base	12	17	35.5	35.5
5	develop a data base	5	16	31	48
6	send and receive e-mail	65	20	10	5
7	write a program	2	10	24	64
8	draw a picture or diagram	23	30	44	3
9	present information (e.g., use PowerPoint or equivalent)	42	33	23	2

B How important is each of the following computer-related skills for your teaching?
Ratings: 1 - Very Comfortable 2 - Comfortable 3 - Somewhat comfortable 4 - Not at all comfortable

		1	2	3	4
10	write a paper with a word processor	42	48	5	5
11	search for information on the WWW	47	30	20	3
12	create Web pages	5	19	46	30
13	use a data base	5	25	40	30
14	develop a data base	6	20	38	36
15	send and receive e-mail	33	37	17	13
16	write a program	7	8	34	51
17	draw a picture or diagram with a graphing/drawing application	22	52	24	2
18	present information (e.g., use PowerPoint or equivalent)	10	10	51	29

C During the past school year, how often did your students on average do the following for the work you assigned?
Ratings: 1 - Very Comfortable 2 - Comfortable 3 - Somewhat comfortable 4 - Not at all comfortable

		1	2	3	4
19	use the World Wide Web	10	10	51	29
20	create web pages	2	4	8	86
21	send or receive e-mail	8	17	27	48
22	use a word processing program	10	19	35	36
23	use a computer to play games	5	8	18.5	68.5
24	use a spreadsheet	2	10	13	75
25	use a graphics program	5	0	30	65
26	join in an on-line forum or chat room	3	7	12	78
27	use a presentation program (e.g., PowerPoint)	3	17	53	27
28	use an instructional program (including simulations)	2	8	31	59
29	other computer uses (please specify)	0	4	36	60

				Good	Fair	Poor
30	How would you rate your ability to use a computer?			32	58	10

Answer questions 31 - 38 based on experiences or policies from the last school year.

				Yes	No
31	Was student computer use ever evaluated for grading?			24	76
32	Did you create or modify a Web site with any of the classes that you taught?			10	90
33	Did you participate as a student or instructor in a virtual course through the Internet/World Wide Web?			32	68
34	Did you involve your students in collaborative learning over the Internet/World Wide Web with students from other classes?			17	83
		all	most	some	little

#	Question				
35	What portion of the computer use in your classes was directly related to the course content?	4	29	46	21
36	What portion of the computer use that you assigned was done by students individually?	0	12	55	33

#	Question	No restrictions	some restrictions	designated sites only
37	If you assigned World Wide Web searching, how much freedom did you allow students in locating sites to visit?	13	42	45

#	Question	several times a week	several times a week	a few times	never	no computer
38	If you have a computer at home, how often did you use it for preparing for teaching?	51	29	18	2	0

#	Question			Yes	No
39	Are you currently using technology to collaborate with other teachers (professional chat rooms, forums, network system or the like)?			27	73

#	Question	> 12	6 -11	1 - 5	none
40	How many e-mail messages do you send each week on average?	23.5	20	43.5	13

How many of the following have you ever done? Please tick the appropriate boxes.

#	Item				
41	made changes to a computer s hardware				28
42	updated an application program (word processor, graphics program, etc.)				47
43	recovered a damaged file				27
44	created a web site				27
45	developed a data base				23

[1] Refer to Singapore Country Paper

2 See School 4R[1]s 1998 ICT Workplan at the following web site:
http://schools.moe.edu.sg/xinmin/departments/IT/Default.htm

3 See School 4's [1]999 ICT Workplan at the following web site:
http://schools.moe.edu.sg/xinmin/departments/IT/Default.htm

4 See School 4's 2000 ICT Workplan at the following web site: [
]http://schools.moe.edu.sg/xinmin/departments/IT/Default.htm

5 See School 4's 200[1] ICT Workplan at the following web site:
http://schools.moe.edu.sg/xinmin/departments/IT/Default.htm

[1] Mortimore, P., et al. The culture of change: case studies of improving schools in Singapore and London. Bedford Way papers. London: Institute of Education. 2000.
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