OECD/CERI ICT PROGRAMME

A Case Study of ICT and School Improvement at Kyungin Elementary School, Seoul, Korea

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Jaeshin Song, Principle Investigator

Ju Yeon Lee, Co-Principle Investigator

Soo Jung Jang, Ph.D. Co-Principle Investigator

Mi Lee Ahn, Ph.D. Co-Principle Investigator, Hanyang University

Korea Education & Research Information Service

Seoul, Republic of Korea

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1. Overview

Kyungin Elementary School has a hanging board in its main entrance with Internet is My Friend scribed on it. Just at the inside of the main entrance, underneath the title of the bulletin board Internet Dream Wiz Open Learning and Teaching as the school s main goal of learning improvement is posted. Kyungin Elementary School was selected as one of information technology model school last year, and built an advanced ICT infrastructure. Kyungin School has 33 classes from grade 1 through 6, 36 teachers including three curriculum-specific teachers, and has 41 students per class in average. It has 33 classrooms, and special activity rooms including science lab, library, multimedia lab, learning resource center, resource development center, broadcasting center, and a student lounge.
Last year, Kyungin School had an extra room for students. In this room, students could use computers to solve academic problems and to do their assignments during recess times and/or during after school sessions. However, in order to accommodate two additional classes this year, the special lab had to be converted into classrooms, and students no longer have a place where they can freely use computers.

Although there is another computer lab in the school, it is not available for students during classes. At present, every teacher has a computer in his or her classroom. There are two computers for teachers in the Instructional Material Research office on the first floor. Each classroom is equipped with an Internet compatible computer (PC 586 s at a minimum), a printer, and a projection TV and all of them are connected via a high speed Local Area Network (LAN). There are scanners, digital cameras, videoconferencing equipment, camcorders, Over Head Projectors, and CD-RW s in the media center for teachers. The media center is also equipped with UPS s, routers and hubs that are connected via a dedicated data transfer line. Each classroom has classroom management software, Office CD tools to help develop instructional materials and programs, a PC booting CD, and other necessary software.

Students: A majority of students are from the middle-to-high class families whose parents have at least a college degree (80%). These students live in highly populated, high-cost apartments located near school with safe neighborhood. None of the students need any remediation program, and they all have high standards of academic achievements due to private tutoring that make them lose the academic interest in school works. Teachers commented that their students tend to be individualistic and be lack of peer cooperation. With the current background of the students, it is evident that the instructional activities should be more diversified with the use of multimedia materials, and incorporate more cooperative and student-oriented learning activities. 95% of students had access to Internet at home, and they were getting private or group tutoring outside of school.
Teachers: Due to hiring of new teachers, the school is undergoing administrative problems. Although teachers have, as a result of last years model school, in general, advanced ICT skills and work hard to develop individually oriented instructional materials, their ICT use in class is not efficient. Teachers spend 70-80% of their time to prepare ICT classes. They believe that without the use of the ICT, preparing for classes would be more difficult, especially when enormous amount of information and instructional materials are constantly published.

Use of ICT by the teachers: The most positive aspects and affects of ICT in Kyungin School are that ICT makes the whole process of information dissemination more interesting to students. Many instructional materials are available through different media. Teachers can participate in online media as cyber-counselors (privacy protected). However, the negative aspect is decreasing interactions between the teacher and students due to excessive use of the media (use of CD-ROM titles in Open class environment). Teachers may overly dependent on the use of media and ready-made instructional materials, which may discourage to make creative curriculums. Also, due to abundance of information and relative ease access, students may face problems in selecting helpful information. Teachers over-dependence on obtaining ready-made instructional materials through the Web may help students to get shallow knowledge in various subjects but without depth.
Parents: Most of the parents consider various school reform efforts made positive effects. Although they did not see immediate changes, they felt the gradual transformation of teachers and school. They think these efforts will help develop their children s learning capacities. Parents thought that ICT was not only the assistant methods of children s school works but also it helped young students broaden their horizon. It also helps students to be self-directed learners. They are only worried about their children s deficiency writing skills.
Principal as a School Manager: The Principal thought of school reform as a way to improve students learning quality. He said information Age society demands for school informatization, and Kyungin adopted ICT to mediate this reform process
Technology Specialist: School reform or improvement should meet the parents and the students needs. In addition, school could provide various learning materials for students. School informatization is one of the means to school reform.
Positive and Negative aspects of ICT: For positive aspects, most up-to-date information provided to

students motivates their learning. Such media provide students with a chance to access various resources just-in-time. In addition, teachers play a significant role in cyber-counseling for it protects students privacy. For negative aspects, the use of media limits student-teacher interactions. Teachers may depend on resources on the internet and become a resource-provider, and the students may not internalize the vast amount of materials. Furthermore, students may develop broad but shallow knowledge.

Teachers thought there were no differences in ownership of computers for both male and female students in Kyungin School. However, most male students are interested in playing computer-based games while female students are interested in online chatting. For the ICT use in learning, students in both genders use computers for about the same amount of time and for similar purposes. Students who are curious, explorative and enthusiastic, and who employ individually learning process use ICT the most. However, individual interest and family background make a difference in the effective use of ICT.

In order to achieve the desired learning environment reform, the number of students per class needs to be reduced and better utilization of school spaces is required to create special labs. The resources that are needed for the school reform are: continuing involvement of ICT experts, additional supportive human resources, and increase in school budget for the ICT equipment purchases (ex. Software purchases). Also, teachers active involvement in ICT is crucial element for successful school reform.

2. Past: Initial Development and Application of the ICT

The seed for the school reform efforts was planted when the school received a special budget for an information technology model school from Korean government. The ICT integration was a three-way collaborative work. The administrators, as decision-makers and the leaders, paved the way by writing a school innovation plan that worked as a blue print for the whole process. The teachers had the feasibility tests and developed the effective strategy of implementation in collaboration with the ICT experts, and the PTA (Parent-Teacher Association) members supervised the purchase and adoption of the equipment and other necessary systems. The information directors, as the media specialists, and senior teachers were the firsts in adopting ICT in their curriculum. Some of the teachers, however, reluctantly adopted the system only because the school was selected as the model school. Some of the younger teachers who were familiar with the technology usually adopted ICT in classes, and they helped other senior teachers. These last ICT adopters were the relatively older, and female teachers. The teachers who opposed school reform integration of the ICT did not want additional workload due to the ICT adoption, and they typically lacked ICT skills. It was noted that the main reason of Kyungin School s successful reform was because teachers recognized the needs of changes in the school system accompanied with the new technological developments in society, and they were willing to adapt to changing educational needs.

Kyungin School initiated **teacher training programs to encourage the ICT use.** First**,** by testing their teachers level of computer literacy, then train the teachers from the basics. The training program includes Excel, Namo Web Editor, PowerPoint, SPSS, Photoshop Pro, and Internet searching. They also trained the school network to assist their administrative work -- for student information, medical history, class management, student evaluation records, information about junior high schools, etc. Some individual teachers received additional training from school cooperation or other teacher training centers. Most of these training covered higher level of multimedia development, network, or managing server.

When asked about the level of training provided by the school, teachers answered that the training was somewhat ineffective since training programs were not designed to fit for different individual levels of ICT knowledge. Teacher said that the subjects of ICT training programs should be more practical. They wanted to take ICT training courses provided by professional ICT institutions. Teachers

felt that there was no formal or informal support for teachers ICT training from the school.
Some of the problems that had to be overcome relating to the reform were: 1) to continue teacher training, 2) to continue investment of necessary budget, and 3) to continue administrative support. However, some of the teachers with relatively advanced ICT skills, so called computer generation, blamed teachers who cannot use computers as incompetent. The ICT incompetence was the additional obstacle to those teachers without ICT skills to improve their curriculums.
Other problems were: 1) lack of solid long-term plans caused frequent modifications and unnecessarily increases teachers workload; 2) teachers rejection to using ICT in their teaching; 3) difficulty in obtaining software; 4) lack of expertise to further develop and run the system; 5) lack of funds and expertise in teachers maintaining servers and the system; and 6) conflict among the teachers due to the increased workload. Some teachers resisted to the adoption of the school system innovation as well, although the ICT oriented atmosphere in the society encourage teachers to use ICT. The level of resistance of for ICT adoption seemed to correlate with teachers age.

Some of the methods that were utilized in overcoming problems of ICT development and operation in school were: 1) teacher training on the application of the state-of-the-art ICT system; 2) teacher training in the application of the ICT system in instructional settings; 3) teachers familiarization of the ICT system from increased training and opportunities in using the system; 4) provision of various software; 5) sharing and exchanging of information via the Internet among the teachers that effectively reduced their time spent on reviewing instructional materials; 6) in-service professional development to narrow the gap in technical skills among the teachers; and 7) instructional method research to effectively use the ICT system.

3. Present: Current Application of the ICT

The ICT plays a role of improving the instructional methods, and supplements the classroom activities. It creates students learning interests, induces their motivation for learning and provides information in diverse subjects. However, some students develop keen interest in the ICT use at first for a while but soon lose interest thereafter.

After the ICT innovation in Kyungin School, teachers could gather diverse information for classes. However, they believe that the ICT system is only a part of educational improvement process, not an end of the school reform.

The teachers reported that they use the ICT for: producing reports or documents (86%); email communication (83%); searching for information on the Web (77%); using existing database (63%); database development (26%); drawing figures or charts (54%); presentation (54%); Web page development and maintenance (23%); and word programs (29%).

The teachers assign students to find educational materials in diverse subjects through web. Since classroom activities for certain subject have limits to fit for individual learning needs, the ICT is used to provide supplementary information. Upper level students can find information from the Internet in a given topic with their relatively higher technical skills compared to lower level students who frequently experience frustrations in finding needed information. The allotted ICT skills training time for students, is one-hour per week. Students can take one more extra-curricular ICT class a week. And students in 5th and 6th grades have additional ICT practical course.

The level of students overall ICT skills is about middle-to-high (i.e., producing documents, information search, communication, etc.). About 30-40% of students have their own Web pages. To

write documents in Korean with computers is a basic skill to most students. Most of them surf the Internet to find information for project presentation. Upper level students can use PowerPoint programs for classroom presentation.

For students better use of computer, teachers and parents are involved in maintaining the class Websites. At the beginning of the ICT application, some students used false log-in names and abused language. In order to overcome those problems teachers and parents supervise bulletin board of class websites and campaign for better use of computer. Teachers also encourage: provision of information on correct and appropriate use of language, active use of Korean words, commendation for using Internet technology, and active use of the Guarding Angels which is a filtering adult software. Students were taught to use appropriate language when exchanging emails. Also, to prevent students from irresponsible plagiarism of the information gathered via the Internet, they were instructed to write and edit their writing with pencils and papers.

Students, in general, spent many hours on computers at home unless limited in the use. Parents are worried of two side effects of spending too many hours on computers such as decreased level of attention to students study and isolation from peer activities. For these two reasons, some parents actively limit their children s use of home computers.

1. Main Hypothesis of ICT Application

1. Hypothesis: Technology, including the Internet is a strong catalyst to reform and improve education. The opposing hypothesis is, The true improvement is found in schools which uses the technology as a supplement to their materials, not as a catalyst, and improvement is achieved when technology is applied in a specific educational problems.

The principal, the main instigator of the reform effort, said that ICT is deeply involved in school reform. Integrating ICT to reform is unavoidable part of keeping up with the rapid changes in the digital age. The ICT is probably one of the best systems that can effectively integrate technology in schools to improve education.
Teachers, however, see the ICT as one part of the whole educational innovation process, not a solution for school reform. They believe that ICT is only teaching aids. Some teachers stated that the ICT is not particularly better than other teaching tools.
The media specialist stated that the ICT is an important part for the educational innovation process, and with the support of the system maintenance provider, the Kyungin Elementary School is ahead of other schools in integration of technology.
Principal and the media specialist thought the ICT as the mediator to change the school, teachers, and how students learn at school. They viewed the successful implementation of ICT as a way to speed up the process of school reform. Principal and media specialist supported the hypothesis, however, few of the teachers indicated their resistance thus oppose the hypothesis.

1. Hypothesis: The proliferation of the reform/improvements with the application of the ICT system is closely guided by the typical reform/improvement model suggested by Rogers (1995). The opposing hypothesis is, Technological reform works differently from the typical reform model; and ,therefore, it will show a different proliferation outcome than the one obtained from the original model.

The reform process carried out by Kyungin School showed the traditional reform procedures reported by Rogers(1995). Their firsts were information technology director or media specialist. They in turn

trained the fellow teachers to use ICT and research for ICT uses in different subjects, and shared their use of ICT through internet. At the beginning of ICT adoption, some teachers were very reluctant to use ICT. However, school developed various training sessions, occasions to use ICT, provide different software to overcome teachers resistance. Although there were different levels in ICT use, most teachers in Kyungin School feel competent about the ICT use in their classes.

Media specialist believe that the integration of technology is part of the school reform process and the successful reform is achieved when the school s new system meets students and their parents, when it provides students with self-learning in various subjects, and when effective teaching-learning strategies for teachers are developed. Thus, Kyungin School s case supports Rogers (1995) traditional reform expansion process.

1. Hypothesis: The success of the implementation of the ICT depends on the level of teachers ability to integrate it in their teaching-learning situations. This hypothesis states that teachers mediate the use of the ICT and that the ICT s intellectual value is strongly related to the teachers ability. The opposing hypothesis is, The successful adoption of the ICT is determined by the school s technological infrastructure and the students ability to use the ICT rather than the teachers abilities.

The Principal stated that about 50% of teachers use ICT to selectively adopt instructional materials for their classes and to utilize a PowerPoint program for class presentation. They also use CD-ROM titles and/or the Internet for information searches. However, not all the teachers have the ability to use ICT, and to some of teachers feel it as a burden or a challenge instead of a tool to enhance their teaching. Although Kyungin School has ICT and some of the teaching-learning framework with the use of ICT to help teacher current level of ICT can not meet the needs of each classroom. Teachers ability to use ICT has a direct impact on the success of ICT innovation in schools, and the level of the ICT integration for in-class teaching and learning.

1. Hypothesis: The gap between the haves vs. have-nots on the technological knowledge should not widen if there is an equal access to the ICT system. The opposing hypothesis is, There will be an increased gap between the haves vs. have-nots on the technological knowledge if there is an equal access to the ICT system.

Most students in Kyungin Elementary School have similar economic background, and they have similar frequency of access to the technology at home. The variable to make students individual gap in learning ICT skills, is their parents interest level on the ICT education. Media specialists stated that independent students, rather than dependent, learn better with using the ICT. Also, students learning styles and abilities affect learning with the use of ICT, because each individual has different learning strategies and cognitions.

1. Hypothesis: The successful operation of the ICT system in the classrooms will help students to achieve higher learning skills even if the quality of the instructional materials may be low. The academic achievement is dependent on the teachers roles and the school s expectations (goals), not on the instructional materials and the information gathered from using the ICT system. The opposing hypothesis stated that, The use of the ICT will lower the academic achievement due to wasted time spent on reviewing lower quality materials from the Web sites.

The more effective ICT use in teaching is achieved by providing instructional materials that were

searched and reviewed by the teacher prior to presenting it to the students. However, in reality, teachers do not have enough time to review all teaching materials before classes. Teachers would like to reduce time spending on administrative works and want more time to research for instructional materials. They also prefer that the school would not make any further technology integration, and that they could increase collaborative learning with the use of ICT in school.
Currently, in Korea, the role of public school is limited due to the growth of various private institutions offering individual or group tutor after school. The level of students academic achievement is not influenced by the role of the teacher in public schools. The above hypothesis has no value for Kyungin School s case.

1. Future Prospect of the ICT

The success of the Kyungin Elementary School s ICT integration stimulates surrounding schools interests on school ICT innovation. Teachers who participated in the ICT integration at Kyungin School take a leading role in integrating technology in the new schools that they are transferred to. Also, the School developed in-service professional training programs and train teachers and students of other schools, as well as visitors and observers. However, the Principal asserted that there is no new or expanded plan for further ICT use. Teachers need to continue their own professional development otherwise they can not get further success.

In order to maintain the success of the ICT integration, the following are needed: (1) increased expert support to reduce teachers extra administrative workload, and reduce student-teacher ratio, 2) increased development and expansion of more focused and specialized teacher training programs that include other teacher, 3) improved after-service to upgrade equipment and software for changing needs; 4) continued investment of the government funds to increase computer labs to provide better computer access to students; 5) continued research and development of and sharing of the multimedia instructional materials and teaching methods; and 6) increased the use of ICT for cyber-counseling and other activities to exchange ideas, and to seek different role of teachers.

Strategies for Effective Use of the ICT

1. Continued development of instructional programs by the teachers that would give the students an opportunity to learn by voluntarily attending programs during after school hours or during vacations. Teachers would like to have individual training sessions or trainings on newly developed instructional programs.

1. Teachers roles in the integration of the ICT system must be better defined. They can be teachers and/or development counselors. They need to be developed as a full users of the system who can adopt it collaboratively and for presentational purposes in their teaching. They need more training, and more of them are needed. They also need more time so they can take time with their students as well as to develop more and better instructional materials.

1. Teachers feel that the most pressing need to improve the learning is their effort in developing instructional materials. There is a need for an instructional method research to provide an effective instructional model.

Appendix A: Research Methods

Preliminary Meeting:
A total of five (5) researchers Jae Shin Song, Director and JuYeon Lee from KERIS, Professor Mi Lee Ahn, Co-researcher In Jin Cho, and Jung Heun Joo visited the Kyungin Elementary School on Friday, March 23, 2001, to introduce the purpose and the procedures for the OECD research, discuss the detailed schedules, and tour the school facilities.

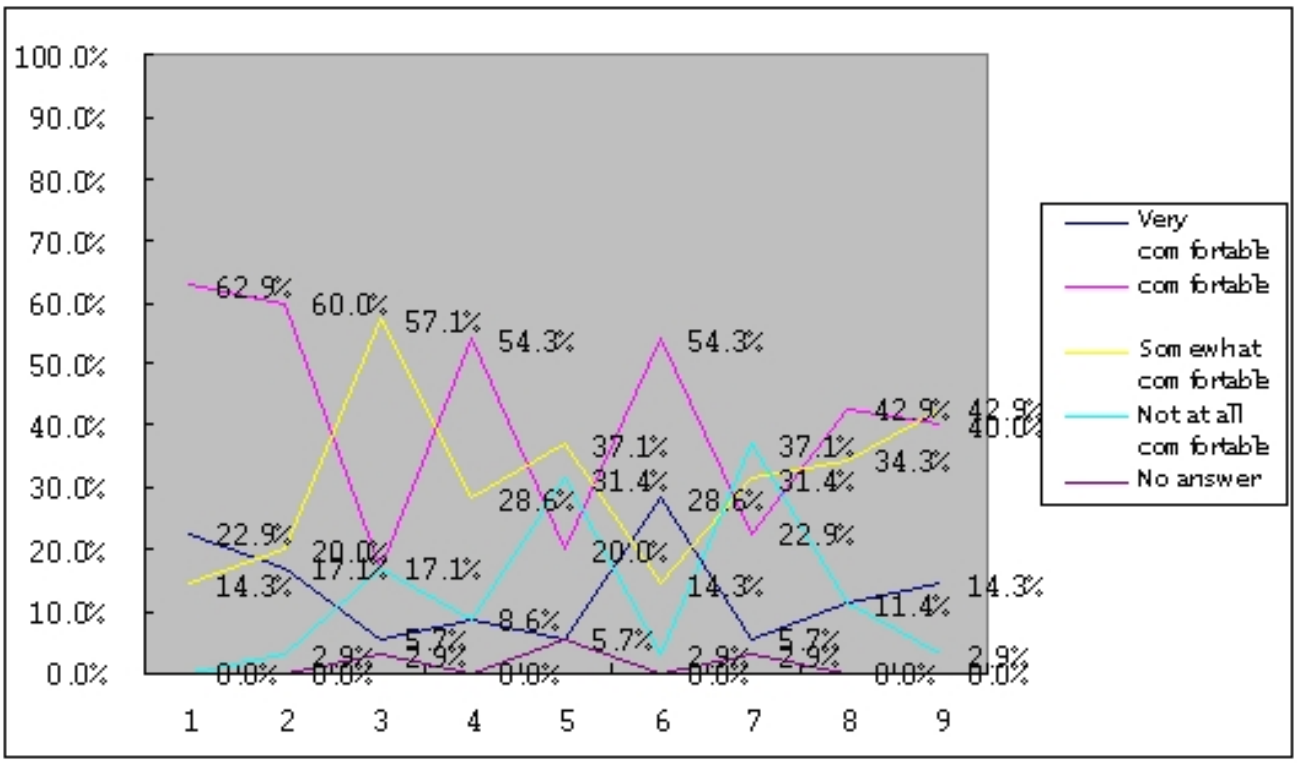
Data Collection:
Three researchers collected data for five days from March 29, 2001, to April 4, 2001. Data collection methods include interview teachers, principal, students, parents, and media specialist. They also observed and video taped the classrooms and collected other related printed materials.

The following figure is the detailed data collection schedule:

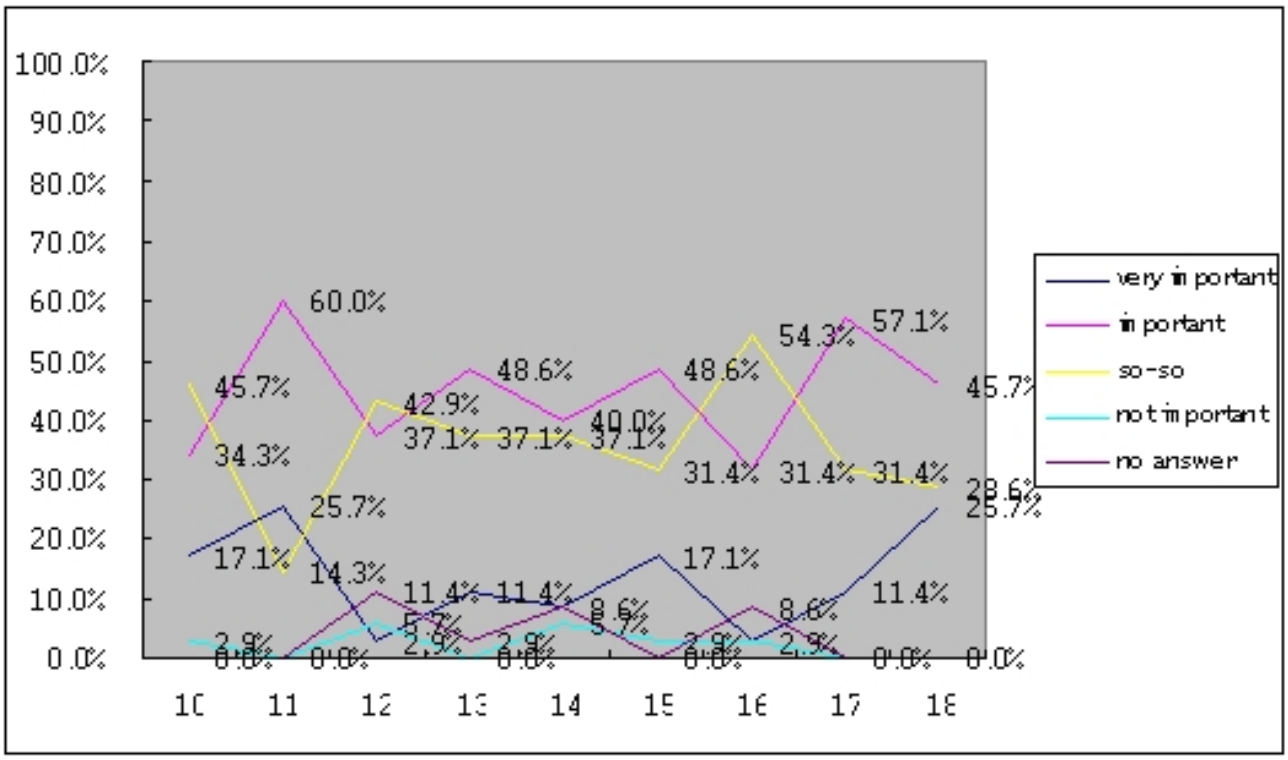
Schedule Day	Researcher	A day s program
3. 29. Thu	In Jin Cho, Ae Jin Ko	(AM) 10:30~12:00 Interview principal : In Jin Cho (PM) 1:00~3:00 Interview 2parents 2 group : In Jin Cho, Ae Jin Ko 3:00~4:30 Interview technology specialist : Ae Jin Ko
3. 30. Fri	In Jin Cho, Ae Jin Ko	(AM) Interview(teacher, technology specialist) 2:30~4:00 3, 4 Grade Interview 2 teacher 2 group: In Jin Cho, Ae Jin Ko 4:00~6:00 5, 6 Grade Interview 2 teacher 2 group: In Jin Cho, Ae Jin Ko ICT Practices survey for teachers: In Jin Cho
3. 31. Sat	In Jin Cho, Ae Jin Ko	(AM) 10:00~11:30 Follow up interview with principal : In Jin Cho 11:30~12:30 Outside of classroom observation : In Jin Cho, Ae Jin Ko
4. 3. Tue	In Jin Cho, Ae Jin Ko, Soo Hyum Yeon	(AM) 3, 4 Grade Observation 6 Classes (2, 3, 4 Class) : In Jin Cho, Ae Jin Ko, Soo Hyun Yeon (PM) 2:30~4:00 Interview 3 students 2group : In Jin Cho, Ae Jin Ko
4. 4. Wed	In Jin Cho, Ae Jin Ko, Soo Hyum Yeon	(AM) 5,6 Grade Observation 6 Classes (2, 3, 4 Class) : In Jin Cho, Ae Jin Ko, Soo Hyun Yeon (PM) Debriefing with lead administrator : In Jin Cho

Appendix B: Research Result of Teachers Current Use of ICT in Figures and Charts

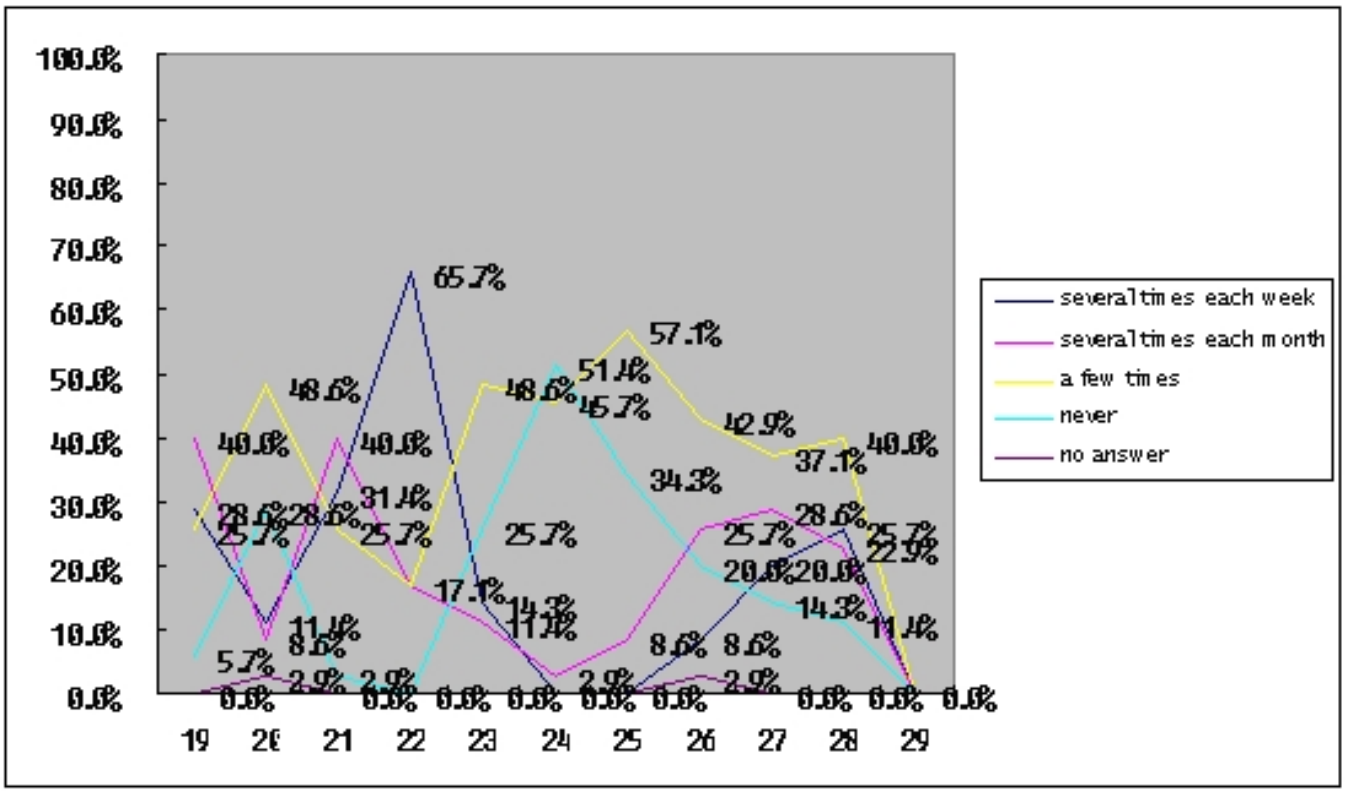
How comfortable are you with using a computer to do each of the following?					
Contents	Very comfortable	Comfortable	Somewhat comfortable	Not at all comfortable	No answer
1. write a report	8(22.9)	22(62.9)	5(14.3)	0	
2. search information on the web	6(17.1)	21(60.0)	7(20.0)	1(2.9)	
3. create and maintain web pages	2(5.7)	6(17.1)	20(57.1)	6(17.1)	1(2.9)
4. use a data base	3(8.6)	19(54.3)	10(28.6)	3(8.6)	
5. develop a data base	2(5.7)	7(20.0)	13(37.1)	11(31.4)	2(5.7)
6. send and receive e-mail	10(28.6)	19(54.3)	5(14.3)	1(2.9)	
7. write a program	2(5.7)	8(22.9)	11(31.4)	13(37.1)	1(2.9)
8. draw a picture or diagram	4(11.4)	15(42.9)	12(34.3)	4(11.4)	
9. present information (e.g., use PowerPoint or equivalent)	5(14.3)	14(40.0)	15(42.9)	1(2.9)	



How important is each of the following computer-related skills for your teaching?					
Contents	Very important	Important	So-so	Not important at all	No answer
10. write a paper with a word processor	6(17.1)	12(34.3)	16(45.7)	1(2.9)	
11. search for information on the WWW	9(25.7)	21(60.0)	5(14.3)		
12. create Web pages	1(2.9)	13(37.1)	15(42.9)	2(5.7)	4(11.4)
13. use a data base	4(11.4)	17(48.6)	13(37.1)		1(2.9)
14. develop a data base	3(8.6)	14(40.0)	13(37.1)	2(5.7)	3(8.6)
15. send and receive e-mail	6(17.1)	17(48.6)	11(31.4)	1(2.9)	
16. write a program	1(2.9)	11(31.4)	19(54.3)	1(2.9)	3(8.6)
17. draw a picture or diagram with a graphing/drawing application	4(11.4)	20(57.1)	11(31.4)		
18. present information (e.g., use PowerPoint or equivalent)	9(25.7)	16(45.7)	10(28.6)		

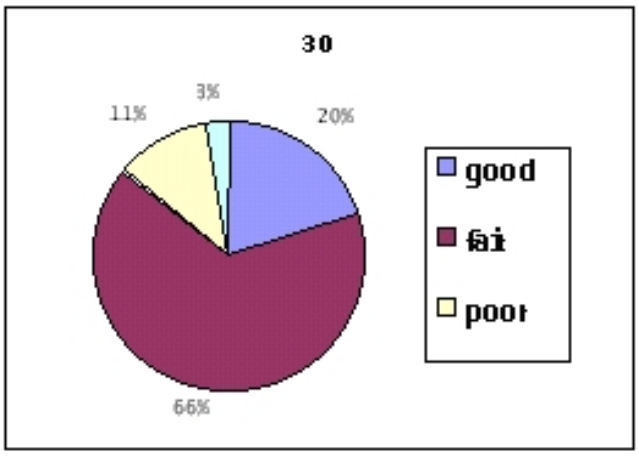


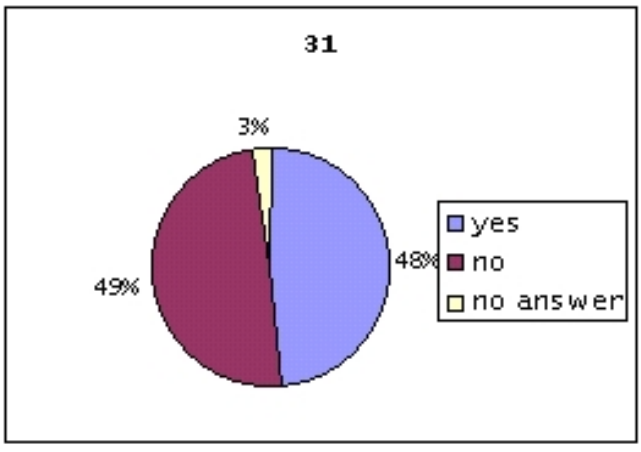
During the past school year, how often did your students on average do the following for the work you assigned?					
Contents	Several times each week.	Several times each month	A few times	never	No answer
19. use the World Wide Web	10(28.6)	14(40.0)	9(25.7)	2(5.7)	
20. create web pages	4(11.4)	3(8.6)	17(48.6)	10(28.6)	1(2.9)
21. send or receive e-mail	11(31.4)	14(40.0)	9(25.7)	1(2.9)	
22. use a word processing program	23(65.7)	6(17.1)	6(17.1)		
23. use a computer to play games	5(14.3)	4(11.4)	17(48.6)	9(25.7)	
24. use a spreadsheet		1(2.9)	16(45.7)	18(51.4)	
25. use a graphics program		3(8.6)	20(57.1)	12(34.3)	
26. join in an on-line forum or chat room	3(8.6)	9(25.7)	15(42.9)	7(20.0)	1(2.9)
27 use a presentation program (e.g., PowerPoint)	7(20.0)	10(28.6)	13(37.1)	5(14.3)	
28. use an instructional program(including simulations)	9(25.7)	8(22.9)	14(40.0)	4(11.4)	
29. other computer uses(specify)	1(2.9)	1(2.9)	0	8(22.9)	20(57.1)

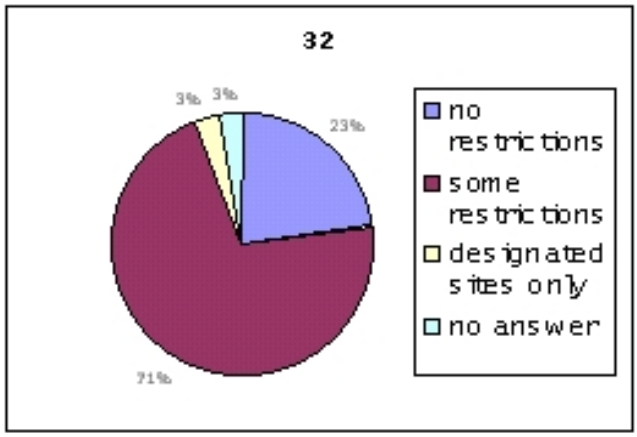


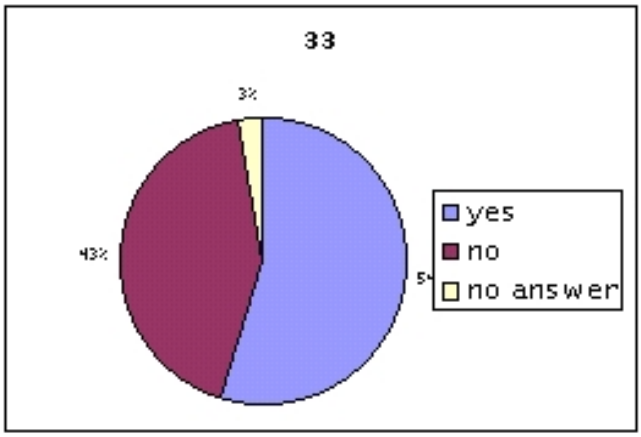
	good	fair	Poor	No answer
30. How would you rate your ability to use a computer?	7(20.0)	23(65.7)	4(11.4)	1(2.9)
; Answer questions 31-38 based on experiences or policies from the last school year.				
	Yes	No		
31.Was student computer use ever evaluated for grading?	17(48.6)	17(48.6)		1(2.9)
	No restrictions	Some restrictions	Designated sites only	
32. If you assigned World Wide Web searching, how much freedom did you allow students in locating sites to visit?	8(22.9)	25(71.4)	1(2.9)	1(2.9)
	Yes	No		
33. Did you create or modify a Web site with any of the classes that you taught? (yes-no)	19(54.3)	15(42.9)		1(2.9)
	all	Most	some	Very little
34. What portion of the computer use in your classes was directly related to the course content?	4(11.4)	22(62.9)	7(20.0)	1(2.9)

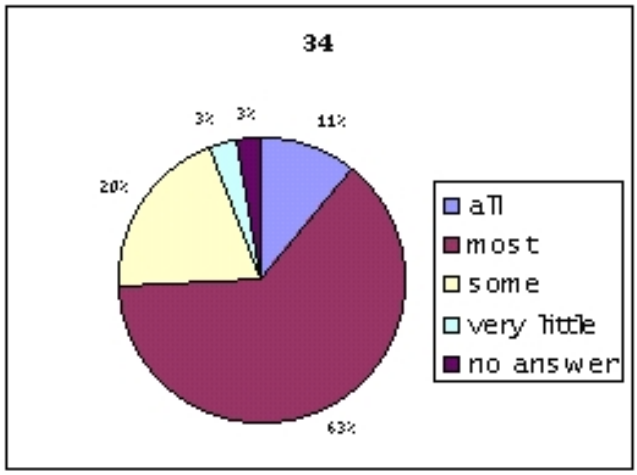
35. What portion of the computer use that you assigned was done by students individually?	0	18(51.4)	14(40.0)	2(5.7)		2(5.7)
	Several times a week	Several times a month	A few times	Never	No computer	
36. If you have a computer at home, how often did you use it for preparing for teaching?	11 (31.4)	11 (31.4)	11 (31.4)	1 (2.9)	0	1 (2.9)
	Yes		No			
37. Did you participate as a student or instructor in a virtual course through the Internet/World wide Web?	11(31.4)		23(65.7)			1(2.9)
38. Did you involve your students in collaborative learning over the Internet/World Wide Web with students from other classes?	7(20.0)		27(77.1)			1(2.9)
39. Are your currently using technology to collaborate with other teachers (professional chat rooms, forums, or the like)?	15(42.9)		20(57.1)			
	More than 12	6-11	1-5	None		
40. How many e-mail messages do you send each week on average? (more than 12, 6-11, 1-5, none)	6(17.1)	8(22.9)	17(48.6)	4(11.4)		

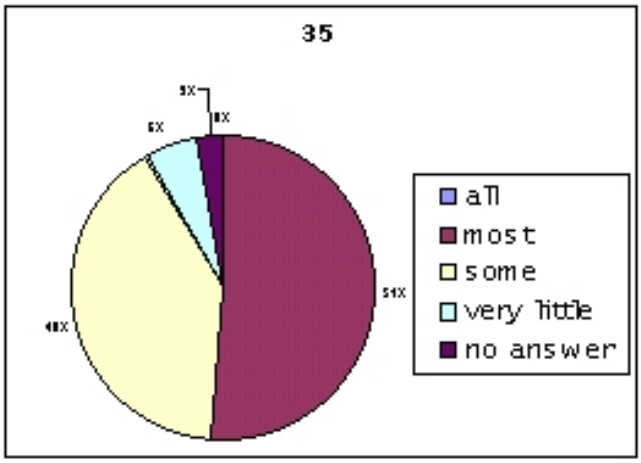


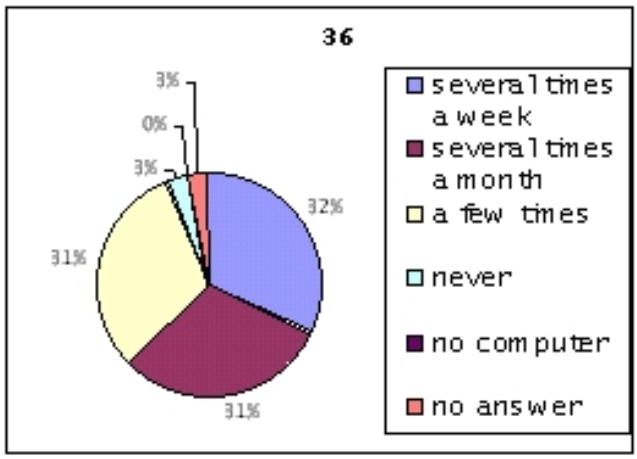



32
3%
3%
23%
71%
no restrictions
some restrictions
designated sites only
no answer

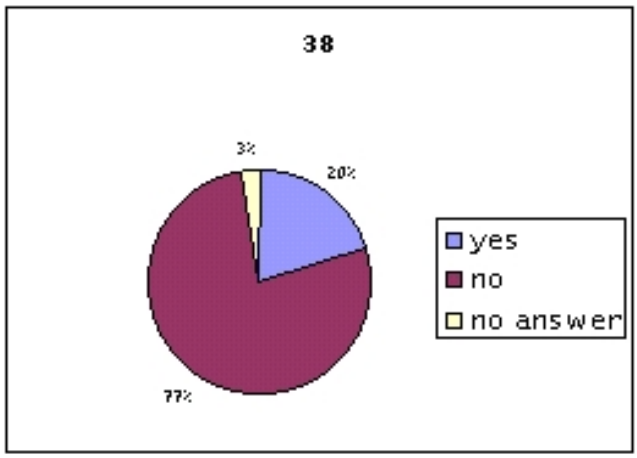

33
3%
43%
yes
no
no answer

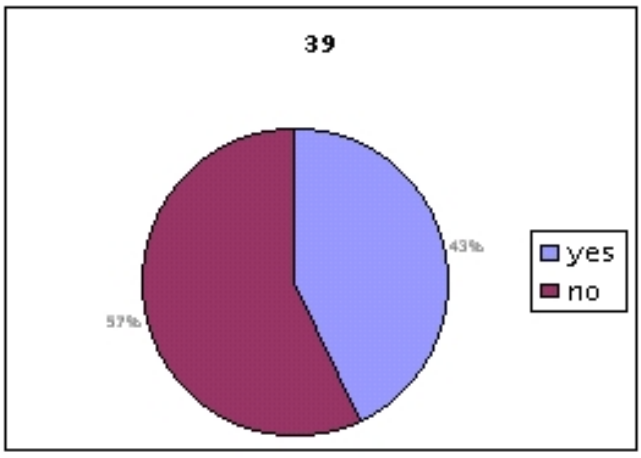

34
3%
3%
11%
20%
63%
all
most
some
very little
no answer

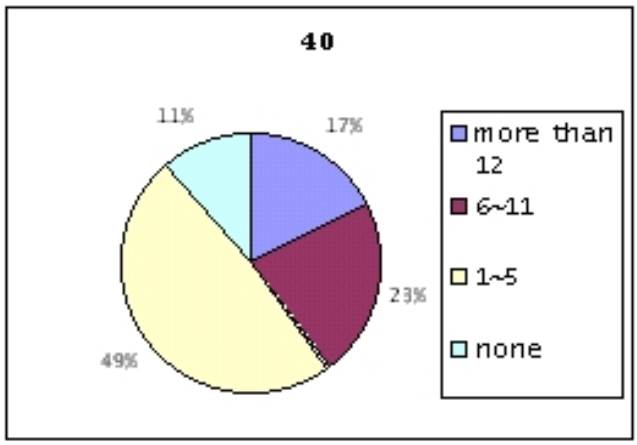

35
3%
6%
51%
all
most
some
very little
no answer


36
3%
0%
3%
32%
31%
31%
several times a week
several times a month
a few times
never
no computer
no answer

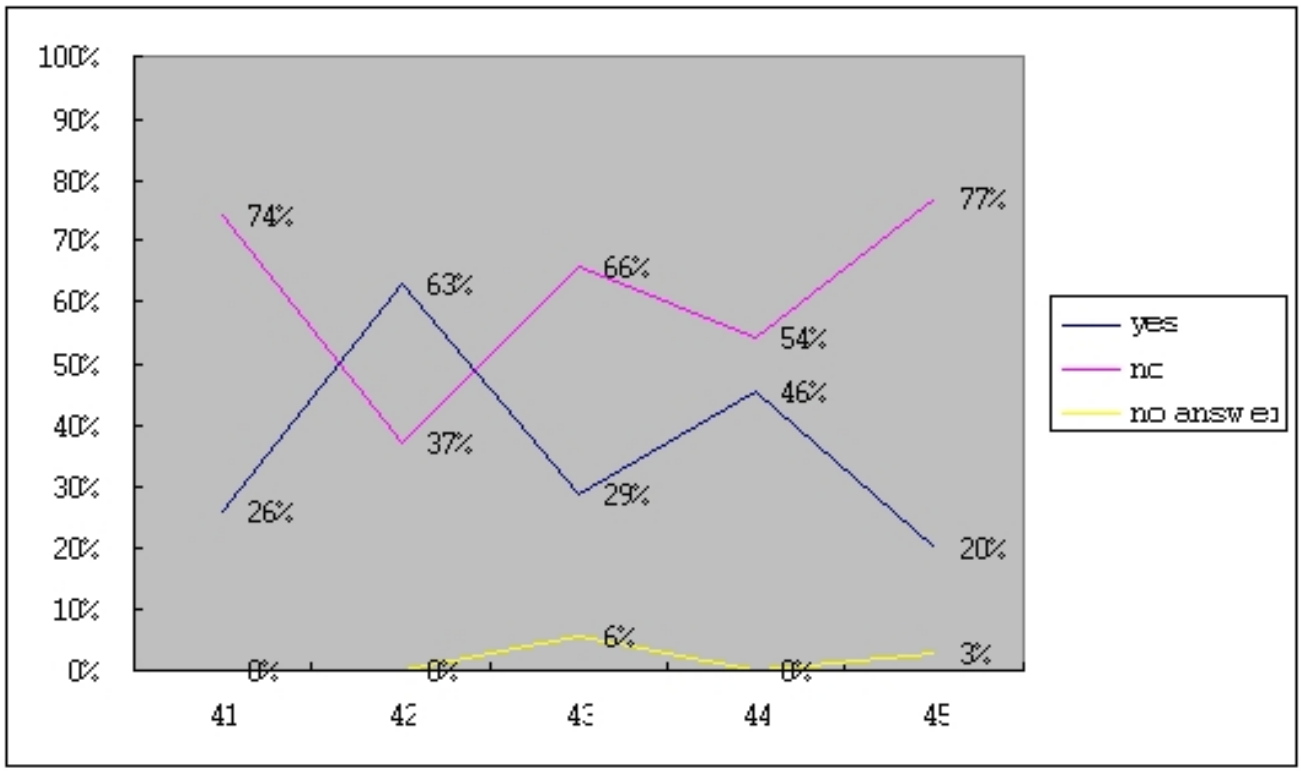

37
no answer
yes
no
yes
no
no answer


38
3%
20%
77%
yes
no
no answer


39
43%
57%
yes
no



; How many of the following have you ever done?			
Contents	Yes	No	No answer
41. made changes to a computer s hardware	9(25.7)	26(74.3)	
42. updated an application program (word processor, graphics program, etc.)	22(62.9)	13(37.1)	
43. recovered a damaged file	10(28.6)	23(65.7)	2(5.7)
44. created a web site	16(45.7)	19(54.3)	
45. developed a data base	7(20.0)	27(77.1)	1(2.9)



Appendix C: Other Related Material Index

Item	Contents
Nomination Form for a School	
Lists of teacher	Lists of teacher
School calendar	School calendar
School Web Site	School web site Review the school web site
ICT plans	Administrator generated materials
School improvement plans	Administrator generated materials
School reports	
School curriculum	
ICT Practices Survey for Teachers Interview Form	
Interview	Administrator, Teacher, Technical Specialist, Student, Parent Interviews record tape
Observation	Classroom Observation Form Observations record tape 6 pieces

	Outside of Classroom Observation Form Pictures
Teacher generated materials	Performances criteria, Lesson plans
Student generated materials	Project report, Homework, Portfolio