OECD/CERI ICT PROGRAMME

**A Case Study of ICT and School Improvement
at
School D**

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1. Overview

School D is a public school situated in the north-west area of Peloponesi and consists of one educational level, the Gymnasium (lower secondary).
The school was last year sharing the building with the Lyceum school and it is only this academic year that with relief it has been released to run the school alone free from the functional -problems created by the other school which moved to another building.
School D is running three grates, totally numbering 330 students 15 of them foreigners (Albanians). Only 15% of the students move from the above school to other school locations each academic year. The school budget sums about 5 million drachmas, an average of the resources awarded by the local Municipality another by the exploitation of the school refreshment room, and the rest by the Ministry of Education.
The school is considered one of the best functioning in the area not only because it has adopted innovative tools to handle the new technology wave but also, as the teachers have highlighted, because the school Head cares for the school development and improvement. Although the social economic level of the students is considered rather medium the school has a full registration each academic year keeping an excellent profile among the other schools of the area. School D is both academically and administratively directed by the school Headmaster called Gymnasiarchis. She is a woman who is sharing the school functionality with 38 teachers, 25 of them having a permanent position, 5 been transferred from other schools, 7 having supplementary one year position, and 1 part time teacher. All the above teachers are completing a full academic year generally working about 18 hours per week.
The academic start school date is scheduled for the 11th of September while sessions cease on the 15th of May. It is a full five day per week working period lasting for about 490 period lesson sessions. After this training

period students sit for the final June time exam having already completed 3 more one hour exams at the end of each three months semester. These two types of written exam assessment are normally influenced by the students daily performance. The average students mark in Greek language and Philology rates between 16-17 out of 20 while in Mathematics the average mark is about 15/20.

2. Overview of the past

The school has had a long rout along before Odessia project first appeared. The headmaster of the school confirms the hypothesis that the school passed from the traditional use of information technology to computer based activities through the procedure of, old technology networking machines (Acheos net), changing machines in the information technology lab in1986, and later establishing the administration computer service which meant computer use for the teachers.

The Ministry of Education in collaboration with ITY were the first to suggest teachers to adopt the Odessia project together with the precious effort provided by the local trainer and the information technology positioned person who technically supported the whole process.

The most important thing in this case seems to be also revealed from the Headmaster s interview data who mentioned that it was the information subject teacher and the Sub-Headmaster to create their web page, got some encouraging messages from other schools and finally decided to participate. It was quite difficult at their age, as she mentions, to start learning new things, some found it hard and quitted while others were joined, even some others being transferred to other schools and had to give up.

T2 mentions that it happened some colleagues from the area to come over and convince them to attempt their participation. It was a quite tiring effort to attend training after seven hours afternoon school sessions, while T4 argues about her decision to be quite negative at the beginning....

 I still have some reservations, I was certainly involved in order to be updated on new methods....penetration no...I am OK ...the students action and their enthusiasm guide us.. they know more things than we do on the use, but the problem is that they use it to play games, we have to control them...

The diffusion process aimed two things. First, familiarize students and teachers with the information technology and second, introduce some computer based learning activities either through ready software material or through teacher prepared activities relevant to their subject. The process of action learning and collaborative work was hardly noticed during the observation, in this second type of approach Teachers did not manage to operate as   back-seat facilitators , taking away any students individual autonomy and effectiveness. This lack of understanding the main concept of computer based instruction was relatively due to the short time procedures of training and application procedures and probably to the lack of adequate ready software material to be distributed. These reasons guided teachers to the emergency to prepare their own material pressed by time and lack of organization structures.

As for the resistance T3 argues that some teachers had had personal reasons not to participate, while others consider technology a positive thing but to be controlled, thinking that this silly box might take them over and become slaves of the tool. She seems to agree with these reservations supporting her view....

I am also reserved to use the computer not to be used by it....

While T2 thinks that this innovative tool isolates people as they interact with the machine, communicate with Internet but not with the real world.

Turning to the students use of computers and how they benefit, interviewed teachers consider that there is no evidence about gender discrimination in learning through computers. However, teachers think that boys are more involved in searching and dealing with machines in comparison with girls who pathetically receive whatever is transmitted. Moreover, T2 thinks that everyone benefits the computer use, the expert users having little time avoid playing games and browsing for nonsense, while the medium/bad use it with pleasure and interest both to draw information and play. Another very important aspect regarding the economically privileged students defines the benefits from computer use. These students appear more informed and better users as they have the chance to use the computer both at school and home.

As for the training which played the central role in establishing, applying, and integrating the reform, teachers argue that 40 hours of introductory learning in both computer use and educational instruction were just the minimum offered to start with it. Since then little was done for the teachers to be developed. The only educational and technical support was provided by the local trainer who, as it was observed in the experimental

instructions basically supported the teachers in their technical problems than evaluating and receiving feedback from the teachers instruction and students learning process.

The reform started in 1996 but nothing considerable happened until one year later that they made their web page in collaboration with school teaches and other involved in Odissia schools communication.

Some more programmes such as environmental, COMENIOUS, Cyprous Vergina schools Thalassa began to operate as a result of the computer, internet, phase communication. The Sub-Headmaster stated that their objective is to provide students with something more than simple knowledge. Since computers entered the school, communication with the outside world was a simple matter. Groups of students are in search of persons capable to offer their help through the Internet. This obviously happens in their free time without taking up lesson time.

Impacts on school functioning and student learning also mentioned mainly on the change of instruction, teacher s and students role in the process of ICT implementation. Teacher 1 characteristically reflects these changes and benefits of the integration of new technologies at school level.

The student /teacher contact I feel has changed, the students have a closer contact with their teachers , I feel they have improved their relationship.Teachers are satisfied with their students who understood the utility of computers and use it enthusiastically to cover up their needs .

3.The present

As it has been mentioned before the ICT use at school D has completed only one year operation. Within this time frame a lot has been accomplished both in the perspective of reform and school functioning or student learning.

The reform was firstly linked with training teachers to use Information Technology. As teachers argued in the interviews, out of one or two teachers who had poor knowledge on computer use, the rest had never touched the mouse before . This, obviously delayed the process of implementation and its further diffusion. However, the personal enthusiasm for development from the part of the teachers worked as a catalyst in the implementation and diffusion process. Motivation did not arise from professional, economic or other external factors but it was the result of individual curiosity-as the teachers stated-to explore new ways of approaching teaching and learning. The Headmaster said

we hoped something good will come out that s why we entered the project

Data revealed that a very low percentage seems to have Access to computer use at home. Only 20% of the teachers use the computer outside school while students percentage appear lower. Only two teachers were familiar with information technology since 1992 for Administrative use when computers were introduced at school as information subject

The school following the National Curriculum offers the subject of Information Technology as a separate subject in all three grates of Gymnasium. The aim is to familiarize students with computer use and computer applications.

Turning to the Odissia project it only started in 1999 with the integration of computers within curriculum disciplines.

Ten teachers out of 35 attempted ICT use within the school curriculum as a teaching /learning aid. Their aim was to practice students knowledge, provide them with skills, and encourage collaboration and communication rather than cultivate methodological and high thinking skills, such as analytic and synthetic thinking and hypothesis testing.

Teacher 1, 2 think that they would probably have organized specific subject activities if they did not waste their time with teaching students computer use. This problem, they argued, seems to be the biggest obstacle especially in the first grate because students have not been familiarized with the information technology subject in the lower level (Demotiko) and therefore computer use is for them the first aim.

3.1 Infrastructure

The main technologies are briefly described in this section.

There are 2 PCs locally networking in the Administration office.

In the Odissia lab there are 11 networking PCs
The information lab disposes 8 old technology PCs
The Internet is provided through the Pedagogical Institute link, Department Ministry of Education. Internet access is available to students even outside school hours provided that the responsible teacher is present in the lab to inspect students work.

3.2 Support

Three are the current uses of technology at school
A) Information technology subject which was first introduced to familiarize students with computer use
Administrative use either in the secretary room or in the Odissia lab. Teachers use computers to register grating, list students files, draw results, or even use the word processor for communication purposes.
Within school curriculum
The subject area is information and experimental approaches to Greek language, History, Physics, PE, and Foreign Languages. Teachers who have obtained typical training on ICT use, voluntary enter the Odissia lab with their students whenever they consider they need supplementary consolidation and support in the particular subject or unit. Some of the teachers have adopted the model of instruction which they had been once or twice trained to use, while others invented approaches which are not far from the conventional teaching and learning. All these approaches will be presented and discussed in the next section.
As mentioned above, the school, after its involvement in the Odessia project established a computer lab with 11 networked PCs , Internet link, to serve the needs of computer based activities. It seems that infrastructure is not adequate for the school needs with the exception of Internet. The link is provided by the University junction networking through out the academic year.
Administration services are provided through 2 locally networked PCs which are located in the secretary office. However, the teachers think that the establishment of a second lab would facilitate their work and provide with more availability of service and use.
Turning to the support provided, during the academic year 1999 a special positioned person within the school offered technical support. This, as the teachers mentioned facilitated the implementation process providing the inexperienced teachers the security to attempt more and more computer applications. However, in the academic year 2000, when this research was in process, the technical person had not appeared in the position alarming teachers and administration about the continuation of their effort to apply experimental teaching in the computer lab. The solution was partly given by the Odessia project school trainer who was offered to provide both technical and educational support.
The trainer still organizes educational training sessions in the afternoons instructing teachers both in Information technology use and computer based activities. However, the teachers insisted on more specific training on each subject material by a specialist trainer for each particular subject. As they mentioned it was only once that they met the specialist, e.g Greek Language trainer in two years time pointing that methods or approaching computer based learning are applied the way each teacher perceives the concept...
 if here was proper step by step software, we could use it more frequently , when the teacher is obliged to collect the material and prepare an experimental teaching for a week arrange it the way he thinks , surely this is negative for the teacher to start this process....
The only opportunity for the teachers to communicate was given through these few meetings with the trainer, but it is worth mentioning that these enthusiastic teachers of the above school kept exchanging ideas with the more experienced, solving problems they faced and participating in instructional experimentations in the computer lab.

3.3 Computer use and activities

Observation data and teachers interviews revealed that the organization of computer based activities were linked to the National Curriculum subjects, discussed and assessed but did not aim to cultivate any methodological skills or problem solving.
It was observed that all teachers, except one who seemed to have partly approached the concept, did not manage

to escape the traditional practice inside a technology based environment. They gave the impression and were well convinced that they were doing the right thing, being stressed, speaking all the time, presenting in detail, asking questions and assessing, typically not escaping from the conventional approach.

What they really presented was observed and video taped.

Teachers have drawn information from the Internet or software, have created questions on worksheets, send them at the students terminals the Internet address-or browse it themselves- suggest students to be informed on the subject matter (usually translated into Greek) and finally distribute the worksheets to be completed.

Teacher instructs students to connect a URL with information relevant to the subject she intends to practice. Students collect the information and complete the worksheets which have been distributed.

It is worth mentioning that although the students worked in groups of two in search of the information, the students received one worksheet each to complete and therefore excluding them from the possibility to collaborate. Interaction happened only with the teacher who had the principal role in the process aiming to a product oriented approach. Student autonomy and self decision was rarely noticed as all students depended on the teachers guide being always explained about their next step.

ICT use was observed only after the students were ordered to press enter a case which was explained as full teacher centered intervention. Teachers themselves explained that their students had little knowledge of computer use and therefore they had to intervene avoiding probable damages and also saving time for the instruction.

It seems that teachers were confused about the what and how this new approach would proceed. Teacher 4 expressed doubts...

Now I don t know which of the two is better, two or three heads bending over, or one child and the computer
Interview data from T2 reveal that all this approach was not the result of their training but their own invention. However, she thinks that a lot of initiatives are provided to the students to develop their critical thinking and that she is not stressed any more in search of teaching material

in the traditional classroom the material is limited...now with Odessa the students will discover it alone, it is an initiative and judgment, it is my first aim, to develop critical thinking and initiatives...
Teacher 4 realized tasks with pictures and annotations or dictionary search.

She was quite satisfied for her students to learn through pictures without any text comprehension because it was in English and she did not have the fluency to translate. She complained about the lack of software relevant to her subject and wished more training in the future.

3.4 School community s perceptions on the use of ICT and its relation to educational innovation

The multidimensional role for the ICT use is presented below by the Headmaster and the school involved teachers. Teacher1 thinks that innovation is what is to be instructed in class to be followed on the computer screen, it is an experiment, do not know about the outcome, she considers it as a modern tool that students need to be familiarized with in order to enter the informational society. On the other hand she thinks that the computer is not capable to substitute the teacher, it simply helps him to improve his teaching, Additionally, she complains about ITY which

threw some machines here (at school) and we were left to manage by ourselves
It is quite interesting the way the Headmaster perceives the innovation. She accepts the term innovation but she considers it is still at the beginning, it needs conditions, better organization, collaboration from the part of all the involved in education, policy making...

We have to know whom to revolt to , now we have no idea about the person in charge , there is no curriculum that includes computer activities, it has to be within a project of disciplines, it is an uncontrolled teaching process...
She goes further saying that no complete course can be integrated and instructed only in the computer lab as a whole subject.

T2 explains why they started the ICT use considering that it is an international revolution and the future of the new generation, adding that she has tremendously been influenced by her son s enthusiasm for computers and her students interest at school, also that the information exchange is very important as well as the speed with

which information travels foreseeing that the future will be completely different. T3 thinks that a very little piece has been exploited, the possibility to benefit is endless and the children tend to adapt this possibility. She only worries about the children whose teachers are not involved in the computer activities highlighting the rival created in the school community, as well as the , competition that is provoked among the students not participating in the process. Additionally, she mentions that the comprehension of English language texts remains a problem for the people who do not master the English language.

T4 separates the material arguing that some units can be taught with great interest, students prefer the computer lab to their conventional class undertaking the responsibility to explain students the situation and finally that it is quite positive for the students to work in groups.

Turning to the part of the students they are obsessed with the new mean, sometimes appear addicted with computer use for all subjects. Students 1, 3 think that little by little teachers should be substituted by the computer as it is more interesting, avoid boring classrooms and give a good chance to the weak students to try a motivational way of learning.

Student 2 believes that

 Odessia upgraded the school converting it to one of the best in the area, students learn skills and apply competencies through computer use.... Our school could probably work as an experimental school similar to those in Athens with separate science computer labs

In parallel, he thinks that it should be diffused to other subjects, escape common ideas, write assignments enriched with updated information and generally enlarge their knowledge.

S4 thinks that their school has quite been improved since the computer activities were added to the curriculum, it has been an evolution, but he only points out the fact of being spoilt so the teachers avoid giving them chances to use the lab. He supports the idea that the practice is great, learn new things which sometimes are quite impressive.

P.2 reflects with his words the innovation at school pointing that the involved in different disciplines teachers combine the ICT use with subject learning.

 It is something new it could be probably written on a piece of paper but it is done on the computer, it is more entertaining, interesting giving the student a different taste of action,, and this is considerable...

Additionally, he points out the change in the school functionality, having escaped the traditional and giving place to innovative approaches, more interesting, fairly a step ahead.

Parent 4 has no idea how the school has been organized after the introduction of computers.

Parent 1 thinks that computer use and computer activities is an evolution , as reading books was quite limited, while computer analysis is endless.

As it has already been mentioned the Information technology subject was first instructed in the A class Gymnasium within the public school curriculum. This, as teacher 2 considers does not help the process of the innovative instruction of computer based activities on the curriculum subject. It should, as the above teacher thinks, either information technology sessions be increased in all grates and especially in grate A , or the subject of information technology to be included in the Demotiko curriculum (elementary level). As she reasonably argues, it is not possible for the teacher of Greek Language to instruct students on the computer use.

On the other hand, teacher 4 wonders where this passion with computers could lead. She believes that action should be controlled and only use computers in working hours, otherwise they face the students rivalry sometimes denying to enter the conventional classroom.

 I talked it over with my students, because it was a recent experience they liked it a lot, certainly because they missed a conventional session.....something like that.....no some other student said, we had also instruction from the book ...(.in the computer class)

Teacher s 3 opinion coincides with T2, that if students familiarize with computers then they will see it as a tool while the Headmaster thinks that students should be controlled while browsing because it is a two coin face, get the information or get lost in it. She even goes further presenting her traditional view by discriminating

 in parallel students should understand that the lesson is done in the conventional classroom while in the computer room it can be understood how to draw information...

It is obvious that teachers have different views about the innovation because in this school only one teacher managed somehow to approach the concept. This might be explained and justified as inadequate training on the specific aims, methods, and strategies of attaining their objectives through ICT. Therefore, they consider innovation firstly as an aid solving some educational problems (information , practice, group work) and

secondly as a challenge that they ought to accept and resist against its extreme innovative approaches. Additionally, involved teachers had to give up a lot of leisure time in favor of the reform as they had to start from scratch except few- learn how to use computer and consequently follow training on educational technology. This, surely promoted school profile but also provided the basis for further diffusion.

Although involved teachers kept on working with great enthusiasm, some not involved teachers reluctantly created a negative profile to their students as they were in a way provoked by the participating students. This cannot be controlled at this particular phase of the project as no teacher is obliged by the national curriculum to include computer based activities in his subject. They are all free to chose optional involvement, but highly encouraged and supported by the school Administration.

As for the fact that students tend to divert the computer lab into a computer games area the involved teachers react to this tendency by controlling the students use any time they freely enter the lab to search for information. Finally, what is planned for the future cannot be confirmed by anyone as they think this transition period could last for long. However, the Headmaster in her word reflects the need for more detailed information on what is scheduled for the future expressing the lack of communication between the school and the responsible of the project

we are not informed at all, it is basic, organization is basic, I have no idea whom to ask for information, I ask PLINET and refuse, ITY and answer it is not us, who at last is the responsible......

4. Main hypotheses

In what follows we discuss the main hypotheses of the study in the light of the empirical evidence that have been presented in the preceding sections.

Technology is a strong catalyst for educational innovation and improvement especially when World Wide Web is involved.

Concerning the history of the introduction of ICT in their school, interviewed teachers and the administrator supported the second part of the hypothesis. As teachers argued, the computer use, although it provided a modern multidynamic tool they used it to support existing practices in their classrooms, traditional or progressive. Additionally, they point out the change in the school functionality, having somehow escaped the traditional and giving place to innovative approaches, more interesting , fairly a step ahead.

As observed in the teaching sessions, the teachers modernised their teaching in terms of materials used, and tried to shift to more open learning approaches. Most of them, however, could not avoid returning to the traditional teacher centered teaching model.

The diffusion of the innovation/improvement (and therefore of ICT) followed the traditional diffusion pattern for innovations, as outlined by Rogers (1995).

As we have discussed, the school introduced the use of ICT in the school participating in the national project Odysseas funded by the Ministry of Education. Participation of the school was accepted since the Headmaster of the school and the most of the teachers at that time were willing to participate and organise pilot computer based lessons. However, the involvement of the teachers was by no sense obligatory, and there was no specific school policy related to the aims of the computer based activities or specific subjects for ICT to be used. It was up to interested teachers to get involved and use ICT in their teaching. Still, as it was observed it is the interested teachers who use ICT in their teaching. It seems that inadequate in-service training on the use of ICT in the teaching practice and mentality resisted teachers ,discouraged the rest of them to risk and get involved in the innovation. It has, though, to be highlighted that the effort for the introduction of ICT use in Greek schools in general is very recent. Thus, there was not the necessary time to allow the appropriate structures for training or support to be built.

Successful implementation of ICT depends mostly upon staff competence in the integration of ICT into instruction and learning.

As already mentioned, all the teachers that used ICT in their teaching modernised their teaching by using modern multidynamic tools that were used by the students and not the teacher anymore. However, most of them did not manage to shift their students learning to progressive approaches. It has to be highlighted that teachers worked very hard and additionally to their teaching duties to familiarise themselves with the computer use and applications, to prepare the computer based lessons, and try them out before entering the classroom. They were very enthusiastic with what they were doing and committed to try out at least some computer based lessons. In

this sense, and considering how recent was this effort, they succeeded to integrate a modern tool in their classrooms overcoming technical problems and frustration. It will need though more time for these teachers to reflect on these first try outs and move forward to the next step of using the computer to upgrade their own teaching objectives. Moreover, it will need support on the pedagogical issues of using ICT and development of communication networks between teachers to exchange ideas and share activities.

Gaps in academic performance between high and low poverty students will not increase when all students have equal access to ICT.

Involved teachers consider that the innovation has opened new opportunities for schooling. Computer use, and equal access rather diminished the gap in performance between high and low economical level students than enlarging it as the reform hypothesis prescribes.

We cannot test the truth of this finding hypothesis because academic performance was not related to the computer use.

Successful implementation of ICT will lead to the same or higher academic standards in spite of the low quality of many ICT materials.

We cannot test the truth of the fourth hypothesis because academic performance was not related to the computer use.

5.Overview of the future

As it has been mentioned above the school first introduced the Information Technology subject which traditionally created the basis for all the school community to proceed to the Educational Technology which only two years ago was integrated into the school curriculum. Therefore, it is too early for the involved persons to talk about revolutionary learning outcomes. They are satisfied even when students send e-mail or collaborate in groups.

It seems that in order the innovation be sustained, both technical and educational support should continue from all the involved parts.

First, the lack of technical support this year created problems both to teachers and students. They fear the possibility of damages which might cost the interruption of their effort. However, they confess that they feel more secure than last year that they had just started from scratch, having acquired the basic knowledge on computer use. Basically, the teachers would like to present more than their students do, but as all rather view with disappointment this is inevitable because of age restrictions and social responsibilities.

Finally, it could be of considerable importance the provision of a second lab which would facilitate the school scheduled sessions and provide access to more students in more frequent periods.

Second, in order teachers to be able to fully integrate innovation in all subjects-probably even mathematics- the existence of scaffolding software could both release them from the obligation to prepare experimental instructions dedicating precious time, and help them organize more systematic computer activities. Moreover, training could support them educationally and provide with confidence as they would feel secure that new approaches through technology are quite effective. They do not need extra incentives to move on, as they view, but, teacher 1 supports it

probably we could be provided with economical help to have our own machine at home... even we were very happy to hear that we would be provided with a certificate for participating in the computer based activities....nothing more just moral reward...

Another initiative from the part of the Ministry of Education to fully integrate subjects in computer based learning by policy making. This could be achieved by including computer activities in the National Curriculum and adding sessions in the daily school programme. This would facilitate the process and motivate the whole educational community. This way, teachers consider, they would be less stressed to cover up classroom material, and would provide students with extra practice needed to consolidate their knowledge. Teacher 4 goes a little further wishing an ideal teaching/learning situation....

I like quality not quantity, I think few moments in the computer lab are quality ones....I wish this could mean the beginning for the children to move on alone...our work in class should be improved, organized, attractive for children, so that they might not need to be instructed by the teacher,...that is, a type of school where after the student has finished sessions to continue studying, a classroom where students never give up using the machine..... a continuous and close relation with it...

APPENDIX A

Consistent with the methodology described in the Workbook for Organisational Case Studies (OECD/CERI) a short-term explanatory case study has taken place in the school in order to compile a corpus of information that would allow a rich description of the ICT integration within the site. The data collection was completed in a three day visit of two researchers of the ICT team of the Center for Educational Research. Classroom observations were conducted in the school as well as interviews with the staff. The purpose of classroom observations was (a) to validate how ICT is used in the lessons and (b) to gather evidence for how lessons were taught. The overall time of observation was 12 sessions of 45 minutes. The scheduling of the observations in school C shown at the Table 1 - was arranged with the head master before the visit.

Teacher	Subject	Grade	Number of observations	ICT use
T1	History	C	1	Internet Image and video processing
T2	Ancient Greek	C	1	Internet Image and video processing
T3	Modern Greek Language	B	1	Internet Image and video processing
T4	Anthropology	A	1	Internet
T2	Modern Greek Texts	C	1	Internet Image and video processing
T4	Anthropology	A	1	Internet
T2	History	A	1	Internet
T5	English	C	1	Internet
T6	Interrogation	B	1	Internet
T7	Ping-pong	A	1	Internet
T8	Olympic games	B	1	Internet
T9	Greek Language	A	1	Internet

Table 1: Classroom observation plan

For the observational data collection one video-camera was used - occasionally moving to capture instances of the classroom atmosphere. Concurrently with the video-recordings, observation notes have been taken describing the overall classroom activity and focusing on potentially significant details and episodes in teacher practice, student groupwork and student communication. During our visits to the school 14 interviews were conducted: 1 with the head master, 4 with teachers (one not engaged in the ICT use), 4 with students, 4 with parents and 1 with the technical support specialist. The average time of each interview is shown Table 2.

Interviewee	Time (min.)
Head master	60
Teachers	50
Parents	40
Students	30
Technical specialist	45

Table 2: Average interview time

Background data was also collected (i.e. students written presentations of their work) that served as complementary information to the video-recordings and observation notes, which formed the main corpus of our observational data. Verbatim transcriptions of all interviews were made.

APPENDIX B

Table 1. Familiarisation of teachers with computer applications					
How comfortable are you with using a computer to do each of the following?	Very comfortable	Comfortable	Somewhat comfortable	Not at all comfortable	Missing cases
1. write a paper	2	6	4	5	0
1. search for information on the World Wide Web (WWW)	4	6	1	5	1
1. create and maintain web pages	2	1	13	0	1
1. use a data base	6	2	7	0	2
1. develop a data base	2	2	11	0	2
1. send and receive an e-mail	4	4	2	7	0
1. write a program	2	12	0	0	3
1. draw a picture or a diagram	1	4	5	7	0
1. present information (e.g. use Power Point or equivalent)	1	2	6	8	0

Table 2. Importance of computer-related skills for teaching					
How important is each of the following computer-related skills for your teaching?	Very important	Important	So-so	Not important at all	No answer
1. write a paper with a word processor	5	4	2	2	4
1. search for information on the WWW	8	4	1	0	3
1. create web pages	1	3	4	4	5
1. use a data base	4	3	1	4	5
1. develop a data base	3	3	2	4	5
1. send and receive an e-mail	5	4	3	1	4
1. write a program	3	2	1	3	8

1. draw a picture or a diagram	3	5	2	3	4
1. present information (e.g. use Power Point or equivalent)	4	5	2	1	5

Table 3. Frequency of use of computer applications by the students					
During the past school year, how often did your students on average do the following for the work you assigned?	Several times each week	Several times each month	A few times a year	Never	No answer
1. use the World Wide Web	1	8	4	0	4
1. create web pages	13	0	0	0	4
1. send and receive an e-mail	5	8	0	0	4
1. use a word processing program	1	5	7	0	4
1. use a computer to play games	6	6	0	0	5
1. use a spreadsheet	1	11	0	0	5
1. use a graphics program	3	9	0	0	5
1. join in an on-line forum or chat room	11	0	0	0	6
1. use a presentation program (e.g. Power Point	5	7	0	0	5
1. use an instructional program (including simulations)	6	6	0	0	5
1. other computer uses (specify)					

Table 4. Teachers ability to use computers			
	Good	Fair	Poor
30. How would you rate your ability to use a computer	1	6	5

Table 5a. Experiences and policies concerning ICT use			
Answer questions 31-38 based on experiences or policies from the last school year	Yes	No	No answer
31. Was student computer use ever evaluated for grading?	13	0	4
33. Did you create or modify a Web site with any of the classes that you taught?	13	0	4
37. Did you participate as a student or instructor in a virtual course through the Internet/WWW?	14	0	3

38. Did you involve your students in collaborative learning over the Internet/WWW with students from other classes?	14	0	3

Table 5b. Experiences and policies concerning ICT use (continued)

Answer questions 31-38 based on experiences or policies from the last school year	No restrictions	Some restrictions	Designated sites only	No answer
32. If you assigned WWW searching, how much freedom did you allow students in locating sites to visit?	6	5	0	6

Table 5c. Experiences and policies concerning ICT use (continued)					
Answer questions 31-38 based on experiences or policies from the last school year	All	Most	Some	Very little	No answer
34. What portion of the computer use in your classes was directly related to the course content?	1	5	3	2	1
35. What portion of the computer use that you assigned was done by students individually?	3	3	5	1	5

Table 5d. Experiences and policies concerning ICT use (continued)

Answer questions 31-38 based on experiences or policies from the last school year	Almost every day	Several times a week	Several times a month	A few times a year	Never	No computer
36. If you have a computer at home, how often did you use it for preparing for teaching ?	1	1	3	1	6	1

Table 6a. Computer use for communication

	Yes	No	No answer
39. Are you currently using technology to collaborate with other teachers?	13	0	4

Table 6b. Computer use for communication (continued)

	More than 12	6-11	1-5	None	No answer
40. How many e-mail messages do you send each week on average?	4	9	0	0	4

Table 7. Advanced uses of computer

How many of the following have you ever done?	Yes	No
41. make changes to a computer s hardware	3	10
42. updated an application program (word processor, graphics program, etc.)	1	12
43. recovered a damaged file	1	11
44. created a web site	21	11
45. developed a data base	2	11