OECD/CERI ICT PROGRAMME

A Case Study of ICT and School Improvement at

Jacobus College, Enschede, The Netherlands

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Table of Contents

A Case Study of ICT and School Improvement at the Jacobus College

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1. Overview

1.1 School description

The Jacobus College is a catholic comprehensive school for pre-vocational secondary education, senior secondary general education and pre-university education in Enschede. Enschede is a middle-sized town in the east of The Netherlands. The income level of the parents is mixed.

The present school is the result of a merger between several schools for secondary education. At this moment, there are four locations. The total number of students is 2.600. The teaching staff is about seventy persons.

The location where we studied the project 'School 2000' is the main location of the school. At this location, there are 1.100 students. The main location is a traditional building for secondary education.

This location has a computer lab and a study house for the upper grades (a study house is an area where students can work independently, they can study and do their assignments).

The school has its own website (http://www.jacobus.nl/). This website can also be used to visit the website of the 'Whitbread Race' project.

Since 1996, this school has become well known in the country, especially students, because of their elaboration of the examination assignments for junior and senior secondary general education and pre-university education. They have set up a website for this purpose. In May and June, the period in which most examinations take place, the website is visited very frequently.

The school is part of a foundation. This foundation has over twenty schools for secondary education in The Netherlands.

In 2001, the school will merge with a protestant school for secondary education.

The school has been visited in June 2000. At that moment, the 'Whitbread Race' project was carried out, supervised by the mentor of the class. At the end of the school year, an evaluation has taken place. In school year 2000/2001 educational assistant have taken over the tasks of the mentor. In February 2001, the 'Whitbread Race' project was repeated. Therefore, the school was visited again to know what the effects of the evaluation have been on the project 'School 2000' and especially the 'Whitbread Race' project.

1.2 Educational system

Secondary education in The Netherlands starts in grade 7 (age 12). The first two years are called 'basic secondary education'. Students are offered fifteen subject areas. Schools have formed homogeneous or heterogeneous classes. After this period the students go to pre-vocational secondary education (up to age 16), senior general secondary education (up to age 17) or pre-university education (up to age 18).

National exams are given at the end of the final grade: pre-vocational education in grade 10, senior general secondary education in grade 11 and pre-university education in grade 12.

Recently a new type of secondary education has been introduced in the Dutch educational system: pre-vocational secondary education. It is a combination of junior vocational education and junior general secondary education. Within the new type there are four learning pathways related to the abilities of the students.

Photo 1: Students at work in the 'Whitbread Race' project

Most of the schools for secondary education in The Netherlands are comprehensive schools, which offer all types of secondary education. By successive mergers in the past few years, the number of schools has decreased.

1.3 School improvement and ICT

The project 'School 2000' is an innovation project for the lower grades of secondary education (i.e., grades 7 to 9, age 12 to 14). The school wants to achieve two goals in coherence: (1) innovation of the teaching practice aimed at independent working and learning, and student-directed teaching, (2) release time for teachers by decreasing the number of their lessons, teachers will be able to develop new lessons (e.g., by applying innovative aspects in these lessons). In this project, an educational assistant supervises students. It is a cross-curricular project in which ICT is used in several projects as a source of knowledge and information, especially the Internet, because a teacher is not present in the lessons.

The teaching material is developed by a group of teachers. The material needs to be student-proof: students should be able to use the material independently. Students work in groups of two to four students. They have to organise and plan their activities.

By reducing the lesson time of all lessons to forty-five minutes, three study-skills lessons have been realised. Two of them are used for the project. During the school year, students do one large or two small projects in a term. A term lasts about ten weeks. One of these projects is the 'Whitbread Race' project, a large project of the subject area English for students of grade 8 (age 13). The students search the Internet for information, they use a browser and search engine. Information, instruction and teaching materials are available on the website of the project. However, ICT is used in this project as additional information. The problems with the Internet causes to make more use of printed documents than of ICT.

In this report this project will be used as an example of a project within the framework of project 'School 2000'.

1.4 Profits of improvement

With project 'School 2000', the school wants to provide challenging projects to the students. Students will be actively involved in these projects. The projects are designed in such a way that students can work independently, individually or in small groups (two to four students). The projects develop the independence and the study skills of the students, which they will need in the upper grades of secondary education.

The educational assistant keeps an eye on the students while they work. The educational assistant can help the students, but does not give instruction. So this assistant cannot answer questions from students regarding the content of a project.

In the first year of this innovation, their mentor (a teacher) supervised the students. Now, in the second year an educational assistant does the supervision. The assistants appear to be more critical than the mentors. Probably because it is their only task in the school, while the teachers have more tasks.

The teachers have time available for the development and improvement of their teaching and pay attention to innovation in their teaching.

Now, the project manager has to deal with six educational assistants. This is easier to manage than with forty-six mentors.

1.5 Accomplishments

Students say that they have learned to collaborate and to plan activities. When they work in a group, they have to make a planning, search for information on the Internet and share this information. The competencies the students use in the projects will be needed in the future, e.g., in the upper grades of secondary education.

The use of ICT is regarded by the technology co-ordinator as a tool to achieve goals which are harder to achieve in a different way. A parent thinks that using a computer is important for later, after finishing school.

According to the project manager, the teachers do not regard the projects yet as a relief of their tasks. But next school year, when the projects will not be additional but a replacement, then they will experience it. The school has not applied a specific strategy in which the teachers could experience the effects on their tasks.

At the end of the first year, an evaluation has taken place. Students, teachers and mentors were asked to give their opinions. This evaluation has been very useful. Project 'School 2000' will be integrated more in the educational programme of the lower grades. The 'Whitbread Race' project has been one of the better projects. It is not necessary the change the materials and the assignment of this project. Students should be given more time to read the texts.

1.6 ICT use in the school

The management of the school regards ICT as very important, it should be linked to the content of the various subject areas. This will create a powerful learning environment.

The technology co-ordinator states that ICT has become widely accepted by the staff in a short period. He notices that there are differences between sections and within the sections with regard to the use of ICT in lessons. The integration of ICT in lessons could be improved, according to the technology co-ordinator.

The teacher who developed the 'Whitbread Race' project states that certain departments use the computer very frequently, but others don't, e.g., the language departments. He thinks that there are several possibilities to use ICT in the language departments. There are programmes, which prepare students for their final examinations. A problem is that lessons of information technology take up most of the available time in the computer lab (there is only one lab in the school). It is difficult to plan a series of lessons in which ICT is used.

1.7 Primary innovations

The school has participated in the 'Vanguard schools' project of the government. This project was aimed at the integration of ICT in education. In this project the school paid extra attention to students who had difficulties with the Dutch language (mother tongue) and to highly gifted students who need their own individualised approach in which they can show their capacities.

The foundation to which the school belongs has set up a project 'New learning' in which a school for the 21st century will be created. This school will be based on constructivistic principles. ICT will be integrated in the concept of this school. There will be groups of fifty students with six teachers for each group. This school will be realised and will be an example for other schools.

Back

2. The Past

2.1 Innovation history

The school has been engaged in several innovation projects, mostly related to one of the subject areas in secondary education. In some projects ICT plays an important role.

One of the innovation projects is the history project 'The voyages of discovery'. In this project students had to set up an exhibition about one of the voyages of discovery with the use of ICT. In another project, students had to write a musical on the basis of a story. The project is closely related to the normal Dutch language lessons; what they learn in these lessons has to be applied in the project. ICT is not used in this project.

2.2 Initiator of the innovation

The project 'School 2000' has been initiated by the management of the school. An external advisor and the National Institute for Curriculum Development were consulted to draw up a plan. Together with the board of the school, the management of the school has submitted a proposal to the government for the funding of the project.

Photo 2: Students using the Internet

The management of the school has appointed a project manager. He has consulted the teachers and has inquired which teachers were willing to set up a project.

Two English teachers set up the 'Whitbread Race' project. They have developed the teaching materials with the assignments and developed a website where the students also can find the information they need. The project manager has not interfered with this process until one month before it had to be delivered. He has reviewed the project together with the teachers. The mentors have not been involved in the development of the project. These developers use ICT frequently. Their colleagues in the department do not have the same opinion regard the use of ICT in education.

The project manager has also asked teachers of other subject areas to develop a project. According to him, most teacher have their speciality, one is better in teaching than the other, while others are better in developing materials and lessons. The latter group is eligible for developing projects.

2.3 Supporters of the innovation

The project 'School 2000' is supported by the Catholic Educational Advisory Centre, the University of Twente and the National Institute for Curriculum Development. They are involved in the development of the project, especially with respect to content. The Catholic Educational Advisory Centre is doing a study in which the researchers investigate the effects of the project 'School 2000'.

The Ministry of Education, Culture & Science has supported the project financially because of their interest in the innovation.

The trade union federations have been involved in the project regarding the conditions of employment (displacement, pressure of work, and shortage of teachers). First, they were pessimistic, but now they are enthusiastic about the project.

2.4 Innovation problems

It took a long time before the funding was available. At the moment the funding was granted, there was little time to prepare the first project and to set up the study house for the lower grades in the first year of the innovation.

The mentors did not feel at ease because it was not their subject area, and the subject teacher was not available during the lessons. The students asked questions, but the mentors could not answer them. We observed that the students make a lot of noise when they work in groups.

This school year the lessons started with twenty minutes reading time, instead of using the Internet at once. This helps to avoid most of the problems with the assignments.

In the first year, there were ten computers in the study house. This is not always enough. The mentor has to control the use of the computers. Sometimes students go to other places in the school, e.g., the computer lab. In the second year, six computers have been added. It happens frequently that one or more computers cannot be used. Students have destroyed the cables or changed the configuration.

During our observation problems arise with some computers: They had no connection to the Internet anymore. Other respondents also reported this problem. These problems have to do with Kennisnet (a national computer network for schools and related organisations, which gives the schools access to the Internet). Problems occur regularly: the connection is broken because of repairs to the network.

The teachers who developed the 'Whitbread Race' project said that because of the problems with access to the Internet (via Kennisnet), the project will depend less on ICT. Written documents can be used to retrieve information. He has made clear to his colleagues that Internet is additional and not controlling the project.

Back

3. The Present

3.1 Diffusion patterns

Though all staff members were informed about project 'School 2000', the project started with a small group of teachers. These teachers prepared a project. A teacher, who was not involved in the project, told us, that he was willing to consider the preparation of a project when the project manager would ask him.

A member of competent authority notices that at the beginning of the project a small part of the organisation is involved in the innovation. He expects that this number will increase.

The project manager thinks that not all teachers need to be involved. There are about thirty-two projects and about twenty-two teachers involved in developing these projects. Not all of them have the skills to develop a project; they are good teachers and perform best in a traditional setting. The project manager regards this as a kind of specialisation. The representative of the competent authority foresees that the roles of the teachers will change into a 'specialists'-model in which teachers have a specific task (e.g., developing lessons and materials), while others do the other tasks (e.g., grading tests and papers).

On the other hand, the projects within the framework of project 'School 2000' affects all teachers. They must adapt the content of their lessons to the content of the projects because their students of the lower grades participate in these projects. It takes time to get support from those teachers who are not involved in developing the projects.

3.2 Staff development and involvement

There is no special training needed for the mentors of project 'School 2000'. There have been meetings in which the developers of the project explained their project and the mentors could ask questions. The educational assistants have also been informed about the projects they will do. They received a handout with practical points and directions on how to organise the projects in their classes.

The members of the staff have learned the basic ICT-skills. The training was not voluntarily; the teachers were compensated. This training has been provided by the technology co-ordinator. Nearly all teachers have achieved the European Computer Driving Licence (ECDL). The educational assistants have not had this course on basic ICT-skills because they were appointed at a later moment.

Probably there will be training on how to prepare a project and teaching materials for a project. Several projects have to be checked and/or rewritten to satisfy criteria (independent working, level, etceteras).

During the school year 2000/2001, the educational assistants attend a course on the functioning of an educational assistant. The Catholic Educational Advisory Centre provides this course.

3.3 Role of leadership

The management of the school initiated project 'School 2000' and has made it an important issue of their school policy. The management has appointed a project manager for this project.

It is the main task of the project manager to carry out the project according to its aims, to stimulate the teachers, to monitor and to evaluate the progress that is made in the project, to make plans for the coming years. He also gives information about the project, e.g., to representatives of the Ministry of Education, Culture and Science.

The project manager sees himself as a stimulator to teachers and students and as a facilitator with regard to the organisation, timetables and materials.

3.4 ICT-innovation Connections

Normally, teachers do not collaborate so often with colleagues of other subject areas, mostly the teachers of a subject area collaborate. During the intervals, teachers talk about the project. At the end of the first year, there was an evaluation. All teachers who have been involved could express their experiences.

Relevant connections to organisations outside the school refer to the Catholic Educational Advisory Centre, the University of Twente and the National Institute for Curriculum Development. In this stage of the project 'School 2000', representatives of these organisation participated in the further development of the project. They mostly have contact with the project manager.

3.5 ICT infrastructure

There are ninety computers in the main location of the school which are connected to the Internet. Forty-five computers are multimedia computers (equipped with a CD-ROM and a sound card). This is for the greater part the result of the participation in the 'Vanguards school' project (see also section 1.6). At this moment, these facilities are regarded as average to a little above the average for schools. The technology co-ordinator expects that the number of computers will increase.

The school has a computer lab with thirty-one computers and a study house for the upper grades with thirty computers of which fifteen still have to be connected. In both areas one laser printer is available for the students. Scanners will be soon available. For teaching and learning a video-projector is available.

For project 'School 2000' a study house for the lower grades has been created. In this former classroom, there are sixteen computers (all connected to the Internet) available (but no peripherals). In the first year, the connection with the Internet was rather slow. To speed up the connection, a server has installed. Internet Explorer is available for browsing and searching the Internet. For the 'Whitbread Race' no other programmes are needed or available.

A small number of classrooms is connected to the Internet. The computers in the classrooms are to be used by the teachers.

The school has a system manager who is available for all locations (4) of the school. Technical problems are not solved immediately and requests to install new software have to be submitted in advance. Not everybody is satisfied with the present technical support.

3.6 Effectiveness

In general, it is expected that the students will learn to work independently, that they are able to plan their work, to help their classmates and to collaborate with classmates. The responsibility for their own learning will increase with this project. Students will need these competencies in the upper grades and in post-secondary education. Possibly, in the future, there will be effects, according to a teacher. Students reported when the first year was evaluated that they have learned these skills.

A student thinks that he learns less because there is less monitoring by the English teacher. This teacher will do only the correcting at the end of the project. Another student thinks they learn to look up English words in a dictionary. The parents say that their children have become more motivated, e.g., to use English.

At the end of the 'Whitbread Race' project, there is a multiple-choice test (paper and pencil test) to assess what they have learned. The developer of the project has not found evidence that the results of this test are related to the degree students have worked well

in their groups. The test was not too difficult. With little effort, the students could learn the most important facts of the Whitbread Race.

Photo 3: The mentor of the class supervised the students in the first year

The developer states that is difficult to indicate what the project contributes to the reading skills of the students. He cannot test the influence of the project on the reading skills.

In the second year of project 'School 2000', the teachers have not yet experienced the effects of the project. The teachers have not been on duty because the educational assistants were appointed for this task.

3.7 Academic rigour

The projects have become isolated from the ordinary subject areas. Teachers and students do not make the connection. Students experience these lessons as 'project lessons', a different subject. Next school year, the subject teachers will introduce the projects.

In the evaluation, it appeared that in some cases there was too much time between a project and the lessons in the referring subject area dealing with the same topics. The students did not see the relation. There was no follow up in a project of what had been learned in the lessons.

In general, the assignments in the projects for the students of the combination junior and senior general secondary education were too difficult. These students need their own version of the assignments, more structured, less open. Students of the combination senior general secondary education and pre-university education could do well with the assignments.

The goals of the 'Whitbread Race' project refer to developing and improving the reading, writing and searching skills of the students. In their school career they will need to look up information, especially from the Internet, but also in dictionaries, and need to write a lot. The project is additional to the subject matter. The developer regards this project as an enhancement, a desirable enrichment. According to 'School 2000', the projects should give a relief, but the developer thinks that the project is an extension of their tasks.

3.8 Equity

The assignments the students have to do in the 'Whitbread Race' project are too difficult for students of the combination junior and senior secondary general education. The evaluation has made clear that differentiation is needed. A student of pre-university education will do better and must do better than the students of other types of secondary education. They will need more supervision by the educational assistant, according to the teacher who developed the Whitbread Race' project. Both students will benefit from the project, each on his own level. Students are challenged to perform well.

Because of the limited role of ICT in the 'Whitbread Race' project, there are no indications using or not using the Internet influences the results. Students who have a computer and an Internet connection at home can visit the website of the 'Whitbread Race' project and use the hyperlinks to get more information.

3.9 Sustainability

The project will continue for several years. After the first year, the project management and the teachers (including the mentors) have evaluated their experiences. As a result of this evaluation, several projects have been adapted and improved.

Both students and parents are content with the projects, though the students say that they would learn more if the groups are smaller and there would be less noise. Mentors are satisfied with the projects, especially in classes with students of senior secondary general education and pre-university education.

On the basis of the experience during the second year, further adaptations of the project will take place. Students do not always see the relation between the projects and the regular subjects. The subject teachers will give them the assignments and at the end of the term the students have to hand in their products to the subject teacher, but they will do these activities conducted by the educational assistants.

Students will do two projects in a term, but can also use the time for their homework if they have finished their projects or cannot proceed with a project; e.g., when there is no connection with the Internet available.

The 'Whitbread Race' project will also be carried out in school year 2000/2001. The project will not change. There was little criticism about the information to the supervisers on the subject matter that had to be learned for the test.

For the time being, the merger with a school for secondary education will have no influence on the project 'School 2000'.

3.10 Scalability

The requirements for other schools to implement project 'School 2000' are not so extensive. Most important is the belief of the teachers that it is profitable for students to work and learn independently.

A school needs to adapt the school timetable to create time for study skills lessons. Next, there has to be a classroom (a large classroom is preferable) with computers (connected to the Internet) and reference books (dictionaries, atlases and encyclopaedia). Students and teachers need to know how they use a computer and how to search on the Internet.

The developers have published information on the Internet how other schools can use their website there are five possibilities. They will check the information and the hyperlinks on the website of the 'Whitbread Race' project regularly.

3.11 Results of the Teachers ICT Practices Survey

The Teachers ICT Practices Survey was given to five English teachers and one educational assistant. Four surveys were returned. The results are presented in Appendix A.

(Nearly) all respondents feel (very) comfortable when the use a computer for writing a paper, searching for information on the World Wide Web, sending and receiving e-mail and presenting information. They do not feel comfortable when they use a computer for creating and maintaining web pages, using a database, using a programming language and drawing a picture or diagram.

In the past school year, the students used the World Wide Web several times each week according to two respondents. (Nearly) all respondents indicate that their students never of a few times created web pages, sent or received e-mail, used a word-processing programme, used a computer to play games, used a spreadsheet, used a graphics programme, joined in an on-line forum or chat room and/or used a presentation programme.

Half of the respondents rate their ability to use a computer as 'fair' (one 'poor' and one 'good').

Student computer use was not used for grading, according to three respondents. None of the respondents created or modified a web site with any of their classes. Some portion of the computer use was directly related to the course content, according to two respondents. Most or some computer use that they assigned was done by the students individually.

When the assign World Wide Web searching, students are allowed to visit designated sites only or give some restrictions.

Two respondents use a computer at home for preparing for teaching several times each week, one several times each month and one a few times.

The respondents did not participate in a virtual course through the Internet or involved their students in collaborative learning over the Internet. They do not use technology to collaborate with other teachers.

All respondents send one to five e-mail messages each day on average.

Two respondents have ever made changes to the computer's hardware, recovered a damaged file or developed a database, three have ever updated an application program and one has ever created a web site.

Back

4. Main hypotheses

4.1 Technology is a strong catalyst for educational innovation and improvement

Some of the projects within the framework the project 'School 2000' make use of ICT. ICT is not a requirement. In the 'Whitbread Race' project students use the Internet for retrieving information. But most of the information they need, can also be found in written documents, like encyclopaedia, dictionaries, etceteras. The teacher who developed this project does not want to depend too much on the Internet because of the problems the school experiences with Kennisnet. It occurs very frequently that there is no connection via Kennisnet (see section 2.4).

Also because of the unreliable connection to the Internet, students will not be offered two ICT-related projects in a term. There must always be one non-ICT project. A student can switch to this project if the Internet is not available (see section 3.9).

It must be concluded that hypothesis has to be rejected in favour of the rival hypothesis. The problems with Kennisnet block the possibilities of ICT in this innovation.

4.2 The diffusion followed the traditional diffusion pattern for innovations

There are three groups involved: developers (teachers), educational assistants, and others (teachers). Therefore, we do not have the usual diffusion pattern with early and late adapters. The project manager makes use of teachers who are competent enough to develop a project and are enthusiastic to deliver the efforts needed to develop a project (see section 2.2). These teachers can be regarded as the early adopters.

It is not the purpose of the project manager that all teachers will develop projects for their subject area. Then there would be too many projects. Some teachers are better in teaching and instructing, while others are better in developing (see section 3.1). But 'School 200' will affect all members of the staff who teach in the lower grades.

Although the diffusion pattern does not follow a fully traditional pattern, the hypothesis needs not to be rejected. The way it is organised is comparable to the traditional pattern.

4.3 Successful implementation of ICT depends mostly upon staff competence

It is difficult to establish whether the hypothesis should be rejected or not. Because of the problems with ICT (no reliable connection to the Internet because of Kennisnet) the 'Whitbread Race' project will depend less on ICT.

Photo 4: Internet is one of the sources of information

The members of the staff have learned the basic ICT-skills, and nearly all have achieved the European Computer Driving Licence. Teachers are competent to use ICT in education (see section 3.2).

The teacher who developed the project is considering several possibilities to use ICT in this project, especially as an alternative for the test at the end of the project. If the teacher can realise these possibilities, i.e., change the assessment of the project by making more use of ICT by the students, and the ICT-infrastructure is stable enough, then we can accept the hypothesis.

4.4 Gaps in academic performance between high and low poverty students will not increase

Several respondents have reported that the projects, also the 'Whitbread Race' project is too difficult for students of junior secondary general education (see section 3.8). Differentiation will be applied by developing two sets of assignments, which differ in structuring and openness.

Gaps in academic performance will not increase when all students have equal access to ICT only if the materials the students use are tuned to their capabilities. Therefore, it can be concluded that this hypothesis needs not to be rejected in favour of the rival hypothesis.

4.5 Successful implementation of ICT will lead to the same or higher academic standards

There are two important aspects. First, the role of ICT in the 'Whitbread Race' project is limited because of the problems with the ICT-infrastructure and the connection with Kennisnet (access to the Internet). Second, the project and 'School 2000' are still in a developmental stage. This school year, educational assistants made their entry.

There is no evidence available at this moment that the reading and writing skills of the students have improved because of their participation in the 'Whitbread Race' project (see section 3.6). But there is also no evidence for the opposite. Therefore the hypothesis can be accepted.

Back

5. Projection to the future

5.1 Sustainability

The project 'School 2000' will continue for a number of years. At the end of a school year, an evaluation takes place. This evaluation serves to improve the quality of the projects. In school year 2001/2002, students will be given more freedom, but also more responsibilities. In each term, they will do two projects. They have to plan their activities, but also can choose to do their homework. The projects will be integrated more explicitly in the subject areas. The subject teachers will give the assignments.

The facilities (computers) have improved. The number of computer has increased. But the classroom is too small to work in groups, in combination with a reasonable number of computers. There are plans to improve this situation: a study house for the lower grades with sufficient ICT-facilities.

In 2001 the school will merge with another comprehensive school in Enschede. This is a protestant school. This merger will not influence the implementation of project 'School 2000'. Though the new school will have one mission, each location will keep his identity.

5.2 Scalability

There are no real requirements for other schools to implement this innovation. Most important is the vision of the school and the members of the staff. Changing the roles of the students and the roles of the teachers can be accomplished in several ways. The reasons behind an innovation can be different. All participants should agree with the innovation.

Well designed projects (with or without the use of ICT) and facilities (classroom, ICT-infrastructure, computers) will facilitate the implementation of this innovation.

The 'Whitbread Race' project can applied in several ways. The developers have made suggestions on the website of the project. The project can be adapted to the circumstances in a school. The use of the Internet is only additional, traditional sources of information can be used very well.

Back

Appendix A: Tables for Teacher ICT Practices Survey

Gender of the respondents

		Count	Col %
Gender teacher	female	1	25,0%
	male	1	25,0%
	not answered	2	50,0%
Group Total		0	100,0%

How comfortable are you with using a computer to do each of the following?

	Create and maintain web pages		Write a paper		Search for information on the World Wide Web	
	Count	%	Count	%	Count	%
not at all comfortable	3	75,0%	0	,0%	0	,0%
somewhat comfortable	0	,0%	1	25,0%	1	25,0%
comfortable	0	,0%	0	,0%	1	25,0%
very comfortable	1	25,0%	3	75,0%	2	50,0%
Total	4	100,0%	4	100,0%	4	100,0%

How comfortable are you with using a computer to do each of the following? (continued)

	Use a data base		Send and receive e-mail		Programming (i.e., use a programming language)	
	Count	%	Count	%	Count	%

not at all comfortable	1	25,0%	0	,0%	3	75,0%
somewhat comfortable	2	50,0%	0	,0%	1	25,0%
comfortable	0	,0%	0	,0%	0	,0%
very comfortable	1	25,0%	4	100,0%	0	,0%
Total	4	100,0%	4	100,0%	4	100,0%

How comfortable are you with using a computer to do each of the following? (continued)

	Draw a picture or diagram		Present information (e.g., use PowerPoint)	
	Count	%	Count	%
not at all comfortable	1	25,0%	1	25,0%
somewhat comfortable	2	50,0%	0	,0%
comfortable	1	25,0%	2	50,0%
very comfortable	0	,0%	1	25,0%
Total	4	100,0%	4	100,0%

During the past school year, how often did your students on average do the following?

	Use the World Wide Web		Create web pages		Send or receive e-mail	
	Count	%	Count	%	Count	%
never	1	25,0%	4	100,0%	3	75,0%
a few times	1	25,0%	0	,0%	0	,0%
several times each month	0	,0%	0	,0%	0	,0%
several times each week	2	50,0%	0	,0%	1	25,0%
Total	4	100,0%	4	100,0%	4	100,0%

During the past school year, how often did your students on average do the following? (continued)

	Use a word processing program		Use a computer to play games		Use a spreadsheet	
	Count	%	Count	%	Count	%
never	0	,0%	4	100,0%	3	75,0%
a few times	3	75,0%	0	,0%	1	25,0%
several times each month	0	,0%	0	,0%	0	,0%
several times each week	1	25,0%	0	,0%	0	,0%
Total	4	100,0%	4	100,0%	4	100,0%

During the past school year, how often did your students on average do the following? (continued)

	Use a graphics program		Join in an on-line forum or chat room		Use a presentation program (e.g., PowerPoint)	
	Count	%	Count	%	Count	%
never	3	75,0%	4	100,0%	3	75,0%

a few times	1	25,0%	0	,0%	1	25,0%
several times each month	0	,0%	0	,0%	0	,0%
several times each week	0	,0%	0	,0%	0	,0%
Total	4	100,0%	4	100,0%	4	100,0%

During the past school year, how often did your students on average do the following? (continued)

	Use an instructional program (including simulations)		Other computer uses	
	Count	%	Count	%
never	1	25,0%	3	100,0%
a few times	2	50,0%	0	,0%
several times each month	0	,0%	0	,0%
several times each week	1	25,0%	0	,0%
Total	4	100,0%	3	100,0%

Rating the ability to use a computer

		Count	Col %
	poor	1	25,0%
How would you rate your ability to use a computer?	fair	2	50,0%
	good	1	25,0%
Group Total		4	100,0%

Based on experiences or polices from the last school year

	Was student computer use ever evaluated for grading?		Did you create or modify a Web site with any of your classes you taught?	
	Count	%	Count	%
no	3	75,0%	4	100,0%
yes	1	25,0%	0	,0%
Total	4	100,0%	4	100,0%

Based on experiences or polices from the last school year (continued)

	What portion of the computer use in your classes was directly related to the course content?		What portion of the computer use that you assigned was done by students individually?	
	Count	%	Count	%
very little	0	,0%	0	,0%
some	2	50,0%	1	25,0%
most	1	25,0%	3	75,0%
all	1	25,0%	0	,0%
Total	4	100,0%	4	100,0%

Based on experiences or polices from the last school year (continued)

| | If you assigned World Wide Web searching, how much freedom did you allow? | |
	Count	%
designated sites only	2	50,0%
some restrictions	2	50,0%
no restrictions	0	,0%
Total	4	100,0%

Based on experiences or polices from the last school year (continued)

| | How often did you use a computer at home for preparing for teaching? | |
	Count	%
never	0	,0%
a few times	1	25,0%
several times each month	1	25,0%
several times each week	2	50,0%
Total	4	100,0%

Based on experiences or polices from the last school year (continued)

| | Did you participate as a student or instructor in a virtual course through the Internet? | | Did you involve your students in collaborative learning over the Internet? | |
	Count	%	Count	%
no	4	100,0%	4	100,0%
yes	0	,0%	0	,0%
Total	4	100,0%	4	100,0%

Using technology to collaborate

		Count	Col %
Are you using technology to collaborate with other teachers?	no	4	100,0%
	yes	0	,0%
Group Total		4	100,0%

Sending e-mails each day on average

		Count	Col %
How many e-mail messages total do you send each day on	none	0	,0%
	1-5	4	100,0%

average?	6-11	0	,0%
	more than 12	0	,0%
Group Total		4	100,0%

Have you ever done the following?

	Made changes to a computer's hardware		Updated an application program (word processor, graphics program)		Recovered a damaged file	
	Count	%	Count	%	Count	%
no	2	50,0%	1	25,0%	2	50,0%
yes	2	50,0%	3	75,0%	2	50,0%
Total	4	100,0%	4	100,0%	4	100,0%

Have you ever done the following? (continued)

	Created a web site		Developed a data base	
	Count	%	Count	%
no	3	75,0%	2	50,0%
yes	1	25,0%	2	50,0%
Total	4	100,0%	4	100,0%

Back

Appendix B: Other supporting evidence

- At the main location, there are 90 computers available for 1100 students (student : computer ratio = 12.2).
- All computers are connected to the internal network. This network gives via Kennisnet access to the Internet.
- Most of the computers are located in the computer lab, the study house for the lower grades and the study house for the upper grades.

Back

Appendix C: Documents

- Jacobus College, (1997), Actieplan ICT voor de eerste tranche scholen Voortgezet Onderwijs (Project plan Vanguard School), Enschede.
- Jacobus College, (1998), Tussenrapportage en bijstelling projetplan (Interim report), Enschede.
- Jacobus College, (1999), Project 'School 2000': Het Jacobus College op weg naar leerlinggestuurd onderwijs (Project plan project 'School 2000'), Enschede.
- Jacobus College, (1999), Schoolgids 1999-2000 (School Guide), Enschede.
- Website Jacobus College: http://www.jacobus.nl/.
- Project Engels, Tweede klas. The Whitbread Race (Materials for students).
- Chapter 1. Assignments.
- Website project The 'Whitbread Race': http://www.jacobus.nl/english/project2000.
- Informatie over deze website (the 'Whitbread Race' project).

Back