

OECD/CERI ICT PROGRAMME

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

Greenfield College, England

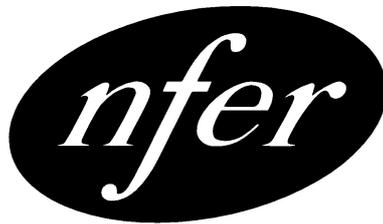
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**Integrating ICT into Teachers practice**

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# NATIONAL FOUNDATION FOR EDUCATIONAL RESEARCH



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# 1. EXECUTIVE SUMMARY

*Every student needs a grandparent to link them to the past,  
and  
a PC to take them into the future  
(senior member of staff).*

## 1.1 Introduction

As part of the OECD qualitative research Case studies of Organisational Change this study was carried out during 4 - 8 December 2000 at Greenfield College<sup>[1]</sup>.

The data collection was carried out by means of:

1. Interviews with teachers and students, administrators (headteachers, governors), parents and technology specialists.
2. Observations of school functioning.
3. Collection of school documentation.
4. Survey of teacher ICT practices.

The research focused upon a major whole school reform and the part that ICT has played in that reform.

### 1.2 The whole school reform: Integrating ICT into Teachers practice

In this case, the major reform was the school's adoption of a strategy to integrate ICT into teachers' practice through the provision of computers for all teachers, backed up by multimedia projectors, digital cameras, substantial technical support, the school intranet and internet access in all classrooms.

## 1.3 Evidence relating to the research hypotheses

The data collected relating to the whole school reform (i.e. the integrating of ICT into teachers' practice) elicited evidence in relation to the five hypotheses postulated in the initial stages of the research. In summary, the data showed:

### 1.3.1 Hypothesis 1: Technology as catalyst or as additional resource?

The data supported the alternative hypothesis that the technology acted as an additional resource to support whole school development. A key concern of the school management team was to support teachers in the provision of a high quality teaching and learning environment for pupils by whatever means were available. This included not just the use of ICT. Other examples include the provision of administrative support staff and stimulating staff debate about appropriate approaches to teaching and learning. Without the vision and actions of the senior management team the resources would not have been available and the integration of ICT would not have happened.

### **1.3.2 Hypothesis 2: Traditional diffusion patterns apply or is the diffusion pattern of ICT innovation different?**

In this case the data supported the alternative hypothesis that this particular ICT innovation did not follow traditional diffusion patterns. Prior to the innovation there was already extensive ICT technical support, an intranet and other ICT resources as well as a collaborative ethos in departments. Teachers saw ICT as providing a work tool and they recognised that the use of ICT by teachers was expected as part of their professional role.

### **1.3.3. Hypothesis 3: Staff ICT competence is critical or are infrastructure and student competence more important?**

The data supported the first hypothesis that teacher competence was a critical factor in successful implementation in ICT rather than student competence or technical infrastructure. Teachers were driving the demands on the technical infrastructure. There was an expectation that ICT resources would work. Teachers expected ICT resources such as the intranet and internet, multimedia projectors, laptops, and the computers in the hubs to be available, and planned their work accordingly.

### **1.3.4 Hypothesis 4: Is the gap between more and less advantaged students stable when ICT access is increased?**

The data supported the first hypothesis that with equal access to ICT, gaps between high and low poverty students would not increase. Where substantial access was provided as in this school, those who did not benefit appeared to be those who were technophobic or were just not interested.

### **1.3.5 Hypothesis 5: With improved ICT, academic standards will stay the same or increase, or decrease?**

The data supported the first hypothesis that successful implementation of ICT could lead to the same or higher academic standards. The data suggested that in the ICT environment provided by this school boys were more likely to complete examination coursework, as the technology made it easy for the student to redraft to get a high quality product. Students were completing work more quickly allowing more time for revision and reinforcement. There was some concern that girls were not benefiting as much as boys. Teachers were able to use their time more efficiently and could produce high quality learning materials and lessons.

## **2. OVERVIEW**

*Every student needs a grandparent to link them to the past,  
and  
a PC to take them into the future .  
(senior staff member)*

Greenfield College is a co-educational, 14-19, comprehensive community college serving the community at the edge of a large town in the Midlands. The school was over 600 years old, during which time it had evolved from a single-sex school into its current form. The school has technology college status which means it gains additional government funding of approximately £100 per year.

The school was situated in a relatively affluent area and, although its catchment area included rural

communities, over 40 per cent of students were from outside the catchment area. The school had 1850 students on roll, 900 of whom attended the sixth form, which was above average for maintained schools nationally. The school had 100 teachers on its staff list. If normal staffing ratios were applied the staff list would number over 120. However staffing was organised so that teachers could focus on student learning i.e. teachers did minimal administration as administrators were provided to support teachers. In addition the technical support team had seven members.

In the early eighties the institution was involved in an initiative to introduce technical and vocational education into schools (the Technical and Vocational Educational Initiative). In April 1996, the school was designated a Technology College. An OFSTED Report noted that students had benefited from the subsequent curriculum developments and resourcing. The report also commended

*The high standards of attainment across the curriculum, the very positive ethos and values of the college is promoting, the very good quality of relationships, the very good attitudes and behaviour of students and the very wide range of opportunities provided, make it a very effective college in which students learn and develop.*

The school benefited in 2000 from its involvement in the Computers for Teachers National Initiative that enabled teachers to buy laptops to support their teaching. This meant that teachers could prepare lessons at home and connect their machines to the projectors, intranet and internet at school to deliver their lesson materials and resources. The college policy reflected the importance of ICT in the school and was one which encouraged the widespread use of ICT. One teacher mentioned *As far as I know, computer use is very much guided by teachers...It s better resourced than when I came a year ago, but with IT you always need more resources .*

Greenfield College placed much emphasis on examination results. The headteacher took the approach of interviewing all new students when they began their GCSE (General Certificate of Secondary Education) studies for an average of ten minutes, in order to guide their aims and ambitions, and to negotiate how the school could best meet each individual student s needs. Unless a child was known to be of low ability she asked them *What do you want to do at University?* and then guided them to set personal goals. The school had a vision of staying at the forefront of educational developments and aimed to get involved in every new initiative that would benefit students including Information and Communications Technology (ICT) initiatives (e.g. Computers for Teachers Scheme, on-line GNVQ, Advanced Skills Teachers, Technology College status). The headteacher described their vision as *to keep at the forefront and to use ICT to its full potential .*

This view was echoed by a number of teachers at the school. One means of achieving this was through on-line assessment, whereby teachers could deliver assessment of their subjects via ICT. The ICT co-ordinator and other teachers described the vision of the virtual department where ICT resources were used fully to support the lessons, departmental planning and departmental resource banks. The ICT co-ordinator commented on his vision for the school:

*Our common aim is to keep to the forefront of technology...we can reduce the amount of paperwork which makes it appealing to staff and students.*

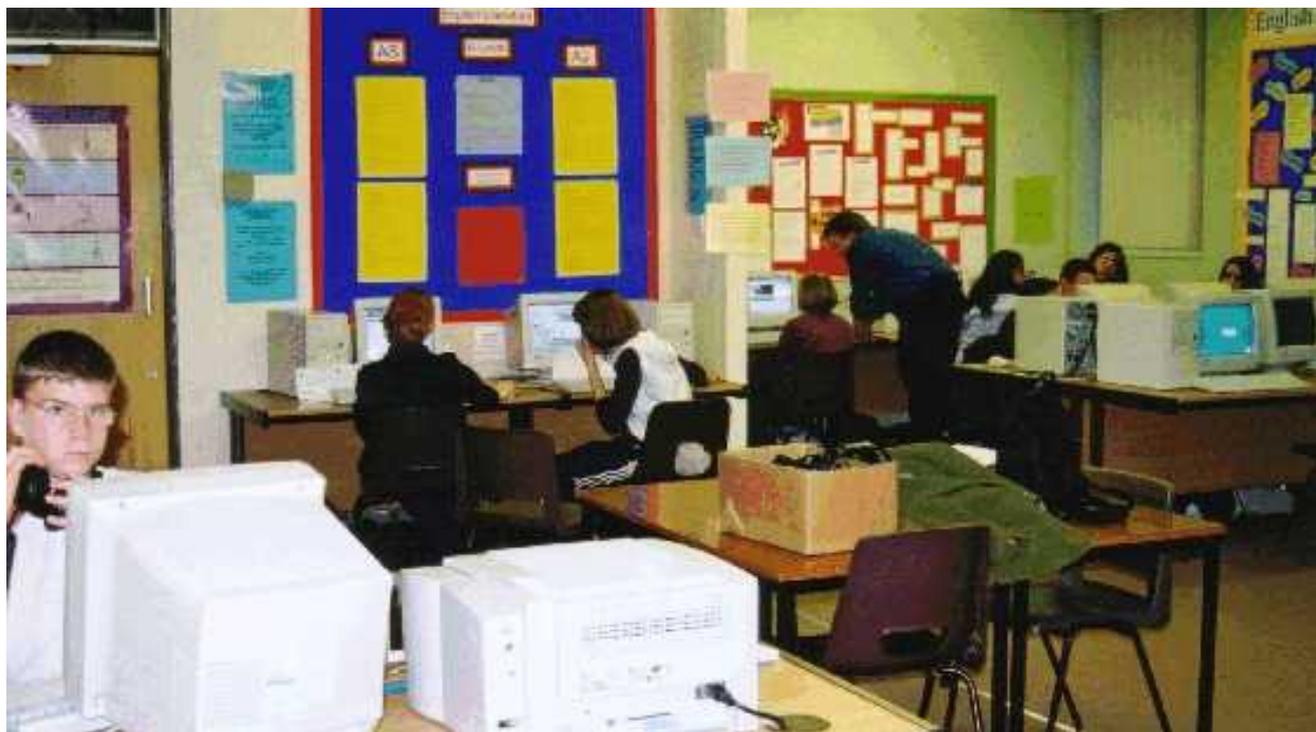
The school had 500 computers arranged as five computer suites and eight computer hubs linked to the teaching areas for Maths, Science, English, Design, Economics, Physical Education, Modern Foreign Languages and for the 6<sup>th</sup> Form. There were also 23 mobile computers. Of these computers, 450 were networked and 100 were multimedia computers. The school also had laser and colour printers, scanners, digital image or video processing equipment, video projectors and electronic bulletin boards which provided up-to-date information of clubs, societies, local events and room changes to students. Pupils were required to agree to abide by the school's IT code of conduct and all emails and internet usage were logged. Searches for

groups of words or websites that shouldn't be accessed were periodically undertaken. Filtering software was also used.

**Figure 1** - Example of the layout of three of the five computer suites. These three suites were separated by glazed partitions.



**Figure 2** Pupils working in the English hub. Computer hubs are provided for Maths, Science English, Design, Economics, PE, Modern Foreign languages and for the 6<sup>th</sup> Form.



ICT featured in *99.9 per cent of all lessons at some point*, according to the headteacher who, with the senior management team, had encouraged the rest of the staff to take advantage of the benefits technology could offer. As one teacher said,

*IT makes learning more interesting for students it's obviously a great attraction. You can do things that you could never have done without them.*

### 3. THE PAST

Since joining the school staff in 1982, the headteacher had been involved in many initiatives involving ICT in a successful attempt to increase resources and improve access to technology at the college for all staff and students. This began when Greenfield College became one of the first Technical Vocational Education Initiative (TVEI) schools, being involved in the first round in 1984. This resulted in the school receiving funds to develop vocational courses for its students to run alongside the more traditional, academic ones.

In 1996, the school became a specialist technology college for which the school had to raise a one off payment of £100,000 in sponsorship and present a bid to the Department for Education and Employment (DfEE). An anonymous donor provided the sponsorship through the Technology Colleges Trust (TCT). The DfEE released £100,000 pounds to match the money the school had raised plus an additional £100 per student per year. This enabled the school to improve ICT facilities for staff and students in many ways.

The College subsequently became involved with the Advanced Specialist Teachers (AST) Initiative

introduced by the Government. Teachers who fulfilled the criteria for this status were provided with their own laptops. The headteacher of Greenfield College wanted to extend the access to laptops to all staff and became involved in the DfEE Computers for Teachers scheme offering money to buy laptops for teachers. The DfEE supplied £500 and the college supplied a further £700 for each machine.

*I had heard from another headteacher that it (providing computers for teachers) worked, and that it was linked with student progress. There was a little resistance, but not much. It s like equal opportunities in that some will resist and then there s a dramatic conversion. It often occurs with those who are initially sceptical (headteacher).*

The laptops were introduced in May 2000. About sixty of the one hundred staff took up the offer (many already had computers through other initiatives). Teachers were issued with a contract between the school and the teacher to give the teacher exclusive use of the machine.

*It was hoped that the laptops would improve teachers confidence with ICT and that they would use it more in their lessons, providing teachers with interactive lessons and the ability to record the assessment of a class (headteacher).*

One of the deputy heads of the school was particularly involved in the decisions regarding the purchase of the laptops, including taking advice on the tax issues surrounding such a scheme. The first reaction of the local tax office was that the £700 for each laptop provided by the school would not be taxable for this purpose as it would be classed as a grant, they also agreed that this would be the case for the money given by the Government. This decision was subsequently revoked. However, after several enquiries by the deputy head, to the DfEE and Inland Revenue, it was agreed the school could buy the laptops back from the teachers when they left the school, which resulted in there being no tax liability on any of the money provided.

The deputy head recalled initial problems with the original supplier of the laptops:

*The first laptop that came was below specification. The supplier tried to pull the plug [withdraw from the contract] because they could not supply the machines we wanted at the price. I told them that they had committed to it. We got the name of another supplier who gave us machines of a higher specification than agreed because HP [Hewlett Packard] had already stopped producing the original ones. In the end we got about £100,000 of equipment for less than £40,000.*

Basic training sessions were given for staff who needed them, but the senior staff found that the majority of staff already knew enough to get themselves started. There was no extra formal programme of training, but support was available if needed.

*We ran basic setting up sessions, but had nothing specific other than IT support getting occasional questions. There was no formal programme of training (headteacher).*

One teacher, an Advanced Skills Teacher AST, also commented on the way staff learned saying that:

*[staff learned through] the constant informal chat, questions, debates and passing that information on.. It s the visual awareness of where we re going and sharing practice across the college.*

## 4. THE PRESENT

Overall, the current aim of the school was to increase the day to day use of ICT to aid both teaching and learning. The school wanted to encourage students independent learning and strongly believed that the use of ICT was a way of doing this. Since the headteacher joined the school in 1982, she had been involved in a number of initiatives. Resources such as networked computers, PowerPoint presentations, coursework and assignments completed using a range of computer packages and use of multimedia projectors were normal for this college.

Both staff and students had access to computers during the school day and were encouraged to use them. A member of staff with ICT responsibilities commented:

*All staff and students in some way or another use ICT. On the average day there are up to 1500 logons, so it is a high percentage, probably about 70-80 per cent of staff use it regularly. 80-90 per cent of the non-IT department staff use it...there are very few that do not. The only thing that stops people [is that] they are technophobes and their own fears that stop them from taking ICT further.*

Students also had the opportunity to use the computers during the holidays, except when maintenance work was going on. A high proportion of students also had computers at home and many of them used them for recreation, research (using the Internet) and typing assignments and coursework. One Year 10 student remarked:

*I use it at home for schoolwork because my handwriting is not the best. I use it for research as well (CD Rom and Internet). I do not use the school computers much other than on the GNVQ (General National Vocational Qualification) course because I do not do IT. At home I use a computer for leisure as well.*

The school had 500 computers, of which 450 were networked and 100 were multimedia computers. The school had laser and colour printers, scanners, digital image or video processing and multimedia projectors. There was a variety of educational software available for all the National Curriculum subjects and many vocational subjects.

Many of the computers were available to the students in the computer hubs around the school. These hubs had been designed so that classrooms were grouped around an open hub of approximately 15 networked computers. This had the flexibility in that the hub was not a timetabled classroom and teachers in the rooms around the hub could allow students to use the computers when it was appropriate for their individual or group work without having to book in advance.

In addition, students had access from 8.00am until 10.00pm. A staffed room was provided every day between 3.00pm and 4.00pm. There were five computer suites available (two for GNVQ, two in the 6<sup>th</sup> form, one in the ICT department).

To maintain the resources there was a full time team of six technical support staff and one manager. They were responsible for solving any software and hardware problems arising on any of the school machines. There was a mixture of views on the level of support from the technical staff, with teachers saying they would prefer more help and advice.

Despite teachers feeling the need for more technical support, ICT was now used in the majority of all lessons in most subjects at some point in the year. Many of the teachers agreed that the use of technology had a positive affect on the teaching and learning of students with special educational needs.

*The students that are difficult to teach, such as the demotivated and the low achievers, are quite eager to get*

on with this approach. I think it's about being able to work at your own pace and not getting shown up (teacher).

## 5. MAIN HYPOTHESIS

### 1. Hypothesis 1: Technology as catalyst or as additional resource?

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

#### 1. Evidence in support of hypothesis 1:

1. ICT was a catalyst for increasing teamwork within the school as departments collaborated to develop their virtual department resources on the intranet.
2. The availability of ICT had a significant impact on the way the school functioned, the way teachers taught, prepared, monitored and the way students recorded and presented their work.

#### 1. Evidence in support of the rival hypothesis:

1. The vision and actions of the senior management team were the critical factors in moving the school to the point of ICT integration that it had achieved.
1. The innovative strategies used (by the headteacher and senior management team) to manage resources, were critical to the freeing up of resources necessary to create an ICT rich environment and to ensure ICT integration across the curriculum.
1. The philosophy of learning and style of people management adopted by the senior management team played a critical role in creating a positive, forward- looking, student-centred school ethos in which the developments could take place.
1. The technology was an additional resource enabling teachers to plan and deliver their lessons and structure their lesson notes more effectively. Many teachers expressed similar views to this experienced teacher: *Transferring all written notes onto my laptop makes it easier to store them...Before I'd make notes on paper and now I do them on the laptop, I quite enjoy planning now but it hasn't helped with marking. E-mailing work to me works well, but sometimes the machines do not work and it can all cause hassle* (experienced teacher).

#### 1. Summary

The data supported the alternative hypothesis that the technology acted as an additional resource to support whole school development. A key concern of the school management team was to support teachers in the provision of a high quality teaching and learning environment for pupils by whatever means were available. This included not just the use of ICT. Other examples include the provision of administrative support staff

and stimulating staff debate about appropriate approaches to teaching and learning. Without the vision and actions of the senior management team the resources would not have been available and the integration of ICT would not have happened.

## **5.2 Hypothesis 2: Traditional diffusion patterns apply or is the diffusion pattern of ICT innovation different?**

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

Note: The development of the school's ICT resources had taken place over nearly a 20 year period so the innovation of providing computers for all teachers was set within a context where use of ICT was considered normal. It was possible resisters of ICT innovation (i.e. teachers not wishing to use ICT in their practice) either do not apply to this school or have left this school because of its tradition of ICT use.

### **5.2.1 Evidence in support of hypothesis 2:**

1. Some teachers and technicians felt there were big gaps in the amount of ICT use between staff.  
*Teachers are either doing everything, or not very much (technician).*
1. At the outset of the laptop scheme, there was some resistance to the increased use of technology in lessons, as one teacher recalled *Everyone in my department was keen, but there were some [other departments] that weren't. We had a gradual adoption in our department*. At the time of the research the initiative had been widely accepted by the majority of teachers who used the laptops for planning and delivering lessons.

### **5.2.2 Evidence in support of the rival hypothesis:**

1. ICT was seen as a normal work tool for teachers. *I would be expected to be computer literate if I applied for a job anyway, it is part and parcel of the way things are now (experienced teacher).* The data showed that overall teachers felt personally and professionally obliged to keep up to date. They did not report feeling any pressure from colleagues. *Everyone in my department is keen...we had gradual adoption in our department, there was no formal decision to use ICT, apart from the use of the [electronic] Mark Book. I fiddled about with it and others joined in (experienced teacher).*
2. A number of teachers commented that change in attitude to ICT use could be rapid when the ICT supported professional personal needs and when teachers had their own computers.

### **5.2.3 Summary:**

In this case the data supported the alternative hypothesis that this particular ICT innovation did not follow traditional diffusion patterns. Prior to the computers for teachers initiative there was already extensive ICT technical support, an intranet and other ICT resources as well as a collaborative ethos in departments. Teachers saw ICT as providing a work tool and they recognised that the use of ICT by teachers was expected as part of their professional role.

## **5.3 Hypothesis 3: Staff ICT competence is critical or are infrastructure and student competence more important?**

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

***This hypothesis assumes that teachers mediate ICT applications when they are successful, and that ICT's academic value relates positively to teacher competence. The rival hypothesis is that the school technological infrastructure and student ICT competence rather than staff competence determine ICT implementation outcomes.***

### ***5.3.1 Evidence in support of hypothesis 3:***

1. Staff competence was critical to the integrated approach to ICT in the school. The school ethos encouraged staff in their departments to collaborate in the development of ICT skills and expertise. Staff exploration of the possibilities of ICT made a critical difference to use of ICT in the school e.g. the Virtual Department Initiative mentioned by staff involved departmental staff collaborating to put the department resources and records on line.
  
1. The Computers for Teachers initiative enabled embedding of ICT skills in teachers' professional knowledge and practice. *IT skills have always been a problem so the concept of the laptops means teachers can take away what they have learnt and practice it at home because they may not need something they have learned in an INSET [in-service training] session until 6 weeks later. They can develop resources for use in the classroom and they do not have to wait for a machine to become available (teacher).*
  
1. The initiative increased the level of teachers' skills. The laptops improved *staff generic IT skills, so increased confidence. If you do not know what you are doing (with ICT) you won't want to do it with students, so laptops increased teachers' confidence enabling them to do more with students (head of ICT).* ICT was an embedded part of the pedagogy in this school and the development of pedagogy using ICT was reported as a collaborative staff effort.
  
4. The enthusiasm of teachers in this school for ICT was apparent. Many teachers mentioned that the quality of their teaching improved through their use of ICT. The views of the head of ICT was that there was extensive use of ICT *to support the curriculum e.g. spreadsheet and powerpoint presentations* and that significant amounts of the curriculum *could not be taught without computers or without certain software being available...* was backed up by evidence from a range of sources. Many teachers considered that ICT was essential to many courses now.
  1. The senior management team was very supportive of departments' requirements for further resources and teachers were encouraged to use and develop ICT applications.
  
6. Teachers were leading the demands on the infrastructure. They wanted faster access and more access. There was some disruption in the technical support infrastructure due to staff turnover and consequent replacement of skills issues. As one senior staff member said *There is frustration at seeing the potential and not being able to get it going. I just need someone to sweep in and tell me what is wrong. I do not want to have to go through a manual. Our system is big and sometimes does not work fast enough.*
  
7. Some teachers consider that the innovation did not go far enough for them. *I can write notes very quickly by hand and find it too slow to use the computers. If I had a voice activated one I would probably use it more...really the technology is out of date for me! I think you have to keep up-to-date. I do not feel under pressure to use ICT (experienced teacher).*

### ***5.3.2 Evidence in support of the rival hypothesis:***

1. Student ICT competence was harnessed by the school particularly in work concerned with the development of content for the intranet and school web site.

## 1. Summary

The data supported the first hypothesis that teacher competence was a critical factor in successful implementation in ICT rather than student competence or technical infrastructure. Teachers were driving the demands on the technical infrastructure. There was an expectation that ICT resources would work. Teachers expected ICT resources such as the intranet and internet, multimedia projectors, laptops, and the computers in the hubs to be available, and planned their work accordingly.

### 5.4 Hypothesis 4: Is the gap between more and less advantaged students stable when ICT access is increased?

*Gaps in academic performance between high and low poverty students will not increase when all students have equal access to ICT. The rival hypothesis is that equal access to ICT will lead to more advantaged students increasing the performance gap with disadvantaged (high poverty) students.*

**Note:** Students had ICT access at the school in lunch times and evenings and had a huge computer resource to draw on. Therefore it could be argued that students regardless of background had considerable ICT access through the school.

#### 5.4.1 Evidence in support of hypothesis 4:

1. Teachers had mixed views about any additional advantages students gained through ICT access at home. They suggested that students with home access did not necessarily use this for educational purposes. *When they use it at home they tend to concentrate on the style rather than the content and you cannot tell whether they would have produced the same piece of work if they had to write it. It has an effect on students when they sit exams because they are used to being able to cut, paste, delete etc. and they cannot do that in exams* (head of department).
1. The real problem in terms of students developing ICT skills and competence appeared to be not related to disadvantage but to whether individuals were technophobes or simply not interested. Teachers found that students in this technology rich environment still reached the 6<sup>th</sup> form i.e. to 18 years old, without being competent in ICT. So access was not enough, motivation was essential. There was no evidence about whether these students were more likely to be from high or low poverty backgrounds.

#### 5.4.2 Evidence in support of the rival hypothesis:

The data provided no evidence to support the rival hypothesis.

#### 5.4.3 Summary

The data supported the first hypothesis that with equal access to ICT, gaps between high and low poverty students would not increase. Where substantial access was provided as in this school, those who did not benefit appeared to be those who were technophobic or were just not interested.

**Hypothesis 5: With improved ICT academic standards will stay the same or increase, or decrease?**  
*Successful implementation of ICT will lead to the same or higher academic standards in spite of the low quality of many ICT materials. Academic standards are a function of teacher and school expectations and not of the standards of textbooks, ICT materials, and the like. The alternative hypothesis is that ICT use will lead to a lowering of academic standards as students spend more time on marginally beneficial searches and in browsing poor quality Web and courseware content.*

### 5.5.1 Evidence in support of hypothesis 5:

1. Teachers across a number of departments indicated that having a laptop saved them time and allowed them to improve the quality of their work. *The teachers seem to work more efficiently as well* (teacher).

2. Teachers reported that ICT enabled them to plan more rigorously *Lesson preparation, it made me more organised, motivated me to do planning, not so much of a chore. Same with the students when we do a piece of writing. They would rather do it on a computer than by hand. Much easier for cutting and pasting. My resources are better organised*. Teachers were writing their own resources, tailor-made to the teaching they want to undertake. Few teachers reported using published resources to any great extent.

1. Teachers across a number of departments indicated that students were completing their work faster and that the time gained was a matter of weeks in a 3 month period. *The retake group i.e. 16-17 year olds [who failed examinations the previous year] do not like drafting or are reluctant to do that. So I take them into the hub and they word process their work straight away and they redraft on the computers. I give constant input to their work as I walk around the classroom. They are more motivated. I will finish the retake by Christmas because of the increased motivation and environment [in the hub] and have achieved more than what would have been done by handwriting work. Ultimately my students will benefit from me being organised and getting into the hub. I spend more time on exam preparation. This works well with retake students because they write short pieces of work and so can get the work done and be more focused. It would not work so well with the Lower School because of discipline matters and larger size of the groups* (teacher).

1. Most teachers considered there were advantages for both high and low ability students. Teachers said that each however probably used ICT differently. *I do not think they use them for the same thing. The low ability students see what it can do for their reading and writing skills, but the higher ability students are aware of this already because often they have had more experience of IT at home* (teacher). *...the least able ones gain more self-esteem so they gain most because this effects operation in all ways of life* (teacher). *...all students gain from it, although there are a few that do not like using the technology* (teacher).

1. Lessons were said to be more interesting. One teacher said *It makes learning more interesting for students...you can also do things you could never have done without them [the computers]. Computers provide you with interactive lessons. ...[there is] flexibility of use of different resources, different styles of teaching, different ways of learning for students and a bit of personal ownership of what they are learning. They can learn at any time. The potential is brilliant. I have been stuck with something and have been on-line which has given me the information. The idea of being able to speak to someone in America about something you are working on has only just begun to happen.*

1. Students worked harder. As one teacher said *The students who are difficult to teach, such as the demotivated and lower achievers are quite eager to get on with this approach (an on-line course). I think it is about being able to work at your own pace and not getting shown up. The least able ones gain more esteem, so they gain most because it affects operation in all ways of life*.

1. Different learning styles could be employed: *It makes students more autonomous, in charge of their own learning and makes them have to take responsibility for their own learning which is useful preparation for university* (teacher). Teachers reported that reinforcing learning was easier when using powerpoint because it was easier to go back to earlier slides to reinforce teaching points.

1. Quality of work was improving: *I think it has improved student assessment so they seem to be scoring higher because of the IT in the coursework - the work is more accurate* (teacher).

1. Students gained a different form of individual attention. Students used e-mail to send work and queries to teachers. This personal attention may bring benefits but more detailed research would be needed to see what kinds of students used this facility and in what ways.

10. There appeared to be some evidence that boys were more motivated by ICT use and were benefiting more than girls. Teachers suggested that in the past boys in particular may not have completed examination coursework because they could not be bothered to write in the form required and to the extent required. Teachers across a number of departments indicated that boys were more likely to complete coursework through use of various features of technologies e.g. cut and paste options which enabled students to produce well presented work. This benefit applied for example, to projects that needed word applications (English, food technology) as well as to music e.g. using the Sibelius software.

1. ICT supported independence: *higher ability students will focus on what they are supposed to be doing and it will sustain their interest longer* (teacher).

1. Lower ability students could be advantaged by access to ICT: *....lower ability students can actually be very IT literate* (teacher).

### 5.5.2 Evidence in support of the rival hypothesis:

1. There seemed to be some confusion in the data about whether girls were gaining as much from the ICT rich environment as boys. Some teachers said that girls were less likely to use the technology, but others said they were just as likely.

1. Some data from students supported the notion that students wasted time searching the internet. Teachers said effective use of IT was not related to ability. *You would be surprised at how many high ability students have poor IT skills and vice versa* .

1. One teacher also commented: *I have used the internet to find resources, but did not find it useful - it is deceptive and there is a lack of quality. It is deceiving for students, as they cannot pick out what is relevant. I am concerned about the inaccuracies in the material* (experienced teacher).

### 5.5.3 Summary

The data supported the first hypothesis that successful implementation of ICT could lead to the same or higher academic standards. The data suggested that in the ICT environment provided by this school boys were more likely to complete examination coursework as the technology made it easy for the student to redraft to get a high quality product. Students were completing work more quickly allowing more time for revision and reinforcement. There was some concern that girls were not benefiting as much as boys. Teachers were able to use their time more efficiently and could produce high quality learning materials and lessons.

## 6. PROJECTION TO THE FUTURE

The school had a number of areas which it wanted to improve and develop in the future. These included

● Training for staff	● virtual departments
● multimedia projectors in every room	● laptops for students
● unified monitoring and assessment methods using database systems	● wireless technology
● more bulletin screens	● reduction of paperwork

The school hoped to embark on further ICT training for staff through the Government funded New Opportunities Fund (NOF) ICT training for teachers. The headteacher hoped that ICT would become an everyday tool where the teacher provided: a diversity of resources; a variety of learning styles; high impact; fast pace; and edutainment .

The ICT co-ordinator explained:

*I think it s important now to maintain the impetus that we ve got and not feel complacent. We need to look at more machines for students so that we can increase the student:machine ratio and we need to increase hardware e.g.video cameras, scanners, etc. as well as overall staff competence.*

The school had already installed multimedia projectors in the school hall, conference room, science, and design technology areas, and they hoped to soon have them installed in English, maths and languages. With regard to the bulletin screens, at the time of data collection there were two in the foyer and two in the sixth form. Four more were planned for the library, drama block, new building corridor, and outside the science hub. We observed them being used mainly for bulletin items, student of the month, birthdays and photos of events. The school hoped that it would take on a greater role and display sports results, extra-curricular activities and images of all events and achievements.

Another area that the school wanted to develop was the integration of the various databases used. At present, the school had an online reporting system, a system for ICT and science, one for maths and languages, and a system recording attendance data. The databases were utilised for a number of reasons including coursework, topic tests, summary sheets, and trial and final examination.

The advantages of an integrated system to the students included instant access to up-to-date grades, motivation to improve, and identification of areas of weakness for action planning. The advantages for staff included analysis of teaching and learning outcomes, analysis of INSET needs, targeted revision sessions, and data about student achievement level of entry. The advantages for parents included instant feedback related to previous performance and quality feedback at parents evenings and on reports. Such a system allowed teachers to give up-to-date subject reports on attendance, target grade, current grade, coursework and homework completion and deadlines. The school hoped to extend the use of these databases, allowing more access to staff and students, as well as a more integrated use between systems.

Some departments were developing virtual departments (on the school intranet) which would eventually include a digital archive of resources online. The plans are to allow students, staff and parents to gain access from home. Students can then work at their own pace on work at home and staff can share and disseminate useful resources more easily.

The headteacher was also keen for all students to have access to a laptop. She planned to use 30 laptops to pilot a wireless network. A governor of the school said that *The next step is to give general access to laptops to every student* .

## 7. APPENDICES

# APPENDIX A: METHODOLOGY

## 1. Contact period

First contact was made with the school, in the form of a site visit, on 4th October 2000, followed by a draft itinerary being sent to the school. The actual data collection took place between 4th and 8th December 2000, totalling five school days with two researchers.

### 1. Data collection

The following itinerary documents the data collection for the OECD study for the five days in school.

		<b>Data collection</b>
<b>Mon</b>	am	Introduction with the Principal Interview with innovation teacher
	pm	Focus group interview with Year 12 students Interview the Head of Modern Languages
<b>Tues</b>	am	Interview with Assistant Principal Interview with technician
	pm	Focus group interview with Year 10 students Observation of video conferencing Latin lesson
<b>Wed</b>	am	Observation in science department Interview with teacher Interview with AST
	pm	Interview with technician
<b>Thurs</b>	am	Interview with the Principal
	pm	Interview with Vice Principal
<b>Fri</b>	am	Observation Year 10 English Interview with a school governor
	pm	Debrief

## Key

AST Advanced Skills Teacher

## Notes

1. All interviews were of approx. 1-2 hour unless otherwise stated.
2. All classroom observations were of a typical lesson (approx. 60-75 mins)

### 3. Organisation of the data collection

Two researchers were present for all interviews and observations. During interviews, one researcher conducted the interview and the other took notes. All interviews were also recorded using audio tape.

# APPENDIX B: ICT PRACTICE SURVEY FOR TEACHERS

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

	Very Comfortable	Comfortable	Somewhat Comfortable	Not at all Comfortable
Write a paper	36	5	4	
Search for information on the WWW	33	5	3	2
Create and maintain web page	7	4	6	29
Use a database	17	13	11	3
Develop a data base	9	5	14	17
Send and receive e-mail	35	5	1	3
Write a program	7	5	7	26
Draw a picture or diagram	18	6	5	8
Present information	19	11	11	4

n = 46

**How important is each of the following computer-related skills for your teaching?**

	Very important	Important	So-so	Not important at all
Write a paper with a word processor	25	13	6	2
Search for information on the WWW	17	16	8	5
Create Web pages	3	7	18	17
Use a data base	10	17	15	4
Develop a data base	9	8	17	12
Send and receive e-mail	12	13	7	13
Write a program	4	2	6	23
Draw a picture or diagram with graphing/ drawing application	13	13	11	9
Present information	20	12	11	3

n = 46

**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	Never

Use the world wide web	6	15	18	5
Create web pages	1	1	5	37
Send or receive e-mail	3	5	17	18
Use a word processing program	15	16	10	3
Use a computer to play games		1	16	26
Use a spreadsheet	4	10	16	12
Use a graphics program	3	7	16	18
Join in an on-line forum or chat room			4	40
Use a presentation program	1	13	20	10
Use an instructional program	1	6	21	16
Other computer uses	1	4	6	12

n = 46

**30. How would you rate your ability to use a computer?**

<i>Good</i>	<b><i>Fair</i></b>	Poor
24	<b>15</b>	5

n = 46

**31. Was student computer use ever evaluated for grading?**

<i>Yes</i>	No
16	25

n = 46

**32. If you assigned World Wide Web searching, how much freedom did you allow students in locating sites to visit?**

<i>No restrictions</i>	Some restrictions	Designated sites only
11	19	5

n = 46

**33. Did you create or modify a Web site with any of the classes that you taught?**

<i>Yes</i>	No
5	39

n = 46

**34. What portion of the computer use in your classes was directly related to the course content?**

<b>All</b>	<i>Most</i>	<i>Some</i>	<i>Very little</i>
20	14	7	3

n = 46

1. **What portion of the computer use that you assigned, was done by students individually?**

<b>All</b>	<i>Most</i>	<i>Some</i>	<i>Very little</i>
6	20	14	2

n = 46

1. **If you have a computer at home, how often did you use it for preparing for teaching?**

<i>Several times a week</i>	<i>Several times a month</i>	<i>A few times</i>	<i>Never</i>	<i>No computer</i>
30	7	5		1

n = 46

1. **Did you participate as a student or instructor in a virtual course through the Internet/World Wide Web?**

<i>Yes</i>	<i>No</i>
<b>6</b>	38

n = 46

1. **Did you involve your students in collaborative learning over the Internet/World Wide Web with students from other classes?**

<i>Yes</i>	<i>No</i>
1	44

n = 46

1. **Are you currently using technology to collaborate with other teachers (professional chat rooms, forums, or the like)?**

<i>Yes</i>	<i>No</i>
11	34

n = 46

1. **How many e-mail messages do you send each week on average?**

<i>More than 12</i>	<i>6-11</i>	<i>1-5</i>	<i>none</i>
11	9	18	5

**n = 6**

## 41. How many of the following have you ever done?

Made changes to a computer s hardware	15
Updated an application program	20
Recovered a damaged file	22
Created a web site	15
Developed a data base	22

n = 46

### APPENDIX C: DOCUMENTATION

#### 1. Documents

Documents collected from the school, and used in the preparation of this report included:

- Copy of an article by the Principal featured in *School Headship national and international perspectives*. Do we have to?
- A series of Vision 2020 documents
- Summary of the OFSTED inspection report
- Booklet - A guide to examination results for 2000
- Documents from the County Education Department
- BECTa briefing paper On-line student review database
- Copies of PowerPoint slides used for presentation given by science teacher to the rest of the staff (5/12/00)
- Information on Learning Transfer produced by Vice Principal
- Booklet - College statutory information
- Booklet - Sixth Form opportunities
- Booklet Year 10 coursebook 2001

#### 2. School OFSTED report main findings

The following is an extract from a document reporting the main findings produced by the Office for Standards in Education (OFSTED) following an inspection of Greenfield College in May 1998. Inspection reports are available from the OFSTED website ([www.ofsted.gov.uk](http://www.ofsted.gov.uk)).

*Students attainment on entry to the college is well above the national average. The college ensures that students maintain, and frequently improve, on these high standards of attainment. Overall standards in the college, as measured by public examinations and as observed in lessons and scrutiny of students work is above national average in most curriculum areas and well above average in some.*

#### APPENDIX D: Greenfield College

## OECD/CERI ICT PROGRAMME

### Nomination Form for a School Site

*Note: This form should be edited for conditions and terminology that may vary in your country or with the sites you will be choosing among. Keep in mind, however, that the data gathered through this form should inform categories 4-7 in the Organisation of Evidence chart at the end of the Workbook.*

#### ***B. Basic site description***

1. *Type of site (age levels/grades, public/private, special populations or services):*

KS 3, 4 and 5. Aged 14-19. General Certificate in Secondary Education, General National Vocational Qualification, A & AS Levels.

1. *Location of site (urban, inner-urban, suburban, small town, rural):*

Suburban

1. *Socio-economic status of parents (describe indicator used):*

Mixture of working class and affluent

1. *Number of students plus notes on any imbalances in representation by gender or citizenship:*

1910 students. 30 per cent ethnic minority students but most UK Citizen

1. *Percentage of students moving to another school before the end of the academic term:*

Low 6 per cent

1. *Total site budget:*

£5,060,902

1. *Percentage of budget (approximately) spent on ICT:*

6 per cent Hardware/software and 4 per cent technician salaries

1. *Sources of income:*

Local authority and additional funding of £100 per student through the Technology College Trust.

1. *Other significant resources received in the past two years (volunteers, corporate donations, etc.):*

Sponsorship of £100,000 for Technology College Trust, Annual funds for TC Trust status £169,00 this year

#### ***C. Staff***

1. *Number of staff:*

Approx 100 teaching, 50 support

1. *Percentage of staff who do not complete the full academic year:*

Very low

1. *Average number of hours spent teaching for teachers whose primary assignment is classroom teaching:*

26 out of 30 periods per week

#### ***D. Academic schedule and performance***

1. *Organisation of instruction (timetable type, special educational needs provisions, etc.):*

Weekly

1. *Formal assessment procedures (types of tests, dates given, purposes):*

GCSE 16+ A level (see prospectus) NFER CATS Y7, Y3. KS3 SATS. Examinations take place in the summer term or at the end of modules of work.

1. *Student performance levels for mathematics and reading (or equivalent) at two representative student year groups:*

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*Students attainment on entry to the college is well above the national average. The college ensures that students maintain, and frequently improve, on these high standards of attainment. Overall standards in the college, as measured by public examinations and as observed in lessons and scrutiny of students work is above national average in most curriculum areas and well above average in some.*

#### ***E. Improvement/Innovation***

1. *Description of improvements or innovations (400-500 words--please attach, along with relevant documentation).*

See main report

1. *Main indicators of success of the improvements:*

See main report

1. *Role of information and communication technologies (ICT) in improvements (400-500 words please attach).*

See main report

#### ***F. ICT***

1. *Brief description of the main technologies (ICT) used at the site:*

Multimedia projectors, (14) internet, intranet, 6 digital cameras, PC/laptops for all teachers who want them

1. *Total number of WWW-usable computers*

500 PC s for children and 60+ laptops for staff and various other staff computers

1. *Total number of other computers*

Couple of Macs, and one reprographics

1. *Locations of computers (labs, classrooms, library, etc.)*

Hubs in Maths, Science, English, Design, Economics, PE, 6<sup>th</sup> Form, Language and 5 computer labs (13 rooms altogether) and 23 mobile computers.

1. *Type of Internet connection*

2MB

1. *Are computers and the Internet accessible to students and teachers beyond class time?*

Yes

1. *Main uses of ICT in the curriculum:*

See main report

1. *Brief description of the ICT technical and pedagogical support provided to students, teachers, and administrators:*

See main report

1. *Main indicators of successful use of ICT:*

See main report

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[1] In order to preserve the anonymity of the school and staff this is a pseudonym.