

# A case study of effective teaching with and through the Internet

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## > Aim

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To investigate teacher and pupil attitudes towards the use of the Internet in teaching and learning.

## > Dimensions of this Case Study

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The Netherhall School is an LEA 11 - 18 comprehensive with 1450 pupils and 82 members of staff, situated to the south of the city of Cambridge. The project was undertaken with four departments: science, mathematics, geography and art.

Seven classes were involved in the project, from years eight to ten. In total, over 200 pupils took part in the study.

## > Summary of Findings for this Case Study

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- Teachers needed training in basic Internet skills;
- Use of the internet did not significantly increase lesson preparation time;
- Assessment strategies were enhanced, particularly where pupil self assessment was involved;
- Teaching styles remained relatively unaltered and reflected teachers' personal preferences;
- All pupils were positive in their response to using the Internet in their lessons;
- Pupils valued being able to work at their own pace and appreciated the Internet's role in the development of independent learning skills;
- All the teachers reported positively on using the Internet and found that traditional classroom teaching methods were not replaced but extended;
- All teachers involved planned to use the Internet as an on-going resource for their teaching.

## The project

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The project focused on the attitudes of both teachers and pupils and considered:

- whether or not lessons which involved the use of the internet improved the quality of teaching and learning;
- what resources needed to be developed for such lessons;
- how teachers and pupils interacted in such lessons.

Each department planned a unit of work involving use of the Internet. The project explored the impact of using the Internet and the World Wide Web on teachers' professional learning, including their confidence and competence in ICT.

The project activities focused on the classroom teaching of four members of staff in the computer room with Internet access, supported by a group of pupils working from home. The pupils provided an evaluation group for materials developed by the teachers.

The study was therefore focused on classroom practice using the Internet. Targeted groups of teachers and pupils piloted online classwork and homework, together with the necessary ICT support for interaction between home and school.

Almost all the teachers involved in the project had minimal ICT skills and teaching with and through the Internet was to be a new experience for them.

## Classroom activities

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*Art* – researching lessons involved pupils in the styles of different artists so that pupils could identify with a particular style of painting and drawing. This 'style' was then adopted in their work on storyboarding, depicting a particular event or activity. The finished artwork was then exchanged with pupils in the Czech Republic as 'Epics', attachments to emails sent via the Internet.

*Chemistry* – researching lessons involved pupils in the properties of the atmosphere of Venus so that pupils could decide on the best materials to build a spacecraft to fly to Venus. Once research was completed the pupils returned to the laboratory and carried out an experiment, based on their research, to

investigate the reaction of combinations of acids on different metals.

*Geography* – lessons involved pupils in a virtual fieldtrip to Antarctica and used satellite imagery, virtual walks, data and scientific reports to experience what life was like in a remote and cold part of the world. The pupils had to report on their experience and prepare a presentation to an audience as though they had experienced the visit in real life.

*Mathematics* – lessons involved exploring the value of topic based websites to support differentiated learning in mixed ability groups. Most of the sites used involved interactive materials and active diagrams.

## The research

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In order to investigate outcome, both teachers and pupils were asked similar research questions. Their responses form the basis of the full report. Extracts from the questionnaires include:

- How did you learn to use the Internet?
- Did the pupils respond in different ways when using ICT compared to normal classroom behaviour?
- What were the learning outcomes?
- What were the positive and negative aspects of teaching with the Internet?
- What have you discovered about your own teaching through using ICT?
- Did you find your approach to assessment changed and if so how?

The full set of questions and survey results appear on the school website - including content analysis of questionnaires (<http://www.netherhall.cambs.sch.uk>).

## The findings

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### Impact on teaching

- Training needs: All but two of the project teachers took up twilight training offered by the Head of IT, and two then went on to teach colleagues not taking part in the project. The other teachers received 1:1 tuition in the use of the Internet in

preparation for classroom teaching. One teacher reported that she had learned by 'talking to and watching other Internet users', and another said that he had received support in learning to use the Internet from pupils 'though this made me feel at a disadvantage!'. The maximum time taken to learn to use the Internet was one hour, reported by one teacher in order to achieve confidence 'in the use of email and web searching'. At the other extreme, one teacher stated, 'Very little – it was extremely easy to pick up.' Key findings from training for the teachers included:

- discovering the need to be clear about what they wanted from a search in order to maximise time available;
- sharing 'good' sites and URLs with colleagues; and
- developing confidence in use 'Not to be afraid – just have a go'.

The training was led by the Head of ICT who was an expert user and was able to enthuse the staff about the forthcoming project. In addition the Head of ICT also ensured that support would be on hand during the Internet lessons and this gave the subject teachers the confidence to work with the technology on their own. In practice no classes actually required additional support of a technical colleague and the teachers were clearly buoyant about their success.

The training also fostered an atmosphere of co-operation and collaboration which was expressed openly in discussion and conversations that followed classroom lessons. Teachers felt part of a team and were experiencing new methods of teaching relevant to their subject.

Teachers identified key issues and needs prior to teaching a class using the Internet. All teachers needed to be familiar with the computers to be used, the teachers wanted a good conceptual knowledge of what the Internet is, what is meant by the world wide web, how to use a browser, how to search and refine a search and how to save and use information they had discovered.

## Lesson preparation

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Teachers reported that planning and preparation for using the Internet in lessons was not significantly different: 'I had my main aims and objectives. Preparation was much easier and cleaner compared to

an Art lesson'. Another teacher stated that preparation 'was not really different. I followed the same pattern but this time instead of using textbooks from the library I used the Internet. It was a different way of accessing information and proved to be a lot quicker'. In terms of procedures, most teachers said that they had spent some time identifying and bookmarking useful sites in preparation for the lesson.

Lesson preparation was initially based on the teacher's normal classroom experience - because they did not have ICT based experiences. Use of the Internet was initially seen as access to a vast collection of resources that the students would browse. However, after the first lesson teachers rapidly evolved much more advanced strategies for ICT lessons in response to two major factors:

- a) the need to stop pupils rapidly moving on to new information and surfing at speed from site to site; and
- b) the need to make pupils read and use more carefully websites that had been recommended by the teacher

Hence discussion between teachers began to focus on the learning outcomes for their lessons, learning styles and methods of assessment.

## Assessment strategies

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Approaches to assessment varied between departments. One department (mathematics) did not report any changes to assessment strategies; science reported that 'The same assessment skills apply as in the lab – working with pupils closely and identifying levels of achievement, but I found that the active involvement pupils had with the materials has resulted in a much better standard in the initial planning of investigation – so they are likely to get higher marks in their GCSE coursework'.

The Art department found that 'Assessment is probably the same but easier to achieve. Pupils are able to give accurate information on their own progress.'

This was an area that could clearly become an extension of the project or the basis of a new study. Teachers and pupils were interested in assessing the value of using the Internet, assessing what they had learnt and comparing the use of the Internet with the more traditional classroom teaching. By working one

to one at a computer workstation pupils were less distracted and felt that they were being assessed. The conditions were similar to those in an exam room. The teacher became the roving reporter and invigilator - although in practice the teacher was more of a music conductor - controlling the pace of the learning and interpretation as the classroom expert. Even though some pupils were clearly expert users they still relied on the relatively inexperienced teacher for guidance to determine whether the content was at an appropriate level and relevant to their study. This interaction motivated the teachers and ensured they had an important role to play in the classroom. Having trained teachers to use ICT with pupils it is now important to raise their own personal skills so they are in a position to assess learning not only in their own subjects but through ICT as well.

## Teaching styles

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Some teachers reported an initial predominance of 'teaching from the front' as they sought to guide pupils in this new medium. However, they also stated that many pupils were clearly competent in IT skills and so teachers returned to their established styles. One teacher found that 'there was a lot more dialogue and interaction with pupils in lessons using the Internet than in her usual lessons.'

All the teachers began their lessons in the traditional 'speak from the front' way. However, they all immediately became highly mobile, roaming experts answering questions related to the computers, browsers, search engines and then most significantly the relevance of the content. Some teachers 'brainstormed' ideas before pupils used the computers, others developed worksheets and some asked for links to be added to the school website for ease of access. All the teachers had integrated their ICT lessons into schemes of work so that there was classroom preparation before using the Internet and follow-up afterwards.

All the teachers involved in the project have continued to use ICT very effectively and all have expanded their use of ICT within their own teaching, across year groups and with other colleagues in their departments.

## Pupil responses

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All teachers reported differences in attitude from their previous lessons. One teacher said that 'They [the pupils] all came out with a real sense of achievement at the end. More time was available to work with the wide spread of ability in that class, and pupils found they could work at their own pace'. Another said that 'There was a sense of excitement and enjoyment and a sense of reward, but also a let down if they didn't find what they wanted. However, it was much easier for them to move on. When pupils know how to use a computer they can be much more independent researchers and they clearly enjoy that.' This was echoed by another teacher who reported that 'Pupils can push their learning on an individual basis, as using a computer assists differentiated learning in the classroom', though one teacher also pointed out that '...there are issues with less able children as sites often have difficult text.'

Pupil responses were indeed very good and initially one wondered if this was due to the novelty of using the Internet. Some pupils have now had many Internet based lessons and the novelty factor has not worn off. Indeed the pupils seem to respect the opportunities offered to them and the quality of the resources they find. Many pupils now use the Internet at lunchtime and after school in the same way they use the library. The Internet is clearly a part of their world and teachers need to develop the 'street-cred' to work with the pupils.

All the teachers reported positively on the use of the Internet as a teaching resource. One science teacher said 'I would like to have more Internet lessons enabling pupils to take more responsibility for their learning. We would like to have the information available [from the lesson] on our home page so pupils can use it for homework.' A mathematics teacher reported 'In the long term we want to think about assessment and integrating web based activities with the use of word processing and desktop publishing.' The Art department produced an extensive list of planned activities, stating that 'We plan to make Internet researching a major focus within the department and integrate it fully into Art teaching.' One teacher added 'What is reassuring is that working with computers does not replace traditional methods but extends opportunities.'

Attitudinal change, where most teachers had expressed interest but a degree of reserve largely associated with their own anxieties about IT skills, recorded a marked positive response. In particular, one teacher who had reported early on that 'Computers don't like me' now demonstrated a real enthusiasm '...the motivation of the pupils when using the Internet entices and enthuses – this [the Internet] is now a permanent resource for my teaching.'

## Impact on learning

Pupils generally reported favourably on the introduction of the Internet into lessons, although one pupil stated that 'I've got it at home so it didn't feel all that different.' There were, however, a notable number of responses which referred to the time taken for sites to download, something which teachers may wish to take into account in their planning.

## Attitudes to learning:

All pupils expressed a strong liking for using the Internet in learning 'I felt I wanted to learn more' ... 'I was keen to learn this way' ... 'It made me more interested in studying'. However, pupils were also able to articulate a qualitative difference in the learning experience 'It is a different experience ... instead of being told, you had to find out the information' ... 'I had to broaden my mind and use information I wouldn't have thought of including' ... 'I took the info in instead of almost falling asleep (sometimes)'... 'Using the Internet is more interactive than normal learning' ... 'I thought more laterally' ... 'If you have more to work at you just want to get on with it'.

Many of the comments referred to the motivational factor of Internet use 'I find a computer more interesting than using books and I tend to work harder

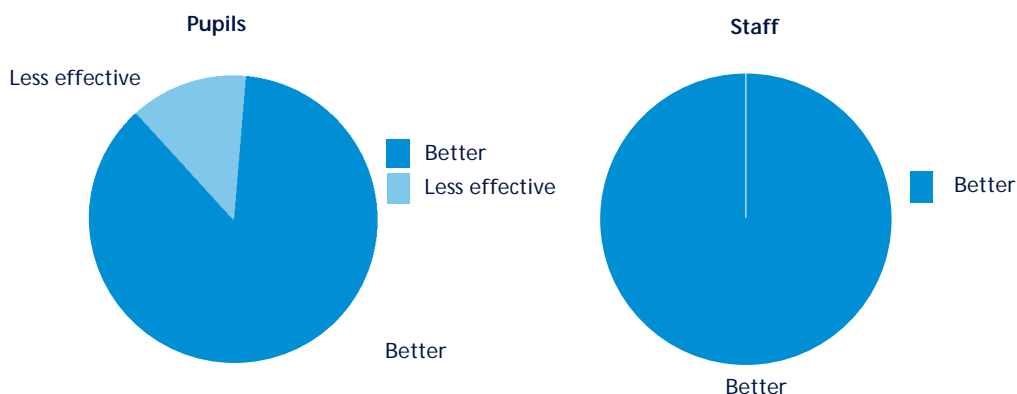
and faster' ... 'When using IT my motivation to learn increases' ... 'It's good fun to learn this way'. Some pupils discovered that they were more effective learners than they had realised: 'I was better than I thought at research', whilst others found less positive aspects: 'I found out I don't like looking for information'.

Unexpectedly, pupils reported on the number of 'traditional' skills that they had found they needed. 'You still have to skim read'... 'You have to spell correctly or the search engine won't be able to find what you want'...' You need to be able to take notes well' ... 'you have to be good at reading the instructions that you get on the screen' ... 'You need to be literate!'

Pupils were clear that the Internet was an efficient source for information, citing that it was up to date, extensive, allowed them to search for information that the library would not necessarily have to hand, e.g. recent environmental statistics, and that the information available was 'global'. One pupil put it succinctly: 'More sources say more things'. Pupils did not question the validity of the sources of information; however, this was not an integral part of the questionnaire and pupil awareness is therefore difficult to assess from this study.

Pupils did not differentiate about the use of the Internet in the range of subjects, though they cited Art as an area where the Internet offered a particularly rich resource. When asked how they thought they might use the Internet for future learning, many anticipated being able to use the Internet to support GCSE coursework: '...planning my experiments – and to make scientific predictions and conclusions'...'writing down the URLs of useful sites and then going home and printing them out from my Internet connection'. Two pupils responded with 'wisely' and 'for inspiration'!

Did you work in a more effective way with the Internet compared to normal classroom resources?



Pupils saw the use of the Internet as reflecting an approach to learning which they felt to be relevant to their future lives: 'You take responsibility to find out what you need for your own project – it's independent study. I'll need to be able to do this when I go to university.' ... 'there's a more calm and mature working environment – it's not like being at school'.

Finally, pupils were asked about the positive and negative aspects of using the Internet in the classroom. Most frequently cited negatives related to time 'slow access' ... 'it can crash and then you have to begin again'. Other negatives included a reluctance to use computers generally 'Don't feel I'm in control' ... 'technofear' and the time factor 'too much to explore in one hour' ... 'run out of time after finding what you want'. However the positives far outweighed the negatives, including '...being able to work at your own pace' ... 'Having to use different skills' ... 'great for research' ... 'I can develop computer literacy at the same time – good for my CV' ... 'masses of accessible, useful information' ...'

## Method

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The teachers were interviewed at the start, mid way through and at the end of the project. The interview questions were designed to ascertain any attitudinal change, practical considerations such as training needs, lesson preparation and changes, if any, to assessment strategies, styles of teaching and perceived pupil response. The project also looked at differences in these areas across subjects for either subject specific issues, or generic findings.

The data collection phase of the project involved pupils answering questionnaires.

The questionnaires allowed for open ended responses and pupils were asked to reflect on their own experiences of using the Internet in the classroom in terms of learning styles, classroom activities and positives and negatives of Internet use in lessons.

## Dissemination

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The Netherhall School website.

Channel 4 training video for teachers to be broadcast from October 1999.

Conference presentations by Alastair Wells (e.g. ITTE, Resource, Headteachers conference in Coventry).

Visitor Presentations - the school receives regular visits from the DfEE, BECTa, British Council and BESA.

## Further reading

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**Abbott. C.** *Making the Web Special*; A guide for special schools and PRUs Kings College London

**DfEE (1997)** *Connecting the Learning Society: a consultative document*. London: HMSO

## Websites

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- [www.neonpartners.org](http://www.neonpartners.org) Strategies for implementing an effective infrastructure for teaching with and through the Internet.
- [www.netherhall.cambs.sch.uk](http://www.netherhall.cambs.sch.uk) The Netherhall School website with several reports and initiatives together with the full text of this report.
- [www.becta.org.uk](http://www.becta.org.uk) - Guidance and reports on subject teaching with the Internet.
- [www.uni.edu/profdev/teachnet/wkspintro.html](http://www.uni.edu/profdev/teachnet/wkspintro.html) Teaching with the Internet - a UNI Professional development Workshop.
- [www.uni.edu/profdev/teachnet/six/intro.html](http://www.uni.edu/profdev/teachnet/six/intro.html) Training and Learning Online by J.M.Vandervelde.
- [www.suvi.kas.utu.fi/papers/earli/opethki.htm](http://www.suvi.kas.utu.fi/papers/earli/opethki.htm) Teacher's mastery of information technology and pedagogical expertise.
- <http://it-resources.icsa.ch/Introduction/NFIndexE.html> the Information Technology and Pedagogy Resources Site.
- <http://sunil.umd.edu/documents/teaching.htm> Internet and Teaching by Sunil Hazari.
- <http://www.crito.uci.edu/TLC/findings/Internet-Use/startpage.htm> Internet Use by Teachers by H.J.Becker.

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