



**Office for Standards  
in Education**

## **2004 Report: ICT in schools – the impact of government initiatives**

### **Secondary geography**

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## Contents

Introduction	4
Main findings	4
The impact of the initiatives	5
Teaching and learning in geography	5
Standards and achievement in geography	7
Implementation in schools	9
Leadership and management	9
Staff development	9
Resources and accommodation	10

## Introduction

This report is based on subject-specific evidence from visits to secondary schools made as part of the inspection of the impact of government ICT initiatives between April 2002 and December 2003 and has been supplemented by evidence from other school visits where appropriate. This contributed to the main report, *ICT in schools*, which is available from the Ofsted publications centre (07002 637833) or via the Ofsted website ([www.ofsted.gov.uk](http://www.ofsted.gov.uk)).

## Main findings

- Geography provides a rich and varied context for the use of new technology to enhance both learning in the subject and to reinforce existing ICT skills. Commonly, desktop publishing, word-processing and spreadsheets are used to enhance presentation and to organise geographical data, particularly for examination coursework, and the internet is used to research information.
- There are inconsistencies in the quality and use of ICT in geography across schools as well as among staff within schools. In over a third of schools, good use is being made of ICT, but in one school in five this remains unsatisfactory.
- Good teaching using ICT often involves the effective use of new technology to enhance exposition in the classroom. In departments that are confident in ICT use, teachers have made imaginative use of geography materials on the school intranet to support learning outside of the classroom.
- As schools face increasing demands on access to finite ICT resources, including computer suites, lack of access at required times is often discouraging geography departments from using ICT.
- In too many cases, the limited time spent in ICT suites is well used to reinforce ICT skills, but there is too little focus on enhancing the delivery of geography.
- New Opportunities Fund (NOF) training often failed to meet its objectives. Even so, in the majority of schools, many teachers have well-developed ICT skills which are occasionally enhanced by additional in-house training. There are relatively few opportunities for continuing professional development in the use of new technology. A minority of teachers remains reluctant to use ICT.
- In half the schools, weaknesses in geography are associated with limitations in the strategic management of cross-curricular ICT.

## The impact of the initiatives

### Teaching and learning in geography

Geography provides many rich opportunities to use ICT to enhance both subject teaching and learning. Good teaching is based on clear expectations of geographical outcomes, with good preparation and planning which provide a number of linked activities to maintain pace and pupils' interest. This example from a Year 9 lesson shows the benefits of a straightforward activity to research and report using a CD-ROM:

*Pupils used the 'Kenya: the final frontier' CD-ROM to research aspects of the Masai's way of life. The materials were used as a source of images alongside text at an appropriate level. Pupils worked quickly and effectively through the instructions to locate relevant material, focus on one aspect and make detailed notes. After 20–25 minutes the pupils returned to their desks and shared their findings. Pupils' interest and concentration was maintained because the teacher made sure that they were aware that they needed everyone's findings to complete their homework task.*

In this lesson, ICT is used effectively as a tool to support learning in geography; attainment in computer skills is not significant. Frequently, however, there is a greater gain in developing and consolidating ICT skills rather than enhancing learning in geography. For example, geography often provides the context for pupils to feed data into a spreadsheet with little or no time used to analyse and explain the data. In contrast, where the teacher understands the value of ICT as a tool to organise data for ease of analysis rather than as a means of occupying pupils, greater gains can be made in geographical learning. In one school, for example, the use of databases and spreadsheets was always taught in the context of a problem-solving scenario:

*As well as presenting information graphically (for example scatter graphs), pupils are required to look for associations in the data. The dangers of creating graphs in a database, without understanding the underlying purpose and the method, are a clear consideration of the teaching. For that reason the department is keen to teach skills with pencil/paper methods as well as using ICT.*

Teachers are increasingly using the internet as a resource for pupils' research in lessons. Too often, however, both teaching and learning are unsatisfactory. In particular, project work in Key Stage 3 often involves downloading text and pictures rather than more refined editing and analysis of information to develop geographical concepts and ideas. Where the searches are carefully managed and supported, pupils can make good progress in acquiring geographical information for further use in subsequent geography lessons. In a Year 7 lesson, as part of an induction unit of work on the local area, the specific task was linked to this year's 'Geography in Action Week' which focused on images in geography:

*The objective for the lesson was to complete a web search to identify suitable images of Stourbridge for inclusion in a poster. The teacher had previously prepared a worksheet, which had been placed on the shared area of the network by the ICT technician. Although the Year 7 pupils had only recently transferred from primary*

*school, on the basis of clear instructions they showed skill and confidence in copying and pasting the worksheet into their own managed area, and in opening up both a Word document and the internet.*

*The teacher's introduction was brisk, purposeful and motivating as pupils were set the task to use the hyperlinks to research sites about the area where they live. At first, most pupils concentrated on the mapping rather than the image facility of the website. Few pupils had prior knowledge of this site, and the teacher sensibly allowed them to explore the scale function, the use of directions for moving across the map, and the matching of pupils' own knowledge of the Stourbridge area to the screen maps.*

*The teacher then reminded pupils of the need to move to the core task, that of locating appropriate images. Pupils worked at fast pace and began to produce high-quality posters. A significant minority of pupils created draft poster sheets that integrated photos with their location on the map. Some pupils even used aerial photography as a base map. All pupils quickly learned how to manipulate images on to their document template by cutting and pasting, resizing and integrating text with image. The teacher used time targets effectively to make sure that pupils focused on the lesson's purpose while exploring other elements of the websites visited.*

*This was very effective practice, with pupils knowing the purpose of the activity. This increased their enthusiasm for using ICT to research and record their findings, and they clearly benefited from the teacher's preparation in finding useful websites. The teacher also set clear expectations for the lesson, but showed flexibility in adjusting her plans when she judged that pupils' interest in the map website was a good means of developing understanding of maps of the local area.*

Teaching using ICT requires a new range of skills. In this lesson the teacher needed to know how to make effective use of presentation software and what to do when the technology goes wrong.

*In a Year 7 lesson on weather and climate, the focus was on creating climate graphs, using a spreadsheet to plot both temperature and rainfall on one graph. The teacher used a multi-media presentation to pose the question 'what is a climate graph?'. The questioning and exposition were clear and well planned and enabled the pupils to see the difference between rainfall (bar) and temperature (line) graphs and how these can be combined onto the same graph. The teacher modelled how to open a file and enter shared documents. This ensured that pupils understood how to begin the task. However, the slow speed of the server disrupted the pace of the lesson. The teacher had to change tack and show pupils how to access the files in another way. This was done very effectively and eventually pupils located tasks in shared documents which gave clear step-by-step instructions to enable them to plot line and bar graphs.*

*Despite the technical difficulties the teacher maintained control and interest and effectively coped with a difficult situation. Overall, the lesson was effective in reinforcing and teaching ICT skills in a geographical context so that the class could then follow up to develop the geographical explanation of the graphs produced.*

In many schools, the most significant progress in the use of new technology to enhance geography learning can be found in geography classrooms rather than the computer suites. In particular, interactive whiteboards can provide a powerful visual stimulus to aid

teachers' exposition and stimulate discussion, as in this Year 10 lesson on urban models.

*The lesson began with the teacher giving an oral presentation on 1920s Chicago, supported by a multimedia presentation using images of the old city and introducing the idea of development with a time-line and some old black and white images. This was done very well, using resources researched from the web which held the pupils' attention because of the interesting associations with movie images of gangsters. This set a real context for the Burgess model of urban development. The main part of the lesson used the concentric model diagram (taken from the class textbook and displayed on the screen) and an aerial oblique of the city to discuss whether the model matched reality. The teacher challenged the pupils to say if it worked, and they came out to the front to draw over the photo to demonstrate whether they could match the zones in the model. This led to a lively discussion, in which one pupil after another came to the whiteboard to put over their ideas, some actively criticising the model since they saw several zones that did not match in the modern picture, but conceding that in the old image there was some match. They also asked good questions about the diagram, such as 'what are bright lights?' to which the teacher carefully explained the meaning of 'ghetto' in this context of Chicago, demonstrating very good subject knowledge. The quality of the large images and clear diagram, and the ability to flip back and forth through the displays as the discussion progressed, were important to focus the discussion. As a result, the exchange of ideas was very high and could have been part of a good sixth form lesson. The pupils then summarised in notes the discrepancies they had noted in the model. The lesson then moved on to consider Hoyt's adaption and applying the model to their own city.*

A small number of teachers are using Geographical Information Systems to provide tasks that require the application of wide-ranging and high-order ICT skills to exemplify the geographical content. These help pupils to develop their skills in exploring patterns and relationships, in testing out ideas, analysing large quantities of data, and recognising that the interpretation of such data is complex and yields a range of possible answers.

Many geography teachers are becoming more confident users of ICT to support their preparation of lessons and to complete administrative tasks. Effective use is made of a range of software to produce worksheets and booklets as well as access to a range of photographic and movie resources. Increasingly more sophisticated presentations are being produced for use in the classroom, although sometimes this is for visual impact alone rather than more specific learning outcomes.

## **Standards and achievement in geography**

Pupils use a range of ICT applications to enhance their achievement in geography. These include:

- desktop publishing and word-processing packages for drafting and to improve presentation
- spreadsheets to organise primary data

- the internet to research information
- geography-specific software such as digital mapping programmes.

Where teachers are confident with ICT, these applications are combined to provide pupils with the tools for research, drafting and presentation. Such effective and imaginative use of ICT takes place most often in examination classes. In the following example, Year 10 pupils were required to develop a business presentation to promote fair trade and raise awareness of trade issues in less economically developed countries.

*All pupils had completed their tasks and were competent at putting their presentation on the class computer and managing the whiteboard. The content of the presentation for most pupils was varied, well researched and clear. ICT used included graphs and pictures in the multi-media presentations and some pupils had included sound and scanned in logos. Pupils had also produced posters and a leaflet to show their understanding of fair trade. These were well produced, with many using a desktop publishing package effectively. Achievement by all pupils was good; all made gains in knowledge and understanding of aspects of fair trade and had consolidated ICT skills for a particular purpose.*

At best, such presentations are very sophisticated, reflect high levels of geographical thinking and understanding at the drafting stage, and high levels of technical skill. The following example is from Year 11 where pupils had prepared presentations on various aspects of glaciation:

*Pupils worked collaboratively and co-operatively on their presentations. They had agreed the approach as a group and shared out tasks. They exchanged work by email, disk or memory sticks. This lesson involved giving presentations at the draft stage, so that evaluations could be made by the teacher and peers and improvements suggested. Pupils, working in groups, showed excellent understanding of processes and features and each individual selected one in-depth case study. Extremely high-quality presentations were developed using multi-media facilities, often including annotated full-screen images. One pupil had impressively developed an animation from the textbook to show the rotational slip within a corrie. He used free software for this, devising four images and created a GIF file. Another group used a specifically devised interactive software package to incorporate CD-ROM video clips and again this was technically very impressive. The oral presentations by the pupils and their answers to questions were knowledgeable and articulate. They showed very thorough knowledge of their subject matter, which was well above General Certificate of Secondary Education (GCSE) standards. The pupils' contribution to the evaluation of the presentations was very good, and they referred to both the content and the effectiveness of ICT use.*

Achievement was also high in instances where pupils used geography-specific software. For example, a Year 7 class used digital mapping to locate features, plot routes and calculate distances.

*Pupils were highly interested in the map, and most spent a few minutes panning around it locating features of interest. This was followed by discussions in pairs to consider which routes are used to get to school and why. All pupils were confident*



*users of the basic functions of the software. Some pupils used the instruction sheet while others preferred to use trial and error methods. These worked just as well, and most pairs made good progress in plotting and measuring routes. By the end of the lesson many pupils had plotted their route to school, calculated distances, added labels and a title and printed their maps, and most also knew how to load, manipulate and save a digital map.*

However, pupils' achievements are often limited by low-level tasks and the inappropriate application of ICT. For example, where pupils are given too much latitude in searching for information on the internet, they frequently digress from the objective of the lesson. Equally, setting broad tasks such as 'a project' on a particular country often results in pupils downloading information at random rather than refining the content to make it geographically appropriate.

## Implementation in schools

### Leadership and management

The inconsistencies in the use of ICT in geography identified in this report reflect the different emphases placed by different departments on the development of new technologies. In a minority of schools, good and sometimes innovative leadership has led to a wider use of ICT, both to provide a core of ICT within the planned programme and to enhance learning outside the classroom using the school's intranet or website. In the majority of departments, however, schemes of work still make only brief reference to ICT. Typically they contain a list of websites and software resources such as CD-ROMs held in the department, but little indication is given as to how these can be used effectively in geography lessons. In a minority of departments, a conscious attempt to weave ICT into the teaching framework results in a much more clearly focused and effective use of ICT to aid geographical learning as an entitlement for all pupils.

There is little evidence that the use and effectiveness of ICT in geography are being monitored with any rigour. For example, none of the schools in this sample made formal evaluations of which ICT resources were the most effective in enhancing either geographical teaching or learning.

In most geography departments, the use of ICT to support assessment is embryonic. Many departments place the required data on central assessment information systems and are given targets for pupils based on this data. However, there is little evidence that this is being used in any detail to inform planning or teaching in geography.

### Staff development

In many schools, the NOF-funded training did not provide good value for money. In many geography departments it was considered to be of only limited value, although there were some benefits where teachers' awareness and expectation of ICT use were raised. Often the training did not consider the range of existing competencies of

teachers in the department and extend or build on them. More competent ICT users were frustrated by the low-level starting points of the training. For some, there were gains from work on applications in which they were less secure, for example the use of spreadsheets and databases.

Furthermore, in the great majority of schools visited, there is little continuing professional development to support the use of new technology. Few departments have considered the need for further training. Where they have occurred, teachers' confidence continues to grow, as in this example:

*Last year's departmental training time was used to develop materials for the GCSE coursework, with the intention of placing these on the school intranet. The department consolidated personal skills by devising spreadsheets, digital photos imported into a publisher document, web links and student guidance material. This has supported their work in the classroom in a practical way. It also raised staff morale to the extent that the department is now confident enough to participate in the 'Link Learning' project with the local university to investigate the impact of new technology on students' learning and offer this as a twilight workshop for the whole staff.*

Most effective practice and development has occurred where the school has provided high-quality in-house training to supplement that already received, as in this example.

*The additional training was very well organised and relevant. Basic skills training was ongoing and many staff participated as they deemed appropriate to their needs. In the summer term, they were able to enhance their knowledge and skills in (i) internet searching (ii) multi-media presentation – creation and use and (iii) email – creation and use. This was followed up in the autumn term with workshops on using desktop publishing to enhance worksheet design as well as training in using the interactive whiteboard and developing the use of databases. The geographers used the desktop publishing course as an opportunity to focus on creating 'exciting and professional worksheets'. They found the workshop on spreadsheets as a tool for assessment purposes very useful and are devising their own geography-specific assessment profiles as well as providing an interactive tool for use in managing and refining fieldwork data.*

This training was seen as relevant to their subject and the geographers were able to use generic software to improve the quality of their resources as well as expand their teaching repertoire.

## **Resources and accommodation**

Four out of five departments reported difficulties in gaining regular access to ICT accommodation. For many departments, access is limited to suites not in use for discrete ICT or block booked by other departments. Some schools still use a 'first come, first served' system which can be inequitable and fails to address the planned curriculum.

However, some departments do not make the most of ICT even where it is available. In particular, limited use is still being made of new technology to support fieldwork. In schools which are well supplied with such resources, greater opportunities could also be

sought to use data loggers, palm tops and digital cameras to enhance fieldwork across all year groups. Few departments are using data loggers for collection of primary data. Increasing use is being made of digital cameras to collect images for use back in the classroom, but most frequently by staff rather than pupils. In a minority of schools, simulated or 'reality' fieldwork is being developed and used on the school intranet. If used correctly, this can be a useful resource to support learning but there is a danger that this is at the expense of real experiences in the field.

Departments that are furthest forward in using ICT are aware of the range of opportunities and the quality of resources available and are able to offer pupils an extensive and cumulative experience, as in the following example:

*The geography website, large image projection, interactivity and laptops for pupils have all revolutionised the geography curriculum in this school. All lessons were ICT-focused and were mainly based on pupils' contributions via research and presentation, or teacher-led discussion using large visual images. The curriculum was open to all – parents, pupils and the world on the website! Pupils' contributions were posted and shown to others via multi-media presentations, so this wider audience had a very positive effect on the quality of pupils' work. Geography coursework presentation was of very high quality.*

More often, however, teachers are unaware of the range of ICT resources available to improve the learning experience for their pupils.

Some schools make good use of the school intranet or website, especially if access to computers in geography lessons is restricted. Pupils can be encouraged to use it in their own time. Good use can be made of local public library facilities, after school computer clubs and personal computers at home to enhance and support pupils' learning of geography. Particular use can be made of online resources to research information about specific topics or support homework tasks. In one school:

*The geography department had been very active in preparing many new resources for pupils to access outside normal lessons. Pupils were able to access from home banks of photographs and a range of resources produced by the teachers. Many were hyperlinked to relevant resources on the web. An induction unit to support transition was available to all new pupils to the school to enable them to complete preparatory work before starting their new school. This was particularly useful for those pupils from primary schools where little geography had been taught. All multimedia presentations and lesson notes used by teachers in classrooms were made available to pupils, making it easier to check on aspects they remained insecure with. This bank of material was especially useful for pupils who were absent or had long-term illness and enabled them to keep in touch with lessons they had missed.*

In most schools, the lack of technical support still remains a problem. The difficulties experienced in setting up equipment such as data projectors can discourage regular use.