

Managing pupil research using the WWW

Introduction

The Internet can be likened to a giant growing library in which the contents are totally disorganised. Some catalogues exist but none are complete. Yet this library is likely to contain the information you want, at the level you want. The only difficulty is in locating that information. Hence, it is essential for any user of the Internet to develop a clear research strategy, a strategy which will evolve with practice and will become more and more specific. It is possible to use the Internet productively with Key Stage three (KS3) pupils but first think hard about learning objectives – exactly what are you looking for? – will the pupil achieve success relatively easily? Is the Internet the best place to look – or do you already have appropriate print resources?

Before pupils are asked to use the Internet to obtain information, they should be encouraged to consider alternatives. For example, a half-hour Internet trawl to find something about photosynthesis, may be a waste of time - much information can be found from books. In the context of pupils developing information skills, working as a team and refining searches, a seemingly frustrating 30 minutes will have its gains – especially if the pupils are asked to critically review their experience. After a number of positive experiences, a user will gain in confidence and be willing to persevere when their initial search produces '15 000 hits.' Perhaps, a need to narrow my search terms? - 'Wind Power, UK' rather than simply, 'wind'?

Bear in mind that your pupils may not have the literacy skills which they will need to deal with the material they find on the Internet, most of which was never written as a resource for KS3 pupils. Confronted with material which is too difficult for them to handle, there is a danger that they will resort to cutting and pasting, rather than extracting useful ideas from the Internet and using them to construct their own material.

For pupils to experience success in searching the Internet, it is important that you specify the task clearly, perhaps giving some starting points, e.g. specific sites. Some of the class may not go beyond these points.

Classroom organisation

The layout of your room can be instrumental in facilitating constructive experiences for your pupils. For example, Newfield School City Learning Centre (Sheffield) opened in the autumn of 2001. The centre includes two 'computer rooms' of similar dimensions, each with 30 pupil workstations and an interactive whiteboard with data projector. One room has been designed along traditional 'straight lines' while the other has a series of islands. The latter has proved to be much more appropriate for interaction between users. Any pupil can easily relate to four or five of their companions. The more traditional layout acts against such interaction, thus stifling debate and cross-fertilisation of ideas and techniques. The latter also has the problem for the teacher of a lack of lines of sight – it is difficult to see a high percentage of computer screens at any one time. The former example is much more friendly for this essential policing task.

It is also important for a room to have enough space to allow work away from the computer – pupils can compare printouts from sites, images of an event, work on presentation storyboards or tackle the alternative lesson which is ready for when the 'network goes down.' This is a precaution, which is always worth taking – can you still deliver a successful lesson when access problems occur?

Data projectors are essential – a large TV screen is simply not suitable for demonstration work with computers, it is impossible to see the intricacies of the drop-down menu. An interactive whiteboard can be an excellent resource, however, a data projector shining onto a traditional whiteboard offers the opportunity for the teacher to highlight on the screen. This technique can allow you to draw attention to salient features of any website.

Large TV screens may be suitable for small group work or for providing the broad picture – for example demonstrating the growth of a temperature/time graph from a datalogging experiment. If you have a small island of Internet Access in a corner of your laboratory, many uses present themselves. A research activity can be part of a natural circus of events – an extra research based aspect of your normal teaching.

Accessibility Management

When using the Internet in the classroom, you may find things not going to plan. The Internet connection or server may be so busy that pages take an age to appear on screen or the document you bookmarked has been renamed, deleted or moved, a 'not found' message appearing. Perhaps, the Web site you found in the morning may be inaccessible in the afternoon. Opening a new browser window lets you explore elsewhere, but this is unlikely to help you complete your original task by the end of the lesson. The Web is by its nature never the same two days in a row; this very strength and flexibility can sometimes prove to be a weakness.

Pupils will require guidance on the quality of the information available. On the Internet, there are few guarantees about what is accurate and impartial. Ways of evaluating Web sites include (i) the date of last up-date, (ii) who produced the information and (iii) factual conformation from elsewhere. Pupils can usefully learn that the material they find on the Internet has not been refereed; there is an almost total lack of scrutiny of the contents of websites, and you will often come across opinion, argument and assertion pretending to be fact.

Every educational establishment should have a suitable Internet Access Policy. The British Computer Society (BCS) and the National Association of Advisers for Computers in Education (NAACE) have produced a downloadable 16-page leaflet, <http://www.bcs.org.uk/ial.html> to help schools and colleges formulate such a policy.

Downloading

Given a project such as preparing a report or display, pupils can assemble the material they need from Websites. They can view a page, highlight text or pictures and copy them into a word processor. They can save text, pictures or the whole page as a file on disk. In this way they can treat Web pages as raw data to mould to particular purposes. Most downloads may be accomplished relatively easily – for example, when using Internet Explorer, use the right mouse button – this will allow you to *save* the image or text file. Alternatively, you can highlight the text which interests you, then use the right mouse button to *copy* and then *paste* into your word processing file.

Caching can be a useful way to introduce your pupils to a website, as you can be sure the pages are there. However, caching is not straightforward. You have to alter the settings on the options menu of your browser, raise the maximum memory and make the software never check Web documents. You must also remember to reload pages when you are on line if you think they may have changed since you last visited them. It could be worth alerting your network manager of sites you may wish to use as part of your teaching. He/she may be able to cache them, or, at least, check that they are easily accessible at the time of day you wish to link to them.

It is possible to use special programs to copy pages, and even to capture whole sites. Examples include Webwhacker, <http://www.bluesquirrel.com/products/whacker/whacker.html> and Near Site, <http://www.nearsite.com/>. These programs let you organise and recycle the pictures and text they contain. However, Web pages that use programs such as Java or CGI may not work when you are off line. Nevertheless, off-line material has its uses: for example, you can rewrite the material or add pages with questions. The technical side of this should be discussed with your network manager. It is also possible to use Adobe Acrobat to copy web pages into Acrobat format, <http://www.adobe.com> - this can be very useful if you want easy access to a single site or small group of sites.

Accessing Sites

You could take a very structured approach by previewing websites and devising activities around them. Your pupils will obtain exactly what they need, and can work on their task towards an expected outcome. The directed approach has been used for centuries: it is tidy, focused and the outcomes can be easily assessed. You could develop a simple template, around which your questions could be posed, for example Template One. If the page you want has moved, it is often possible to use the search facility provided on the home page of the site in order to locate the page you want.

In the 'Energy and the Environment' unit, the Centre for Alternative Technology site, <http://www.cat.org.uk> may be used for a variety of purposes. You could ask your pupils to use the quiz, a 'simple evaluation of how green your lifestyle is' - <http://www.cat.org.uk/information/howgreen.tmpl?subdir=information> - each of the points raised could be developed further - what are the rights and responsibilities of citizens to the global environment?

The 'Environment in your Pocket' site, <http://www.defra.gov.uk/environment/statistics/eiyp/intro.htm> is part of the site of the Department for Environment, Food & Rural Affairs. It contains data, notes, graphs and charts on a large variety of environmental issues, ranging from air quality, waste and recycling and radioactivity to wildlife and public attitudes. This is an excellent reference source for up-to-date data. This site can be used in a variety of ways - from downloading data and using a spreadsheet (for example, Excel) for alternative display techniques (highlight, *copy*, then *paste*) to using the data to confirm ideas regarding the environment. It could be used with the template mentioned above (Template Two). Extension work involving consideration of a more complicated data set from the same source.

<http://www.stlcc.cc.mo.us/fp/users/kkiser/History.page.htm#Culture%20Methods> is a very detailed site on the history of microbiology. It includes information on the key developments and key individuals. This site could be used to allow pupils to develop an understanding of the microbiology timeline, leading to an appreciation of the key events from the development of the area. For example, was it ethical for Jenner to deliberately infect others with smallpox?

Search Techniques

Portal sites can be very useful for initial research. For example, the Teacher's Guides for the Oxford University Press, World of Science KS3 scheme, includes a selection of links for each chapter of the book. The links <http://www.oup.co.uk/worldofscience> cover a wide range of abilities. Weblinks, <http://www.sheffcol.ac.uk/links/> provides over 3000 educationally useful, annotated, categorised and searchable links, many are categorised as 'Science.' Weblinks was the winner of the year 2000, Becta/Guardian website award <http://www.becta.org.uk/websiteawards/2000winners.html> Physics.org, <http://www.physics.org> is a new gateway from the Institute of Physics (IoP), which uses a powerful natural language programme to give an accurate and relevant answer by the use of a database of refereed resources that are guaranteed by the IoP. If you provide your age and knowledge of physics, the answers become even more focused.

No search tool covers more than a relatively small percentage of the Internet. They search through directories or via key words, hence it is essential that spelling errors are avoided. Most search tools can use Boolean operators (AND, OR, NEAR, NOT) in order to narrow the subject of a search. At KS3, Ask Jeeves, <http://www.ask.co.uk> and Ask Jeeves for Kids, <http://www.ajkids.com/> can both be very useful. The user poses a question, Jeeves automatically turns the question into search terms and submits them to other search engines.

The main problem with Ask Jeeves is the difficult in finding the exact URL. The easiest way is to go to a site recommended by Ask Jeeves, who waits in a frame at the top of the page and leaves a long URL in the address book, right click on a link almost anywhere on the page and open that page in a new window, close all the Ask Jeeves pages and from this new page go back to the site's home page. It is usually possible to pin down what you want and also have a sensible address for future use.

Google <http://www.google.com> was officially launched in September 1999 (Stamford University) - it does not aspire to cover as many pages as its competitors but has a number of useful features (eg. GoogleScout). Google has opted for quality and relevance rather than quantity. It has a large database and an intelligent system of ranking hits with results presented in order of relevance.

You may also find iLOR useful, <http://www.ilor.com/> iLOR Search claims to use the most efficient search engine methods in the world to obtain their search results. It offers four ways of interacting with search results and provides three ways of working with those links once selected. The result is an effective and efficient method of finding information.

You could also try having a look at Copernic <http://www.copernic.com/index.html>. The way it works is that it chooses ten of the best search engines available and gets them all searching at the same time. Each are set to find ten matches according to a key words search instruction. Duplicates are ignored so you end up with one hundred matches altogether. What is fun about his search engine is that it lets you see the progress of each search engine as it is searching. Results are classified by order of relevance.

Search Engine Colossus, <http://www.searchenginecolossus.com/> is an international directory of over 1000 search engines, many in the language(s) of the country in which they are located. It also groups search engines by theme.

Bare Bones 101, a basic tutorial, <http://www.sc.edu/beaufort/library/bones.html> contains 20 'lessons' covering many aspects of searching the web. These include search engines, search strategies, evaluating web pages, troubleshooting and a closer look at some of the more popular search engines. The Internet Detective, <http://www.sosig.ac.uk/desire/internet-detective.html> is a downloadable interactive tutorial on evaluating the quality of Internet resources. This is suitable for teachers.

Copyright Issues

If a pupil copies some text from a website and uses it in their written work, this text should be referenced. The usual manner is to copy the url from the address box, paste it onto your document and add both the name of the site and the date accessed. For example:
ScienceYear, 2001: UK. Visited February 2002. URL: <http://www.scienceyear.com/>

The same should occur when a pupil uses an image. However many images on the web are examples of publishing without permission (and therefore violate copyright law). The copyright held in digital images on the web can be a complex set of 'layers' of ownership depending on how old the image is, when its original copyright holder died, whether it has been published prior to its digital publishing and whether the digital version is an adaptation (as opposed to a more direct 'copy') of an original photograph.

Many websites contain a copyright notice detailing how the material they contain may be used. If no copyright notice is provided, it is not really safe to assume anything. For those wanting to reuse materials found on the web, a good starting point is to send an email to a named contact or email address provided on the website.

However, I believe that the use of an image by school pupils is permitted because the document is produced for the purposes of examination. (Section 32 of the Copyright, Designs and Patents Act (1988), http://www.hms.gov.uk/acts/acts1988/Ukpga_19880048_en_4.htm) Should you wish to use the document for any other purposes, then copyright clearance should be sought. However, there are sites available, which can provide images suitable for your pupils. ClassroomClipart, <http://classroomclipart.com/cgi-bin/kids/imageFolio.cgi?direct=Science> contains hundreds of scientifically based images which can be used for educational purposes.

The ASE Image Gallery, <http://www.ase.org.uk/cgi-bin/imageFolio/imageFolio.cgi> is a growing resource which can be used freely in any educational context. An example of how North Chadderton School (near Oldham) has used these resources in developing its own online KS3 Science Scheme of Work can be viewed, <http://www.webschool.org.uk/> Other images may be found at Google, <http://images.google.com/> where more than 150 million are listed and indexed.

Website lists

QCA has developed a two-unit Scheme of Work for teaching about citizenship through Science at KS3. These units, *People and the environment* and *What's in the public interest?* include annotated lists of relevant websites which you may find a useful starting point for research in these areas. You can find them on this disc and at <http://www.standards.dfes.gov.uk/schemes>.

Summary

The use of the Internet at KS3 can only grow as accessibility to the Internet continues to increase. This ease of access will allow our pupils to become experts in the art of searching for, and processing information, not as repositories of facts and information. This increase in expertise can only increase their awareness of the importance of the world around them, and of the importance of citizenship.