**The Internet supporting an aspect of Designing and Making: a mini case study.**

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Children's development in the understanding of some difficult concepts can, at times, benefit from the use of dynamic and sometimes interactive media. Some websites simply demonstrate a scientific principle, or show a simple mechanism in action. In doing so they give a greater insight into the principles and processes involved than a two dimensional diagram could ever hope to give. Access to such sites can make the difference between understanding and not understanding the process in question. There are many CD-ROM based programs which include interactivity and dynamic features, but to search out the best and then to spend money on them when a freely accessibly option exists is not always the best way forward. Time does need to be spent in searching out appropriate sites, but through the gateway of the National Grid for Learning and other well known and reputable sites, it is often not too difficult a task for a busy teacher.

One such example came to light when a search was undertaken for examples of cams. A cam is a feature of a variety of mechanisms and cams are often used by children in the course of work in Design and Technology. The best way to explore the notion of a cam is probably to examine toys, or other mechanical devices which actually make use of cams in the way that they work. The second best way to learn about cams is possibly, to watch an animated cam in action. Such an animation was found: www.dtonline.org. The site was in fact not a dazzling all action version of what might have been found. It was actually a very low key site but with excellent moving representations of gears, cams, levers, pulleys and linkages. With the use of a large screen the class were shown the essential aspects of cams along with

other interesting and arresting moving representations of other mechanical devices. The work proceeded well, and the temptation for some children to visit the site and relive the wonder which they derived from the moving images was hard to overcome. One child in particular spent an inordinate length of time watching and re-watching the movement of the cam in the animation.

It is worth considering the progress of the search for moving images of cams, as it highlights some of the problems which can be faced when undertaking searches on the Internet. Table 1 gives a summary of the process.

| **Starting point/ search** | **Result / Comment** |
|---|---|
| | |
| Learning Alive home page<br>www.learningalive.co.uk/ | Learning Alive is a site used by many schools as a “gateway” to the Internet. It has access to search facilities and a host of other school centred features. For many of the features there is a subscription charge. |
| ↓ | |
| Search the Internet | |
| ↓ | |
| Yahoo Search Engine<br>Key word search "cam" | About 17,000,000 web sites found. Since the word "cam" in Internet parlance refers to a web camera these results were of no use. Those not relating to a camera seemed to relate to "computer assisted manufacture". |
| ↓ | |
| Yahoo Search Engine<br>Advanced search<br>Key words "cam" and "mechanics" | 90,000 web sites. Most seemed to be related to CAD/CAM (Computer Assisted Design/Computer Assisted Manufacture) and car engines. |
| ↓ | |

| | |
|---|---|
| Yahoo Search Engine<br>Advanced search<br>Key words "cam" and "machine" | 404,000 web sites, none of which seemed to be appropriate. |
| ↓ | |
| Change of search engine: Google<br>Key words "cams levers pulleys linkages" | 238 sites found. |
| ↓ | |
| Add the phrase “design and technology” to the key words | 68 sites returned. Most seem to relate to GCSE syllabuses. |
| ↓ | |
| Try a promising site further down the list: **www.dtonline.org** | Choice of different topics to look at. |
| ↓ | |
| Choose "mechanisms" and then "information" and then “cams and followers" | Useful diagram of a cam. |
| ↓ | |
| Go back and look at "rotary cams" | Animated diagram of a working rotary cam and a simple explanation.<br>Exactly what was required. |
| ↓ | |
| Note the address of the site and save the page as a bookmark/favourite. | |

Table 1

Note: Another site with a moving image was also located at technologystudent.com/cams/cam1.htm . This site was equally good in its animation, and it gave a lot more background information for the teacher. In this case the teacher chose not to use it because the screen was too “cluttered with words” which she considered would be a distraction for her children.

The progress made through the search is interesting because it illustrates a principle which is often found useful. The principle is: carry out a broad search with perhaps one key word (“cam” in this example); progressively narrow down the search by adding further key words or phrases (levers, pulleys, linkages, and finally the phrase “design and technology”). Different search engines set out the procedure for searching differently. Google, finally used in the example above, allows for a “Search within results” option which allows a further search on the restricted, though at times very large, set of sites which were discovered in the initial search. It is worth reading the “Tips for searching” information when using a search engine for the first time, as the ways and means of carrying out certain types of searches can be different.

The teacher involved in this work, and who carried out the searches, was able to make a comparison with the same work – making a simple toy involving a cam, which she had undertaken the previous year. Although she did not evaluate it formally, and recognising that a range of variables may well have made an impact on the way that the children worked, and on the end products, she felt that having had access to the animated cam was an important factor in the level of interest taken by a good proportion of the class, and she also felt that in an overall sense, the standard of the work was better than the year before.

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