NAVIGATING ECONTENT

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Abstract

This presentation describes experiments in replacing parts of some lectures with multimedia enhanced teaching materials (eContent) for on-campus students in the School of Technology at Oxford Brookes University. In one example electronic lectures were developed to augment conventional delivery for a topic with which students always have difficulty. In another, a range of online teaching materials were used to support students with different technical backgrounds to develop their skills and subject knowledge.

Issues that have arisen out of this work are Whether creating in-house eContent to replace all or parts of lectures is worthwhile; whether home produced eContent is acceptable to students; how to provide the structure and guidance to help students navigate and select, from a variety of online electronic teaching resources.

Concept maps linked to a database of eContent catalogued using IMS metadata were used as a method of solving the problem of navigation. Creating them and keeping them current was time consuming, however thinking about their design and structure ensures that the pedagogy was not neglected.

Keywords
EContent, Concept Maps, IMS Meta-Data

Developing eContent

For the first module used in this pilot study, eContent was developed to augment conventional delivery of a topic with which students always have difficulty. In the 1999-200 run of the module, 120 students submitted an assignment on *Parametric Cost Models*, the assignment was marked and graded in the normal fashion but no comments were written on their work, instead the tutor made available via the module's Web site a narrated model answer. Students were encouraged to compare their answers with this and if they could not understand where they had gone wrong (and lost marks) then they were could consult their tutors. Most did not find it necessary to do this.

The narrated on-line worked solution, produced in 8 hours over 2 days, replaced one hour of lecture time. While, on the face of it, this seems a poor return on investment, the model answer is now a well-used teaching resource. In the 2000 - 2001 run of the module, 90 percent of students reported finding it helpful to their learning and used it to help do the assessed assignment. In the 2002-2002 run of the module more such online explanation of technical topics became available, including an interactive tutorial developed in Visual Basic by a computing student for his final year project.

On the second module used in the study, Multimedia Application Design, the problem addressed was that of large student numbers (150+) from different technical backgrounds studying a topic that is still evolving. The module's Web site provided access to a range of multimedia resources including electronic lectures, interactive tutorials, demonstrations etc. These were obtained from the web or developed at Brookes by staff and students using a variety of tools. Outside of lectures students worked at their own pace making use of appropriates resources. Those who liked this move towards independent, self-study style of learning indicated that flexibility and self-control of study were the main benefits. However they

all reported that there was too much content and that effective navigation of it was difficult. This supports the views expressed by other researchers (Jones & Wright 1999) that to be useful eContent has to be properly organised and structured. Interactive concept maps were developed as an aid to navigation.

Concept Maps and IMS Metadata

Concept maps ((http://cmap.coginst.uwf.edu) are sorted graphs visually represented as nodes having a type, name and content, some of which are linked as seen in figures 1 and 2. Each type of node has associated visual attributes, such as shape, description and colour scheme. A characteristic of these concept maps is a hierarchical structure that includes concepts and relationships between concepts. (Gaines & Shaw, 2001). Because the concept maps were interactive and the nodes linked to relevant teaching materials they could be used by learners to search through volumes of educational content.

Information searching on the Web generally doesn't take place within one clean pass (Rosenfeld & Morville, 1998). Users will make a first attempt at finding information, learn something, refine their query, try finding some more information, learn some more, refine again. To make searching results sensible to autonomous learners, it is helpful to describe the information retrieved in a meaningful way. IMS Meta-Data was created to enable the reuse of educational resources within instructional management systems http://www.imsproject.org/metadata/. It was felt that cataloguing teaching materials using IMS Meta-Data would enable learners (and teachers) to make sense of them from a short description and so a pilot system was developed to try out this possibility.

Developing the Pilot System

Creating the Concept Maps

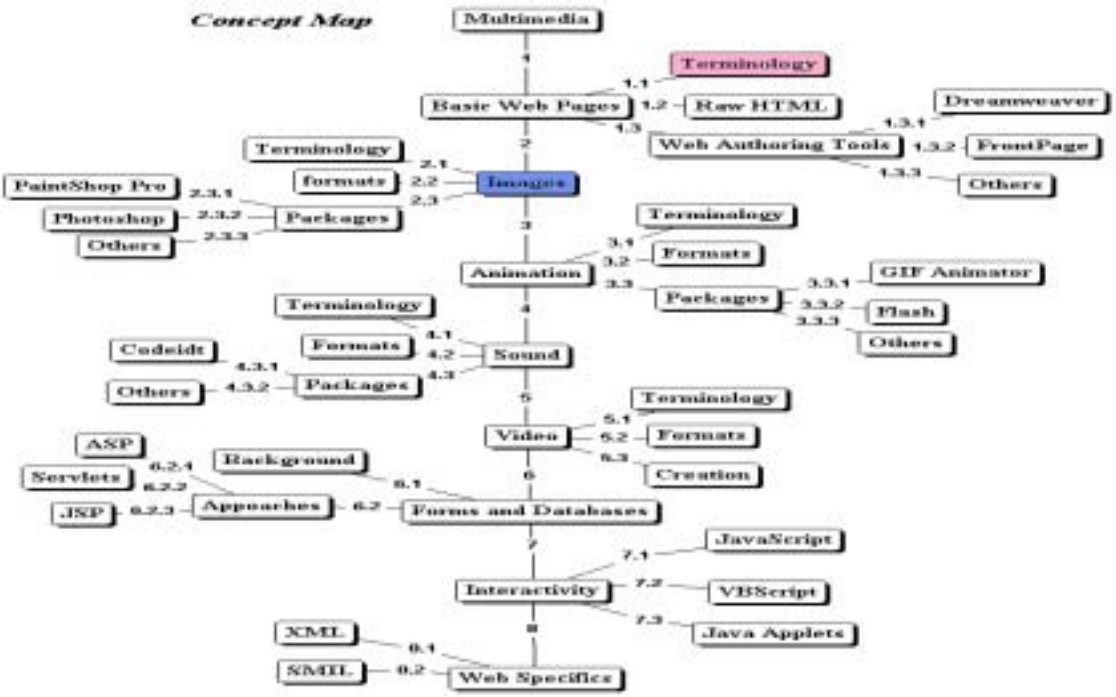

Figure 1 Example Top level Concept Map

The module Multimedia Application Design was chosen to pilot the use of Concept Maps. Colour coded, linked maps were constructed (all coloured nodes are greyscale in this printed version). A blue node indicated that there was a sub-level concept map, (figure 2) and a pink node that there were online teaching materials associated with that concept. On clicking a pink node the database search of related teaching materials was invoked and the results returned (figure 3). White nodes were inactive but became

blue or pink as the system evolved and more concept maps were created and/or content added to the database.

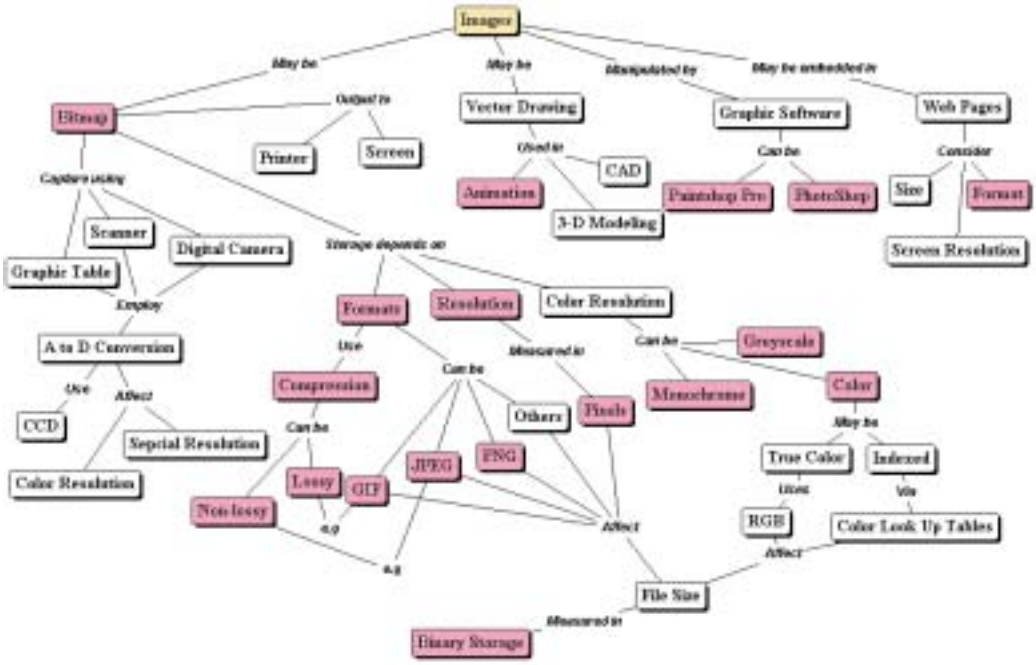

Figure 2 Example 2nd Level Concept Map

Collecting and cataloguing teaching materials

Locating, evaluating and cataloguing teaching materials in the database using the content description fields of IMS Meta-Data was a lengthy task. Materials included electronic lectures, tests and quizzes, sample examination papers, simulations, as well as tutorial materials.

Linking the nodes in the concept map to the database

Each pink node in the concept map had associated with it keywords which were used in the database search. The result of the search, which could be 1,2 or many items returned in the format shown in figure 3. Students could further investigate the selected teaching resources.

Title:	Lecture on Image Compression
Description:	A 30 minute audio visual lecture on image compression
Learning Outcome:	Will be able to explain the difference between lossy and non-lossy compression
Level:	Intermediate
Pre-requisite:	Understanding of how bitmaps are captured and stored
Format:	Streaming (.rm)
Browser:	Needed
Plugins:	Real Player
Keywords:	Bitmap, Compression, LZW, Hoffman
Type:	Electronic Lecture
Location:	Link

Figure 3 Example Return from a Search of the Database

Evaluation of the Pilot system

Seventy students completed a questionnaire and this was followed up by a focus group session with 25 students from both the UK and overseas. In the feedback, most students considered the pilots as valuable sites with many useful links and content. At the same time, they expressed their concern about the constant changes and addition to the content this confused rather than helped them. Most students found some of the content useful but felt there was too much and it was badly organised, this supports the views expressed by other researchers that to be useful eContent has to be organised and structured. There was an even split between those students who felt they could use the site to study independently and those who felt they needed tutor support. Overseas students, particularly those for whom English was not their first language reported that information provided via e-learning served to reinforced their classroom studies and this they liked.

Students indicated that concept maps were a useful and effective way to organize teaching materials. However they stressed that the maps needed to be less complicated than those supplied in the pilot with more levels and obvious colour coding. In addition, students mentioned the value of varying ways of navigation to meet the requirements of different students.

Conclusion and Future Development

From the tutor's perspective, time spent on home produced materials is worthwhile if they become enduring teaching resources. When questioned about the home produced eContent, students were generally very positive. The fact that it was directly relevant to problems they were currently tackling and based on case studies with which they were familiar outweighed it's lack of professional polish. Navigation of teaching content was identified as a potentially growing problem for autonomous learners as more on-line electronic resources become available. Students appreciated the use of interactive concept maps to help them locate relevant teaching material, to evaluate pre-knowledge and by pass familiar concepts. The evaluation was carried out with on-campus students who were using the prototype system within a traditional mode of delivery. Although this was, of course, an artificial situation in that the students were not being tested in an autonomous learning situation the results are useful in highlighting issues that will inform further work where the proposed system will be used in a distance learning environment.

References

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