

# THE BRISTOL BIOMED LEARNING AND TEACHING PROJECT: PROMOTING EFFECTIVE USE OF IMAGES IN BIOMEDICINE

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## **Abstract**

*This paper describes the activities of the Bristol BioMed Learning and Teaching project (BB-LT). The paper will focus on how in response to feedback from users and contributors the project grew out of the successful Bristol BioMed Image Archive. It was identified that, to exploit the visual and cognitive impact of an image fully, there is often a need to embed the image within a specific context, and to integrate it with pedagogical aims and strategies. BB-LT was developed with the specific aim of providing an enabling framework to support the use of Bristol BioMed images in learning and teaching.*

## **Keywords**

*images, digital images, image banks, learning, teaching, case studies, medicine, dentistry, veterinary medicine*

## **Images in Learning and Teaching**

There is widespread recognition that we live in an increasingly visually-oriented society; one in which textual representation no longer has to be the dominant paradigm for information and instruction (Armitage & Enser, 1997). Use of high-quality digital images can add a new dimension to the learning and teaching experience, bringing new opportunities and challenges for teaching and assessment. Images provide access to complex visual information and experiences that cannot be replicated in purely textual terms: "Pictures interact with text to produce levels of comprehension and memory that can exceed what is produced by text alone" (Levin, 1989).

Levie and Lentz (1982) found that users prefer, and value more highly, material which contains visual elements. The processing of visual information involves the engagement of both senses and cortical skills which, it has been shown, can promote deeper learning and recall (McAteer & Shaw, 1995). Additionally, images are intrinsically evocative and associative, stimulating imagination and creative thinking. Research has shown that, providing images are meaningful, the brain capacity for recognition memory for pictures is limitless (Freedman & Haber, 1974). Images have a direct route to long-term memory, storing information as discrete concepts (Paivio, Rogers & Smythe, 1968). These concepts, or structures, are reorganised as new information is received and processed, leading to a more profound and precise understanding (Bobrow & Norman, 1975; Rumelhart, 1980).

## **The Bristol BioMed Learning and Teaching Project**

The Bristol Biomedical Image Archive (Online) is an established, successful Web-based collection of over 8500 biomedical images that can be freely used to support learning and teaching. Having created a successful digital image service, the next stage for Bristol BioMed was to investigate how use of the archive to support learning and teaching could be developed and promoted. As

Stebley (1998) notes, “To really understand the framework of implementing new technologies and resources, one must first have an understanding of what users require and why they will use it”.



Figure 1: Catalogued image in the Bristol biomedical image archive

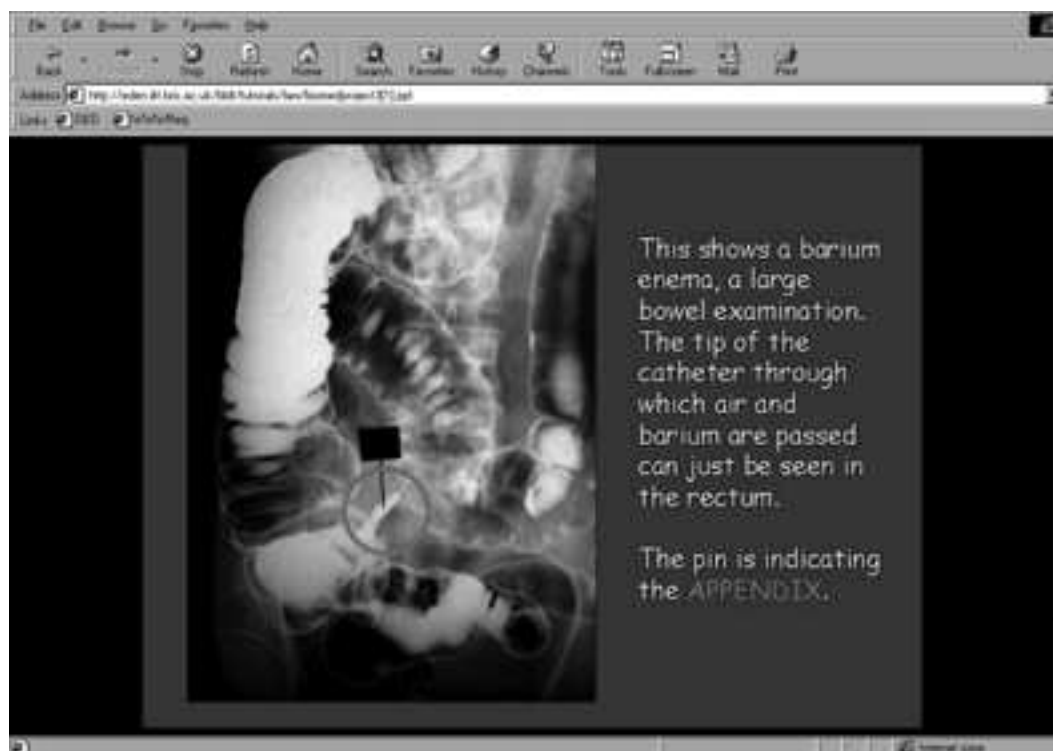
To try to discover what Bristol BioMed users want in terms of support for learning and teaching activities, a survey of archive users was carried out, including selected follow-up interviews, and a focus group of users was held at the University of Bristol. Responses and discussion outcomes indicated that, to exploit the visual and cognitive impact of an image fully, there is often a need to embed the image within a specific context, and to integrate it with overall teaching aims and strategies. The Bristol BioMed Learning and Teaching Project (BB-LT) was developed with the specific aim of providing an enabling framework to support the use Bristol BioMed images in learning and teaching.

BB-LT (Online) consists of inter-linked learning and teaching resources based on Bristol BioMed images. These include tutorials, case studies and how-to guides, which together provide a coherent strategy for the use, evaluation and integration of the archive images with mainstream teaching activities. As Laurillard (1993) recognises, learning is dependant on prior knowledge and experience. Therefore it was essential that resources were authored by experienced practitioners with an understanding of how the content of the resource would map onto students' existing knowledge.

### **Resources Development**

Authors were encouraged to take a simple, pragmatic approach to tutorial construction, using readily available tools and techniques. Take-up rate for digital resources is likely to increase if it can be shown that simple, easily replicable materials can be effective, quick and easy to use, and cheap to create and deliver. It has been noted that many commercial CAL packages are so complex that they can appear daunting to students; short, easily-completed tutorials dealing with clearly defined topics may be easier for students to use more effectively. (Jones, Greenwood, Edwards, McCulloch, Tobias & Nicholson, 1998).

It was recommended that authors should develop resources that would not merely duplicate a traditional lecture or tutorial in electronic form, but take advantage of the medium and its potential for interactivity and visual impact to deliver elements a standard tutorial could not. The ultimate aim was to make learning visually stimulating, however, images should not overwhelm the material to the extent that learners focus on visual elements rather than engaging with content. Reeves and Nass (1996) note that the size and visual characteristics of an image all affect mental processing. For example, larger images have been shown to result in stronger memory retention and more positive perceptions of the content received.



*Figure 2: Image from figure 1 within a PowerPoint tutorial*

All materials may be freely downloaded and can be used in a variety of ways: to reinforce teaching points, to give supplementary information, to check the accuracy and depth of knowledge, to encourage a better understanding of difficult topics, to review knowledge and revise for tests, for independent or class-based learning, for self-paced learning. They are relevant both to primary teaching and reinforcement. The tutorials demonstrate examples of different learning situations and modes, for example, problem-solving, integrating diverse sources of information, synthesising abstract ideas and concepts, and reflection.

Case studies document each author's experience of creating tutorials with Bristol BioMed images. The studies include details of software, tools and techniques used, problems encountered and how these were overcome, as well as details of how to reproduce the tutorial. They provide an insight into the costs, benefits and feasibility of creating and using the BB-LT resources and in particular how they can enhance the learning experience, in addition to providing a critical reflection of the lessons learnt. As well as providing examples of best practices by practitioners in the field, the case studies have also been of value as part of the quality procedures by providing a reflective account and review of the integration process.

## Conclusion

There is clearly a need both for resources which bring high quality digital images together, and for resources which demonstrate how those images can best be used in learning and teaching activities. When designing and developing computer-based educational resources, there is a need to consider both user-computer interaction and learning theory. It is important to plan materials carefully, considering learning objectives and integration with the curriculum. Failure to do so will render the resource unreliable, irrelevant and unlikely to be used.

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