THE USE OF IT IN TEACHING FORENSIC SCIENCE

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ABSTRACT: For a number of years the Forensic Science Unit at the University of Strathclyde has offered teaching in the forensic sciences at undergraduate (BSc) and postgraduate level (MSc, MPhil and PhD). The Unit also undertakes professional short course training where courses are tailored to individual needs and may count towards a post graduate award. Traditionally this teaching has been supported by lecturing, tutorials, practical and problem solving exercises. Video and CD-ROM technology has also been used very effectively at undergraduate level. With the continuing requirement to support student learning through interactive technologies and specifically to provide on-line assessment the use of the World Wide Web as a tool to achieve has also been successfully implemented.

INTRODUCTION

For a number of years the Forensic Science Unit at the University of Strathclyde has offered teaching in the forensic sciences both at undergraduate and postgraduate level. Traditionally this teaching was supported by lecturing, tutorials, practical and problem solving exercises. More recently video and CD-ROM technology has been used very effectively [1]. Other new developments have involved the use of the World Wide Web [6] for teaching questioned document examination and intranet technology to introduce "on line" problem solving aspects into the course. These activities are illustrated in Figure 1.

Advantages on introducing technology into the education process include the following:
- Potentially saves time and resources.
- Opportunity to teach in different ways and enhance the student learning experience.
- Different means of delivery.
- Different means of assessment.
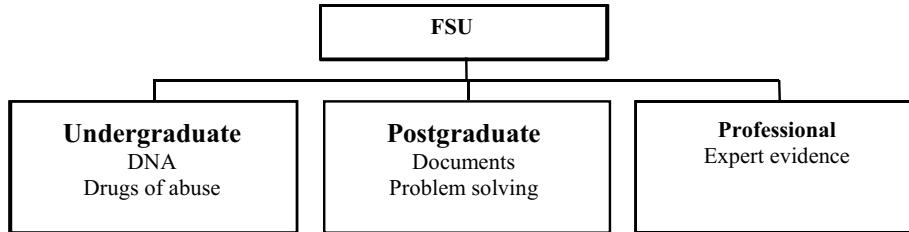- Collaborative projects/group work.

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Undergraduate	**Postgraduate**	**Professional**
DNA	Documents	Expert evidence
Drugs of abuse	Problem solving	

Fig. 1. Training and education carried out at FSU.

THEORETICAL BASIS FOR USING IT IN TEACHING

In order to enhance the educational value and thereby increase the student learning experience, any new development should facilitate the interaction of students with their tutor and each other. Many educational researchers are now advocating the benefits of this approach [5, 7, 9]. Using CD-ROM or web based technologies to deliver information, not only through text but also graphically and using video and animation's can cater for the different learning styles of all potential students [8]. Student interaction can be facilitated by using e-mail lists, discussion groups, on-line assessment with feedback to the student and good practices of promoting student learning may be achieved.

It is important that the computer systems chosen support deeper rather than superficial learning and this can be achieved by choosing the right types of CD-ROM or Internet technologies to support different learning styles. It is well known that different individuals have a tendency to perceive and process information differently. Concrete thinkers absorb information through direct experience where as abstract thinkers take in information through analysis and observation. Similarly active thinkers like to immediately make sense of an experience by using that information, reflective thinkers make sense of an experience by reflecting on and thinking about it [3]. Traditional teaching methods tend to favour abstract and reflective thinkers and it is important that the use of IT methods will promote and facilitate learning by all types of thinkers through providing a more active and supportive learning environment.

OUTLINE OF PEDAGOGICAL PRINCIPLES FOR CHOOSING THESE TECHNOLOGIES

It is most important that this exercise does not become a teacher centred activity (viewing the learner primarily as a passive recipient) [2] but becomes a joint learning effort, benefiting from conversation, multiple perspectives and argument which arise in collaborative group activities. Significant outcomes of the learning experience with an IT collaborative aspect should include:

— Active learning specifically active participation by the students.
— Interactive learning in peer to peer discussion and exchange.
— Multiple perspectives through reading input from other online students as well as the instructor.
— The use of spatial metaphor to facilitate the transition face to face classroom to structured online classrooms (in order words to provide mental or virtual "spaces" within which participants can apply social factors to their interactions.

The learning environment which will be most learner centred will be one which promotes learning as the active construction of meaning or knowledge from information, as well as the construction on internal representations of this knowledge within a specific meaningful context. Interactive learning techniques can be used to support this type of learning environment [10].

There is some resistance to the provision of totally asynchronous learning environments solely involving virtual classrooms and with no face to face interaction [4]. This resistance appears to be primarily as a result of a loss of social environment within which the participants can interact with each other, but also as a consequence of organisational inertia and resistance to change. It is argued that using IT technologies in teaching does allow for the use of innovative pedagogical techniques involving participation both on behalf of the student and teacher and can help to involve and engage students in a more active learning environment.

CD-ROM *V*. WWW

There is a continued debate as to whether CD-ROM technology or Web based technology are preferred. Certainly both have their relative advantages and disadvantages as illustrated in Table I.

TABLE I. CD-ROM *v.* WWW

CD-ROM	WWW
Used (often) on one computer at a time	Once on the server can be accessed by many
Can be platform dependent	Platform independent
Version specific	Easy to up date.
Need access to computers with the right software	Need access to computers with the right software
Can use many media – audio, video…	Can use many types of media – audio, video etc.
Interactive	Can include discussion groups, on line assessment, whiteboard, shared applications etc.
Fast	Can be slow

Whichever medium is used the essential elements which they must contain are that the material is presented in a manner which has the correct pedagogical basis as described earlier.

Considerable amount of development time for both WWW and CD-ROM materials is required. Any development needs to be pedagogically sound and it should be recognised that such exercises are not just putting lectures on the web or CD. It should also be noted that development such as these can generate more work teaching students IT skills, marking on-line assessments, monitoring on-line discussions etc. rather than free up staff time. It is also essential that the infra structure of the learning environment is appropriate and specifically that there is enough computer equipment which is working, available and with the correct software to run the packages.

CONCLUSIONS

Using IT in teaching any subject has significant advantages. These include student satisfaction. With the methodologies chosen, the ability to use a variety of teaching methods and thus try to accommodate different learning styles. The different technologies available have various merits. All will deliver the information to the students/trainees on demand. Web based teaching if done correctly, can also involve the use of on-line discussions and assessments which are valuable because they can provide instant feedback. Innovative project work and collaborative work with groups within a class or with students from other universities/institutions overseas are also possible. The obvious extension of this type of learning technology is in the development of distance learning courses and packages.

References:

1. C o l e M. D., C o p l a n d A. D, The development of interactive teaching material in forensic science at the University of Strathclyde, *Science and Justice* 1997, vol. 37, pp. 183–189.

2. H a r a s i m L. M., Interacting in hyperspace: Developing collaborative learning environments on the WWW, http://www.umuc.edu/icu/workshop97/harasim.html.

3. H a r a s i m L. M., Online education: An environment for collaboration and intellectual amplification. Online education: Perspectives on a New Environment, Praeger, New York 1990.

4. J a f f e e D., Institutionalised resistance to asynchronous learning networks, *Journal of Asynchronous Learning Networks* 1998, vol. 2, issue 2, pp. 21–32.

5. K e m p e r D., University academics conceptions of teaching, *Learning and Instruction* 1997, vol. 1, pp. 225–275.

6. N i c D a é i d N., The development of interactive World Wide Web based teaching material in Forensic Science, *British Journal of Educational Technology* 2001, vol. 32, pp. 105–108.

7. R a m s d e n P., Using research on student learning to enhance educational quality, Griffith University Publications 1994, no. 2.

8. T o p p i n g K. J., Watson G. A., Jarvis R. J. [et al.], Same-year paired peer tutoring with first year undergraduates, *Teaching in Higher Education* 1996, vol. 1, pp. 341–356.

9. T y n j a l a P., Developing education students' conceptions of the learning process in different learning environments, *Learning and Instruction* 1997, vol. 4, pp. 277–292.

10. W i n n W., Learning in hyperspace, http://www.umuc.edu/icu/workshop97/harasim.html.