Exploring the Value Of Integrating WWW-Chemistry Teaching with the Hawkesbury Shell

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Introduction

- This is a non-technical presentation: the URL of our site is available if you want to browse at: http://www.hawkesbury.uws.edu.au/features/UWSHshell/CH101A/index.shtml
- This talk will be centred around the words "value" and "integrating" in the title — with a brief explanation of the role of the Hawkesbury "shell".

Part A: the "shell"

What?
The Hawkesbury Shell project aims to provide an infrastructure and co-ordination umbrella for staff wishing to experiment with any form of IT application to their teaching. It will also be Hawkesbury's face to the world: the interface between us and any off-campus students.

Another aim of those involved in developing the shell is to initiate a variety of collaborative learning prototypes.

How?
In the context of worldwide trends in new technologies, the convergence of on- and off- campus modes of teaching and practical matters like over-stretched budgets, the University of Western Sydney, Hawkesbury (UWSH) has provided funds to be allocated on a competitive basis. The projects funded should have the potential to either increase student enrolments or generate income for the University.

Two of the projects funded in the initial round in 1997/98 were the Infrastructure (Shell) Project and the project to adapt the external chemistry and biology subjects for www-delivery.

These projects were linked even at their conception, and are now integrated in the sense that part of the Introductory Chemistry subject is providing the "content" for one of the pilot projects for the shell.

Why?
Tony Bates (1997) describes the "Lone Ranger and Tonto" — the lecturer and the graduate assistant with a grant to develop a course. He comments that some of the most innovative ideas are generated this way, but in his experience not many of the courses so started are actually developed into fully fledged, working courses. At UWSH, it was felt that an overarching shell could help overcome this problem by:

- providing a standard for IT involvement in courses and subjects;
- choosing and supporting software that was adaptable and user friendly to staff, students and administrators;
- developing collaborative learning prototypes;
- providing a mechanism for students not enrolled in UWSH courses to pay for individual modules (e.g. for HSC revision or pre-tertiary Bridging Courses); and

- eventually providing a mechanism for students to submit assignments or write exams on line.

Where we are at:

- *WebCT* (developed at UBC) has been chosen as the software. The choice was a complex one; a compromise based on cost, ease of use and ability to cope with collaborative learning packages;
- the first web-based module of Introductory Chemistry (CH101A) is being adapted for the *WebCT* software *as we speak*. This is suitable as a revision/bridging course module when the system can cope with payment by students; and
- simultaneously, a collaborative learning prototype course is being developed as another pilot project on the *WebCT* software.

Some comparisons

As a slight diversion, I will mention some comparisons between our resources and those of the authors of the two references I have used:

- Tinker (1998): the FLAP project is part of the Learning Technology Program in the UK. A paper-based program in physics and maths was delivered in 1995 after 3 years of development and an investment of $US 1 million. An electronic version is due out in 1998.
- Bates (1997): at UBC there are now 26 technology-based distance education courses developed in 2.5 years. Staff members are part of a Canada-wide telelearning consortium which has won a contract of $C13.5 million.
- Tronson & Veness (1998) at UWSH: the Shell project grant was $170,000 and the grant for the Chemistry/Biology WWW-adaptation was $30,000 (some of which is to be paid back when we make a profit from the bridging courses).

Part B: The Chemistry/Biology Project

UWSH has a long history of catering for "external" students. Traditionally most of these students have been studying for the BAppSc in environmental health. A wider range of students now studies one or more subjects in the external mode. To facilitate this, the on- and off-campus delivery of some subjects has converged.

What?

The students who take these particular chemistry subjects (either on- or off-campus) are not science-majors. As well as the environmental health students, we now cater for students of horticulture, agriculture, environmental management, food technology as well as students undertaking some Diploma courses.

As a couple of Lone Rangers with our respective Tontos, Shelley Burgin and Deidre Tronson set out on our horses, quite sure we could achieve all our aims:

- to rewrite the two semesters of the biology external course;
- to adapt this for WWW-delivery; and
- to adapt the newly-rewritten two semesters of the chemistry external course for WWW delivery.

Why?

A traditional first-year chemistry course is NOT suitable for these students — neither are many of the www-sites I have visited. We wanted to think about the pedagogical reasons for re-thinking our subject. Our main aims were to provide an alternative medium to help students:

- see logical connections between facts, observations and implications;
- visualise the macro and micro world in **3-dimensions;**

- visualise the submicro world of atoms and electrons; and
- have some ownership of their learning.

We were determined **NOT** to reproduce the text-based material as html. These aims were mirrored in the article by Tinker (1998).

How?
To achieve our aims, we intended to use:

- links within the site and to other sites we chose;
- questions and accessible answers on each page — feedback; and
- animations where appropriate ... **without** the use of sophisticated software that we had already determined many students did not have access to.

Where are we at with the Chemistry project?
We have achieved something concrete. We have one module of Introductory Chemistry on a stand alone web site and part of an organic module being developed. This module is being used as the first content-based pilot project for the *WebCT* software under the shell project.

It was found that the reconceptualisation required to adapt one's lifetime habits of teaching to the electronic medium was a lot of fun, but took a lot of T-I-M-E.

The setting up of prototypes and databases for the web-site, keeping the whole subject in mind, also took Tonto a lot of time. This is not time wasted, as it will be easier and more straightforward for anyone taking on the project later: but it was a surprise.

We have established a valuable link with the Flexible Learning Centre and the shell project. However, during the process of collaborating with those creating the shell, it was found that our aspirations and theirs were diverging. The shell was more concerned with developing collaborative learning. While thinking that this would be useful further down the track, we set our priorities more on imagining ways to use the web to provide visualisation, feedback and links to other sites.

What about the biology project?
The first semester subject has been rewritten and the second semester subject is being rewritten.

Contacts have been made with a major publisher and ideas discussed for the eventual adaptation for WWW.

Where to now?

Immediate challenges:

- We obviously need future funding — but from where? (CUTSD is an option).
- We need to expand time — but how?
- We need to keep working on the collaboration between the chemistry project and the shell now that we are in a productive phase. This means asking for and accepting more support — which also takes time and effort.
- We need to think carefully about integrating the ideas of the Lone Ranger with the technical ability of Tonto: is there an ideal mix of talents? Bates (1997) states that the lecturers will find there are some things they do not want to do. Some of us have other time consuming commitments as well — students and research for example.

The Future

No-one has yet discovered all the interesting or valuable uses of the new technologies we have at present. How can we best assemble people, their ideas and skills to make efficient and effective electronic delivery of real subjects happen?

We need to consider the tensions between:

- teams vs individuals;
- integrated Flexible Learning Units vs support people within the faculties; and
- support (when does it become "control"?) vs academic freedom.

We also need to consider:

- Being a competent teacher does not mean being competent at designing and delivering electronic-based courses.
- Educationalists and science lecturers may have overlapping techniques but vastly different approaches. They need to speak the same language — or realise the need for a translator.
- How much do we rely on technical support, and how much do we need to organise for ourselves?

Conclusion

We have succeeded in providing some web-based material for our Introductory Chemistry subject as an alternative to more conventional modes of delivery. We never intend this to replace what we have, but to provide more flexibility and choice for the students.

It has been valuable to integrate the development of WWW-based chemistry teaching with the Hawkesbury Shell project: without support and nurturing, the embryo may die.

We realise we need to make a "leap of faith" — but intend to keep pushing on with this project.

HI ... HO... SILVER!.

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References

A.W. Bates (1997) The impact of technological change on open and distance learning. Distance Education **18** (1) 93-109.

M. Tinker (1998) The flexible learning approach to physics (FLAP). UniServe Science News **9** (Mar) 3-6.