Practical Replacement of Lectures by Hypermedia Courseware

Edmedia 98
David Skillicorn
Computing and Information Science
Queens University
Kingston
skill@qucis.queensu.ca

We teach courses to on-campus students without lectures. An online system (Hyperwave) delivers all of the content, and is also the medium for communication between instructor and students, TAs and students, and (most importantly) between students.

The metaphor is an online learning community.

"Community" is the most important part – it adds value that is not possible in web-based or CDROM-based courseware. It's hardly possible in lecture-based courses.

Why do we do it this way?

University budgets are being steadily reduced across the western world. There seems little prospect of this changing. The educational component of what we do has to be done with fewer resources.

That said, we are pleased to discover that we get (at least slightly) better learning outcomes.

Who do we teach?

Almost all of our students are mainstream, on-campus students from all years and a wide variety of departments. There are some off-campus and distant students.

What do we teach?

A first-year programming course, primarily for non-majors. (Also several upper-year and graduate courses.)

The course material contains the following:

- Directive content (programming language material, interesting problem domains in computing, examples showing how the programming material is useful for exploring the problem areas).

- Non-directive content.
  - open-ended questions
  - web search
  - exercises with suggestions
  - level-based access
- Self-assessment.
  - exercises
  - interactive quizzes
  - previous midterms and solutions
  - previous exams and solutions
  - previous assignments and solutions

- Discussion.
  - questions and answers
  - annotation of content
  - finding mistakes
  - expectations
  - socialising
- Administration.

How do we do it?

1. Development.

Most of our courseware has been developed incrementally, with reduction of lectures used to free time for further development. It takes about three offerings before a course is ready to be offered completely without lectures.

2. Delivery.

Hyperwave has several critical advantages over web-based courseware:

- Access control means that courseware is private (revenue protected, privacy for students, control of access to segments, constructive criticism).

- Separation of links from documents makes it possible to create a link from a document you don't have write permission for. This is the basis of annotation, which allows discussions, corrections, questions etc.
- Fully http, html, and Java compliant so there is no loss of flexibility moving into the Hyperwave environment.

More than 80% of students own PCs. They access the course server from residence rooms, from public sites on campus, via dialin telephone service, via cable-based service, and through local ISPs.

What can be learned from our experience?

There is a constant temptation to make things easier for students. It feels right, and it's appreciated (in the short term) by the students. However, it isn't necessarily the best way to improve student learning.

We discovered a strong, although unenunciated, belief held by students that being in the same room with a teacher made learning happen – a push model.

Having no lectures made many students uncomfortable at first, but when they tried, they discovered that they *could* learn from online material.

As this happened, they were forced to believe that they had been responsible for the learning that took place, and moved to a <u>pull</u> model.

This change in the locus of control may be the single greatest benefit of using hypermedia-based courseware.

Incremental development of courseware is cost-effective. We had some assistance with developing first-year courses, but the costs were modest, and the benefits continuing.

Using online courseware creates a ‘ratcheting up’ phenomenon, because anything that doesn’t work well can be replaced by something better. There are many ways to discover what doesn’t work, based on direct and indirect student feedback.

The ease of keeping old material accessible gives students much better feel for expectations; and seeing that other students at their level have handled assignment and tests is much more convincing to them than anything that is said by instructors.

Peer interaction of any kind helps learning better than interaction with instructors.

The time spent by an instructor is about the same as would be spent preparing and delivering lectures. Savings come from increasing the span of control. Answering a question online saves answering it directly to 10 or 20 individual students.

Some students who learn well using lectures, i.e. auditory learners, may suffer in hypermedia courses. However, many other students will do better with material that is presented in multiple styles and with which they can interact repeatedly.

One reasonable way to assess the success of courses such as these is to imagine that the new way was normal, and examine the effect of moving back to traditional lecture-based courses.

“You mean I have to come at the same time every week?”

“I have to try and understand what you say *and* make notes about it?”

“What if I don’t understand the way you explain it?”

“You mean I can’t stop you and ask a question if I’m confused?”

Using technology to do more with more, or less with less is easy.

The challenge is to do more with less. Our approach to course development and delivery has demonstrated that this is possible.