Online Course Design and Delivery Using WebCT and Other Multimedia Tools

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ABSTRACT

In this article, we shall describe our experience of developing an online course PHYS007 Physical Phenomena in Everyday Life *for non-physics majors using a variety of multimedia tools. We shall discuss the approach we took, the difficulties we faced, and the experiences we drawn from this education experiment.*

INTRODUCTION

In recent years there has been a tendency for instructors at all levels to put their teaching materials on the Internet, either for distance-learning or ease-of-access purposes. Designing instructional materials for online teaching and learning is quite a challenge to instructors in any field. Teaching materials of this kind can be quite different to those used in traditional classrooms or lecture theatres, in the sense that *they must somehow replace or compensate the role or presence of the instructor*. Other items traditionally found in classrooms or lecture theatres, e.g., hard-copy handouts, demonstrations and even Q&A, must also be substituted or compensated accordingly. In the early days, prior to WebCT or other similar packages, one might have to rely solely on custom-built HTML templates for laying out teaching materials in Web language. Fortunately these days are over. Nowadays, there are more than a handful of well-designed Web-course packages available for instructors to transform their teaching materials for Web-viewing without first acquiring a detailed knowledge of Web-programming. The article is divided into two parts. In Part I we shall we discuss the design strategy we employed in our course PHYS007. In Part II, we shall discuss WebCT and other multimedia components for delivering as well as designing the online course. The aim of the article is to discuss the methodologies used and report the difficulties encountered during the course design.

I. Teaching Materials Design for Online Learning

Building materials for online learning is a challenge because they differ markedly from their counterparts in the traditional classroom; they have to take the role of the teachers, or more accurately, compensate for the absence of teachers.

Traditionally, the handouts distributed to students during the class may not be self-contained. This need not or should not be so, since the lecture itself will fill the gaps in the handouts. The gap may exist because the teachers want the students to think, to understand more, or, at least, to concentrate. Surely there should be textbooks or references for students to read after the class. If online teaching materials are like the traditional handouts, the online students would still need go to the classroom; otherwise they are worse off. Online learning has to do more to help our students.

Online teaching materials have to be redesigned. Without the presence of the teachers, what should they look like? How can they motivate students to read them, to understand them, and to think deeper? Would adding multimedia components help? Or should we consider instructional design too? Should we sit back and think again if we were to expect the same result from classroom teaching?

MS Power Point as Notes for PHYS007

Initially the Power Point (PPT) version of the notes was developed to serve two purposes: To allow the developer to become familiar with the ideas in the notes; and to make the lecture more lively and help the instructor to explain the ideas. They are put on the course web as a supplementary component of the course, together with the HTML and PDF version of the notes. The HTML and PDF notes consist mainly of text.

Since Spring 2000, when PHYS007 was first offered, the PPTs are found to be very useful according the reactions of students and other audiences. They generally think that the PPTs are attractive and can help a lot in explaining complicated physical ideas. We realize that PPTs can be an important component for online learning where the teacher is not always there to stimulate students.

This is a comment from the developer of PPTs:

"When making the Power Points, it was as though I was making "graphical" notes while following ideas from the text. I was actually explaining things to myself and I hope others would also understand the ideas as I did. This actually makes the flow smoother in making and the resulting Power Points are quite self-explanatory. They can serve as self-study materials besides being used in class presentations!"

T. K. Yeung,
PHYS007 Power Point editor

PPT, PDF or HTML?

When asked which kinds of notes are most useful to them, students' responses are diverse. PPT can get the students' attention and lead the flow of thought. It emphasizes important points more than plain text does. It is good for ordinary students. On the other hand, for bright students who are eager to learn or for those who already have pictures in their mind, they feel that the flying graphics in the PPT are annoying. They prefer plain text in PDF or HTML.

HTML is very flexible, though it demands more technically capable developers. It can theoretically embed any object in it. One can insert multimedia and other interactive components into the notes. However, the size of each page matters. Waiting for objects to show up in the page turns students down. PPT, on the contrary, can be downloaded as a whole to the students' side and be read off-line, thus performance is guaranteed. We believe that before fine-tuned HTML notes are fully developed, we should put up all note formats. PPT can act as a virtual teacher to stimulate the students when the real teacher is not there. The plain text versions are the textbooks used for deeper thinking.

PPT has the further advantage that it is light, easily available, and flexible. It technically requires less from the developer and hardware. It is easy to learn, and it is likely that the developer is already familiar with it. It is available on nearly every machine in the world. Teachers can edit the content any time, anywhere. Updates can be made easily.

We note that using PPTs to explain physics is non-trivial. It is an art that requires good physical pictures and good visual design from the developers. Such a process requires digestion and organization of ideas, which are far from mechanical.

II. WebCT and other Multimedia Components

Before we start discussing our use of WebCT for delivering the course PHYS007, let us recap a little what WebCT really is. WebCT is short for **Web C**ourse **T**ools, developed by a team in the Department of Computer Science at the University of British Columbia, headed by Murray Goldberg. The software package was first released in May 1996 and it is now being used by more than 900 universities around the world. Although it looks and feels like a Web page and is even viewed using a Web browser, it is not a Web page. WebCT consists of an integrated set of components for developing, delivering and managing interactive Web courses over the Internet. It has a wide variety of interactive and communication components integrated both in function and appearance. Having everything under one platform greatly simplifies course development and management. The main features of WebCT are student ID management, multiple forums, and chat rooms, calendar with timed announcements, self-testing, quizzes, student progress, glossary, and so on. The front page of our WebCT PHYS007 course is shown in Fig.(1).

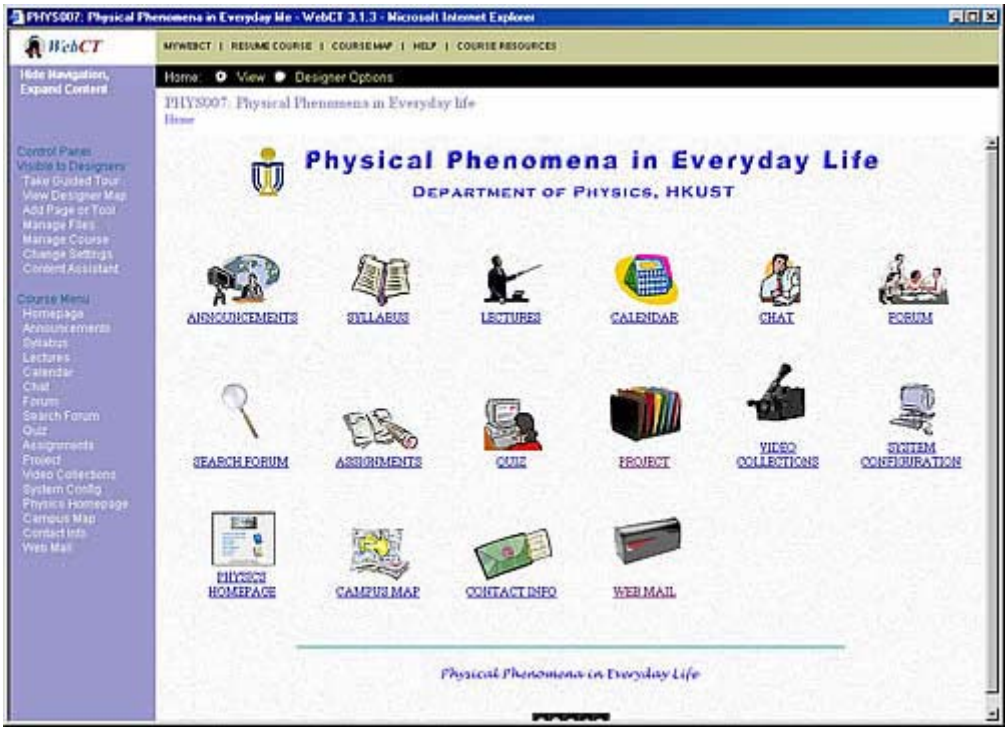

Fig. 1 - Each icon is a folder consisting of materials precisely as labeled.

The main reason for choosing WebCT as a platform for online delivery of our course PHYS007 was a result of intensive discussion with the Center for Enhanced Learning and Teaching (CELT) at HKUST. After deliberating and comparing all the advantages and disadvantages in terms of functionalities and ease-of-use with other platforms/packages currently available, we have eventually concluded that WebCT is the best available platform for delivering our PHYS007 course.

The first thing we must do in designing an online course such as PHYS007 is to repackage everything in an online format. For PHYS007, the complete set of teaching materials includes lecture notes, quizzes, assignments, and projects. In the traditional PHYS007, all these components are available simply as PPT and PDF printouts. In order to convert these components suitable for online delivery, we have to take into account several constraining factors such as availability of computer software and network bandwidth. In determining which computer software to use, we also take into account which software is less likely to cause a computer crash during network delivery. As a result the software chosen for delivering the voice-commentary of the lecture notes is RealMedia by RealNetworks.com. The advantage of using RealMedia for video and audio streaming is its capability to encode the original file into a relatively smaller file with only a slight drop in quality. With its small file size and superior network protocol, *the lecture notes with added voice-commentary could be viewed even with a normal 56k modem at home*. This is actually quite important because it enables those who don't have broadband access at home to view the lecture notes in their own time. Apart from the voice commentary, some video teaching materials were also encoded in RealMedia format for online delivery.

Other items such as demonstrations, quizzes, assignments, and Q&A have all been transformed online. The demonstrations are video-recorded and then encoded in RealMedia format for online delivery. The quizzes are reprogrammed in WebCT native language and delivered at a pre-specified time using WebCT's built-in time function. The assignments are simply relocated into the WebCT platform and delivered as normal assignments with added time control. Finally, the live Q&A is replaced by online Q&A with live video assisted by chat-room-style keyboard communication.

The advantages and limitations of using a variety of multimedia are variable. WebCT does not yet have the video and audio streaming functions built into the package. At the moment, there is simply no single package that can cover everything required for designing and delivering an online course with course management tools. We just have to ask ourselves what we want to deliver, what's needed, and what's available. At least that seems to be the best solution for now.

CONCLUSION

Experience tells us that it is hard to stimulate students to read online materials. For a course requiring Active Learning like PHYS007, the problem cannot be simply solved by setting examinations or otherwise forcing students once more into drill and practice patterns. Therefore, a better instructional design should be considered. We find that explaining concepts in physics without face-to-face contact is difficult. At this stage we solve the problem by arranging classroom tutorials. Online learning will probably have more impact on the style of instruction than wiping out large numbers of classroom offerings in a single swoop. Surely classes can be made shorter and many people will be able to learn with fewer class visits needed.

Although we expect that online courses will save resources in the long run, *instructional and teaching materials development of a working online course is highly time and resources consuming*. Course suppliers and fund providers should understand that technology just solves the easiest part of the problem in online learning.

At the time of writing, there is simply no single package that can cover everything required for designing and delivering an online course with course management tools. As a result of intensive research, we think the WebCT platform assisted by the multimedia components discussed above is so far the best concoction of software for delivering an online course such as PHYS007. We hope our experience will assist the audience to decide what instructional strategy or which design components would serve them best in designing and distributing their online courses.

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