

# Does It Work for Biochemistry Teaching? A Personal Account of a Model One Online Course Development

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## ABSTRACT

*WebCT development was initially targeted to realize my own teaching goals. However, my own initiatives became joint initiatives and collaborations with others, which further enriched the whole course. We had a clear goal for our phase one development, and we also formed a dedicated team in collaboration with CELT. After some intensive work, and within just a few short months, WebCT for BICH172/182 was launched as scheduled in the beginning of the Fall semester, 2001. Clearly, it provides a good anchor for both teaching and learning. It is not only a convenient contact point between instructors and students, but also a good place for course materials. At the moment, there are four videos and ten animations, as well as other course materials available in our WebCT. Although we are only at phase-one of the course development with WebCT, I'd say this online tool for teaching has certainly been helpful to my course delivering, and that I wouldn't do without it. This paper is not aimed at answering the ambitious question posed in the title, but is intended to give a personal account of a still on going attempt to develop a model one online course (BICH172 and BICH182).*

## BACKGROUND INFORMATION ON THE COURSE

BICH172 and BICH182 are two separate courses, yet can be viewed as a coupled undergraduate course in biochemistry. The two courses are closely linked, and the students are required to take the two courses in conjunction with each other. As a coupled course, BICH172/182 is a core/required course for year one Biology and

Biochemistry undergraduate students. It is not a new course, as it has been run for a many number of years already. The course is run twice a year, that the Biology students will take them in the Fall semester, while the Biochemistry students will take them in the Spring semester. The average class size is about 80 students.

BICH172 is a laboratory practical course entitled “Introductory Biochemical Laboratory”, which consist of ten weekly laboratory sessions, with each session lasting for about four hours in duration. The course covers the following syllabus: investigation of the properties of enzymes, lipids, carbohydrates and nucleic acids by physicochemical methods and specific assays; purification and quantification of biochemical compounds by various biochemical techniques.

BICH182 is a lecture course entitled “Biochemical Laboratory Techniques”, which consist of ten weekly sessions of one-hour lectures, with each lecture taking immediately before a BICH172 lab session. The course covers the following syllabus: principles of biochemical techniques including spectrophotometry, column chromatography, electrophoresis, metabolite assay, enzyme assay, nucleic acid isolation and protein isolation.

## **INITIATIVES FOR THE ONLINE COURSE DEVELOPMENT**

In February, I was assigned to teach the course BICH182 in the Fall semester. As a new comer to HKUST, it was very fortunate that I discovered the CELT, as they became my saviors in reaching my goals for quality teaching. In late march, CELT approved my proposal for the on-line development for BICH182. Several planning meetings later, we formed a firm plan with clearly defined targets. By this time, one very important decision had been made based on the coupled nature of the BICH182 with BICH172, that the online development would place the two courses together. So by now, a whole team from CELT and a colleague who was in charge of BICH172 was in for the project. Looking back, the BICH172/182 course as a whole benefited from the team effort. So I hope that my successors will continue with the effort.

## **THE AIMS OF THE ONLINE COURSE DEVELOPMENT**

The aim of the BICH172/182 online development is not to face out the face-to-face teaching mode of the course, but to enhance it. So it is a model one online course development. The necessities for the course enhancement using WebCT was viewed to be obvious from many perspectives: from the student’s perspective, it would provide a good anchor for those not yet so well orientated freshers taking a brand new university degree course; from the instructor’s perspective, it offers an extra platform for better course delivery. Finally, the initial launch was aimed at the commencement of the Fall semester in September 2001.

## **THE ONLINE COURSE DESIGN**

To be practical and realistic, BICH172 and BICH182 were physically presented together in the WebCT, and entitled as “BICH172/182-Biochemical Laboratory”.

The overall design in terms of major course components are very typical for a WebCT course, in that once in the initial homepage of the course, the following icons are revealed: syllabus, calendar, course content, archives BICH182, archives BICH172, communication, and study & navigation guide. These icons are self-explanatory regarding the further contents within them.

Special requirements regarding the designs for the ten animated diagrams and four instrumentation demonstrations were the major challenges in our phase one design and development.

## **THE ONLINE COURSE DEVELOPMENT**

During the phase one development, the ten animated diagrams and four demonstration videos were the major development projects and hence the major challenges to the team. From the initial production in June to the final launch in September, these ten animated diagrams and four instrumentation demonstration videos were created from scratch. Good planning was an important contributing factor for the smooth and speedy launch of those online course components in September.

## **THE DEVELOPMENT OF THE ANIMATED DIAGRAMS**

As a first time instructor, my original goals were simple, firstly, to ensure a clear and attractive presentation, and secondly, that my students get at least some of it during my lecture, and in case they don't, they may re-study the lecture materials in the WebCT.

A clear presentation is not too difficult, but an attractive one as well is not an easy task at all. I thought that traditional teaching with a “difference” might be the style for me. And that “difference”, was attempting to make abstract ideas more illustrative. I believed that animations would spice up the lecture presentations, therefore I was looking for technological support beyond simple power point presentations. WebCT development was initially targeted to realize my goals to deliver a more attractive and illustrative lecture. However, its development has turned out to be killing two birds with one stone, as it not only fulfill my original goals but also shows a greater potential to enrich the whole course as a whole.

Like all new ventures; there were lots of up-and-downs especially at the beginning of the development for the animated diagrams. The initial hurdle was how to establish a good ‘heads and hands’ coordination. I was the one who had the ideas in my head, but CELT was the part that had the skilled heads and hands equipped with all the

latest software technologies. Very good communication was the key to overcome such hurdles, as well as lots of patience and understanding. Few of the practical tips to smooth the developing process may certainly include the following points: 1) a very detailed story boards must initially be prepared; 2) a fairly clear vision of the final product must be foreseen even before the production; 3) a good template must be established which can be suitable for the entire series of the animation. There were also lots of up-and-downs during the three months of the production, but the end results shows that it was all worth it.

## **THE DEVELOPMENT OF THE INSTRUMENTATION DEMONSTRATION VIDEOS**

The instrumentation demonstration videos have shown to be a big hit in terms of viewing frequencies. I was told that the production of the four demonstration videos was certainly not short of frustrations and hard work. Full credits should be given to Mr Bobby Yim, the colleague who was in charge of the running of the BICH172 lab practical sessions.

## **CURRENT OUTCOME OF THE DEVELOPMENT**

As on the 19<sup>th</sup> November 2001, the course had just been completely delivered, however, the students will still be able to access the online material until after the final examination for BICH182.

From the student's perspective, Table 1 and 2 show some of the quantitative data recorded at the end the course delivery on the 19<sup>th</sup> November. The data shown here are only preliminary, as more detailed survey is yet to be conducted.

Table 1. Quantitative survey of the student's visit to various pages (class size: 83)

<b>Pages</b>	<b>Number of Hits</b>
Home	1507
Course Content	377
Archive BICH182	591
• Animated Diagrams	407
• Lecture Slides	268
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Archive BICH172	586
• Demonstration Videos	586

Table 2. Distribution of the number of visits made by the students (class size: 83)

<b>Number of Visited to WebCT</b>	<b>Number of Students</b>
Greater than 80 times	20
Between 79 and 40 times	21
Between 39 to 20 times	21
Between 19 to 5 times	16
Less than 5 times	5

Having taught the year one Biology students all the way through the Fall semester 2001 as their course instructor for BICH182 as well as their laboratory demonstrator for BICH172, I believe that these animations not only had improved my quality of teaching in class, but also eased the pressure off from being a first time instructor of the course. These animated diagrams were the simple pictures that said a thousand words, they were the "sugar and spice" in my lecture delivery, they made difficult to explain issues and the abstract ideas more easy to understand and visually illustrative. The selection of the videos made for the instrument demonstrations were spot on, and were successful due to at least the following qualities: 1) improved viewing quality and more standardized demonstration –when the instrument is shown for the first time in the lab, instead of watching a live demonstration as a group of 80 students, the students were divided into small groups to watch the demonstration from the video tapes; 2) unlimited review –the students can preview the demonstrations before coming to the lab, or revise the procedures again whenever it is necessary as the procedures may be used in more than one lab session.

## **FUTURE DEVELOPMENT**

So far, the use of the WebCT has been a passive one for the students, the challenge in the future development is to create more interactive components to the course material so that it can become a more actively used web site for the students.