

The Evolution of a Web-based Course: What We Did and What We Learnt

Qian, P Y¹; Ko, I W P²; Wu, M C S³; Renneberg, R⁴;
Hsieh, D P H⁵; and Yu, J Z⁶

¹boqianpy@ust.hk

Atmospheric, Marine and Coastal Environment Program & Department of Biology,
The Hong Kong University of Science and Technology

²iceko@ust.hk

⁵dphsieh@ust.hk

Atmospheric, Marine and Coastal Environment Program,
The Hong Kong University of Science and Technology

³bowu@ust.hk

Department of Biology & Atmospheric, Marine and Coastal Environment Program,
The Hong Kong University of Science and Technology

⁴chrenneb@ust.hk

⁶chjianyu@ust.hk

Department of Chemistry & Atmospheric, Marine and Coastal Environment Program,
The Hong Kong University of Science and Technology

ABSTRACT

Web-based learning has become one of the emerging directions in higher education all over the world. The Web offers a vast number of resources and enormous opportunities for more effective learning. Yet, web-based learning is in its infancy in many parts of the world including Hong Kong and many courses are still using a mixture of face-to-face and web-based instruction.

In September 2001, the web-based course 'ESCE 500 Introductory Environmental Chemistry and Microbiology' was introduced into the curriculum of the MSc Environmental Science and Engineering Program (ESCE Program) of the Hong Kong University of Science and Technology (HKUST). This course serves to bridge the knowledge gap for those MSc students who did not have sufficient background in chemistry, biochemistry and microbiology. 'ESCE 500' has been a collaboration with the University's Center for Enhanced Learning & Teaching (CELT) and implemented as a password-protected course through the WebCT learning platform.

Initially, all the course content was delivered online while the final examination was still in a written format. With our previous experiences and the students' feedback collected from the course evaluations, we have developed 'ESCE 500' and now it is the first completely web-based course in HKUST. The Secure Online Assessment

System (SOAS) designed by CELT was employed for the final examination. Our experiences echoed the advantages of web-based learning such as relieving the students from temporal and physical constraints (the course content can be accessed anytime and anywhere), the effectiveness of interactive learning (such as the use of self-assessed quizzes, pop-ups, and video clips), and the potential of the Web that provided extensive information on related topics. We also addressed the importance of user-friendliness of the course design and collected the students' overall comments about web-based learning and SOAS. In addition, we confirmed it was essential for the instructor to act as a facilitator and motivator (not only as an educator), who needed to be very tactful in encouraging collaborative learning among the students through their participation in the discussion forum that was one of the most rewarding features of web-based learning. In particular, most of our students were studying in part-time mode and they frequently had expertise related to the course content. Their contribution through the discussion forum enriched the knowledge of the course and helped to establish a positive learning environment. We posted a range of articles in the discussion forum and the students were very interested in those articles about real life or current issues that related the subjects to the real world. However, students typically did not take the initiative in these discussions and the instructor needed to generate a couple of questions from each article to stimulate discussion and invite responses. In addition, the establishment of participation points as part of the course assessment also helped in this regard.

This paper summarizes our experience and the students' expectation and learning behavior towards web-based teaching. We believe that this course can serve as a type model for other teaching staff in higher education to meet the challenge of implementing web-based teaching.

Keywords

Web-based learning in higher education, WebCT, Secure Online Assessment System, interactive learning, collaborative learning

INTRODUCTION

Hong Kong's higher education has entered into a new era. In 1998, the government suggested to increase the effectiveness and quality of teaching and learning through the application of information technology (Government Information Center, 1998). In order to respond to this challenge, in 1999 CELT launched a project to promote the use of the Web in teaching (Ha, 2001). This was funded by a Teaching Development Grant from the University Grants Committee. Among all the courses that have been using the Web in HKUST, our course 'ESCE 500 Introductory Environmental Chemistry and Microbiology' became a pioneer that has employed the highest percentage of web-based teaching.

In September 2001, 'ESCE 500' was introduced into the curriculum of the ESCE Program and served to equip the students with sufficient background knowledge in

chemistry, biochemistry and microbiology. It has been a collaboration with CELT and implemented as a password-protected course through WebCT. Initially, all the course content was delivered online while the final examination was still in a written format (Qian et al., 2001). The course has been further developed and now it is the first completely web-based course in HKUST. It has already been offered five times to a total of 65 students and some preliminary findings have been reported in Qian et al. (2001).

The current paper identifies the key attributes and improvements we have made over these years. We would also like to share our experience gained so far. It is expected that more and more courses in local higher education will employ the Web to varying extents in the near future. We anticipate that our experience can inject some ideas for our peers in this regard.

KEY ATTRIBUTES AND IMPROVEMENTS TO 'ESCE 500'

1. Instructor and Student Profiles

Since the course was totally web-based, it was important for the instructor and the students to introduce themselves to each other at the beginning of the course period. A 'Student Profile' was used for this purpose. The instructor took the initiative to post a self-introduction and a photograph of herself and the students were invited to follow suit.

2. Design of Content Module

Students are the users and therefore the course should be designed with a student-oriented approach (Smitsen and Sims, 2002). For 'ESCE 500', the user interface was revised (for example, with more anchors and pull-down menus for the students to cross-reference among various sessions) and the content modules were re-structured to fit in this new interface.

A printable text-only version (without figures) was prepared so that the students could print off their own copy for study purpose. In order to motivate the students to make use of the Web environment, the instructor provided documents about timely issues (discussed in '3. Discussion Forum'), useful websites, and other interactive content including a video (about an experiment), animations, pop-ups (three kinds: 'Environmental Issues' with information about environmental issues/ applications that relate to the course content, 'Did you know' with interesting information about related topics, 'Extra Info' with additional information for students to explore certain topics). Each of these pop-ups was assigned a signature icon for easy reference.

As far as possible, photographs taken from local examples by the instructor and the teaching team were used. The student welcomed this approach because it helped them to relate what they learnt to their real life.

3. Discussion Forum

One of the advantages of web-based teaching is the possibility to keep the students abreast with timely issues that are relevant to the course content (and they can explore further about the issues from related websites) and provide them with an environment of collaborative learning. To enhance collaborative learning, the instructor needs to be an educator, facilitator and motivator (Landram, 2002).

For 'ESCE 500', documents or websites about current news or research (for example, about dengue fever) were posted in the Discussion Forum. The students were encouraged to share their knowledge (mainly generated from their working experience) with their classmates (Rossman, 1999). In order to keep the discussion moving on track, a couple of general questions were added in each article (Embleton, 1999). As the discussion started, more probing questions (for example, 'Does everyone agree with his viewpoint?') were asked. Instead of addressing the questions directly, the instructor would wait for a while so that the students could have time to express their views. Sometimes, students might even initiate a new and relevant topic for discussion (for example, about SARS). During the course of the discussion, the instructor helped to clarify the questions and encourage responses. After some time, the instructor closed the discussion with a summary and gave feedback to any unanswered question.

To further motivate the students to contribute in the Discussion Forum, their participation was counted as a portion of the final course grade (Embleton, 1999).

4. Secure Online Assessment System (SOAS)

The students were assessed through three quizzes (one for each module) and an examination. The quizzes were treated as assignments: the quiz papers were uploaded on the Web and the students turned in their answers through the course's built-in Email Box. For the examination, the students were required to come to the University and do it together. CELT's Secure Online Assessment System (SOAS) was used for the examination of this course. Since our students had been 'conditioned' to using the Web environment, they did not seem to have any difficulty in using SOAS and they regarded it as user-friendly.

5. Students' Feedback

Students are the 'clients' and it is essential for us to customize material to their needs. Their feedback helps us constantly reflect and examine the course outcomes in order to achieve this goal (Fang, 2001; Wines and Bianchi, 2002). For 'ESCE 500', students' feedback was collected through questionnaires and interviews (Ha, 2001). Their feedback revealed their expectations for web-based learning, and provided useful information for the instructor to develop the course and for CELT to enhance the Web course delivery system and SOAS.

In general, students found WebCT to be user-friendly, which echoed the findings of Ha (2001). The students also enjoyed the interactivity of the course content (for example, pop-ups and video) and learning collaboratively through the Discussion Forum (among

all the articles posted, they particularly welcomed those about timely issues). SOAS was considered an appropriate means for taking the examination.

It was found that interviews (conducted by CELT staff) were useful as a complementary way to pinpoint and respond immediately to the students' questions.

CONCLUSION

Web-based instruction is an effective way to enhance teaching and learning quality by providing certain attributes such as flexibility (virtually without temporal and physical barriers), opportunity for collaborative learning and availability of extensive online references. Yet, instructors often need to spend a considerable amount of time (on average, about a couple of hours per day for 'ESCE 500') to create a positive learning environment online (Goldsmith and Rogers-Ward, 2003). A successful web-based course needs to be student-oriented: well-structured, with a user-friendly interface, interactive content, and the instructor taking up the role of a facilitator and motivator. Students' feedback is always essential for the instructor to fine-tune a course towards a student-oriented design.

ACKNOWLEDGEMENT

This course is a sub-project of the 'Continuous Learning and Improvement through Teaching Innovation' project funded by the Teaching Development Grant from the University Grants Committee. We would also like to thank CELT for their support throughout the course development.

REFERENCES

- Embleton, K. (1999). Online Teaching Tips. <http://www.fcs.iastate.edu/computer/tips/onlinetechtips.html> (retrieved: February 14, 2004).
- Fang, W. M. Y. (2001). No Pain, No Gain: Opportunities and Dilemmas in Online Learning and Teaching. *Proceedings of the First Teaching and Learning Symposium: Center for Enhanced Learning and Teaching, Hong Kong University of Science and Technology, Hong Kong*, pp. 153-158.
- Goldsmith, D. J. and Rogers-Ward, C. (2003). An Interactive Peer Examination of Online Teaching: Experienced and Novice Instructors Explore Best Practices. Connecticut Distance Learning Consortium. <http://www.ctdlc.org/Evaluation/DavisDocs/FinalReportDavisResearch10-22-03.pdf> (retrieved: February 14, 2004).
- Government Information Center, HKSAR Government. (1998). The 1998 Policy Address. <http://www.policyaddress.gov.hk/pa98/english/high.htm> (retrieved: May 12, 2004).

Ha, T. S. (2001). Students' Views about Their Experiences of Learning Online. *Proceedings of the First Teaching and Learning Symposium: Center for Enhanced Learning and Teaching, Hong Kong University of Science and Technology, Hong Kong*, pp. 93-105.

Landram, F. G. (2002). Online Teaching: Say Goodbye to Chat. *Journal of Computing Sciences in Colleges*, 18 (1), 228-231.

Qian, P. Y.; Ko, I. W. P.; Wu, M. C. S.; Hsieh, D. P. H., Renneberg, R. and Yu, J. Z. (2001). An Overview of a Web-based Course: From Design to Evaluation. *Proceedings of the First Teaching and Learning Symposium: Center for Enhanced Learning and Teaching, Hong Kong University of Science and Technology, Hong Kong*, pp. 190-196.

Rossman, M. H. (1999). Successful Online Teaching Using an Asynchronous Learner Discussion Forum. *Journal of Asynchronous Learning Networks*, 3 (2), 91-97. http://www.aln.org/publications/jaln/v3n2/pdf/v3n2_rossman.pdf (retrieved: February 13, 2004).

Smissen, I. and Sims, R. (2002) Requirements for Online Teaching and Learning at Deakin University: A Case Study. <http://ausweb.scu.edu.au/aw02/papers/refereed/smissen/paper.html> (retrieved: February 13, 2004).

Wines, J. and Bianchi, J. (2002). Online Teaching and Learning: Faculty Reflections. <http://www2002.org/CDROM/poster/179/> (retrieved: February 13, 2004).