Web-based resources for extended learning in Biology

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Year Starting: 2004

Introduction

This is the strategy used by a pioneering teacher of eLearning at The Chinese University of Hong Kong. He adopted a number of eLearning strategies to engage students in extended learning. The course was in the areas of Molecular Biology & Genetic Engineering. He taught several undergraduate courses. The teachers spent time during semester-breaks developing self-accessible online materials for students to self-learn in parallel with the ongoing of the course-work, as an additional but separate component of the course. In the academic year 2004–2005, he started to extensively revamp the course website of the undergraduate course in molecular biology. In 2006–2007, he also applied the eLearning strategies to another course BIO2010, which was a undergraduate course for mainly Year 1 students. The paper looked at the implementation of the various eLearning strategies in these courses in the years between 2004 and 2007. All the courses were taught in the first semester of the academic year.

Year	Number of students enrolled	
	BIO4320	BIO2010
04-05	44	/
05-06	67	/
06-07	43	49

Table 1: The courses included in the study and the number of students enrolled

Below are some of the online learning activities and resources used:

- *Quizzes (competition)* - The site housed many interactive quizzes in three different levels of difficulty. The questions enabled students to self-test their general knowledge about the field and so they were not limited to the topics covered in class. Immediate computer-generated feedback will be given once the quizzes are completed online. To make the quizzes more exciting, students were allowed to go to the next level only after they had attempted all the three questions on the previous level right. There was a new quiz for students to take every week. Students' scores were recorded and accumulated. Prizes were given to the students scored the highest at the end of the "competition". This activity was held in 2004-06.

- *Marks-giving weekly quiz competition* – Starting from 2006-07, the teacher decided to the interactive approach to the web activities. He employed a full-time research assistant for upgrading the questions and maintaining the system. The quizzes were also associated with course grades too. More question items were written and many of them were directly related to suggested additional readings for students. He employed a part-time research assistant to update the questions every week, and give feedback to students' answers.

- *Forum* – the forum was used as a platform for students to ask questions concerning the subject matters.
- *Video clips* - video clips were be put on a 'Video Virtual Lab' section of the site to illustrate the different laboratory technologies used to study molecular biology and genetic engineering.
- *Animations and graphics* - there were animations and well-drawn graphics which better explained difficult concepts in the subject because they assist students to visualize movements of molecules and genes in three dimensions.
- *Game* - there was also a game 'Mission BIO4320' which intends to let students learn in an interactive fashion. In the game, the player takes the role of a genetics professional and is required to carry out some important research projects. Students are supposed to learn some course-related knowledge from the game.
- *Past papers* - the past papers on the sites also assist students' preparation for examinations.
- *Glossary* - glossary of terms were housed in the website inspire the students to search for knowledge.
- *Links to other resources* - the links to the other resources on the Web has a potential in letting the interested to search and explore.

The teacher used some of the animations and graphics on the site to help teaching in class, but the majority of the site was used by the students as self-study materials. The teacher promoted the students' motivation to use the site mainly by means of encouragement. For example, the teacher demonstrated the various website features in the beginning of the course, presented gifts to students who are able to score full marks in all the three difficult levels of quizzes. The fact that students can access these materials an unlimited number of times, and at any time and any place outside the classroom means that they are given more opportunities to learn.

Advantages of this learning activity

Through encouraging students to engage in extended learning, the teacher wanted to achieve the following learning benefits:

- *Higher level of understanding of the knowledge* - to enrich students' knowledge not only in the basic concepts of the area, but also the other related but extended concepts of the subject; and to enable students to perform cognitive reasoning in the higher levels, such that they are able to apply, synthesize and create based on the learned ideas and concepts; and
- *Learning skills* - to promote students' willingness and readiness in utilizing the web functions to learn.
- *Improved learning attitudes* – tofacilitate students' interest in the subject such that they employ a deep approach to learning**.**

Feedback from teachers and students

The evaluation of these strategies in general showed that the strategies were not particularly successful in the beginning but could gradually gain students' acceptance and achieved considerable outcomes along the years. Continuous improvements made to the various

components of the innovative strategies were considered to be essential to these achievements. The findings exemplify well the long process needed for the evolution of any new eLearning strategies. The time and effort, however, is well worth spending. Though immense learning benefits have not been observed yet, more is likely to be achieved as the strategies increasingly mature. The employment of self-directed learning and the acquisition of extended knowledge of the field, in the long run, should let students appreciate that learning is not for marks and grades and thus build up a quest for a sustained deep approach to learning.