THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 1: Basic Scheme

Final Report (2015-16)

Report due 31 December 2016
Please return by email to The Ad hoc Committee on Planning of eLearning Infrastructure
mmcd@cuhk.edu.hk

PART I

Project title: Using Flipped Classroom To Enhance Interactive Teaching and Learning in Cell and Molecular Biology
Principal supervisor(s): Dr. Lawrence Chiu and Prof. Liwen Jiang
Co-supervisor(s):
Department / Unit: School of Life Sciences
Project duration: From January 2016 to December 2016
Date report submitted: 30 Dec, 2016

1. Project objectives

Is the project on track to meet its objectives?
Have the objectives been changed as a result of the experience of working on your MMCDG project?

The project objective is to develop micro-modules on the introductory and background topics in protein trafficking. This allows students to self-learn them out-of-class so that the valuable in-class time could be more intensively used for interactive teaching-and-learning.

The project follows its original objectives. Online lectures (a total of 7 videos) regarding introductory and background knowledge in protein trafficking were recorded by Prof. Jiang to meet the objectives. The videos have been be uploaded to website for students' self-learning, and have also been used for teaching in the courses of CMBI4001 Protein Trafficking and BIOL2120 Cell Biology during the academic year of 2016-2017. These materials will be used again for teaching in coming years.

2. Process, outcomes or deliverables

Please specify the number of micro modules produced, and the course(s) (with course codes and titles) that have used the micro modules in Part IV, and provide more detailed descriptions here.
Has the nature of the deliverables been changed?
Have you adjusted your timeline?
Overall, was the project completed satisfactorily?

During the project period, a list of videos relating to the introductory and background knowledge of the topics in CMBI4001 Protein Trafficking were recorded by Prof. Jiang.

In the proposal we planned to record the online lectures via the Echo360 system. Nonetheless, the Centre for eLearning Innovation and Technology (ELITE) has recently been established in CUHK to provide advanced support for video recording. Therefore we decided to use the Self-recording Studio of ELITE to create the online lecture videos. Compared to Echo360, it provides a sound-proof recording environment and enable students to see the content of the powerpoint slides included in the video in a clearer way.

In the proposal, we aim to develop five micro-modules on introductory and background topics in protein trafficking. During the second half of the project period, we decided to expand it to seven micro-modules. They are:
1. Basic Concept of Protein Trafficking
2. The Secretory Pathway
3. Protein Degradation System
4. COPII Vesicles
5. mRNA Sorting
6. Autophagosome
7. EXPO & EMP

We planned to produce Micro-modules 1-2 by March 2016 and completed Micro-modules 3-5 by August 2016. Nonetheless, we have adjusted our timeline that, we have already completed modules 1-4 by June 30. We have finished producing modules 5-7 during June to December.

The seven videos produced for each of the micro-modules have been uploaded to our website for students to view before classes (e.g. CMBI4001). Each of the video is complemented with a set of multiple choice, true or false and discussion questions. The questions are also uploaded to the website. These served as quizzes which students are required to complete after watching the videos.

From September to December, in the courses of CMBI4001 Protein Trafficking, students

were required by Professors to watch the online videos in the Micro-modules and answer questions on line before lessons. Questions regarding the content of online videos were discussed at the beginning of each class. Follow-up explanations and discussions using 1-2 related papers recently published in top-ranked international journals were achieved in classes.

All online lectures, quizzes and answers are uploaded to the website. The link is:
http://www.cuhk.edu.hk/centre/ccdb/micro-modules

In summary, we have completed the project in a timely fashion.

3. Evaluation Plan

Have you altered your evaluation plans?
What monitoring data did you collect?
Does your evaluation indicate that you have achieved your objectives?

We have performed two sets of surveys in the first and last lesson of the two courses (CMBI4001 and BIOL2120) respectively to identify students' potential learning problems and to determine whether the problems have been solved by our micro-modules. Academic performance of these classes with the micro-modules was also compared with those of previous classes without.

Surveys were collected and analyzed, the result revealed that over 72% of the students found the videos stimulating and interesting. In a five-point scale, 85% of them rated 4 or 5 point regarding the usefulness of the micro-modules in facilitating their learning and solving their learning problems. 81% of them think that they gained more cell biology knowledge after watching the videos. The two classes which adopted the micro-modules for teaching shown 8 to 10% improvement in students' academic performance, compared to those of previous classes without.

In conclusion, the evaluation result shows that our micro-modules are successful in achieving the pedagogical goal.

4. Dissemination, diffusion and impact

Please provide examples of dissemination: website, presentations in workshops or conferences, or publications.
Please provide examples of diffusion: how the project results/process/outcomes/deliverables have been used in your unit and other parts of CUHK or other institutions?

Please provide examples of impact: how the project results (micro modules) can be adapted to other disciplines.

Online lectures, quizzes and answers are uploaded to the following website.
The website can also be accessed by non-CUHK teachers and students and the videos can be downloaded freely for teaching or self-learning use.
http://www.cuhk.edu.hk/centre/ccdb/micro-modules

The micro-modules will also be disseminated through the China Massive Open Online Courses (CNMOOC) scheme, which provide an online platform for uploading teaching videos. Through this scheme, the micro-modules can also benefit Mainland Students.

PART II
Financial data

Funds available:

Funds awarded from MMCDG	$	100,000
Funds secured from other sources	$	0
(please specify_____)		
Total:	$	100,000

Expenditure:

Item	Budget as per application	Expenditure	Balance
RA	1		65,000
Student helper(s)	5		5,000
Computer system with software	1		30,000
Total:			100,000

PART III

Lessons learnt from the project

Please describe your way forward.
Please describe any of the following item(s) accordingly:
• *Key success factors, if any*
• *Difficulties encountered and remedial actions taken, if any*
• *The role of other units in providing support, if any*

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We planned to carry on producing videos on other topics in Cell and Molecular Biology. We will continue updating new online lectures and quizzes onto the website which is accessible for both CUHK and non-CUHK students.

We would like to thank the Centre for eLearning Innovation and Technology (ELITE) in CUHK for providing advanced support for video recording and editing.

PART IV
Information for public access

Summary information and brief write-ups of individual projects will be uploaded to a publicly accessible CUHK MMCDG website. Please extract from Part I the relevant information to facilitate the compilation of the publicly accessible website and reports.

1. Keywords

Please provide five keywords (in the order of most relevant to your project to least relevant) to describe your micro-modules/pedagogies adopted.

(Most relevant)   Keyword 1: Cell and Molecular Biology

Keyword 2: Protein Trafficking

Keyword 3: Secretory Pathway

Keyword 4: Autophagosome

(Least relevant)   Keyword 5: EXPO

2. Summary

Please provide information, if any, in the following tables, and provide the details in Part I.

Table 1: Publicly accessible online resources (if any)
(a) **Project website:**   *If a publicly accessible project website has been constructed, please provide the URL.*   http://www.cuhk.edu.hk/centre/ccdb/micro-modules
(b) **Webpage(s):**   *If information of your project is summarized in a webpage (say a page in the department's or faculty's website), please provide the URL(s) here.*

(c) **Tools / Services:**
If you have used any tools or services for the project, please provide names of the tools or services in here.

(d) **Pedagogical Uses:**
If any flipped classroom activities have been conducted, please provide information in here. If relevant, please indicate how your project output can be used to support flipped classroom activities. Online lectures, quizzes and answers are uploaded to the following website. The website can also be accessed by non-CUHK teachers and students and the videos can be downloaded freely for teaching or self-learning use. http://www.cuhk.edu.hk/centre/ccdb/micro-modules

(c) **Others (please specify):**

Table 2: Resources accessible to a target group of students (if any)

If resources (e.g. software) have been developed for a target group of students (e.g. in a course, in a department) to gain access through specific platforms (e.g. Blackboard, facebook), please specify.

Course Code/ Target Students	Term & Year of offering	Approximate No. of students	Platform

Table 3: Presentation (if any)	
Please classify each of the (oral/poster) presentations into one and only one of the following categories	**Number**
(a) In workshop/retreat within your unit (e.g. department, faculty)	
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	
(e) In international conference	
(f) Others (please specify)	

Table 4: Publication (if any)	
Please classify each piece of publication into one and only one of the following categories	**Number**
(a) Project CD/DVD	
(b) Project leaflet	
(c) Project booklet	
(d) A section/chapter in a booklet/ book distributed to a limited group of audience	
(e) Conference proceeding	
(f) A chapter in a book accessible internationally	
(g) A paper in a referred journal	
(h) Others (please specify)	

3. A one-page brief write up

Please provide a one-page brief write-up of no more than 500 words and a short video.

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From September to December, in the course CMBI4001 Protein Trafficking and BIOL2120 Cell Biology, students were required by Professors to watch the online videos in the Micro-modules before lessons. Questions regarding the content of online videos were discussed at the beginning of each class. Follow-up explanations and discussions using 1-2 related papers recently published in top-ranked international journals were achieved in classes.

We have performed two sets of surveys in the first and last lesson of the two courses (CMBI4001 and BIOL2120) respectively to identify students' potential learning problems and to determine whether the problems have been solved by our micro-modules. The evaluation result shows that our micro-modules are successful in achieving the pedagogical goal.

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