

THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 1: Basic Scheme

Final Report (2017-18)

Report due 31 October 2018

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 with recent Research Discovery to Enhance Interactive Teaching and Learning in Protein Trafficking

Principal supervisor: Prof. Jiang Liwen

Co-supervisor(s): N.A.

Department / Unit: School of Life Sciences

Project duration: From December 2017 to October 2018

Date report submitted: 31 Oct 2018

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 from our recent research findings published in prestigious international journals that are related to protein trafficking in both animal and plant models. The micro-modules will explain the background information and the research data in the publications.

The project follows its original objectives fully. 18 Micro-modules have been produced by Prof. Jiang and the first authors of the publications collaboratively to meet the objectives. The videos and related publications have been uploaded to the KEEP Platform, which have been put into use for teaching the course *CMBI4001 Protein Trafficking* in September 2018.

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. Must specify duration of each micro-modules (in terms of students online contact hours), total duration time of all deliverables and style. (With reference to the “Summary of video presentation styles” developed by CLEAR)

Has the nature of the deliverables been changed?

Have you adjusted your timeline?

Overall, was the project completed satisfactorily?

18 micro-modules were produced in the project and the corresponding details are shown below:

No.	Video Title	Duration (minute)	Style
1	Plant COPII Paralogs: Functional Redundancy or Diversity?	03:11	S2
2	FREE1: a magic plant protein	12:21	S2
3	Sorting and targeting mechanisms of Golgi membrane proteins	13:15	S2
4	Molecular Mechanism of Tonoplast Protein Targeting	10:44	S2
5	Activation of the Rab7 GTPase by the MON1-CCZ1 Complex is Essential for PVC-to-Vacuole Trafficking and Plant Growth in Arabidopsis	07:28	S1
6	Fast-suppressor screening of sof mutants in Arabidopsis I	08:08	S2
7	Fast-suppressor screening of sof mutants in Arabidopsis II	06:56	S2
8	A rapid and efficient method to study the function of crop plant transporters in Arabidopsis	04:04	S2
9	Biogenesis of Plant Prevacuolar Multivesicular Bodies	08:39	S1
10	Molecular study of EXPO-mediated plant exocytosis	06:10	S2
11	A BAR-Domain Protein SH3P2, Which Binds to Phosphatidylinositol 3-Phosphate and ATG8, Regulates Autophagosome Formation in Arabidopsis	08:33	S2
12	Exocyst-Positive Organelles and Autophagosomes are Distinct Organelles in Plants	14:11	S2
13	N-linked glycosylation of AtVSR1 is important for vacuolar protein sorting in Arabidopsis	13:54	S2
14	AtBRO1 functions in ESCRT-I complex to regulate multivesicular body protein sorting	16:18	S2
15	Organelle pH in the Arabidopsis Endomembrane System	14:44	S2
16	An in vivo expression system for the identification of cargo proteins of vacuolar sorting receptors in Arabidopsis culture cells	14:01	S2
17	Current models for autophagosome initiation and its relationship to the ER in yeast, mammal and plant	03:04	S2
18	ATG9 regulates autophagosome progression from the endoplasmic reticulum in Arabidopsis	05:35	S2
	Total duration:	2hr 44min	

In the proposal, we aim to develop 16 micro-modules derived from the recent research findings published in prestigious internal journals that are related with the course contents. We planned to produce Micro-modules of topics 1-8 in the first stage and topics 9-16 in the second stage. Following the original timeline, we have completed modules 1 to 8 by May 2018. By October 2018, we have produced 10 more micro-modules, including 2 extra topics which are not mentioned in the proposal. The project was completed satisfactorily with a total of 18 videos produced. The videos were complemented with related publications.

The videos and the related publications have been uploaded to the KEEP online platform. Students taking the course *CMBI4001 Protein Trafficking* were required to watch the videos before lectures, so that they can understand the background information and research data in the publications, which is elaborated in the videos. During the lecture time, students who have already gained understandings about the research publications in the topics will have more intensive and deep discussion with the professor (and/or each other) regarding the current developments in protein trafficking. The videos were also uploaded to a public-accessible website to share the eLearning resource to other students in CUHK or from other institutions (including those in Mainland China) who are interested in the topics.

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 distributed surveys to the students during the lectures of *CMBI4001 Protein Trafficking*. Students reflected that online learning allowed a flexible mode of learning and that more knowledge can be gained without the limit of lecture time. They also suggested that the micro-modules served as a good learning tool to get the students exposed to frontiers of various research in a short time. The videos also allowed students to have prior understanding on the recommended publications so that they can have more in-depth discussion during the lecture. The evaluation indicated that the project has achieved its original objectives effectively and completely.

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.

The videos and the related publications have been uploaded KEEP online platform for students taking the course *CMBI4001* to view before classes. The link for KEEP is:

https://edx.keep.edu.hk/courses/course-v1:CUHK+CMBI4001+2018_01/info

The videos were also uploaded to a public-accessible website to share the eLearning resource to other students in CUHK or from other institutions. The website link is:

<http://www.cuhk.edu.hk/centre/ccdb/mmcd2017-18/>

The work in the project will be shared as a Poster in the "Teaching and Learning Innovation Expo 2018" held at CUHK on 7 December 2018. The objective and content in the project will be summarized and introduced to the participants via poster presentation.

PART II

Financial data

Funds available:

Funds awarded from MMCDG	\$ 100,000
Funds secured from other sources (please specify _____)	\$ 0

Total: \$ 100,000

Expenditure:

Item	Budget as per application	Expenditure	Balance
Staff Cost	90,000	86,960	3,040
Computer system with software and stationeries	10,000	13,049	-3,049
Total:			-9

Remarks: We will settle the deficit amount by other fund source as soon as possible.

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*
- *Suggestions to CUHK, if any*
 - *Example: what should be done differently?*

We plan to continue producing videos to elaborate more recent publications that are related to the topics in protein trafficking. We will continue updating new micro-modules 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) of CUHK for providing professional 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: Protein trafficking
 Keyword 2: Scientific publications
 Keyword 3: Flipped classroom
 Keyword 4: KEEP Platform
- (Least relevant) Keyword 5: Interactive teaching and learning

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:**<http://www.cuhk.edu.hk/centre/ccdb/mmcd2017-18/>**(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.

The videos and the related publications have been uploaded KEEP online platform for students taking the course *CMBI4001 Protein Trafficking* to view before classes. The link for KEEP is:

https://edx.keep.edu.hk/courses/course-v1:CUHK+CMBI4001+2018_01/info**(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.

<u>Course Code/ Target Students</u>	<u>Term & Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>CMBI4001</i>	<i>1st term 2018</i>	<i>20</i>	<i>KEEP</i>

Table 3: Presentation (if any)

Please classify each of the (oral/poster) presentations into one and only one of the following categories

(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**Number***1*

(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)	
<i>Please classify each piece of publication into one and only one of the following categories</i>	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.

Our project has developed 18 micro-modules that comprised of online videos which introduce selected scientific publications derived from RGC-funded CUHK research that are related to the course contents of *CMBI4001 Protein Trafficking*.

This course covers the general principles of protein trafficking and has a pedagogical goal to share with students the current developments in protein trafficking research via discussions and presentations. Students are expected to develop lifetime knowledge, critical thinking ability and skills in scientific methodology and problem solving. While the general principles of protein trafficking can be taught in lectures, the knowledge related to recent scientific discoveries in this area are much richer and more challenging. In this project, we developed micro-modules from our recent research findings published in prestigious international journals that are related to protein trafficking in both animal and plant cells. The micro-modules comprised of online videos explaining the details of the background information and research data of the publications.

The videos and the related publications have been uploaded to the KEEP online platform. Students taking the course *CMBI4001 Protein Trafficking* were required to watch the videos before lectures, so that they can learn by themselves via watching the videos and have basic understandings of the related publications before the lectures for discussion. As a result, they can have more intensive and deep discussion about the latest research development during valuable lecture time. The micro-modules-based learning mode also allows students to have the most up-to-date knowledge on the latest research findings in this field. The videos were also uploaded to a public-accessible website to share the eLearning resource to other students in CUHK or from other institutions who are interested in the topics.