THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 2: Studies in Foundation Courses

Interim Report (2016-17)

Report due 31 October 2017.
Please return by email to mmcd@cuhk.edu.hk

PART I

Project title: Production and Application of Micro-modules in Geophysics
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Department / Unit: Earth System Science Programme
Project duration: From May 2017 to April 2018
Date report submitted: 31 October 2017

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?

(1) Our first objective is to produce a new micro-module to help students improve their skills on identifying rocks and minerals by means of multi-media tools. All activities conducted so far as well as the current outcomes strictly meet this objective.

Firstly, as we proposed in the project application, high quality photos for each of the rock samples in our petrology lab have been taken using Canon PowerShot SX60 HS. The most typical characters, such as the sample's mineral assemblage and texture, are emphasized in the photo. All the photos are currently presented online using the free service provided by Google, in a form of Picture Gallery. This digital resource is very much more approachable for students than those physical ones in the lab. Students could use this resource limited by neither time nor venue. They can simply go online to practice on rocks identification.

Secondly, micrographs for each petrographic thin sections in our petrology lab have been taken using the Nikon H550S and camera system. Typical physical characters of the major rock-forming minerals in thin sections under plain polarized light (PPL) and cross polarized light (XPL) are carefully selected when the micrographs are taken. All micrographs are now presented online, too, so as to further enrich our newly initiated digital resource pool for the Earth System Science curriculum. Given the relative scarcity of petrographic microscopes, the digit resource could be a great help for students on the study of optical mineralogy.

Thirdly, in order to reinforce students' active learning and enhance the learning effectiveness, KEEP Open edX, a more engaging platform than Google, has been used. A KEEP course called Petrology has been developing. Other than presenting both the hand specimen photos and the thin sections micrographs in KEEP, a number of questions focusing on the key knowledge are specifically being developed. Students could get timely feedback when taking this online course, hence to effectively get their knowledge consolidated and skills enhanced. These online materials will be used in ESSC2010 and ESSC2120 (replacement of ESSC2110) in the second and summer semesters.

(b) The second objective is to greatly extend our Earth System Science classroom teaching through virtual geological field trips. And at the same time we would like to have a group of student helpers fully involved hence to provide incentives for them to conduct self-learning, and meanwhile to encourage an all-round development, particularly in IT fluency. Our conducted actives and the preliminary outcomes strictly meet this objective.

Firstly, educational videos have been shot to help students better understand the topic of Hong Kong Geology. Limited by resource such as time and manpower, our students didn't have the chance to visit all the important geological sites in Hong Kong. However, with our newly produced videos, all students could have a virtual geological field trip in classroom or whenever and wherever they want. In addition to watching the videos, we have also provided an engaging way to get students feedback. The KEEP course (Hong Kong Geology) has been launched and incorporated into a junior course ESSC1000. With this platform, we designed various forms of questions. It is also expected to collect some data about students' performance from KEEP for our future pedagogical research.

Secondly, we are very proud to say that student helpers are involved in this project's almost every step. A group of high ability and self-motivated student helpers are selected, who have contributed abundant resource. The major jobs student helpers has dedicated include: (1) generating detailed annotations for rock sample photos and micrographs; (2) generating geological report on geological field trips, which will help the later shooting and website developing; (3) in-site shooting for the geological field trips; (4) post productions using Adobe software. The first group of helpers is now stepping into their final year study and their service will be limited largely by their time. So we've decided to recruit a new group of helpers from the third year students and hence a total amount of students involved will

increase consequently.

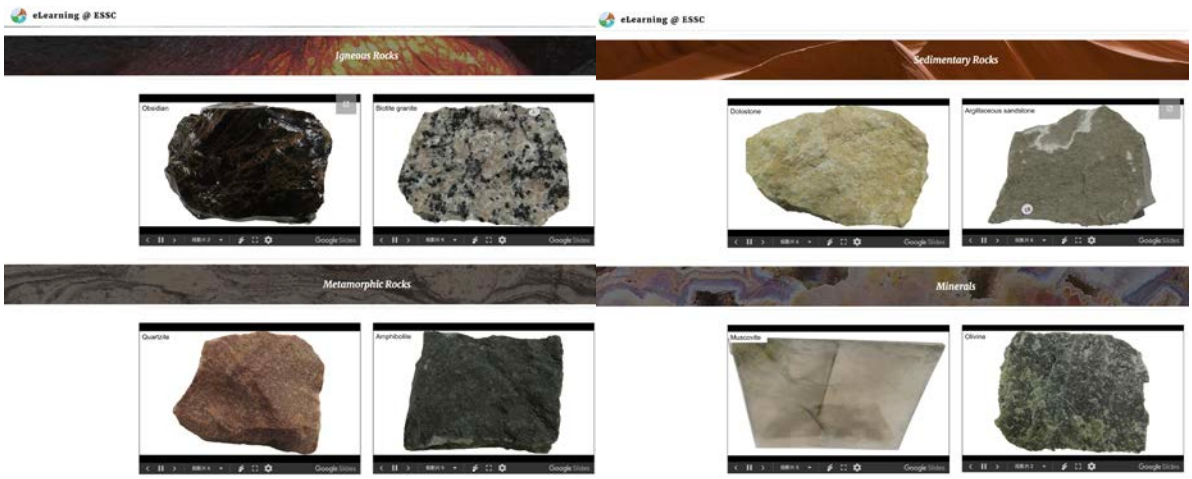
2. Progress on process, outcomes or deliverables

What have been accomplished so far?

For the first micro-module, we have finished:

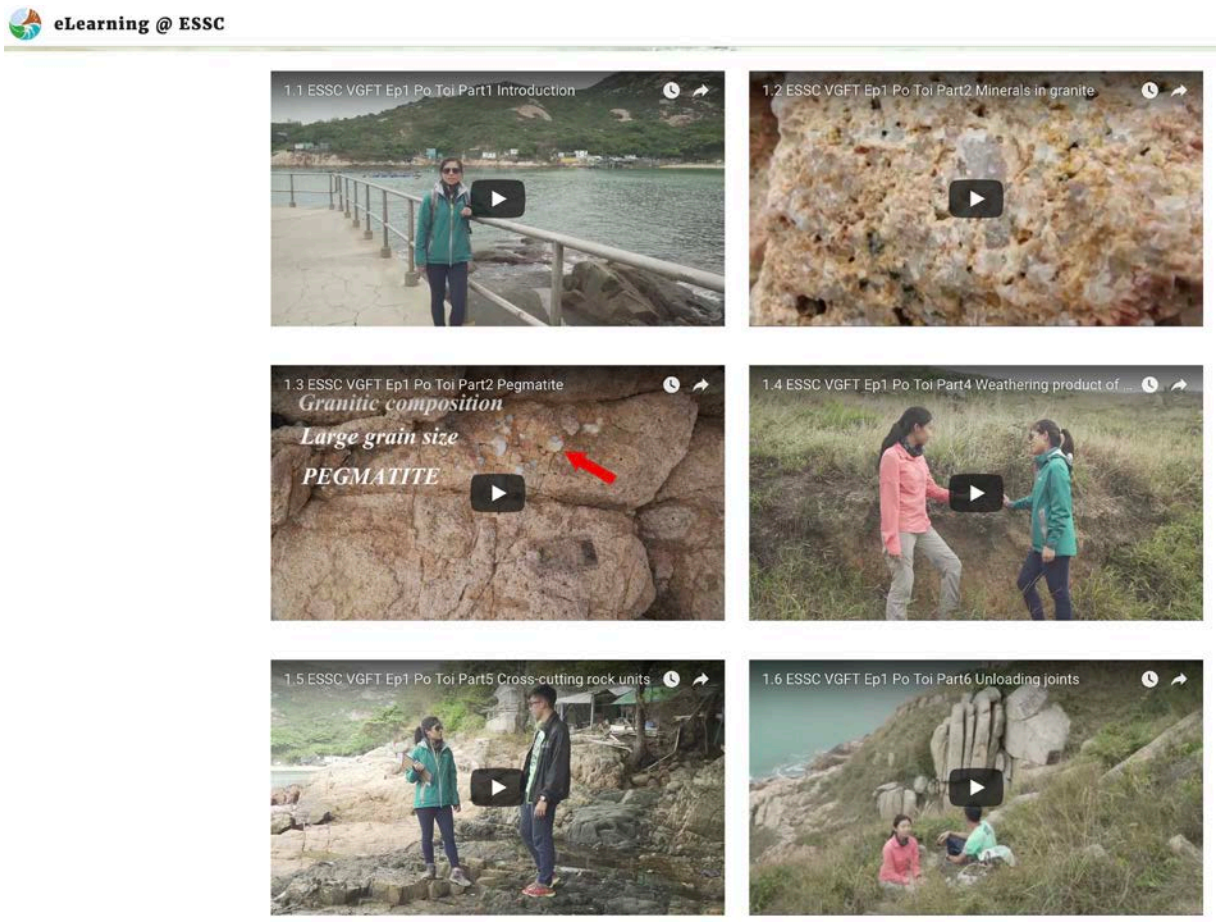
(1) 92 high resolution photos of rock samples and mineral samples;
(2) 204 petrographic micrographs of minerals in thin sections;
(3) A webpage to showcase the rock samples;
(4) A webpage to present the thin section micrographs;
(5) Am online course on KEEP Open edX to provide an engaging way to study rocks and minerals.

This micro-module will be used in ESSC2010 in the second semester.



For the second micro-module, we have accomplished:

(1) Six short videos (2-3 minutes each) about the typical geological features in Po Toi Island and the materials are incorporated in an online course on KEEP Open edX to assist ESSC1000's geological field trip.



(2) 8-day pre-trip shooting of Taiwan geological features.

(3) Pre-trips to Tang Chau, Che Lei Pai, A Chau and Lai Chi Chong to evaluate the possibility for future educational videos shooting;

Have any obstacles been encountered and what are the remaining tasks to be finished?

Is the project still on time for completion (which includes preparation of the final report) on or before the grant expiry date?

There are four major obstacles we encounter:

(1) It was planned to use a software, PowToon, proposed in our project application to make animations to help students study rocks and minerals. After a trial, we discussed not to use it at the moment. The reason is that the completed animation file couldn't integrate the sample image of the best resolution. Therefore, we decided to replace the animation with the best quality sample photo directly with detailed annotation to emphasize the fundamental knowledge. The budget previously for the software purchase has been reallocated to the recruitment of more student helpers to work on the samples annotation.

(2) It was planned that animations to simulate the geological process will be used in each video and the work was allocated to our contract company (Hong Kong Discovery). Due to lack of geological background and slow pace of editing of this company, the final products provided are less geologically accurate. Therefore, we decided to:

   a. slightly reduce the amount of animations in the video so as to buy more time from our student helpers to make the animations correct;
   b. replace some animations with other means, such as experiments and sketches, so as to guarantee the video's quality;
   c. recruit more student helpers to work on the project, especially for the field shooting and video editing.

(3) The geological materials of Taiwan shooting are much richer than we expected. We believed that these materials are not only different from those in Hong Kong, but they are also more valuable to be used in the micro-modules. The time needed for editing these materials would be much longer than we planned. Thus, we decided to reduce the number of local field shooting but spend more time on the edition of this part. An increase number of student helpers are expected.

(4) One shooting of local geological features of an area may not be done in one day. It is because changing/bad weather and sea conditions could greatly affect the safety and the video quality. Thus, pre-trip study is needed to ensure the safety and back-up plan for the field shooting. Due to safety concern and more time for Taiwan materials editing, originally planned five local field shooting will be reduced to two local field shooting.

We have the following remaining tasks:

(1) Videos of on-site shooting of six geological sites in Hong Kong, which include Po Toi Island, Bluff Head, Tung Ping Chau, High Island, Hung Shek Mun and Ma Shi Chau are being further edited. They will be incorporated into the online course "Hong Kong Geology" to further enrich the contents. This online course could be applied and assist to other advanced courses like ESSC3100 and ESSC4120 in the future.
(2) To further edit Taiwan geological materials, incorporate them into an online course and use them to assist teaching in ESSC2120 (replacement of ESSC2110).
(3) Two local field shootings will be conducted to produce videos for enriching online course Hong Kong Geology. Pre-trip study may need to ensure safety;
(4) Further enrich the Rocks and Minerals Gallery.

We believe that with the adjustment of our strategies on these two micro-modules, the project completion on time can be guaranteed.

Provide a listing of project outputs to date.

As mentioned in the first part of this session, our completed work mainly include digital sample galleries, KEEP courses and geological field trips videos. The final products will be gradually integrated into our eLearning website:

https://sites.google.com/view/cuhk-essc-elearn

https://sites.google.com/view/cuhk-essc-elearn-gallery

https://sites.google.com/view/cuhk-essc-elearn-micrograph

https://sites.google.com/view/cuhk-essc-elearn-fieldtrip

https://edx.keep.edu.hk/courses/course-v1:CUHK+ESSC4120+2017_01/about

https://edx.keep.edu.hk/courses/course-v1:CUHK+ESSC1000+2017_01/about

3. Evaluation Plan

Have you altered your evaluation plans?

Does your evaluation indicate that you have achieved your objectives?

Our evaluation plans have NOT been altered. The newly produced eLearning micro-modules will be adopted in various courses, which mainly include ESSC1000, ESSC2010 and ESSC2120 (replacement of ESSC2110). After the practice, we will collect feedbacks from students as well as teachers. Because the courses ESSC2010 & ESSC2120 are not opened this semester, we will apply our products on next semester and conduct evaluation accordingly. In this semester, we've used our completed virtual geological field trips videos in ESSC1000. Students are required to watch the videos and finish the questions in the KEEP course before they joined the one-day trip to the Po Toi Island. A formal evaluation with carefully designed questionnaires will be conducted at a later time of the semester. Although the formal evaluation has not been done, based on some informal interview with students, a positive result could be expected.

4. Dissemination Activities (reports, websites, video links, products, *etc.*)

Provide a listing of dissemination activities to date.

(1) Our eLearning website as listed in the last part of session 2;
(2) A 10-minute talk to share our project outcomes during a sharing session with EdUHK and HKBU;
(3) Two abstracts submitted to EXPO 2017 to share our project outcomes and eLearning strategies;
(4) Annual report as part of the UGC-funded projects.