THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 2: Studies in Foundation Courses

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: Flipping the Classrooms of the Two Foundation Courses in GEF Programme using Whiteboard Animations
Principal supervisor: Dr. Li Ming Kenneth
Co-supervisor(s): Dr. Lai Chi Wai Kevin, Dr. Szeto Wai Man and Dr. Wong Bon Wah Baldwin
Department / Unit: Office of University General Education
Project duration: From December 2017 to October 2018
Date report submitted: 31 October 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 objective of this project is to develop three new micro-modules with four short whiteboard animations to flip the classrooms of UGFN1000 In Dialogue with Nature (UGFN) and UGFH1000 In Dialogue with Humanity (UGFH). Another objective of this project is to produce a handbook of whiteboard animation production. The project is on track to meet these objectives.

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?

Three micro-modules, namely "Greek Philosophy", "History behind Bible", and "Newtonian Worldview", consist of four short animations were developed in this project:

Micro-module "Greek Philosophy" for UGFN and UGFH

- Animation: What is Platonic Form?
  (Cantonese: 5 min 39 sec; English: 6 min 10 sec)

Micro-module "History behind Bible" for UGFH

- Animation: Jesus and Paul in History
  (Cantonese: 5 min 47 sec; English: 6 min 31 sec)

Micro-module "Newtonian Worldview" for UGFN

- Animation: How did Newton do a deductive demonstration?
  (Cantonese: 5 min 24 sec; English: 6 min 6 sec)
- Animation: How did Newton discover the law of universal gravitation?
  (Cantonese: 6 min 10 sec; English: 6 min 40 sec)

An electronic handbook for whiteboard animation production was produced (49 pages): https://gocuhk-my.sharepoint.com/:b:/g/personal/liming_cuhk_edu_hk/EULb-WvKg1VBviRgS70PCnIBv2tI3EIqmmJ7hTOWImBJkQ?e=BfhZep

In general, the project was completed satisfactorily. The nature of deliverables and the timeline of this project have not been adjusted.

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?

Our evaluation plan was not altered. It consists of two surveys.

Survey 1:

There were quiz surveys conducted before concerned tutorial classes. It aimed to evaluate the effectiveness of the whiteboard animations on equipping students with the prerequisite knowledge before tutorials. Students were asked to answer two multiple-choice questions for each animation. These questions tested whether students understand the prerequisite knowledge covered in the animations. In general, students who watched the animations performed much better than those who did not watch (Table 1). The data suggested that the animations are effective to equip students with the prerequisite knowledge for discussion before tutorials.

Table 1 Students' performance in quizzes in Survey 1. The figures are in percentage.

	Platonic form		Jesus and Paul		Newton: deduction		Newton: gravitation	
	Watched	Not	Watched	Not	Watched	Not	Watched	Not
Both Q correct	54.1	15.3	67.6	16.7	20.1	7.1	57.4	15.6
Either Q correct	36.6	38.0	29.4	25.0	53.5	31.0	31.1	39.3
None Q correct	9.3	46.7	2.9	58.3	26.4	61.9	11.5	45.1

Survey 2:

This was a questionnaire survey conducted after students had completed all modules of the course. It aimed to assess to what extent the animations have improved students' preparation for the tutorial discussion and enhanced their motivation for studying the courses. Data from 379 respondents were used in the analysis. The results showed that 64-95% of the students watched the animations (Table 2). Survey 2 also showed that 53% students watched all animations, 32% watched at least one of the four animations, and only 15% of them did not watch any animation.

Table 2 The rate of watching the four animations.

Animation	Platonic form	Jesus and Paul	Newton: deduction	Newton: gravitation
No. of student	379	104	275	275
Watched (%)	69.1	95.2	69.8	64.4
Not (%)	30.9	4.8	30.2	35.6

Our data showed that 87% students agreed (slightly agreed, agreed, and strongly agreed) whiteboard animation is more appealing than lecture recording and 91% students agreed the animations raise their interest in the discussed topic (Table 3). About 95% students agreed that the animations are helpful for their understanding of the texts, clarifying the concepts and providing the prerequisite knowledge before tutorial classes (Table 3). There were 89% students thought these animations are helpful for the discussion during tutorials and 83% students agreed they are helpful in reflecting on topics related to multiple texts (Table 3). About 93% students thought the level of difficulty of these animations is appropriate (Table 3). In general, a total of 94% students were satisfied with the animations. All these encouraging results indicated that the whiteboard animations had improved students'

Table 3 Feedback of the whiteboard animations in the questionnaire survey from 324 students who watched the animations.

	Strongly disagree <--> Strongly agree					
	1	2	3	4	5	6
Compared to video lecture, whiteboard animations are more appealing	0.9	2.2	8.3	35.2	38.9	14.5
The animations make me more interested in the topic	0.9	1.5	6.8	38.3	39.8	12.7
The animations help me understand the text	0.6	0.3	2.8	26.2	50.9	19.1
The animations help clarify relevant concepts	0.3	0.0	2.8	27.2	51.5	17.0
The animations help me understand the prerequisite knowledge before going to tutorials	0.6	0.3	4.0	32.4	45.4	16.7
The animations help me in the discussions during tutorials	0.6	1.2	8.3	37.0	38.9	13.0
The animations help me reflect on topics related to multiple texts	0.6	3.4	13.0	40.1	31.5	11.4
The animations are of the right level of difficulty	0.3	0.6	6.2	30.2	48.1	14.5
I am satisfied with the animations overall	0.6	0.3	1.9	21.6	56.2	15.7

A 6-point Likert- scale is used to indicate the degree of agreement on the statements. (1: strongly disagree; 2: disagree; 3: slightly disagree; 4: slightly agree; 5: agree; 6: strongly agree). The figures are in percentage.

preparation for the tutorial discussion and enhanced their motivation for studying the course.

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 two micro-modules were used in the five classes of the four project members (500 students) in the first semester in 2018-19. Some of the animations in this project were reported in the newsletter *OGE news* (http://cu-genews.com/2018/10/08/a-animations-apps/) published by the Office of University General Education. These micro-modules are now available on YouTube, and they will be used in all the classes of UGFN and UGFH (3800 students per semester) starting from the second semester in 2018-19. The technical skills for whiteboard animation production will be adopted to produce whiteboard animations on other topics to further enhance teaching and learning of UGFN and UGFH in the future. The animation production manual is available upon request. We will present the findings in this project at the 2018 Institute on General Education cum Teacher and Student Conference, and the Teaching and Learning Innovation Expo in Dec 2018.

PART II
Financial data

Funds available:

Funds awarded from MMCDG $ 84,750
Funds secured from other sources $ 0
(please specify_____)

Total: $ 84,750

Expenditure:

Item	Budget as per application	Expenditure	Balance
Artwork by freelance artist (for one 5-min whiteboard animation)	40,000	40,000	0
Voice-over by professional voice artists (for voice-over production, 4 animations,	16,000	9,599	6,401

in 2 languages)			
Graphics, background music libraries, books and other production resources	3,000	8,879.62	-5,879.62
Editing fee (handbook and other publications)	20,000	9,480	10,520
Student helpers (for post-production, handbook, and other assistance)	5,750	13,975.5	-8,225.5
Total:	84,750	81,934.12	2,815.88

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?*

The feedback from this and the previous two MMCDG projects about our whiteboard animations are very encouraging. We will present the findings from the surveys and publish the findings in conferences and papers. After that, we will continue producing more whiteboard animations for flipped classrooms in UGFN and UGFH.

There are several key successful factors. First, the animation should be student-centered and tailor-made. It is important to identify accurately the prerequisite knowledge for students to have an in-depth discussion, and identify their common misconceptions. The length of the animations should be short enough. It is very challenging to integrate all the contents in a five-minute storyline. Balancing the coverage, depth, precision, accuracy, and level of difficulty remains a difficult task. Also, interesting and friendly illustrations and graphics design are the keys. A freelance artist familiar with the project is very important. Hiring freelance voice-artists is very cost-effective for voice-over production. The post-production works are time-consuming. Student helpers for doing the post-production work need to be trained. The production manual developed in this project can serve as a good instruction document to train future student helpers.

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: Whiteboard Animation

Keyword 2: Flipped Classroom

Keyword 3: In Dialogue with Nature

Keyword 4: In Dialogue with Humanity

(Least relevant) Keyword 5: General Education Foundation Programme

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.

(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.

Micro-module "Greek Philosophy" for UGFN and UGFH

- Animation: What is Platonic Form?
  - Cantonese: https://youtu.be/KsxnN9HHjF8
  - English: https://youtu.be/RNSmP6-YUaI

Micro-module "History behind Bible" for UGFH

- Animation: Jesus and Paul in History
  - Cantonese: https://youtu.be/zHWjXb-OhGA
  - English: https://youtu.be/9yWKDqWlMN8

Micro-module "Newtonian Worldview" for UGFN

- Animation: How did Newton do a deductive demonstration?
  - Cantonese: https://youtu.be/VqQn6hPHSI4
  - English: https://youtu.be/M4MU2cW5R0Y
- Animation: How did Newton discover the law of universal gravitation?
  - Cantonese: https://youtu.be/p_PCVGv0bZU
  - English: https://youtu.be/lOLeQptB1qY

(c) **Tools / Services:**

If you have used any tools or services for the project, please provide names of the tools or services in here.

The illustrations and graphics were designed by the team members and a freelance artist using Adobe® Creative Cloud™. Whiteboard animations were created using Sparkol VideoScribe. Some background music was purchased from AudioBlocks.com. The animations were edited with CyberLink PowerDirector13.

(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.

Three micro-modules were developed to flip the classroom of UGFN and UGFH by using four short whiteboard animations. Students were encouraged to watch the whiteboard animations to acquire the prerequisite knowledge and clarify conceptions before attending tutorial classes. Hence, more time could be spent for an in-depth discussion of the cross-text central issues in the interactive tutorial classes.

(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**
UGFN1000 classes L, P, W and Z	1nd term 2018-19, year 1 and 2 students	375	YouTube
UGFH1000 class B	1nd term 2018-19, year 1 and 2 students	125	YouTube

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)	*0*
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	*0*

(c) In CUHK ExPo jointly organized by CLEAR and ITSC	*1 (Dec 2018)*
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	*1 (Dec 2018)*
(e) In international conference	*0*
(f) Others (please specify)	*0*

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	*0*
(b) Project leaflet	0
(c) Project booklet	*0*
(d) A section/chapter in a booklet/ book distributed to a limited group of audience	*1*
(e) Conference proceeding	*0*
(f) A chapter in a book accessible internationally	*0*
(g) A paper in a referred journal	*0*
(h) Others (please specify) Short whiteboard animations published on YouTube	*8*

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.

UGFN1000 In Dialogue with Nature and UGFH1000 In Dialogue with Humanity are the two foundation courses for all undergraduates in CUHK. Students are required to read the core texts before attending interactive tutorials to discuss some enduring questions about nature and humanity. In our experience, students are interested in reflecting on these questions. However, many of them find it difficult to have an in-depth discussion. This is mainly because they lack the prerequisite knowledge beyond the texts; they misunderstand the concepts; or they have an inadequate comprehension of abstract ideas and are unable to connect different texts.

In view of this, we have developed three micro-modules in this project to provide eLearning supplements for better learning and teaching. The micro-module "Greek Philosophy" consists of the animation "What is Platonic Form?", and was developed for UGFN and UGFH. The micro-module "History behind Bible" consisting the animation "Jesus and Paul in History" was developed for UGFH. The micro-module "Newtonian Worldview" was developed for UGFN. It consists of the animations "How did Newton do a deductive demonstration?" and "How did Newton discover the law of universal gravitation?"

These animations have been tailor-made to explain essential knowledge and to clarify misconceptions that might arise. Instead of conventional video recordings of short lectures, whiteboard animations have been created to enrich the students' learning experience. These consist of step-by-step illustrations with voiceover narrations to explain complicated and abstract ideas in an attractive and enjoyable way. The micro-modules are available online for students' self-paced learning. In this project, we have also developed a whiteboard animation production manual to provide instructions for making whiteboard animations.

The micro-modules were used in the five UGFN and UGFH classes of the project members, which have 500 students, in the first term of the 2018-19 academic year. The effectiveness of the micro-modules was assessed by quiz and questionnaire surveys. According to the questionnaire survey, over 88% students agreed that whiteboard animations are more appealing than lecture recording and whiteboard animations raised students' interest in the tutorial discussion. The quiz survey suggested that the animations are effective to equip students with the prerequisite knowledge before tutorial classes. This aligned with the questionnaire survey that over 94% students agreed the animations are helpful for their understanding of the texts, clarifying concepts and gaining knowledge before tutorials. In general, about 94% students were satisfied with these animations. The results are encouraging.

The micro-modules will be full-launched for use in all UGFN and UGFH classes starting from the second term of the 2018-19 academic year. Approximately 3800 students per term will be benefited from the micro-modules. In order to further enhance the teaching and learning of UGFN and UGFH, more micro-modules with whiteboard animations will be developed in the future. At last, we would like to thank the IT Governance Committee for the generous financial support. We would also like to thank Office of University General Education for its support.

Short video:
https://gocuhk-my.sharepoint.com/:v:/g/personal/liming_cuhk_edu_hk/ETAMpLYlp1tPvjUhZYZLQJgBTMIKlZ8hQ7z-K4RrQB-7PA?e=GTtx0g