

# THE CHINESE UNIVERSITY OF HONG KONG

## Micro-Module Courseware Development Grant

### Scheme 3: eLearning Pedagogy Research

#### Final Report (2016-17)

Report due 30 April 2018

Please return by email to The Ad hoc Committee on Planning of eLearning Infrastructure  
[mmcd@cuhk.edu.hk](mailto:mmcd@cuhk.edu.hk)

#### PART I

Project title: **Teaching Health Emergency& Disaster Risk Management Using Massive Open Online Course and Face-to-Face Classrooms: Building a Global Humanitarian Response Community**

Principal supervisor: Prof. Emily Ying Yang Chan

Co-supervisor(s): Ms. Gloria Kwong Wai Chan, Dr. Chunlan Guo, Mr. Chi Shing Wong, Mr. Sida Liu, Mr. Zhe Huang, Ms. Carman Ka Man Mark

Department / Unit: Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC)

Project duration: From May 2017 to April 2018

Date report submitted: 30 April 2018

#### **1. Project objectives**

The project has the following objectives, all of which have been met, and no change has been made throughout the investigation.

1. Explore the spatial and temporal pattern of student enrolment in a Massive Open Online Course (MOOC) and the degree to which socio-demographic variables can predict the course achievement.
2. Examine the pattern of student engagement (the amount of time a student was logged) in the MOOC and its association with the course outcome (the probability of certificate obtainment).
3. Understand students' different learning experience, course perceptions and outcomes between MOOC and face-to-face classroom.
4. Provide recommendations for future policy associated with eLearning development at the university level.

#### **2. Process, outcomes or deliverables**

## **Process**

### **(1) Ethics application**

Two ethics applications were submitted to the Survey and Behavioral Research Ethics Committee. The first was approved by the committee on 10 July 2017. The committee has granted permission to conduct surveys to collect first-hand data and video recording during the summer course. The second ethics approval was approved by the same committee on 17 August 2017. This submission was to seek ethics approval to use the retrospective data of the specific online course including the data collected at registration, Moodle Logs and student evaluation.

### **(2) Face-to-face classroom**

In this project, a face-to-face teaching was conducted. Summer course POPG 5006 Disaster and Humanitarian Crisis bearing 2 credits was run between 27 and 30 June 2017 with a majority of students studying in the Master of Public Health programme. The course comprised of 6 lectures, 3 tutorial sessions, 1 simulation exercise and 1 final examination. The lectures covered the topics of public health & humanitarian principles in disaster settings, disaster management system, management of natural disaster, management of man-made disaster & complex emergencies, preparedness, resilience and international policies in disaster settings and mental health issues relevant to disaster and humanitarian crisis. Students in this course were required to participate in pre- and post-course questionnaire surveys, and 22 valid samples were collected.

### **(3) eLearning**

The MOOC Public Health Principle in Disaster and Medical Humanitarian Response was launched in June 2014. It is a cohort-based course where students in each cohort were required to complete the course in a maximum of 7 months. As of August 2017 when the online follow-up survey was conducted, 5 cohorts had been completed and the 6<sup>th</sup> cohort was coming to an end. The online course consists of 7 lectures: public health approaches to medical disaster response, disaster concepts and trends, the impact of disaster, public health emergency preparedness, human health impact of disasters and 2 modules on responding to health needs in disaster. During the course, students are required to complete 4 quizzes and 1 examination. The average expected online contact hours for students is 14. In the follow-up survey, 392 valid samples were collected from participants who had completed the online course.

MOOC data collection was carried out two months earlier than the original timeline and 100 copies of a newly published eBooks *Public Health Humanitarian Responses to Natural Disasters* were added as incentives for the MOOC participants to have active participation in the follow-up survey.

## **Outcomes**

### **(1) Spatial and temporal pattern of student enrollment in MOOC and socio-demographic predictors of course completion.**

A total of 5,160 participants from more than 150 different countries registered in Cohorts 1 to 6 of the online course, and among them, 19.88% ultimately completed the course and obtained certificates over the 7-month cohort period. Hong Kong (1,279, 24.79%), United States (212, 4.11%), Nigeria (203, 3.93%), United Kingdom (192, 3.72%), the Philippines (189, 3.66%), Kenya (170, 3.30%), Pakistan (142, 2.75%), India (133, 2.58%), Ethiopia (138, 2.7%) and China (130, 2.52%) were the top 10 countries/areas where students of this MOOC course resided. Among the 10 areas mentioned above, China, India, USA, the Philippines, Nigeria and Pakistan are also in the list of top 10 countries with the highest number of reported disaster occurrence. Significant linear positive correlation was observed between the number of registered student and number of disaster occurrence among the countries. The first month of each cohort was the peak of new registrations. Males and students with healthcare qualifications were more likely to complete the course after adjusting for education level, occupation, disaster response experience and initial information source for the online course.

### **(2) Student engagement and its association with the course outcome**

The median hours spent on the course among all enrolled students was 0.77 hours but there was a large variability in time spent between those who completed the course and obtained their certificates (13.64 hours) and those who dropped out (0.23 hours). Males invested 13.28% more time than females. Healthcare professionals spent 29.7% more time than the others. Higher course engagement (in hours) had a significantly strong effect on course completion and obtaining certificates even after adjusting for gender, age and education level. The course design suggested students to spend 1-3 hours per lecture and this was confirmed to be within a reasonable range. The median hours spent on the course for the students who obtained the completion certificate is close to our median suggested course time (14 hours). In addition, spending about 14 hours in the course had a 70% to 80% chance to obtain the certificate according to our statistical model.

### **(3) Face-to-face teaching versus MOOC**

#### **a) Learning experience**

Both face-to-face teaching and MOOC participants had positive evaluation rating toward the amount of course workload, with MOOC participants indicating significantly higher score than face-to-face students. At the same time, a higher proportion of face-to-face students expressed that more tutor's support was required in the course than MOOC participants.

#### **b) Course perception**

Face-to-face teaching and MOOC participants shared the same perceptions towards the

advantages and disadvantages of the two different teaching modes, as indicated in the following table.

	Advantages	Disadvantage
Face-to-face teaching	More interaction and opportunity for in-depth of content	Fixed time schedule and location of study
MOOC	Flexible time schedule and location of study	Minimal interaction, fixed depth of content

#### c) Course outcomes

No significant difference was observed between face-to-face teaching and MOOC participants on the course outcome when binary options (i.e. yes and no) were used to measure course outcome achievement. When using a 6-point Likert scale from strongly disagree (1.00) to strongly agree (6.00), significant difference was found in understanding and identifying key health and medical implication in humanitarian setting (face-to-face versus online course: 3.89 versus 4.38), applying public health principles in disaster response and humanitarian settings (3.65 versus 4.38), and gaining an overview of the disaster management cycle and its respective planning in humanitarian settings (3.90 versus 4.34).

#### **(4) Recommendations for future policy associated with eLearning development**

Face-to-face classroom was still the preferred mode for studying the subject of health emergency and disaster response as reflected by both face-to-face teaching and MOOC participants (face-to-face: 47.2% vs online: 44.1%). However, the percentage of preferring face-to-face classroom among face-to-face course students (94.4%) was much higher than that among MOOC participants (46.7%). At the same time, a substantial number of MOOC students chose eLearning as their favorite mode of learning such subject (44.3%).

Moreover, MOOC participants provided many valuable suggestions on improving the online course. Application of multi-media, such as video, audio and webinar in the course, is expected to increase the effectiveness of the eLearning. More interaction via multiple functions such as discussion page, chat rooms and online interactive live section is anticipated to enhance the performance of students. Having the online course bearing credits, compared with the issuance of certificate with signatures of instructors and organizing institute, is also considered as a better means to enhance students' satisfaction of eLearning.

In addition, students suggest and prefer a combination of online and face-to-face for a more productive learning experience with better course outcomes. Especially for disaster management education, such type of blended learning is expected to provide a chance to do simulation of possible emergency scenarios. A short-term course is suggested to provide global eLearning participants an opportunity to attend the face-to-face classroom.

Overall, the project was completed satisfactorily.

### **3. Evaluation plan**

#### **(1) Online course**

In this project, 392 valid samples of follow-up survey were collected from the students who completed the online course. Among them, 96.3% agreed that this course lived up to their expectation and 87.3% were satisfied with this learning experience. Online course students gave high scores to the following evaluation statements: their subject knowledge was enhanced (5.32 out of 6.0), the assessment method was appropriate (5.11 out of 6.0), the amount of workload was appropriate (5.10 out of 6.0) and recommended readings were useful (5.19 out of 6.0). In this online course, the participants indicated that case study was the most favorite sections (46.4%) and most of them would recommend this course to their friends (5.44 out of 6.0).

#### **(2) Summer course with face-to-face teaching**

In this project, 22 valid samples of face-to-face teaching evaluation were collected from students in the summer course. All of them agreed that this course lived up to their expectation and 90.9% satisfied with the learning experience during the course. Summer course students gave high scores to the following evaluation statements: their subject knowledge was enhanced (5.2 out of 6.0), the assessment method was appropriate (5.0 out of 6.0) and recommended reading was useful (4.9 out of 6.0). However, the rating for the appropriate amount of workload was the lowest (4.5 out of 6.0) among the 10 aspects in learning experiences. In this summer course, students enjoyed the simulation exercise most (36.4%). Most of them would recommend this course to their friends (5.1 out of 6.0).

#### **(3) Research evaluation**

In addition to the online and summer course delivery and evaluation, this project has achieved the four research objectives via data collection and analysis, which is an important indicator for evaluating the success of this project. No change was made to the evaluation plans throughout the investigation. Please see the **Outcome** in Section 2 “Process and outcomes or deliverables” for the research findings and Section 4 “Dissemination, diffusion and impact” for research publications in details.

#### 4. Dissemination, diffusion and impact

##### Examples of dissemination

- (1) Guo C, Chan EYY, Huang Z, Chan GKW, Wong CS. Teaching Health Emergency and Disaster Risk Management (Health-EDRM) using Massive Open Online Course: building a global humanitarian response community. Paper presented at the 49th Asia-Pacific Academic Consortium for Public Health Conference; 2017 August 17-20; Incheon, Korea.
- (2) Chan EYY, Wong CS, Chan GKW, Huang Z. Teaching health emergency & disaster risk management using massive open online course and face-to-face classrooms: building a global humanitarian response community. Paper presented at Teaching and Learning Innovation Expo 2017; 2017 December 7; Hong Kong.
- (3) Tam G, Chan EYY, Liu S. A web-based course on public health principles in disaster and medical humanitarian response: survey among students and faculty. *JMIR Med Educ* 2018;4(1):e2. DOI: 10.2196/mededu.8495
- (4) A manuscript, entitled “Recruitment analysis of an MOOC about disaster management” (Tentative) is in a progress of submission to ‘Really Good Stuff’ section of Medical Education.
- (5) A manuscript, entitled “Students’ perception between traditional classroom and massive open online course: a case of Health Emergency and Disaster Risk Management (Health-EDRM) education” (tentative) is in a progress of submission to *JMIR Med Educ*
- (6) A manuscript, entitled “Teaching Health Emergency and Disaster Risk Management using Massive Open Online Course” (tentative) is in a progress of submission to *Lancet Global Health*

##### How the research results/outcomes/findings may support the University’s strategic aims in promoting eLearning

- (1) The project addressed the importance of developing eLearning, which is a strategic imperative of CUHK. The Collaborative Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC) Moodle site was launched on 8 May 2014 for students to register for the first online course PHPID. More than 6,000 students from over 150 countries have registered on the PHPID course as of

today with the course completion rate (measured in terms of the number of completion certificates issued) of around 20%. The project highlighted the advantages of MOOC by comparing the learning experience between online course participants and traditional face-to-face classroom students.

- (2) The project provided evidence-based recommendations for future policies associated with eLearning development at the university level. With the experience of running eight cohorts of the online course now and the analysis of the data of more than 4,000 participants, the research team is confident to provide recommendation for eLearning application and development, as detailed in the findings above, especially in the field of medicine and disaster response.
- (3) The project advised the direction of traditional face-to-face classroom teaching development. With a systematical comparison of learning experience, course perception, evaluation and outcomes between MOOC and traditional face-to-face classrooms, the research provided advices on the trend that the traditional face-to-face classrooms meet the challenge of blending 21<sup>st</sup> century information technologies into its current teaching.
- (4) The project enhanced the exposure of CUHK in eLearning through the international conference participations and journal paper publications.



PART II

Financial data

Funds available:

Funds awarded from MMCDG \$ 118,900

Funds secured from other sources \$ 0

(please specify \_\_\_\_\_)

Total: \$ 118,900

Expenditure:

Item	Budget as per application	Expenditure	Balance
Research assistant	55,900	59,133.93	(3,233.93)
Souvenirs	23,000	22,793.26	206.74
Publication fee	28,000	0	28,000
Conference	12,000	9,447.44	2,552.56
Total:	118,900	91,374.63	27,525.37

## PART III

### Lessons learnt from the project

#### **(1) Key success factors**

The course on health emergency and disaster risk reduction (Health-EDRM) was taught via face-to-face classroom as well as MOOC by the same research team, which provides an opportunity to compare the learning experience, course perception and course outcome between the two different groups of participants. The online course has been launched for more than three years. At the time of research, six cohorts have been completed, which enables the research team to have a comparatively large sample size (more than 4,000 registered, more than 900 completed) to grasp a general picture of the global eLearning.

#### **(2) Difficulties encountered and remedial actions taken**

Online course students' baseline knowledge and knowledge after intervention (i.e. studying the course) has not been assessed in this project. The comparison of baseline and post-intervention knowledge could contribute to evaluating the effectiveness of teaching health emergency and disaster risk management through eLearning platform. Moreover, a feedback of non-completers is valuable to improve the online course structure and increase participants' involvement.

#### **(3) The role of other units in providing support**

ITSC, as the university unit dedicated to IT development and support, should be funded to provide professional production services to translate the teaching content provided by teaching units into eLearning modules to facilitate more efficient implementation of the eLearning strategy of the university.

#### **(4) Suggestions to CUHK on eLearning**

First, a possible combination of online and face-to-face teaching and learning could create a more productive learning experience with better course outcomes. Second, application of multiple teaching tools, such as video, audio and webinar, is expected to increase the effectiveness of the eLearning. Third, more interaction via multiple online functions such as discussion pages, chat rooms and online interactive live sections is likely to enable students to achieve higher performance.

## 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: health emergency and disaster risk management (Health-EDRM)

Keyword 2: massive open online course (MOOC)

Keyword 3: face-to-face teaching

Keyword 4: comparison of pedagogies

(Least relevant)      Keyword 5: eLearning policy recommendation

#### **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:** <https://phpidccouc.conted.ox.ac.uk/>

*If a publicly accessible project website has been constructed, please provide the URL.*

(b) **Webpage(s):**

<http://ccouc.org/public-health-principles-in-disaster-and-medical-humanitarian-response-2>

*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) in here.*

(c) **Tools / Services:** MYCUFORM, Moodle

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

(d) **Pedagogical Uses:** Face-to-face teaching, MOOC (a kind of flipped classroom activity which can support face-to-face teaching by provide students with basic knowledge before a face-to-face lesson)

*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.*

**Table 2: Resource 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 &amp; Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
POPG5006	Summer term 2017	20	Blackboard

**Table 3: Presentation (if any)**

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

	<b>Number</b>
(a) In workshop/retreat within your unit (e.g. department, faculty)	1
(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  Chan EYY, Wong CS, Chan GKW, Huang Z. Teaching health emergency & disaster risk management using massive open online course and face-to-face classrooms: building a global humanitarian response community. Paper presented at Teaching and Learning Innovation Expo 2017; 2017 December 7; Hong Kong.	1
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	0
(e) In international conference  Guo C, Chan EYY, Huang Z, Chan GKW, Wong CS. Teaching Health Emergency and Disaster Risk Management (Health-EDRM) using Massive Open Online Course: building a global humanitarian response community. Paper presented at the 49th Asia-Pacific Academic Consortium for Public Health Conference; 2017 August 17-20; Incheon, Korea.	1
(f) Others (please specify)	0

**Table 4: Publication (if any)**

*Please classify each piece of publications into one and only one of the following categories*

	<b>Number</b>
(a) Project CD/DVD	1
(b) Project leaflet	0

(c) Project booklet	0
(d) A section/chapter in a booklet/ book distributed to a limited group of audience	0
(e) Conference proceeding	2
(f) A chapter in a book accessible internationally	0
(g) A paper in a referred journal	1
(h) Others (please specify) Three journal papers are in the progress of submission	3

### 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.*

#### **Background**

The research team teaches health emergency and disaster risk management (Health-EDRM) through a summer course “Disaster and Humanitarian Crisis” for postgraduate-level students with face-to-face classroom in The Chinese University of Hong Kong, as well as through a Massive Open Online Course (MOOC) “Public Health Principles in Disaster and Medical Humanitarian Response” via the Moodle platform.

#### **Objectives**

This project aims to i) explore the spatial and temporal pattern of student enrolment in the MOOC and the degree to which socio-demographic variables can predict the course achievement; ii) examine the pattern of student engagement (the amount of time a student was logged) in the MOOC and its association with the course outcome (the probability of certificate obtainment); iii) understand students’ different learning experience, course perceptions and outcomes between MOOC and face-to-face classroom; and iv) provide recommendations for future policy associated with eLearning development at the university level.

#### **Design and subjects**

Two sets of data were collected: MOOC student data (registration, Moodle log, evaluation and a follow-up survey) and summer course student data (pre-course and post-course surveys). Ethics approvals were sought from Survey and Behavioral Research Ethic

Committee, The Chinese University of Hong Kong (issued on 10 July and 17 August 2017). Consents were sought from each participant before survey. Description, chi-squared test, multiple logistic regressions, coding and visualization were conducted using SPSS, R and ArcGIS.

## **Findings**

This project collected retrospective data of 5,160 MOOC participants from cohorts 1 to 6 of the online course. They were from more than 150 different countries and 19.88% ultimately completed the course. Six out of the top 10 reported countries of origins of students were among the seven countries with the highest number of disaster occurrences. Males and students with healthcare qualifications were more likely to complete the course. Time spent on the course was directly associated with the probability of course completion even after adjustment for gender, age and education level.

Moreover, 22 samples of summer course and 392 samples of MOOC participants via follow-up survey were newly collected during June to August 2017. No significant difference was observed on the course outcome achievement between face-to-face teaching and MOOC participants when binary options (yes and no) were adopted in measurements. In general, Face-to-face classroom was still the most preferred method among both summer course and online course participants. Time management and location of study were reported as the two advantages of online course, while level of interaction and depth of content were the advantages of face-to-face teaching.

## **Conclusion**

This project provides insights for teaching health emergency and disaster risk management (Health-EDRM) by using face-to-face and eLearning platforms. Use of multiple tools (e.g. webinars, videos and audios) and more discussion platforms could transfer and deliver the knowledge better and build a wider learning community. A combination of the advantages of face-to-face and online teaching is suggested as a direction when delivering both face-to-face and online courses. This research also provides evidence to support classroom improvement and future eLearning development strategy and policy in the university.