

# THE CHINESE UNIVERSITY OF HONG KONG

## Micro-Module Courseware Development Grant

### Scheme 3: eLearning Pedagogy Research

#### Final Report (2015-16)

Report due 31 July 2017

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:** Evaluation of the Effectiveness Of e-Learning Modules in the Bioethics Curriculum in MBChB Programme: Knowledge Enhancement and Long-Term Impact in Clinical Practice

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**Co-supervisor(s):** Prof. Shekhar KUMTA, Prof. H K NG, Prof. Robert KLITZMAN, Prof. Katrina TSANG, and Ms. Stephanie HOLMQUIST

**Department / Unit:** JC School of Public Health and Primary Care / CUHK Centre for Bioethics

**Project duration:** From February 2016 to May 2017

**Date report submitted:** 31 July 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?*

*Has the project created any impact as expected?*

The goal of the study was to evaluate the blended e-learning course of CUHK-Columbia bioethics. The specific objectives are: (1) to finalise the assessment tool for evaluating the effectiveness of the blended e-learning bioethics curriculum and to pilot test it for refinement and validation; (2) to quantitatively evaluate the learning outcomes of the blended bioethics curriculum among the first cohort of Year 1 MBChB students in 2016 using the measures; and (3) to qualitatively evaluate the process of learning and its outcomes and explore difficulties and challenges in blending e-learning and traditional classroom teaching methods in bioethics curriculum.

During the implementation, the project extension was required as the bioethics course was offered for two terms, from the fall till spring term. Officially, the project ended on 31 May 2017. At the end of the project, the completion of the project has met the study objectives.

We have developed the evaluation assessment instruments based on the in-depth systematic review on the literature of bioethics education. The assessments were reviewed by co-investigators and experts. We conducted a pilot study with a small group of students to examine the psychometric properties of the measures in terms of content, construct validity and reliability). We used the finalized survey questionnaire and conducted an evaluation survey before and after the course to evaluate the effectiveness of the course in terms of changes of attitudes among students. We also conducted four focus groups with 12 students in March 2017 after the course to explore their experience and views with the e-learning and face-to-face in-class tutorial and discussion activities.

## **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 in here.*

*Have the research design, methodology and timeline been changed/adjusted?*

*Overall, was the project completed satisfactorily?*

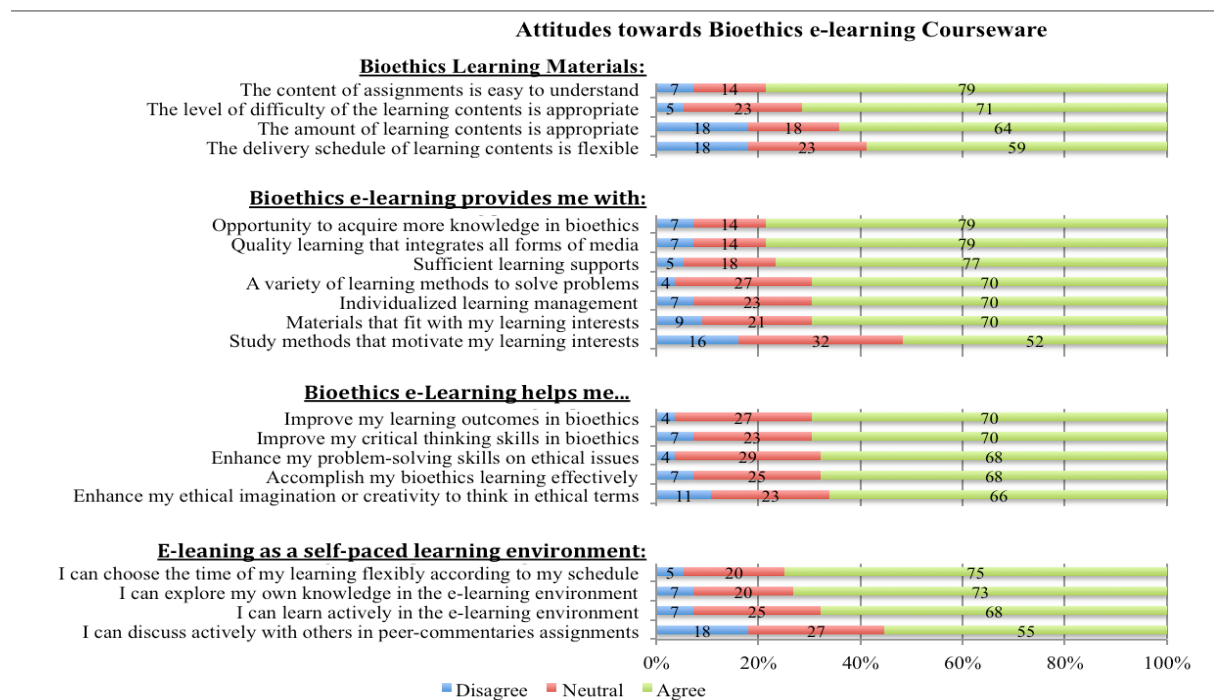
**Blended e-Learning Course.** While conducting this evaluation study, the faculty members at Columbia University and CUHK developed the materials for the blended e-learning course materials and in-classroom tutorials. Each module consists of case-based discussion in the context of local and global biomedical science and medical practice. The courseware consists of seven modules, where each module of the course spans two weeks, consisting of various pedagogical methods including asynchronous e-learning and online group discussion (week 1) and in-class lecture and group discussion (week 2).

- Week 1: reading → online lesson by Columbia faculty → online discussion among students facilitated by CUHK and Columbia tutors → selected students' online post of response to the case of ethical dilemma presented → all students' online reaction commentary to the written response
- Week 2: Students attend the class additional short lectures of reviewing online lecture and current news of bioethics issues delivered by the lecturer and group discussion by tutors, who are lecturers and/or previously taught bioethics at CUHK. In addition to reading and lecture, collaborative learning among classmates is emphasised.

Sample courseware video could be found on the link of: <https://youtu.be/825WmWWtiVc>. The courseware was successfully delivered in the academic year of 2015-16.

**Evaluation Survey.** At the end of the course, we conducted the evaluation survey including measures of assessing attitudes towards the courseware among 56 students enrolled in the class. The measures were reliable in the sample (Cronbach alpha=.97). About half (46%) were males; 64% were Year 1 students; and 77% had not taken any class related to Bioethics prior to the course. Figure 1 shows the respondent students' attitude towards bioethics e-learning courseware. The majority found the content of e-learning content was easy to understand (79%), and the quality was appropriate (64%). Over 70% students found bioethics e-learning courseware helpful in acquiring more knowledge in bioethics (79%) and supportive in online learning (77%). The courseware helped improve critical thinking (70%) and problem-solving skills (68%). Importantly the students valued flexibility account of integrating e-learning platform in the schedule (75%) and exploring knowledge initiatively (73%). About 20% students found it difficult to discuss the assignment with peers actively.

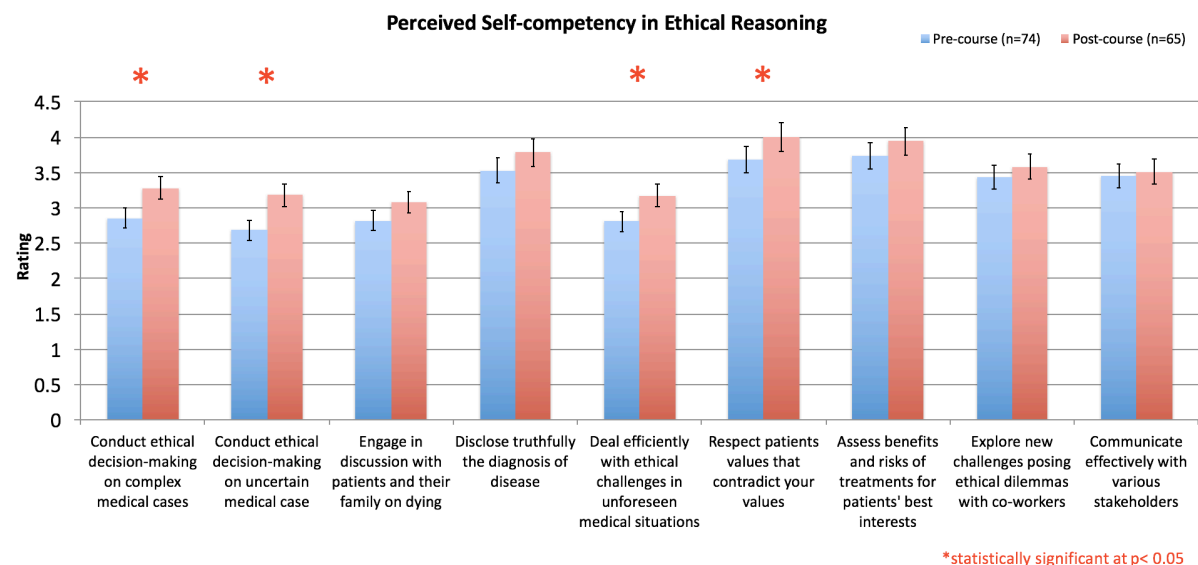
**Figure 1. Attitudes towards Bioethics e-Learning Courseware**



**Comparison of Perceived Self-Efficacy in Ethical Reasoning Before and After Course.**

We examined whether students enhanced their self-efficacy of ethical reasoning through the course. Figure 2. Shows the changes of the perception. Overall there was increase in self-efficacy in ethical reasoning among students after completion of the course. The following four domains were found to be statistically significantly increased.

1. Conduct ethical decision-making on complex medical cases
2. Conduct ethical decision-making on uncertain medical cases
3. Deal efficiently with ethical challenges in unforeseen medical situations
4. Respect patients’ values that contract your values



**Focus Group Evaluation.** Preliminary findings helped inform the development of sample questions for focus group. Table 1 below shows sample questions in exploring unmet needs of courseware that assist students in learning Bioethics.

**Table 1 Sample Questions for Focus Group Evaluation**

- 
- What do you think of the course? (Probe: in-person teaching; e-learning courseware)
  - Have you encountered any difficulties in using the courseware?
  - Did the courseware provide you sufficient learning material to complete the assignment?
  - In addition to the courseware, where do you get new information?
  - How do you find the learning experience incorporating e-Learning courseware in addition to in-person lecture?
  - What, if any, impact has the use of information technology had on your self-learning? (Probe: Motivated? Engaging? Helpful?)
  - How did you feel about the course to the extent enhancing your interest in bioethics?
  - What suggestions would you like to give to improve your learning experience make the courseware better?
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After the end of the course in March, we invited year 1 and 2 students to the focus group evaluation. In the informed consent of study information, we stated that the focus group will be facilitated by an independent researcher who has no relationship with the course and their participation will not affect their academic performance and grade. A total of 12 students participated in the focus group evaluation, which was facilitated by a journalist, who graduated from school of public health and journalism at CUHK.

### 3. Evaluation Plan

*Have you altered your evaluation plans?*

*Does your evaluation indicate that you have achieved your objectives?*

There was neither alteration of evaluation plan and changes of the study objectives. As noted earlier, due to change of class schedules, the project period had to be extended. We identified three themes in regard to the Bioethics teaching and learning. Table below presents samples quotes in relation to the theme.

<b>Theme 1: Barriers to the application of blended learning in bioethics</b>	
<b>Sub-theme</b>	<b>Sample quotes:</b>
Duplication of online and in-class learning materials	But I think the most important thing is that the atmosphere of discussion is not that good. Some students said that the online materials have been discussed before and we have to discuss the same topic again during class. They think it is duplicated and cumbersome. They do not want to speak out and talk about this topic. (F1, FG2)
Barriers to class engagement	Students knowledge to the topics are not on the same page as some students did not do the readings
Time gap between lecture and tutorials	Online materials are made available 2 weeks prior to the face-to-face lectures and students are required to completed the assignment a week beforehand. Students however see the time as a disadvantage in the teaching methods since knowledge retention of online materials is low. (FG1)

<b>Theme 2: Teaching ethics in young medical students, who were educated in science and engineering track in high school</b>	
Career Relevance	<p>I think you can delete some of the content, especially the part about research. I believe that most of the students may not do research in their future career. It may not be that relevant to the students. (M2, FG2)</p> <p>Some topics is not too relevant to real life curriculum and some topics has been covered by high school liberal studies curriculum, like health care system, tobacco control those have been mentioned. Then...I think maybe we can have some more news related issues, for example, more on current affairs, on the ‘medical council reform’, artificial intelligence, the interactions now between technology and medicine; These will be more appealing. (F3, FG4)</p> <p>I think for the research part and it is mentioned that how to handle the epidemics in some lessons, I think they are not that applicable. (F1, FG2)</p>
Hard to conceptualize the core idea of bioethics when the case is hypothetical	<p>But I think the cases are not that common in the real life. Even for the case about heart transplant, I think there is some mechanisms in Hong Kong that decide who can receive the heart first. You cannot say that it is useless and you cannot see the cases in real life. But sometimes the questions may be hypothetical. Therefore, I think it is difficult to see them in the real life. (M3, FG2)</p>
<b>Theme 3: Teaching bioethics using e-learning blended curriculum where lectures are given online by experts, followed by in-class discussion led by lecturers who were first exposed to bioethics</b>	
Want clear explanation	<p>Bioethics is a mysterious course. I think it is not enough for me. Not much guidelines were provided. And most of the problems remain in a way of question without clear answers. There is no provided but rather a new consideration point for you. When the problems come, you still consider it as a problem. You will never think you are confident enough to solve the problem even after finishing this course. (F1, FG3)</p> <p>Bioethics is a mysterious course. Sometimes I do think we are answering questions even now. When we start up a case discussion, it becomes like the Liberal Studies class, we will automatically think according to the 4 principles, what are the good points and bad points under this principle... It is somehow like answering questions. (F1, FG3)</p>

#### **4. Dissemination, diffusion and impact**

*Please provide examples of dissemination: website, presentations in workshops or conferences, or publications. Please provide examples of impact: how the research results/outcomes/findings can be extended to other disciplines. Please describe how the research results/outcomes/findings may support the University’s strategic aims in promoting eLearning.*

Two presentations on the blended e-learning course of bioethics were given at international bioethics conferences. We enclosed the posters in this report.

- We gave a poster presentation about the conceptual framework of our evaluations study at the 13th World Congress of Bioethics, held by the International Association of Bioethics on June 2016 Edinburgh, United Kingdom (see Figure 2). The presentation was entitled as “Blended e-Learning Bioethics Curriculum in Undergraduate Medicine in Hong Kong: Pedagogical Considerations and Challenges.”
- Preliminary results of evaluations study were also presented at the 13<sup>th</sup> Annual International Conference on Clinical Ethics Consultation, held by the National University of Singapore. The presentation was entitled as “Hong Kong Undergraduate (MBChB) Medical Students’ Experience and Views of Learning Bioethics: A Mixed-Methods Evaluation Study

Given the high value of this study of evaluation of bioethics teaching in the field of bioethics, medical education, and e-learning, we are currently writing a manuscript to publish the study findings in high-impact journals in the relevant disciplines.

## PART II

### Financial data

Funds available:

Funds awarded from MMCDG	\$ 132,600
Funds secured from other sources (please specify _____)	\$ 0
Total:	\$ 132,600

Expenditure:

Item	Budget	Expenditure	Balance
TA (Tutor)	\$ 39,200	\$ 39,200	\$0
Focus Group		\$12,196.4	
Student helpers		\$18965.75	
Computer Software and Hardware	\$9,800	\$13014.32	\$0
Travels for conference presentation	\$36,000	\$23,721.57	
Publication cost	\$5,000	0	\$5,000
<b>Total</b>	<b>\$132,600</b>	<b>(\$107,098.04)</b>	<b>\$25,502.96</b>

## 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?*

This study involved a joint effort of experts from CUHK and Columbia University for the development of bioethics curriculum that embeds a hybrid global-local perspective reflecting CUHK's bi-cultural and global orientation. This project successfully opened a new channel for introduction and application of evidence-based e-learning evaluation research at CUHK, with the help of internationally renowned scholars in the field.

One of the main challenges in the development of e-learning course was to identify and develop local materials addressing bio-medical ethics issues. We found that students were more motivated to learn when the learning materials are based on the issues from Hong Kong and mainland China. The development of the materials is dependent upon the teaching capacity in the university. Currently, there is only one teacher for the course, who visit CUHK from the US. There is no permanent staff in the Faculty. This challenge would be hardly overcome without the faculty's commitment for bioethics education.

The project outcome assessed pre-clinical year medical student's readiness in the e-learning adoption and unmet needs of the implementation of blended learning, which in line with the university strategic aims to develop, improve, and promote e-learning and students. The findings support the evidence of effectiveness in increase of knowledge and self-efficacy. Although this short-term effect is promising, further research is needs to examine long-term effects of knowledge retention and changes of ethical reasoning in bioethics during clinical years of 4-6 and internship years.

## 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: Bioethics                |
|                  | Keyword 2: Medical Ethics Education |
|                  | Keyword 3: Blended learning         |
|                  | Keyword 4: MBChB Programme          |
| (Least relevant) | Keyword 5: Hong Kong                |

## 2. Summary

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

<b>Table 1: Publicly accessible online resources (if any)</b>
<p><b>(a) Project website:</b></p> <p><i>If a publicly accessible project website has been constructed, please provide the URL.</i></p>
<p><b>(b) Webpage(s):</b></p> <p><i>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.</i></p>
<p><b>(c) Tools / Services:</b></p> <p><i>If you have used any tools or services for the project, please provide names of the tools or services in here.</i></p>
<p><b>(d) Pedagogical Uses:</b></p> <p><i>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.</i></p>

<b>Table 2: Resource accessible to a target group of students (if any)</b>			
<i>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.</i>			
<u>Course Code/ Target Students</u>	<u>Term &amp; Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>MEDU1140</i>	<i>All 1<sup>st</sup> year students</i>	<i>~200</i>	<i>Canvas</i>
<i>MEDU2140</i>	<i>All 2<sup>nd</sup> year students</i>	<i>~200</i>	<i>Canvas</i>
<b>Table 3: Presentation (if any)</b>			<b>Number</b>
<i>Please classify each of the (oral/poster) presentations into one and only one of the following categories</i>			
<b>(a) In workshop/retreat within your unit (e.g. department, faculty)</b>			<i>0</i>
<b>(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)</b>			<i>0</i>
<b>(c) In CUHK ExPo jointly organized by CLEAR and ITSC</b>			<i>0</i>



(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)  <i>Holmquist, S. (2017, March). "Teaching Very Young Medical Students: Challenges and Obligations" Medical Education Conference, Hong Kong, CUHK. 10-11 March, 2017.</i>	<i>1</i>
(e) In international conference  <i>Yi, H., Holmquist, S. Ngan, O.M.Y, Ng, H.K, Kumta, S. (2016, Jun). "Blended e-Learning Bioethics Curriculum in Undergraduate Medicine (MBChB) Programme in Hong Kong: Pedagogical Considerations and Challenges". 13th World Congress of Bioethics, Edinburgh, UK. Jun 14-17, 2016.</i>	<i>1</i>
(f) Others (please specify)  <i>Yi, H., Ngan, O.M.Y, Holmquist, S., Ng, H.K. (2017, May). "Hong Kong Undergraduate (MBChB) Medical Students' Experience and Views of Learning Bioethics: A Mixed-Methods Evaluation Study". 13<sup>th</sup> Annual International Conference on Clinical Ethics, Singapore, Singapore. May 25-27, 2017</i>	<i>1</i>

<b>Table 4: Publication (if any)</b>	
<i>Please classify each piece of publications into one and only one of the following categories</i>	<b>Number</b>
(a) Project CD/DVD	<i>0</i>
(b) Project leaflet	<i>0</i>
(c) Project booklet	<i>0</i>
(d) A section/chapter in a booklet/ book distributed to a limited group of audience	<i>0</i>
(e) Conference proceeding	<i>0</i>
(f) A chapter in a book accessible internationally	<i>0</i>
(g) A paper in an referred journal	<i>0</i>
(h) Others (please specify)	<i>0</i>

### **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.*

Bioethics is a core curriculum in medical education whose primary goal is to enhance students' ability to care for patients and families, and their communities. Bioethics curriculum covers a wide range of ethical issues in biomedical sciences, clinical practices, medical professionalism, public health, and law and policy. With bioethics as a tool, students and clinicians are able to address ethical problems in everyday practice.

Quality bioethics education is challenging due to a lack of time in the medical curriculum, qualified teachers and coordinated scholarship across disciplines, and objective/validated assessment and evidence-based evaluation. All these barriers result in inconsistency and incoherency in teaching of normative accounts and value-driven bioethics. Bioethics is one of the disciplines requiring an innovative pedagogy to stimulate medical students' interest in learning and exercising moral reasoning.

The primary goals of this project are to develop a blended e-learning bioethics course and evaluate the course using pre- and post-course survey and focus group discussion. There is a paucity of evidence regarding its effectiveness of bioethics education and clearly defined evaluation. Few studies demonstrated the evaluative outcomes in terms of knowledge retention, attitude changes, and enhanced ethical competency. In line with the university aim of evidence-based e-learning, we propose to evaluate the effectiveness of the course and identify the suggestions for improvement.

This project developed materials for the e-learning and in-classroom tutorials. Each video lasts about 5-10 minutes and students are expected to watch the online video and do the readings before attending the in-classroom lecture, tutorial, and discussion. Topics covered common ethical challenges encountered in medicine and related to biomedical technologies. ranges of topics, including 1) biomedical principles, 2) medical ethics, 3) genetic disclosure, 4) care for the elderly, 5) public health, 6) resource allocation (organ donation) and 7) research ethics.

The study found students' positive attitudes towards bioethics e-learning courseware. The e-learning courseware helpful in acquiring more knowledge in bioethics, critical thinking and problem-solving skills. Students valued flexibility account of integrating e-learning platform in the schedule and exploring knowledge initiatively. Significant increases in self-efficacy of ethical reasoning were found. After taking the course, students reported that they were more confident in conducting decision-making. However, about 20% students found it difficult to discuss the assignment with peers actively. Focus group evaluations identified the factors that determine the quality of the e-learning, including duplication of learning materials, lack of clear explanation on ethical dilemmas, local relevance and career prospects.

The course provided students with active learning not only as adaptive, individually tailored to the level of students' knowledge but also collaborative via interactions among students utilizing IT technologies and classroom. Students had a unique opportunity to learn bioethics by interacting with internationally renowned bioethics teachers. Based on the findings from the focus group evaluation, the e-learning modules will be refined. In the curriculum of senior clinical years, we hope that students will apply knowledge learned in the pre-clinical years to analyse case studies in conjunction with the clinical modules.