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

PART I

Project title: Effectiveness of e-learning using micro-module for training of medical students on approach to patients with urological symptom – a pilot study
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Department / Unit Division of Urology, Department of Surgery
Project duration: From May 2017 to April 2018
Date report submitted:

1. Project objectives

Main Objectives:

- To compare the effectiveness of video-based micro-module, with traditional didactic lecture, for training on the approach in managing patients suffering from urological symptoms.

The following areas would be assessed:

- Knowledge acquisition by student after learning
- Self-confidence on patient assessment of the student
- Student's competence & professionalism on patient assessment
- Quality of information obtained by students
- Knowledge retains after learning

Is the project on track to meet its objectives? ***Yes***
Have the objectives been changed as a result of the experience of working on your MMCDG project? ***No***
Has the project created any impact as expected? ***Yes, based on the result, the use of micromodule could provide similar learning information as traditional didactic lecture and would be an approach to consider in medical training.***

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. 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)
Have the research design, methodology and timeline been changed/adjusted? ***No***
Overall, was the project completed satisfactorily? ***Yes***

In this project, besides a record of a traditional didactic lecture, two micromodules have been prepared:

1. Approach to patients with haematuria (Duration 4:30)
   This video mainly teach the students the proper approach to patients presented with haematuria, including history taking and physical examination. Also it provided information about the common causes of haematuria. Lastly, basic investigation and their interpretation was also introduced to students.

2. Approach to male patients with lower urinary tract symptoms (Duration 5:30)
   This video mainly teach the students the proper approach to male patients presented with lower urinary tract symptom (LUTS), including history taking and physical examination. Also it provided information about the classification of LUTS and common differential diagnosis, other than benign prostate hyperplasia. Lastly, basic investigation and their interpretation was also introduced to students.

These micromodule will be used in MED3210 (Junior Surgical Dressership) and MED4710 (Senior Surgical Dressership). The role of these modules are to provide basic clinical background to help the student to familiar with the clinical approach to these two most common urological symptoms. Therefore, during their junior or senior surgical dressership rotations. Since the teaching schedule is becoming more and more busy, therefore, these micromodule would help to provide basic information for students. Then the usual clinical time and lecture time would be used for more in-depth case discussion of the management of patients.

3. Evaluation Plan

Have you altered your evaluation plans? ***No***

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

We have completed the video preparation (both didactic and micromodules) in October. Then we started the recruitment of students to participate in the projects.

The clinical assessment started from 4th December 2017 till 22nd January 2018. The project was assessed as pre-planned:

Before watching of videos, students were asked to fill in a set of MCQ to assess their baseline knowledges and also self-rated about the level of knowledge on the topic (baseline self-assessment of confidence level).

Students would then be randomized into two groups

Group-1, Traditional didactic lecture – students would go through the recorded didactic lecture on male lower urinary tract symptom and haematuria.

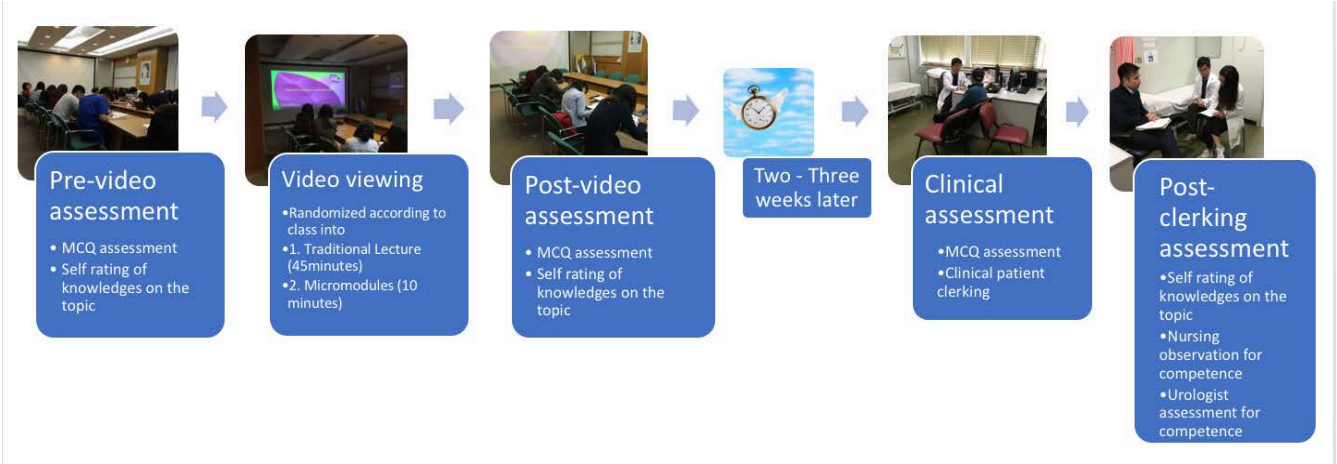
Group-2, E-learning, video-based micro-modules – students would be given the micro-modules on male lower urinary tract symptom and haematuria.

After the video-viewing, students were asked again to fill in the set of MCQ to assess their knowledges (Pre-/post- knowledge assessment) and also self-rating about the level of knowledge on the topic. (Pre-/post- confidence assessment).

Two to three weeks after video watching, the students were gathered in our outpatient clinic. They were asked to repeat the MCQ question again to test the knowledge retain after their learning.

The students were then asked to assess a patient with either lower urinary tract symptom or haematuria in our urology clinic, as part of their formal bedside teaching. A nurse, as a third-party assessor, was present as a chaperon during the patient assessment. After the patient assessment, the nurse would privately comment on the fluency and professionalism of the student during the clinical assessment, basing on a 10-points scale. The student would then present the case to a urologist, who would assess the information obtained by the student, basing on a standardized marking scheme. A separate impression mark would also be given by the urologist on the overall quality of the adequacy of the information obtained by the student in related to their patients. Both the nurses and urologists were blinded from the mode of learning the students gone through.

The results were then compared.



Our results were as follow:

Forty-five students were recruited for this study. Majority of the students were in final year (Medical Year 6) (Senior Surgical Dressership) and about 20% from Medical Year 4 (Junior Surgical Dresserships).

The two groups were basically similar in class distribution and also baseline knowledges before video-watching.

	Group 1 Lecture (n = 22)	**Group 2 Micromodules (n = 23)**	**P-value**
Baseline information			
Male	9 (40.9%)	11 (47.8%)	0.641
Year			1.000
4	4 (18.2%)	5 (21.7%)	
5	1 (4.5%)	1 (4.3%)	
6	17 (77.3%)	17 (73.9%)	
Pre-video MCQ (Maximum 75 marks)	50.18 (3.59)	51.13 (5.01)	0.471
Pre-video self-mark (in 10)	4.59 (1.18)	5.04 (1.64)	0.295

After video watching, there was also no difference between the post-video MCQ mark & self-rating (Pre-post knowledge comparision) , as well as the MCQ mark after 2-3 weeks (Knowledge retain). Moreover, using one-way MANCOVA, there was no statistically significant difference between the two modules on the combined dependent variables (post-video MCQ and clerk MCQ) after controlling for pre-video MCQ (Wilks' Lambda = 0.894, p = 0.101, partial Eta squared = 0.106).

	Group 1 Lecture (n = 22)	**Group 2 Micromodules (n = 23)**	**P-value**
Post-video MCQ (Maximum 75 marks)	57.32 (3.63)	55.91 (6.52)	0.375
Post-video self-mark (in 10)	5.59 (1.33)	6.22 (1.65)	0.170
Pre- patient Clerking MCQ (Maximum 75 marks)	54.45 (6.10)	52.22 (6.58)	0.244

During patients assessment, most of the students (about 75%) were assessing patients with LUTS, which the remain students assessed patients presented with haematuria. Again there was no significant difference observed between all the assessment, including self, nursing and urologist assessment for the two groups.

	Group 1 Lecture (n = 22)	**Group 2 Micromodules (n = 23)**	**P-value**
Patients assessed			1.000
LUTS	17 (77.3%)	18 (78.3%)	
Hematuria	5 (22.7%)	5 (21.7%)	
Nurse mark (in 10)	8.05 (0.72)	8.04 (0.71)	0.993
Clerk self-mark (in 10)	5.80 (0.83)	5.87 (1.14)	0.805
Urologist overall mark (in 15)	13.09 (1.59)	12.98 (1.75)	0.823
Urologist imp mark (in 10)	7.89 (0.91)	7.70 (0.91)	0.487

4. Dissemination, diffusion and impact

Please provide examples of dissemination: website, presentations in workshops or conferences, or publications. ***Full manuscript is under preparation.***
Please provide examples of impact: how the research results/outcomes/findings can be extended to other disciplines. ***We are planning to expand the use of e-learning to Medical year 4 & 6 teaching.***
Please describe how the research results/outcomes/findings may support the University's strategic aims in promoting eLearning. ***Our results support the initiation and promotion of elearning by the University as it provide similar outcomes as traditional teaching.***

From our study, the use of micromodules provide similar learning and assessment outcomes as traditional didactic lectures. As our assessment included multiple parameters, including both knowledge testing (MCQ), practical assessment (Clinical case clerking), self and third parties assessment (Urologist and nurse), the results were very convincing. These result support the direction to provide more e-learning / micro-modules in University teaching, including Medicine.

Currently, due to the increase in complexity of medical knowledge and training, more and more topics are added to the traditional curriculum of Medicine, including communication skill, ethical training, genetic etc. Therefore, the actual teaching time for clinical medicine has inevitably shortened. As a result, better utilization of these precious teaching time is important. The use of e-learning with combination of flip classroom are some of the possible approaches to resolve the tension in clinical teaching. By using e-learning / micromodules, basic knowledge will be provided to students before their clinical rotation / teaching. Then during the clinical teaching (original lecture / tutorial time) could be more focused on the application / practical sides of training, such as more case-based discussion or practical tips etc. However, there are always concerns about whether these approaches could provide the same quality of basic knowledge to students. Our results supported e-learning could provide similar efficacy as traditional didactic lectures.

Because of this encouraging results, our team is planned to re-structure our teaching for Medical year 4 and Medical year 6. We will prepare more micromodule e-learning for the students to cover all the topics that were covered by lectures. For the original classroom teaching section (Lectures & tutorials), more case based teaching will be used to help the students to apply and integrate their learnt knowledge into patient management.

We are also preparing the full manuscript of this project and hopefully our experience could be shared with other people and help to promote e-learning in the academic field.

PART II

Financial data

Funds available:

Funds awarded from MMCDG $ 91564

Funds secured from other sources $ 0
(please specify_____)

Total: $ 91564

Expenditure:

Item	Budget as per application	Expenditure	Balance
ELITE video preparation	36160	5740	30420
Staff cost	55404	55027.9	376.1
Total:	91564	60767.9	30796.1

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?*

Our results supported the similar learning achievement provided by e-learning, when compared to traditional didactic lecture. As mentioned in previous section, we would like to extend the usage of e-learning to both Medical Year 4 & 6 Urology teaching. The combination of this with flip-classroom would help to overcome the constrain of limited clinical teaching time and hope to improve the understanding and application of knowledges in clinical management.

During the preparation of the projects, the support from our department, ELITE and University were all very important. The support of development of e-learning of our department has greatly facilitate the use of department website / servers for the holding of e-learning videos. The professional support and advice from ELITE had greatly helped the success of the production of the micromodules within a short period of time. Certainly the provision of this educational grant has supported the success of this project.

Finally the experience sharing from seminars prepared by CLEAR had provided us with successful examples, which definitely helped the preparation of this proposal and works. Therefore, more sharing section should be provided to update the development of e-learning usage across the different Faculties and departments, in order to further promote this teaching approach in our University.

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: E-learning

Keyword 2: Micromodules

Keyword 3: Lower urinary tract symptom

Keyword 4: Haematuria

(Least relevant) Keyword 5: Urology

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:** *Not available yet*
(b) **Webpage(s):** *Not available yet*
(c) **Tools / Services:** *ELITE for the preparation of micromodules* *Office of Medical Education (OME) for the recording of the didactic lecture.*
(d) **Pedagogical Uses:** *Our data support that there is no difference between the knowledge gained by the use of micromodule and traditional didactic lecture. Therefore, the use of micromodules (as e-learning) could be used for the pre-flip classroom teaching. Our unit will start to apply this model of teaching (micromodules with flip classroom) in coming academic year.*

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.

Course Code/ Target Students	**Term & Year of offering**	**Approximate No. of students**	**Platform**
Medical Year 4	*1st Term of 2018 class*	*~250*	*Micromodules*
Medical Year 6	*1st Term of 2018 class*	*~220*	*Micromodules*

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	*0*
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	*0*
(e) In international conference	*0*
(f) Others (please specify)	*Preparing for manuscript*

Table 4: Publication (if any)	
Please classify each piece of publications 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	*0*
(e) Conference proceeding	*0*
(f) A chapter in a book accessible internationally	*0*
(g) A paper in an referred journal	*Under preparation*
(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.

Didactic lecture is the traditional approach for knowledge transfer in academic fields, including Medicine. However, the change in teaching theory, limitation in teaching time, improvement in audiovisual and IT system had supported the development of e-learning to replace the traditional teaching approach. As we all agreed, medicine is one of the most knowledge demanding subjects. An effective learning approach will not only improve the academic achievement of the students, but also maintain the quality of care of thousands of patients. Therefore, adequate evidence on the effectiveness of new teaching model is needed before we adopting them. Otherwise, the potential serious problems might happen. However, the effectiveness of knowledge transfer by e-learning, in form of micromodules, in medicine was uncertain. As a result we have planned a pilot study to compare the efficacy of e-learning, compared to traditional didactic lectures, in urology teaching for medical students.

In this study, we focused on the knowledge acquired for the management of male lower urinary tract symptom or haematuria. A 45-minute didactic lecture was recorded first. Then two specially prepared micromodules on approach to the two symptoms were prepared. Forty-five students, who had not exposed to final year urology teaching were recruited for the study. They were randomized to see either the didactic lecture or the two micromodules.

A comprehensive approach was used to compare the learning outcomes of the students. Before watching of videos, students were asked to fill in a set of MCQ to assess their baseline knowledges and they would also ask to self-rate their level of knowledge on the topic (baseline self-assessment of confidence level). Then after video-viewing, same set of MCQ and self-rating were done to assess the Pre-/post- knowledge changes.

Two to three weeks later, the students were gathered in our outpatient clinic. They were asked to repeat the MCQ question again to test the knowledge retain after their learning. Then they were asked to clerk a clinical patient with either lower urinary tract symptom or haematuria. A nurse, presented as a chaperon during the patient assessment, would also observe the level of professionism of the students during clerking . The student would then present the case to a urologist, who would assess the information obtained by the student, basing on a standardized marking scheme. A separate impression mark would also be given by the urologist on the overall quality of the adequacy of the information obtained by the student in related to their patients.

From our results, the two approaches of teaching provided similar outcomes, in term of knowledge improvement, knowledge retain, nurse and physician assessments. Basing on our result, micromodules provided similar effectiveness in knowledge transfer to students, as compared to didactic lecture. This information provided some evidences to support the further development of e-learning for medical training.