THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant (2018-19)

Final Report

Report due 31 June 2019

Please return by email to CUHK cdgs@cuhk.edu.hk

PART I

Project title: eLearning Module in Abdominal Ultrasound

Principal supervisor: Dr Tiffany So[1]

Other members in the project team: Professor Ann King[1], Mr Kevin Leung[1], Ms Stella Ho[1], Ms Vivian Leung[1], Mr Kevin Lo[1], Professor Winnie CW Chu[1], Professor Enders Kwok-Wai Ng[2]

Department / Unit: [1]Department of Imaging and Interventional Radiology, Faculty of Medicine; [2]Department of Surgery, Faculty of Medicine

Project duration: September 2018 to June 2019

Date report submitted: June 2019

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 CDG project?

The objective was to develop an ultrasound courseware module to allow students to better develop their understanding of clinical ultrasound and recognize the radiological features of common clinical pathologies whilst delivering the material using an interactive platform. The primary objective of the proposed project did not change during the project duration. Furthermore, during this project, additional ideas for redevelopment of our department Teaching program and future project proposals have arisen.

2. Process, outcomes or deliverables

Please specify the number of different types of deliverables produced, and the course(s) (with course codes and titles) that have used the deliverables in Part IV, and provide more detailed descriptions here.

Has the nature of the deliverables been changed?

Have you adjusted your timeline?

Overall, was the project completed satisfactorily?

Overall, the project has been completed satisfactorily. The deliverable of this project is our ultrasound courseware module which would be suitable for students to use in the Medicine (MBChB) Programme (MEDU3210). Specifically, we have successfully created an electronic ultrasound learning module which features informative content for pathologies in different abdominal organ systems. New teaching material has been presented using a case based approach, in which each case portrays a clinical scenario, followed by clinical questions designed stimulate thinking on the topic. Videos showing abnormal radiological findings have been included to allow students to learn to recognize abnormalities from real clinical cases. Relevant features are pointed out to students as students are guided through each case. An online image library for each case was included and original interactive medical illustrations and graphics were used throughout the module. Each case concluded with interactive MCQs to allow the student to evaluate their own learning of the topic.

The overall nature of the deliverables has not changed. The final development of the project was completed satisfactorily and is able be used on time for the expected purpose. Figures 1 shows a screenshot of our developed eLearning module. For pilot testing, the module was even in use earlier than was planned for a focus group of doctors and students in Imaging and Interventional Radiology during June 2019.

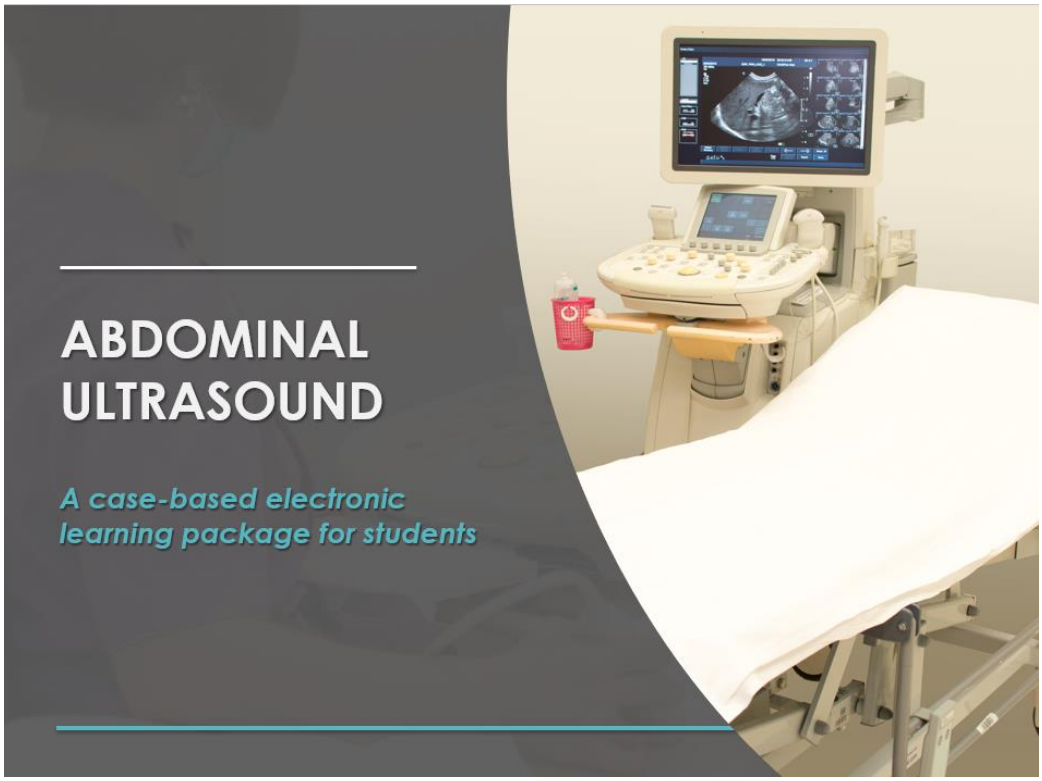


Figure 1 The developed eLearning module

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?

As planned, we have created functionality in the module to evaluate the project via built in interactive quizzes designed to assess students' learning outcomes, and a feedback survey which will assess students' perceptions of the electronic courseware. By review of these results, areas requiring further refinement or explanation for future improvement of the module can be revealed.

A pilot focus group consisting of doctors and students in Imaging and Interventional Radiology was conducted in June 2019 to allow us to perform initial evaluation of our module. Participants in this group were given time to independently navigate their way through the electronic module. The participants completed the interactive quizzes designed in the module, and the online feedback survey, followed by a group

interview.

Figures 2 and 3 show the pilot focus group using the developed Learning Module for initial evaluation and the group interview.

Figure 2: Initial evaluation of developed Learning Module using a focus group

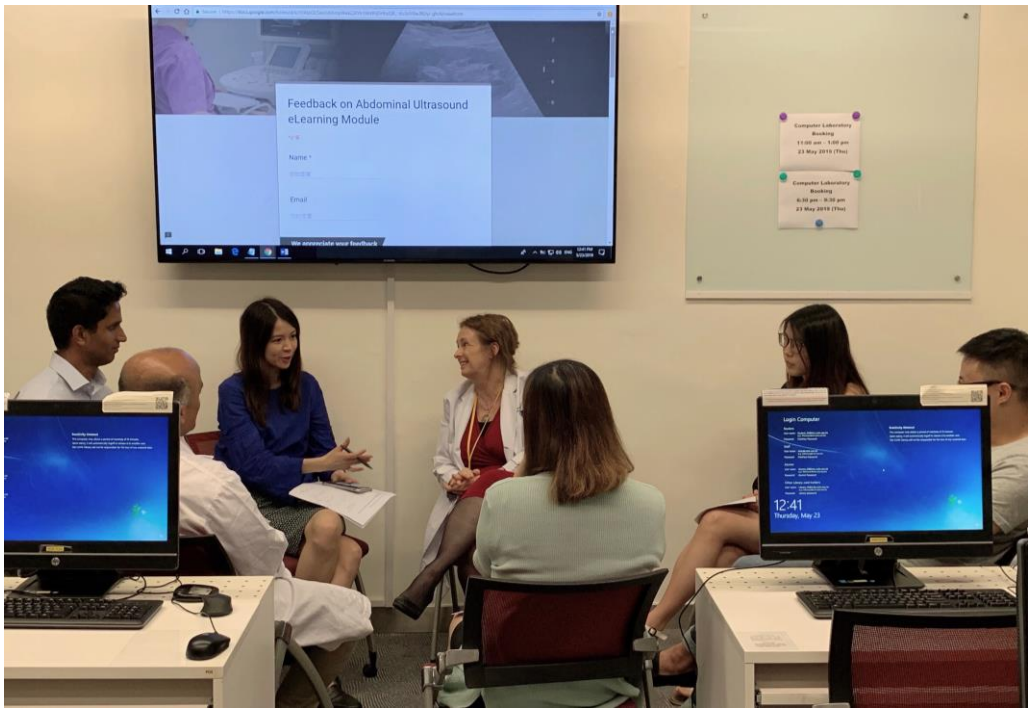


Figure 3: Group interview feedback from the pilot focus group

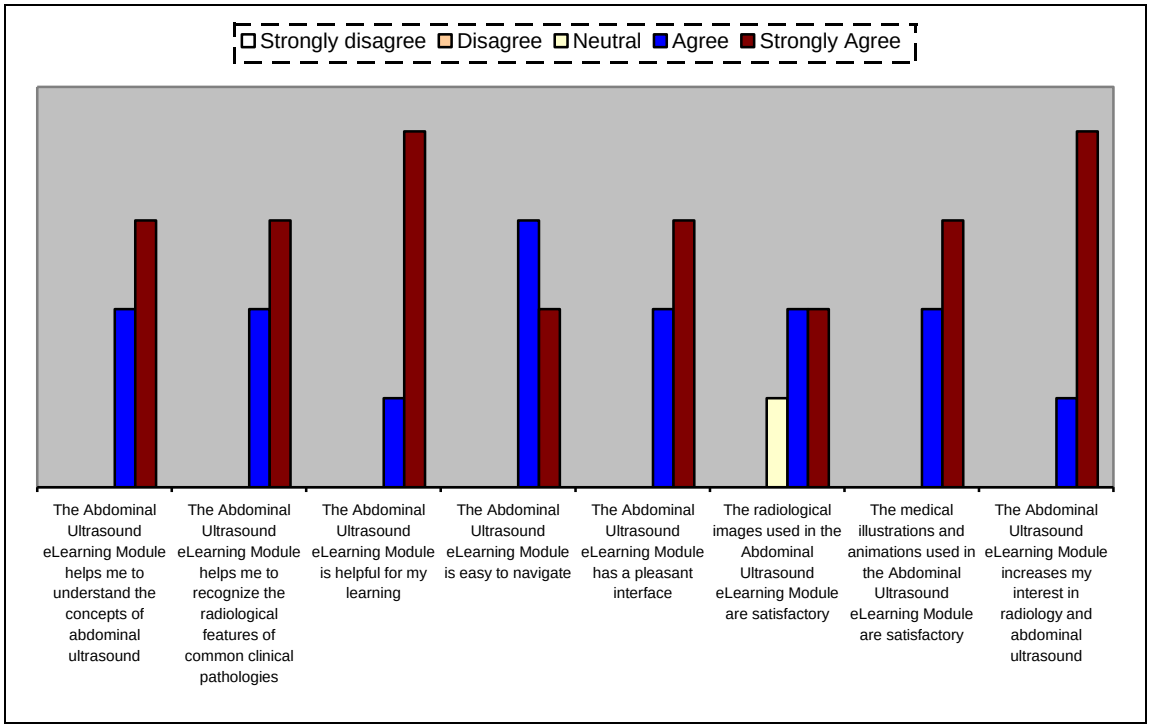
The results from the pilot focus group are shown below. Table 1 and Figure 4 present the results of the survey in which participants could rate each question on a 5 point scale, with 1 indicating that they strongly disagree with the statement and 5 indicating that they strongly agree with the statement.

Table 1: Results of the Feedback survey

	Average rating on a 5 point Likert scale (A rating of 1 indicates strongly disagree, 5 indicates strongly agree)
The Abdominal Ultrasound eLearning Module helps me to understand the concepts of abdominal ultrasound	4.6
The Abdominal Ultrasound eLearning Module helps me to recognize the radiological features of common clinical pathologies	4.6
The Abdominal Ultrasound eLearning Module is helpful for my learning	4.8
The Abdominal Ultrasound eLearning Module is easy to navigate	4.4
The Abdominal Ultrasound eLearning Module has a pleasant interface	4.6
The radiological images used in the Abdominal Ultrasound eLearning Module are satisfactory	4.2
The medical illustrations and animations used in the Abdominal Ultrasound eLearning Module are satisfactory	4.6
The Abdominal Ultrasound eLearning Module increases my interest in radiology	4.8

and abdominal ultrasound	

Figure 3: Results of the Feedback survey



Comments from participants:

- "The topic was covered in bite sized chunks and the animations and imaging used were clear and well marked"
- "The MCQ's were a good standard for testing the module and helped consolidate the knowledge learnt from the module"
- "Very impressive module"
- "It has been a very useful learning experience"
- "Very creative"
- "Ease of use, good illustrations, good coverage of theory"
- "Very detailed"

The results show that the developed module was useful for learning.

Several suggestions from the pilot focus group were used to refine the module to our final version. The evaluation functionality will be kept in place for the students during the MBChB teaching program launch and feedback will be collected to allow ongoing evaluation.

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 can be adapted to other disciplines.

The project work has been disseminated through poster display within the Department of Imaging and Interventional Radiology, presentations within the department, and presentation within CUHK to the Faculty of Medicine Dean. The project deliverables have been shown to overseas visitors of the Department (students and academics from other institutions). Teachers from within CUHK have shown great interest in adopting similar interactive eLearning methods in their own teaching.

The Abdominal Ultrasound eLearning module has created interest in our department to redevelop our Curriculum and teaching materials and construct the materials into eLearning. This Abdominal Ultrasound eLearning module will be used as a proforma for future development of the teaching modules. This Curriculum redevelopment will form the basis of a much larger project, which has been approved by the Faculty of Medicine Dean.

PART II

Financial data

Funds available:

Funds awarded from CDG $ 80480

Funds secured from other sources $ _____

(please specify_____)

Total: $ 80480

Expenditure:

Item	Budget as per application	Expenditure	Balance
ITSC courseware design costs	27695.00	27695.00	
Adobe Articulate program costs	6210.00	6210.00	
Project assistant staff costs	21335.00	14203.30	
Staff training costs	17600.00	17595.30	
Reference books	5700.00	5151.00	
Computer accessories	1940.00	1940.00	
Total:		72794.60	7685.40

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?*

Key success factors

The eLearning program enhances interest in student learning, and allows ready access to relevant and effective learning material. The project has sparked interest in eLearning within our department and the current module will be used as a proforma for future development teaching modules in Radiology Curriculum redevelopment.

The financial support from this grant and the technical support from ITSC, especially Eva Cheung, were crucial to the success of this project.

Difficulties encountered

A major difficulty with the project was the tight timeframe for project completion. We experienced delay in commencement of the project due to much difficulty in staff recruitment. During the project, we adjusted our project timeline and budget costs due to being unable to complete expected recruitment. With the adjustment, more focus was placed on staff training and completing the project within reduced staffing. Again, the input and assistance of ITSC staff was invaluable to the deliverables of the project being met.

PART IV

Information for public access

Summary information and brief write-ups of individual projects will be uploaded to a publicly accessible CUHK CDG 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 relevance to your project) to describe your project.

(Most relevant) Keyword 1: Radiology

Keyword 2: Academic content development

Keyword 3: Electronic learning module

Keyword 4: Ultrasound

(Least relevant) Keyword 5: Abdomen

2. Summary statistics

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) in here*
(c) **Others (please specify):**

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. CU Learning Management System (Blackboard), facebook), please specify.			
Course Code/ Target Students	**Term & Year of offering**	**Approximate No. of students**	**Platform**
Medicine (MBChB) students		214	Blackboard

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)	1
(b) In workshop/retreat organized for CUHK teachers (e.g.	-

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

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	-
(b) Project leaflet	1
(c) Project booklet	-
(d) A section/chapter in a booklet/book distributed to a limited group of audience	-
(e) Conference proceeding	-
(f) A chapter in a book accessible internationally	-
(g) A paper in refereed journal	-
(h) Others (please specify)	*Please insert no*

3. A one-page brief write up

Please provide a one-page brief write-up of no more than 500 words for posting on the CDG website.

Ultrasound eLearning Module Courseware Development Project

Dr Tiffany So[1], Professor Ann King[1], Mr Kevin Leung[1], Ms Stella Ho[1], Ms Vivian Leung[1], Mr Kevin Lo[1], Professor Winnie CW Chu[1], Professor Enders Kwok-Wai Ng[2]

[1]Department of Imaging and Interventional Radiology, Faculty of Medicine, CUHK
[2]Department of Surgery, Faculty of Medicine, CUHK

Objective

- To develop an eLearning courseware module to deliver teaching material in an electronic format.
- To introduce abdominal ultrasound teaching to students in the CUHK Medical Programme Radiology Teaching curriculum
- To allow students to develop an understanding of clinical ultrasound, including the typical clinical indications for ultrasound and the sonographic features of common clinical pathologies

eLearning Module Development

The project comprised of the following components:

Academic content development

New teaching material was created which focused on a case based approach for common clinical pathologies. Each case portrayed a clinical scenario, followed by basic clinical questions designed stimulate thinking on the topic. Videos showing abnormal radiological findings were included, allowing students to learn to recognize abnormalities from real clinical cases. Relevant features were pointed out to students as students are guided through each case. Learning occurs as the case unfolded. An online image library for each case was included. Each case concluded with interactive MCQs to allow the student to evaluate their own learning of the topic.

Electronic module development

eLearning development was with Adobe Articulate. Video clips and radiological images of the ultrasound cases were embedded directly into the module. Blackboard hosting of the module allows student access to the module at their leisure. Students benefit greatly by having access to the learning material anytime and anywhere.

Design and Features

Case Based Learning: A case-based approach engages students in the learning of specific conditions typically encountered in clinical practice. The module acts to facilitate the student in building their knowledge around the case.

Digital videos of real clinical cases: To provide students with relevant practical experience and allow them to appreciate theory in practice.

Interactive Quizzes: Initial clinical questions have been designed stimulate thinking on the topic. An additional bank of end of case questions are included for each case to allow students to test their knowledge and verify their understanding before moving on to the next section.

Medical illustrations and animation: The interactive function of the module has been enhanced with original medical illustrations and animation. The use of multiple content formats (informative text, illustrations, animations, video, etc.), allows students to interact with the material with different learning styles.

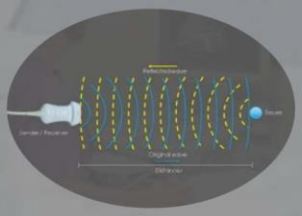
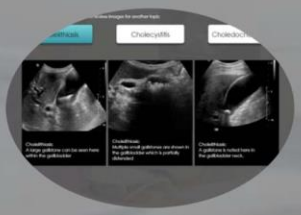
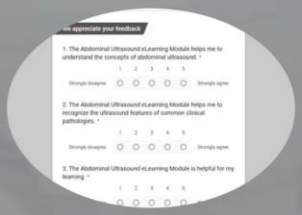


Image library: A collection of digital images relevant to each case have been collected and presented. Students can use these images to gain an appreciation for the spectrum of radiographic findings related to each condition.





Feedback: An end of module feedback feature allows students to complete an evaluation survey and send comments regarding the material to the project team.

Future Directions

eLearning enhances student learning to make it more easily accessible, relevant and effective. This Ultrasound eLearning Module Courseware Development Project has served as a beginning in changes to the Radiology Teaching Program. A focus on eLearning will form a part of the Radiology Teaching Program for the next generation.

Acknowledgements

The project was supported by funding from the Academic IT Steering Committee (AITSC) Courseware Development Grant Scheme (CDGS). We thank the eLearning Team of Information Technology Services Centre (ITSC) for their assistance in module development, and Dr Andi Chan, Ms Winnie Chen, Ms Sou Miu Yi, Mr Matthew Wong and Ms Hazel Wong for their contributions in the project.