THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant (2018-19)

<u>**Final Report**</u>

Report due 31 May 2019
Please return by email to CUHK cdgs@cuhk.edu.hk

<u>PART I</u>

Project title: Virtual reality: The application of genomic technology in health sciences
Principal supervisor: Dr. Hung Ming Wai, Philip
Co-supervisor(s): Dr Sally Lo, Dr Fiona Tang
Department / Unit: The Nethersole School of Nursing
Project duration: From September 2018 to May 2019
Date report submitted: May 31 2019

1. Project objectives

This project is on track to meet all the objectives which the contents delivered in each part are aligning with health science courses. The objectives have not been changed as a result of the experience of working on this courseware development project.

2. Process, outcomes or deliverables

In this project, we provided a mobile app using virtual reality technology. The target groups using the app are the students in

1) Year 2 of Bachelor of Nursing studying the course of Microbiology NURS1701
2) Year 1 of Master of Nursing Science [Pre-registration] students studying the course of Microbiology NURS6212.

Two main areas in game format were covered in this app:
   1) The 3D structures of key materials of genomic technology used in clinical applications.
   2) The working principles of the genomic technology in the 3D virtual reality environment.

The style of each game was produced in the format of animated presentation with annotation and narration and applied in the flipped classroom learning and post-lecture learning material to attract the student's interests.

The nature of the deliverables has not been changed at all and we provided some tailor-made and interactive virtual reality games for explaining the complicated concepts of genomic technology and showing how the knowledge can be applied in some clinical examples in order to equip our nursing students in pathology, nursing care and health care in future.

The timeline of the project development met our proposed schedules perfectly. Overall this project was completed satisfactorily.

3. Evaluation Plan

The games will be evaluated mainly by the scores in each interactive exercise, the survey and the focus-group interviews. The evaluation was focused on the acceptability of the games. A quantitative survey will be conducted to evaluate users' satisfaction.

Participants will be invited to complete a quantitative survey including eleven 6-point Likert-type items for assessing their perception of those games including the clarity, depth and length of the content.

4. Dissemination, diffusion and impact

This project is going to be presented at CUHK Open Day 2019 and Teaching and Learning Expo 2019 CUHK. Based on the positive feedbacks from our target students, we would like to explore any potential to launch this project in other human genomics courses offered in the Faculty of Medicine CUHK.

PART II
Financial data

Funds available:

Funds awarded from CDG	$	90,000
Funds secured from other sources (please specify_____)	$	0
Total:	$	90,000

Expenditure:

Item	Budget as per application	Expenditure	Balance
Service charges by ITSC, CUHK	$71,280	$71,280	$0
Mobile phone cardboard	$6,000	$5970.65	$29.35
General expense	$500	$0	$500
Lab reagents and consumables	$12,220	$12108.2	$111.8
Total:	$90,000	$89358.85	$641.15

PART III

Lessons learnt from the project

Our students appreciated our team to produce all innovative and interactive games to describe and explain the concepts and applications of human genomic technology which are important in the nursing curriculum.

Key success factors in this project:
1. A team of experts in nursing education and information technology colleagues.
2. User-friendly interface of micro-modules and easy-to-access platform of this eLearning project.

Difficulties encountered:

Not available.

Suggestions to CUHK:

1. The duration (only 8 months) is the main limitation of further development of this e-Learning project and we would like to suggest if the project completion timeline could be extended up to 1 year.

2. More content can be added if the project budget could be doubled (i.e. $200,000).

PART IV

Information for public access

1. Keywords

Please provide five keywords (in the order of relevance to your project) to describe your project.

(Most relevant)   Keyword 1: Genome

                   Keyword 2: Replication

                   Keyword 3: Polymerase

                   Keyword 4: DNA matching

(Least relevant)   Keyword 5: thermocycler

2. Summary statistics

Please provide information, if any, in the following tables, <u>and provide the details in Part I</u>.

Table 1: Publicly accessible online resources (if any)
(a) **Project website:**   *NA.*
(b) **Webpage(s):**   *NA.*
(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
• NURS1701 for Year 2 students in Bachelor of Nursing (BN); • NURS6212 in Master of Nursing [Pre-registration] (MNSP)	• 2nd term in BN in 2018 • 3rd term in MNSP	• ~ 200 in BN • ~80 in MNSP	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)	*NA*
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	*NA*
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	*1*
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	*NA*
(e) In international conference	*NA*
(f) Others (please specify)	*NA*

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	*NA*

(b) Project leaflet	*NA*
(c) Project booklet	*NA*
(d) A section/chapter in a booklet/book distributed to a limited group of audience	*NA*
(e) Conference proceeding	*NA*
(f) A chapter in a book accessible internationally	*NA*
(g) A paper in refereed journal	*NA*
(h) Others (please specify)	*NA*

3. A one-page brief write up

Modern genomic technologies have become one of the important tools in diagnosis and guidance in symptoms management. The same technologies are commonly applied in identifying micro-organisms and viruses that further dictate specific therapeutic management or personal medicine. The personal medicine has become the future directions in health strategies and genomic technologies is an important tool applied in this new era. During the 2nd year of nursing curriculum, our nursing students will be studying strategies of laboratory identification of micro-organisms. A number of modern genomic technologies have been discussed with the working principles and their clinical applications. Most of the nursing students found the principle of genomic technologies very hard to understand. Therefore, this project aims to develop tailor-made virtual reality games for explaining the complicated concepts and showing how the knowledge can be applied in some clinical examples.

A mobile app using virtual reality technology was designed and covered the following areas:
1) The 3D structures of key materials of genomic technology used in clinical applications.
2) The working principles of the genomic technology in the 3D virtual reality environment.

A quantitative survey will be conducted to evaluate users' satisfaction. Participants will be invited to complete eleven 6-point Likert-type item for assessing their perception of those games including the clarity, depth and length of the content.

Although formal evaluation has not been conducted yet, it has been perceived the BN and MNSP students have been showing enormous interest in using the VR app during the class.

Also focus group interviews will be conducted.