

**THE CHINESE UNIVERSITY OF HONG KONG**

**Micro-Module Courseware Development Grant**

**Scheme 1: Basic Scheme**

**Final Report (2015-16)**

Report due 31 December 2016

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: **Bitesize Learning Series: A Physiological Interpretation of Important Blood Gas Equations (Phase 1)**

Principal supervisor: **Dr Isabel HWANG**

Co-supervisor(s): **Prof XQ YAO**

Department / Unit: **Teaching and Learning Unit, School of Biomedical Sciences, Faculty of Medicine**

Project duration: **From January 2016 to December 2016**

Date report submitted: **30 Dec 2016**

**1. Project objectives**

Lung physiology is taught in 1 year 3 medicine, but for various reasons, several important mathematical and physiological blood gas equations cannot be covered in sufficient detail. Students often just memorise the equations without being able to apply them accurately in everyday clinical practice.

In this project, we produce a total of four narrated videos to help reinforce students' understanding of several important gas equations taught in year 3 medical lectures. The videos present multiple clinically based scenarios to reflect the application of the corresponding equations in real life. Three of these videos have already been introduced into the year 3 medical course in September 2016.

In all of the videos (Table 1), the emphasis is on *why*, *what* and *how*:

1. *why* the equation is important;
2. *what* criteria need to be considered; and
3. *how* to make use of the equation in selected case studies.

Video	Title of video	Individual webpage links
1	The PCO <sub>2</sub> equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html</a>
2	The alveolar gas equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html</a>
3	The O <sub>2</sub> content equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE3/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE3/story.html</a>
4	The Henderson - Hasselbalch equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html</a>

The project is on track to meet its objectives. The objectives have not been changed as a result of the experience of working on our micromodule project.

## 2. Process, outcomes or deliverables

A total of four videos have been completed. Each video contains information about the importance of the selected equation, followed by case scenarios that help student to apply the equation in reality. We did not encounter any major obstacles in this project as our team has ample experience in developing different types of micromodules.

Video 1: <http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html>

Video 2: <http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html>

Video 3: <http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE3/story.html>

Video 4: <http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html>

## 3. Evaluation Plan

We did not alter our plan of evaluation but since the year 3 medical students will continue to use the micromodules until their final year exam in May 2017, we shall continue to collect data at this stage before data analysis will be conducted. In addition to access rate obtained in *Blackboard*, we also aim to collect more specific feedback from the student users but we need to wait until summer time of 2017 as year 3 medicine is the last pre-clinical year and it would be easier to invite student users to evaluate after the year exam.

## 4. Dissemination, diffusion and impact

As we are still at a stage of collecting raw data, work related to this project will be presented in suitable conference/training workshop in near future.

This project has good potential to diffuse to upper medical years as it summarises valuable tips and instructions that would be useful for more senior medical students who are in their

clinical years of study as a revision or reinforcement exercise. Once we have a more critical mass of related products through the completion of additional micromodules in Phase 2, we shall set up a suitable platform to allow medical students in their clinical years to access these products.

## PART II

### Financial data

Funds available:

Funds awarded from MMCDG	\$ 51,910
Funds secured from other sources (please specify _____)	\$ 0
Total:	\$ 51,910

Expenditure: Balance is calculated as of 30 December as some expenses are still being processed

Item	<i>Revised</i> Budget as per application	Expenditure	Balance
Office of Medical Education	15000	15000	0
A&E Medicine Academic Unit	7500	7500	0
Editing	7000	4578.75	+2421.25
Freelance worker	15000	10700	+4300
Student helpers	4600	4977.5	-377.5
Reference images, USB, books, etc.	2810	2106.96	+703.04
Storyline articulate software (1 extra license)	0	5592	-5592
Total:	51910	50913.5	+996.5

## PART III

### Lessons learnt from the project

Medical students wish to have more practice exercise through case based scenarios even in their pre-clinical years so that they can be guided to think and interpret different types of case studies throughout their study. The existing tutorials cannot serve such increasing as they have been used for many years without any new revision or addition of new ingredients. Delivery of case studies in the format of micromodules serves this need. Student users are given more freedom to learn through these micromodules at their own pace and time.

Our upcoming plan is to continue another project (Phase 2) by introducing additional case-based scenarios related to “Alveolar-arterial (A-a) Gradient” in real life. A total of 5-6 micromodules will be planned to illustrate how an abnormal gradient under different situations could affect lung function of an adult.

**Key success factors** of this project are that we are able to team up with people from different units and background who possess the right skills and knowledge

- Collaborators or service team with the right skills (Office of Medical Education)
- Colleagues such as Prof XQ Yao (expert in basic science of blood gas) and Dr Poon Wai Kwong (expert in clinical aspects of blood gas) has suitable background useful for this project and they are so approachable and eager to help proof read and evaluate source materials I prepared throughout the year
- Professors who are too senior and prestigious may not be the ideal person for this kind of projects that requires true hard work and vigorous revision and proof reading of source materials.

**Difficulties** encountered in this project are that we are not able to continuously employ one highly reliable freelance worker who possesses both medical and basic science background as he has helped in a number of other e-learning projects. This freelance worker also offer free-of-charge revisions if our micromodules that need to be revised due to course development. However, the business office said we need to find quotes from two other companies that show this freelance worker is worth the money. Unfortunately, in reality, we are not able to identify any company or person who has such suitable background to help us. As a result, we have no choice but to buy some similar animated videos from online stores which are more expensive and not as custom made for our micromodules in order to meet the requirement of the Business Office.

### **Suggestions to CUHK**

- *I know that a teacher has applied for the CDG or micro-module grant to develop courseware or micro-modules for some courses that she neither teaches nor coordinates. After producing the final versions of the courseware/micro-modules, she has gone on to ask the teachers/coordinators who are genuinely responsible for the relevant courses to introduce the products to their students. This is not an ideal situation, and some teachers have expressed their discomfort and concern to me that the final e-learning products are not truly suitable for their students or able to accommodate different levels of ability, which has also led to tension amongst the affected parties. Better communication could have improved the situation, but it is suspected that the courseware-development exercise might be wrongfully used as a way to make staff review looks more appealing. Thus, priority in grant allocation should be given to “direct” course teachers and/or course coordinators*

*who are able to develop and introduce e-learning products, ensuring that resources are given to teachers who can benefit students directly. We should not allow resources to be wasted, because technology is advancing every day and products created to assist students' learning must be used as soon as they are developed.*

## PART IV

### Information for public access

In this project, we produce a total of four narrated videos to help reinforce students' understanding of several important gas equations taught in the year 3 medical lectures. The videos present multiple clinically based scenarios to reflect the application of the corresponding equations in real life.

In all of the videos (Table 1), the emphasis is on why, what and how:

- ✓ why the equation is important;
- ✓ what criteria need to be considered; and
- ✓ how to make use of the equation in selected case studies.

**Table 1. Summary of the four blood gas videos**

<b>Video</b>	<b>Title of video</b>	<b>Individual webpage links</b>
1	The PCO <sub>2</sub> equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html</a>
2	The alveolar gas equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html</a>
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4	The Henderson-Hasselbalch equation	<a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html</a>

### **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: blood gas equation
- Keyword 2: respiratory physiology
- Keyword 3: case study
- Keyword 4:
- (Least relevant)      Keyword 5:

## 2. Summary

<b>Table 1: Publicly accessible online resources (if any)</b>
<p>(a) <b>Project website:</b></p> <p>Video 1: <a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE1/story.html</a>            Video 2: <a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE2/story.html</a>            Video 3: <a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE3/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE3/story.html</a>            Video 4: <a href="http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html">http://facs.med.cuhk.edu.hk/site/2016/micromodule/BGE4/story.html</a></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) here.</i></p>
<p>(c) <b>Tools / Services:</b></p> <p><i>The articulate storyline software</i></p>
<p>(d) <b>Pedagogical Uses:</b></p> <p><i>This project is mainly as post-class viewing and study aid because the materials presented in the videos requires prior knowledge and interpretation of case studies</i></p>
<p>(e) <b>Others (please specify):</b></p>

<b>Table 2: Resources accessible to a target group of students (if any)</b>			
<i>As we need to collect data about the access rate, the videos were uploaded into Blackboard and course announcement about the e-learning resources was sent to all medical year 3 students when the course commenced in Sep 2016</i>			
<u>Course Code/ Target Students</u>	<u>Term &amp; Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>MEDU3400</i>	<i>1<sup>st</sup> term 2016</i>	<i>200</i>	<i>Blackboard</i>
<b>Table 3: Presentation (if any)</b>			
<i>We shall fulfill the following when we obtain more data of this project.</i>			<b>Number</b>
(a) In workshop/retreat within your unit (e.g. department, faculty)			<i>NA</i>
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)			<i>NA</i>

(c) In CUHK ExPo jointly organized by CLEAR and ITSC	NA
(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

<b>Table 4: Publication (if any)</b>	
<i>As our project is newly completed, we shall collect more solid data before we can write up for any publication. We shall inform the committee if we have any update in this area</i>	<b>Number</b>
(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 a referred journal	NA
(h) Others (please specify)	NA

### 3. A one-page brief write up

**Video reporting:** (Require CUHK O365 Login)

[https://gocuhk-my.sharepoint.com/personal/taylor-tang\\_cuhk\\_edu\\_hk/\\_layouts/15/guestaccess.aspx?guestaccesstoken=IrfdChwDb0Cku%2fUHAhCUup2xeBYInp%2fEnQDmR9EQtVM%3d&docid=2\\_0fbe6df548f4e4ff08f3bd072b9e93f78&rev=1](https://gocuhk-my.sharepoint.com/personal/taylor-tang_cuhk_edu_hk/_layouts/15/guestaccess.aspx?guestaccesstoken=IrfdChwDb0Cku%2fUHAhCUup2xeBYInp%2fEnQDmR9EQtVM%3d&docid=2_0fbe6df548f4e4ff08f3bd072b9e93f78&rev=1)

This project comprises a total of four narrated videos to help reinforce students' understanding of four important blood gas equations taught in a year 3 medical course (MEDU3400). The videos present multiple clinically based scenarios to reflect the application of the corresponding equations in real life. In all of the videos (Table 1), the emphasis is on *why*, *what* and *how*:

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As the project is newly developed, we have the obligation to obtain access rate of each video to prove usage. As a result, year 3 medical students can access each video via Blackboard that possesses the track function and simple analytics could be obtained in near future. However, our goal is always to facilitate flexibility and convenience in student learning and thus individual webpage links will be provided to student users once we have gathered some solid data in the first year of usage.