

**THE CHINESE UNIVERSITY OF HONG KONG**

**Micro-Module Courseware Development Grant**

**Scheme 1: Basic Scheme**

**Final Report (2017-18) (Additional Call)**

Report due 31 October 2018

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: Micro-Modules in Laboratory Safety

Principal supervisor: WONG, Fai George

Co-supervisor(s) N.A.

Department / Unit Chemistry

Project duration: From March 2018 to October 2018

Date report submitted: 25 October 2018

**1. Project objectives**

This project aimed to produce micro-modules on laboratory safety. In the Chemistry Curriculum, students spend as much as 40% of their time in the laboratory. However, there is not a single course on laboratory safety. The micro modules produced will be used by the Year 2 Chemistry undergraduates. Throughout the development of the courseware, there hasn't been any change on the objectives and the project is on track.

**2. Process, outcomes or deliverables**

In less than 6 months, we have completed 6 micro-modules, including a virtual reality.

These micro-modules include:

1. Virtual Laboratory Tour
2. Chemical Accidents
3. Use of Fume Hood
4. Fume Hood Scrubber
5. Chemical Incompatibility
6. Emergency Handling

These micro-modules will be used by students of CHEM2850 in the form of flipped classroom activity. They are expected to go through the teaching material at home before coming to the experiment class. The contents will be examined in examination.

The duration of each micro-modules lasts for 10-20 minutes. The total duration of all micro-modules is around 45-60 minutes. They are either in the form of virtual reality, which students could put on a VR glass and have a visit in the laboratory, or narrated PowerPoint and video.

The nature of the deliverable didn't deviate from the original plan and the project is completed as scheduled and satisfactorily.

### **3. Evaluation Plan**

The project will be evaluated by questionnaires. It will be carried out in the later stage.

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

#### Website for dissemination

Virtual Lab Tour

<https://www.youtube.com/watch?v=l3GLV5wUWe0&feature=youtu.be>

Chemical Accident

[http://www.cuhk.edu.hk/proj/science\\_resource/Lab\\_Safety/LabAccidents/internal/story.html](http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/LabAccidents/internal/story.html)

Emergency Protocol

[http://www.cuhk.edu.hk/proj/science\\_resource/Lab\\_Safety/EmergencyProtocols/internal/story.html](http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/EmergencyProtocols/internal/story.html)

Fume Hood

[http://www.cuhk.edu.hk/proj/science\\_resource/Lab\\_Safety/FumeHood/internal/story.html](http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/FumeHood/internal/story.html)

These micro-modules are basic laboratory techniques and can be used by other teaching departments which involve experiment classes.

## PART II

### Financial data

Funds available:

Funds awarded from MMCDG	\$ 74,550
Funds secured from other sources (please specify _____)	\$ 0
Total:	\$ 74,550

Expenditure:

Item	Budget as per application	Expenditure	Balance
Staff Cost: Research Assistant	40,000	40,000	0
Staff Cost: Student Helper	17,550	20,480.66	(2,930.66)
Printing and consumable	5,000	5,054	(54)
VR spectacles	5,000	2,189	2,811
VR Digital Camera and Accessories	7,000	6,960	40
Total:	74,550	74,683.66	(133.66)

## PART III

### Lessons learnt from the project

#### Virtual Reality

We made the first micro-module with virtual reality. At the first place, we didn't have the technicality, not even what kind of equipment was required for the production of the video. Later, we sought advice from ITSC staff. We were grateful for their assistance and advice.

#### Other Teaching Modules

We constructed other micro-modules using articulate storyline 2. It is a useful software to make e-learning material. Because it was the first time to use it, it took quite a while for the research assistant to get used to the software.

Overall speaking, after this project, we have acquired basic knowledge to construct e-learning material using articulate storyline 2 which would benefit in the future micro-modules construction.

## PART IV

### Information for public access

#### **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: Laboratory safety

Keyword 2: Chemistry

Keyword 3: Virtual reality

Keyword 4: Experiment

(Least relevant)      Keyword 5: Interactive

#### **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>
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<b>(a) Project website:</b>
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Not available
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<b>(b) Webpage(s):</b>
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Virtual Laboratory Tour
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<a href="https://www.youtube.com/watch?v=l3GLV5wUWe0&amp;feature=youtu.be">https://www.youtube.com/watch?v=l3GLV5wUWe0&amp;feature=youtu.be</a>
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Chemical Accidents
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<a href="http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/LabAccidents/internal/story.html">http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/LabAccidents/internal/story.html</a>
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Fume Hood
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<a href="http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/FumeHood/internal/story.html">http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/FumeHood/internal/story.html</a>
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Emergency Protocol
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<a href="http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/EmergencyProtocols/internal/story.html">http://www.cuhk.edu.hk/proj/science_resource/Lab_Safety/EmergencyProtocols/internal/story.html</a>
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**(c) Tools / Services:**

Articulate Storyline 2

Ricoh Theta V

Zhiyun Crane M

**(d) Pedagogical Uses:**

This product is expected to be used as a flipped classroom activity. Students need to go through the teaching material at home before conducting experiments. The contents will be examined in the examination.

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

**Table 2: Resources 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.*

<u>Course Code/ Target Students</u>	<u>Term &amp; Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
CHEM2850	1 <sup>st</sup> term 2019	60	Blackboard

**Table 3: Presentation (if any)**

*Please classify each of the (oral/poster) presentations into one and only one of the following categories*

	<b>Number</b>
(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	1
(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)	0

**Table 4: Publication (if any)**

<i>Please classify each piece of publication into one and only one of the following categories</i>	<b>Number</b>
(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 a referred journal	0
(h) Others (please specify)	0

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

Laboratory safety is an essential element to promote positive working environment in the laboratories. In the Chemistry Curriculum, students spend as much as 40% of their time in the laboratory. However, there is not a single course on laboratory safety. In the past, some fatal accidents occurred in laboratories such as burning or inhalation of very toxic gases.

e-Learning has been proven to be effective for enhancing the teaching effectiveness and engaging students to become more active in learning various types of courses. In this project, we have developed several micro-modules, covering the topics from chemical accidents, fume hood, chemical incompatibility to emergency handling. More interestingly, we have produced a virtual laboratory tour video using virtual reality technology.

#### Virtual Laboratory Tour

It is a virtual reality tour to the Inorganic Chemistry Laboratory at the Chemistry Department, CUHK. Students could take a glimpse on how a laboratory looks like. It serves as an introduction to students before entering a laboratory. To acquire the relevant information, they should go through all the other micro-modules.

#### Chemical Accidents

This micro-module focuses on serious or fatal laboratory accidents in the past. Four newspaper articles, each with voice-over on the background and reflections at the end, aim at drawing students' attention on laboratory safety.

#### Fume Hood

Fume hood is an enclosure inside which has a slightly negative pressure to avoid air from flowing out. Whenever students handle corrosive, flammable or volatile chemicals, they are requested to handle them inside the fume hood. The correct use of fume hood ensures safety. This micro-module talks about the basic architecture and precautions of fume hood. It also talks about scrubber system which is used to purify gas before disposing to the atmosphere.

#### Chemical Incompatibility

Rules apply in storing chemicals, which otherwise, could lead to explosion. This micro-module covers some rules and principles of storing chemicals.

#### Emergency Handling

Chemical spillage or accidents could happen in the laboratory. In case of happening, how should students react or respond? In this micro-module, students learn about emergency measurements in the laboratory such as eye wash station, fire extinguisher, fire sand, fire blanket, shower station, spill kit and first aid box.