

**THE CHINESE UNIVERSITY OF HONG KONG**

**Courseware Development Grant (2016-17)**

**Final Report**

Report due 31 January 2018

Please return by email to Judy Lo judyl@itsc.cuhk.edu.hk

**PART I**

Project title: Learning Calculus via Role-playing Game

Principal supervisor: Dr. Kai Leung CHAN

Co-supervisor(s): Dr. Lily Li PAN

Department of Mathematics

Project duration: From February 2017 to January 2018

Date report submitted: 11/5/2018

**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 of this project is to develop a Role-playing electronic online game for first year students to learn calculus in a more interactive and interesting way, which has not been changed during the development of the project.

**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?*

The project was finished as planned and an electronic role-playing game called “The Myth of Calculus” was designed.

In the game, the CUHK campus was set as the scene, that represents the game world, where two year-one students, as the main characters, can navigate and find battles. To win the battles to upgrade, players have to answer different pre-calculus and calculus questions correctly within a relatively short time. While playing this game, students can study and consolidate their knowledge in pre-calculus and calculus topics.

The original targeted users are students of MATH1520 University Mathematics for Applications (around 150 students per academic year), but because of the content similarity, the game can also be used by students of MATH1010 University Mathematics (around 400 students per academic year), and MATH1510 Calculus for Engineers (around 600 students per academic year).

### **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?*

Google Analytics was implemented to perform statistical analysis of the project. Up to the submission of this report, there were 5.4K users (7.8K sessions) of the games.

Besides of encouraging comments collected from students by the project developers, this game also aroused attention among students on social media, like Facebook, youtube, etc. Most of the users showed great interest of the game. They found it is enjoyable to play a game set in CUHK campus, and therefore the mathematical concepts would come more naturally. Also, by playing this game, they had a sense of belonging as a CUHK student. We also adopted their suggestions to improve the interface, question banks and teaching materials during the development of the game.

### **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 RPG successfully attracted the attention of our students and the university (refer to <https://www.facebook.com/CUHKSecrets/posts/1212814835489296>

and the interview conducted by the CUHK Communications and Public Relation Office <http://www.cpr.cuhk.edu.hk/cutv/detail/852?lang=en&t=the-myth-of-calculus>).

Apart from online teaching materials or quizzes, this project also explored the possibility of learning mathematics in a more enjoyable and interesting way which is agreed by our students as well as the public. It has been reported by media such as Commercial Radio Hong Kong

(refer to

[http://www.881903.com/Page/ZH-TW/newsdetail.aspx?csid=261\\_341&itemid=956930](http://www.881903.com/Page/ZH-TW/newsdetail.aspx?csid=261_341&itemid=956930) and <https://www.hk01.com/社會新聞/97280>)

## PART II

### Financial data

Funds available:

Funds awarded from CDG	\$ 69,600
Funds secured from other sources (please specify _____)	\$ 0
Total:	\$ 69,600

Expenditure:

Item	Budget as per application	Expenditure	Balance
Computer Software		1,899.81	
Hardware, Stationary and Supplies		16,532	
Hiring Student Assistants		34,500	
Total:		52,931.81	16,668.19

## 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?*

During the development of the project, we found that the budget was not sufficient to hire an external computer graphic designer, while it was also hard for us to hire a student assistant with computer graphic design skills.

#### 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: Calculus  
                           Keyword 2: CUHK  
                           Keyword 3: Role Playing Game  
                           Keyword 4: Educational Game  
 (Least relevant)    Keyword 5: Online Game

### **2. Summary statistics**

*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>
<p><b>(a) Project website:</b></p> <p><i>If a publicly accessible project website has been constructed, please provide the URL</i></p> <p><a href="http://www.math.cuhk.edu.hk/~klchan/www/index.html">http://www.math.cuhk.edu.hk/~klchan/www/index.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</i></p>

<i>department's or faculty's website), please provide the URL(s) in here</i>
<b>(c) Others (please specify):</b>

**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.*

<u>Course Code/ Target Students</u>	<u>Term &amp; Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>e.g.: Dept of xxxx</i>	<i>All 1<sup>st</sup> year students</i>	<i>40</i>	<i>facebook</i>
MATH1520	Year 1 students	150	
MATH1010		400	
MATH1510		600	

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

<i>Please classify each of the (oral/poster) presentations into one and only one of the following categories</i>	<b>Number</b>
(a) In workshop/retreat within your unit (e.g. department, faculty)	<i>Please insert no</i>
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	<i>Please insert no</i>
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	<i>Please insert no</i>
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	<i>Please insert no</i>
(e) In international conference	<i>Please insert no</i>
(f) Others (please specify)	<i>Please insert no</i>

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

<i>Please classify each piece of publications into one and only one of the following categories</i>	<b>Number</b>
(a) Project CD/DVD	<i>Please insert no</i>
(b) Project leaflet	<i>Please insert no</i>
(c) Project booklet	<i>Please insert no</i>
(d) A section/chapter in a booklet/book distributed to a limited group of audience	<i>Please insert no</i>
(e) Conference proceeding	<i>Please insert no</i>
(f) A chapter in a book accessible internationally	<i>Please insert no</i>
(g) A paper in refereed journal	<i>Please insert no</i>
(h) Others (please specify)	<i>Please insert no</i>