THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant (2017-18)

Final Report

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

PART I

Project title: Animated Courseware in Evolutionary Biology
Principal supervisor: Jerome Ho Lam HUI
Co-supervisor(s)   Ray Lee, Ho Yin Yip, Ivy Lee, Kam Bo Wong
Department / Unit   School of Life Sciences, ITSC
Project duration: From March 2018 to February 2019
Date report submitted: 16 May 2019

1. Project objectives

This project aims to develop animated courseware for introducing the basic concepts of evolutionary biology for CUHK students. The materials are intended to be made in an interactive way to which students can understand basic key concepts, especially on how organisms evolve in terms of mutation, competition, migration, and extinction throughout time. Students can better understand these key concepts via interacting with the animation.

The "Evolution" concept is usually found to be abstract to most students, and their understanding will be enhanced or aided with the interactive animated courseware. We aim to use the developed materials as flipped classroom, where students can carry out self-study before going to lectures, which will not only facilitate the teaching and understanding, but will also allow us to have more time to teach both broader and deeper to benefit our students.

Overall, the project on track meets its objectives, and its developed materials can be found at: http://www.cuhk.edu.hk/culive/evolution/.

2. Process, outcomes or deliverables

The target students mainly belong to the advanced course in Biology Programme (BIOL4010 Evolutionary Biology), but the developed courseware will also benefit those in the junior years such as some of the second year students admitted to the School of Life Science under the course MBTE2010 Diversity of Life, and also the first year students under the broad-based admission at the Faculty of Science, where LSCI1002 Introduction to Biological Sciences is offered as a faculty package.

We intended to construct both 1) a website including basic information and concepts of evolutionary biology, as well as 2) developing an animated story showing the evolution of organisms.

A part-time research assistant and current postgraduates who were our previous undergraduate students and had taken the courses LSCI1002 and BIOL4010, have helped throughout the process in the development of courseware. This was done in light that inputs would not only be coming from the perspective of the team leader (i.e. course teacher), but also from the views of students who had taken the course (end users), to facilitate multi-directional inputs during the construction of courseware.

In addition, we had carried out a questionnaire surveys (also to those who had not taken the related courses) to help with evaluating the products at the end, which allowed us to make final amendments to facilitate and cater for the best students learning experience.

Technical skills from the ITSC were acquired in order to develop the website (Adobe MUSE, Photoshop, Illustration, and After effect), animated courseware (Storyline, Adobe Premiere and Animate), as well as hosting and maintenance under ITSC blackboard server.

We envision that this established platform can be used to keep on adding other topics and modules related to evolutionary biology to the website (which could also be hosted under the website of the School of Life Sciences), so we foresee this courseware can be and will be multi-stages.

There is no major change in the deliverables and the project was completed in a satisfactory manner.

3. Evaluation Plan

As mentioned above in section 2, we had asked a part-time research assistant as well as current postgraduates who were previously our undergraduate students taken the courses to provide continuous evaluation during the production of website and animated courseware.

Questionnaire surveys were also carried out by those who had taken or not taken the related courses at the latter stage of the product development.

If deemed appropriate, we also plan to utilize professional consultation service via the eLearning Service in this summer to ensure the product will best reach and can serve its purpose to our students after its first public dissemination.

Questionnaire sample and responses can be found at Appendix 1 and 2.

4. Dissemination, diffusion and impact

A website has been made to contain the 4 modules (including the animations) at http://www.cuhk.edu.hk/culive/evolution/.

The "Evolution" concept is usually found abstract to most students, and their understanding will be enhanced or aided with the interactive animated courseware. We aim to use the developed materials as flipped classroom, where students can carry out self-study before going to lectures, which will not only facilitate the teaching and understanding, but will also allow us to have more time to teach both broader and deeper to benefit our students.

The target students mainly belong to the advanced course in Biology Programme (BIOL4010 Evolutionary Biology), but the developed courseware will also benefit those in the junior years such as some of the second year students admitted to the School of Life Science under the course MBTE2010 Diversity of Life, and also the first year students under the broad-based admission at the Faculty of Science, where LSCI1002 Introduction to Biological Sciences is offered as a faculty package.

We will host the link of the website at the webpage of the School of Life Sciences, and make it available to all students at the School of Life Sciences (~1000 students), as well as to all CUHK students.

PART II

Financial data

Funds available:

Funds awarded from CDG	$	95,000
Funds secured from other sources	$	NIL
(please specify_____)		

Total:	$	95,000

Expenditure:

Item	Budget as per application	Expenditure	Balance
ITSC courseware development service			
Labour cost		$68,510	
Material cost		$26,350	
Total:		$94,860	$140

PART III

Lessons learnt from the project

As one can see in Appendix 2, in general, we have obtained good feedbacks relating to this courseware.

What did you like most in the courseware?

7 responses

contents well illustrated with photos and diagrams

Animations

clear illustrations and animate

The video/animation can clearly explain the concept of evolution

asking questions at the beginning of the module, explaining the concepts with good examples

Nice pic with interesting description

animation

Retrieved from the open-ended question as shown above, the key success factors lie with 1) the animations and presentation of materials, which really help an abstract concept to be better explained and understood.

2) In addition, based on our own team's judgement, during the development of the courseware, we believe continuous inputs from students, especially those who have taken the course, will really help to understand the students' needs from the students' perspectives (end-users) which could be overlooked from the course convenor's point of view.

3) The project could not be possibly finished in a successful way without tremendous helps and supports from the ITSC, including professional advices and works, as well as patience in changing the different features and details from time to time.

In the future, the University should consider taking a similar approach in getting students who have previously taken the course to get involved in making the new courseware. The more they involved, the better it will be delivered.

<u>**PART IV**</u>
<u>Information for public access</u>

This project aims to develop animated courseware for introducing basic concepts of evolutionary biology. The materials are intended to be made in an interactive way to understand basic key concepts, especially on how organisms evolve in terms of mutation, competition, migration, and extinction throughout time. Students can better understand these key concepts via interacting with the animation.

The "Evolution" concept is usually found to be abstract to many, and hopefully the animated courseware presented here will enhance or facilitate one's understanding.

The developed materials can also be used as flipped classroom, where students can carry out self-study before going to lectures, which will not only facilitate the teaching and understanding, but will also allow one to have more time to teach both broader and deeper to benefit the students.

The four modules can be found at: http://www.cuhk.edu.hk/culive/evolution/.

1. Keywords

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

(Most relevant)   Keyword 1: Evolution

Keyword 2: Mutation

Keyword 3: Competition

Keyword 4: Migration

(Least relevant)   Keyword 5: Extinction

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:** http://www.cuhk.edu.hk/culive/evolution/
(b) **Webpage(s):** http://www.cuhk.edu.hk/culive/evolution/
(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**
School of Life Sciences	*All students*	*800*	*Blackboard + CUHK website*

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)	*N/A*
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	*N/A*
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	*N/A*
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	*N/A*
(e) In international conference	*N/A*
(f) Others (please specify)	*N/A*

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

3. A one-page brief write up

This project aims to develop animated courseware for introducing basic concepts of evolutionary biology for CUHK students. We have constructed both 1) a website including basic information and concepts of evolutionary biology, as well as 2) developing an animated story showing the evolution of organisms. The materials are intended to be made in an interactive way to which students can understand basic key concepts, especially on how organisms evolve in terms of mutation, competition, migration, and extinction throughout time. Students can better understand these key concepts via interacting with the animation.

The "Evolution" concept is usually abstract to most students, and their understanding will be enhanced or aided with the interactive animated courseware. We aim to use the developed materials as flipped classroom, where students can carry out self-study before going to lectures, which will not only facilitate the teaching and understanding, but will also allow us to have more time to teach both broader and deeper to benefit our students.

One special feature during the development of this courseware is that we have asked a part-time research assistant as well as current postgraduates who were previous undergraduate students of our School, and had taken the courses, to help with development of the courseware. This was done in light that inputs would not only be coming from the perspective of the team leader (i.e. course teacher), but also from the views of students who had taken the course, to facilitate multi-directional inputs during the construction of courseware.

In addition, we had carried out a questionnaire surveys (to those who had taken or not taken the related courses) to help with evaluating the products at the end, and allowed us to make final amendments to facilitate and cater for the best students learning experience.

We envision that this established platform can be used to keep on adding other topics and modules related to evolutionary biology to the website, so we foresee this courseware can be and will be multi-stages. Overall, the project on track meets its objectives, and can be found at: http://www.cuhk.edu.hk/culive/evolution/.

Appendix I: Questionnaire

1) Have you attended the following courses?

☐ BIOL4010

☐ MBTE2010

☐ LSCI1002

☐ None of the above

Title

If you have chosen "Yes" for one of the above, proceed to Q2.

2a) If you have attended any of the above courses, do you think it has enhanced

○ Yes

○ No

2b) Will you recommend to students who have not taken these courses?

○ Yes

○ No

Title

Go to Section 3

3a) Do you think the modules have increased your understanding in evolutionary

○ Yes

○ No

3b) Do you think the modules have arouse your interests in evolutionary biology?

○ Yes

○ No

About the courseware

Description (optional)

The courseware motivated me to learn by arousing my interest and curiosity

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware helped to improve my understanding of difficult concepts.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware allowed me to learn at my own pace.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware helped me understand the course content better.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware could highlight important concepts.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware is attractive.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

The courseware is easy to use.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

In general, I am satisfied with the courseware.

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

Open-ended questions

Description (optional)

What did you like most in the courseware?
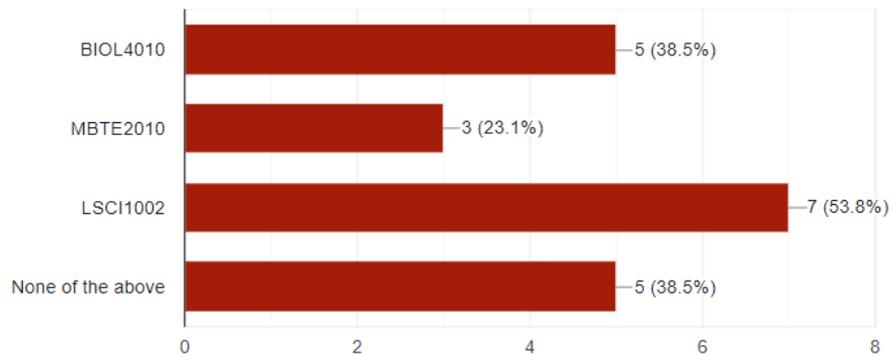
Long-answer text

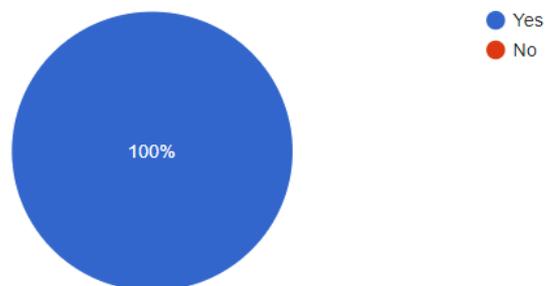What could be improved in the courseware?

Long-answer text

Appendix 2: Responses

1) Have you attended the following courses?

13 responses

Course	Responses
BIOL4010	5 (38.5%)
MBTE2010	3 (23.1%)
LSCI1002	7 (53.8%)
None of the above	5 (38.5%)

2a) If you have attended any of the above courses, do you think it has enhanced your understanding on the topics?

9 responses

- Yes: 100%
- No

2b) Will you recommend to students who have not taken these courses?

9 responses

- Yes: 100%
- No

13
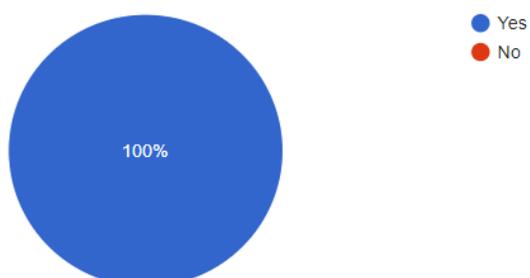
3a) Do you think the modules have increased your understanding in evolutionary biology?
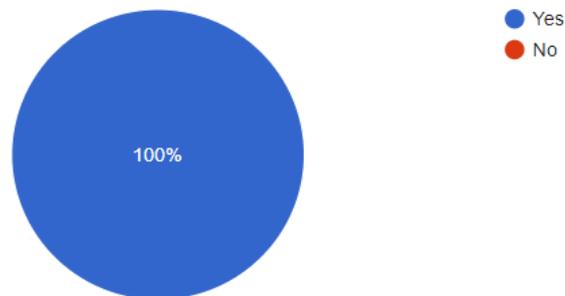
11 responses

- Yes
- No

100%

3b) Do you think the modules have arouse your interests in evolutionary biology?

11 responses

- Yes
- No

100%
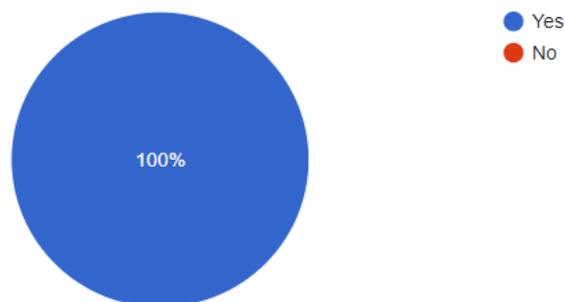
About the courseware

The courseware motivated me to learn by arousing my interest and curiosity towards the subject.

13 responses
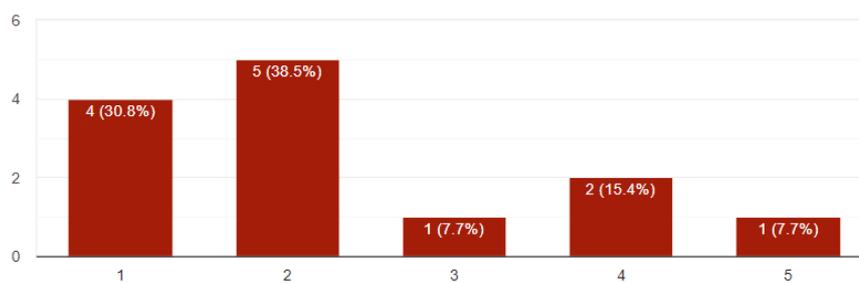
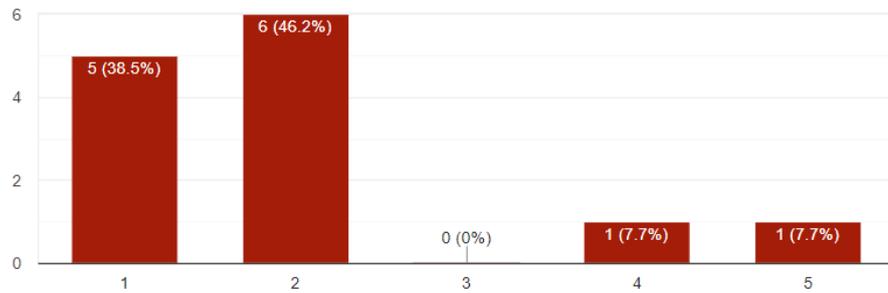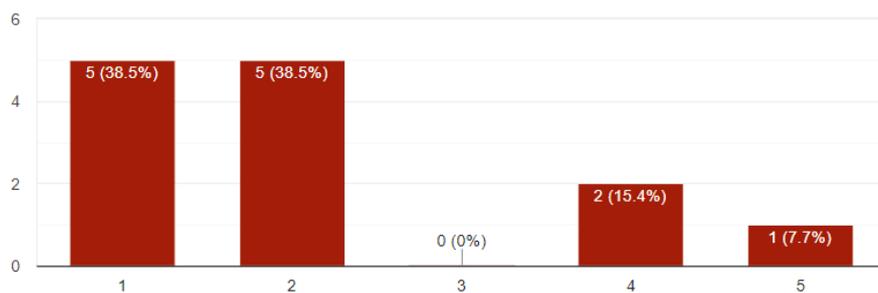## The courseware helped to improve my understanding of difficult concepts.

13 responses
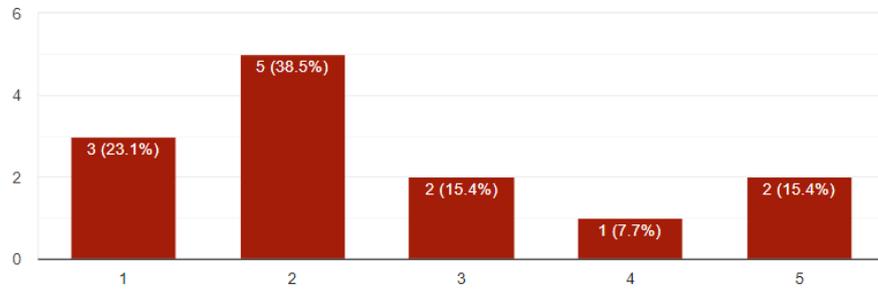
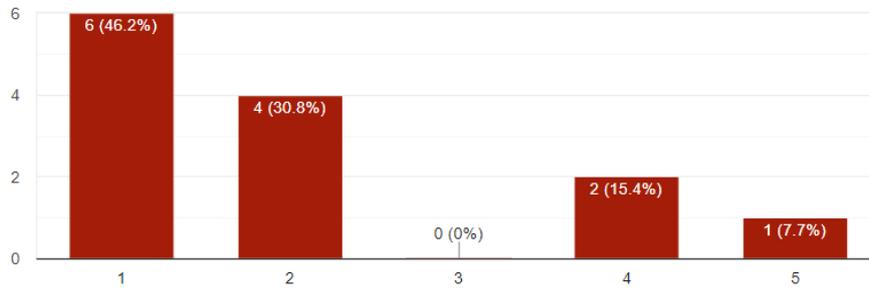## The courseware allowed me to learn at my own pace.

13 responses

The courseware helped me understand the course content better.
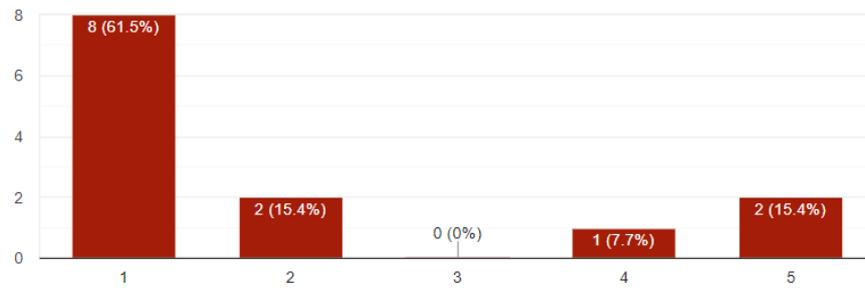
13 responses

15

The courseware could highlight important concepts.
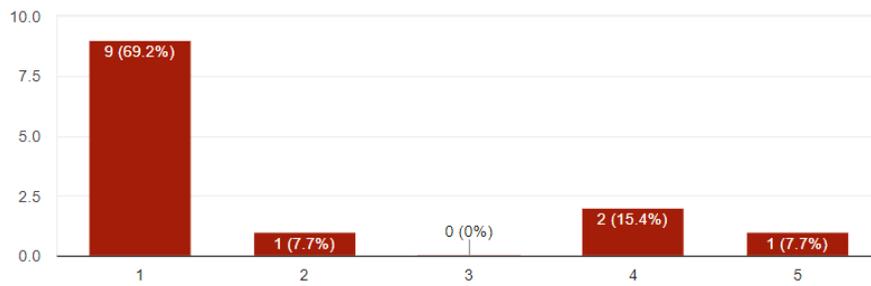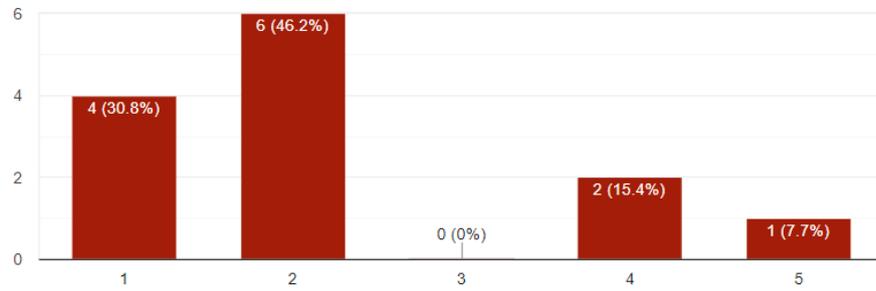
13 responses

The courseware is attractive.

13 responses

The courseware is easy to use.

13 responses

In general, I am satisfied with the courseware.

13 responses

Open-ended questions

What did you like most in the courseware?

7 responses

contents well illustrated with photos and diagrams

Animations

clear illustrations and animate

The video/animation can clearly explain the concept of evolution

asking questions at the beginning of the module, explaining the concepts with good examples

Nice pic with interesting description

animation

What could be improved in the courseware?

3 responses

narration can be added to slides

adding a few question among different modules to test understanding.

N/A