

THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 1: Basic Scheme

Final Report (2016-17)

Report due 30 April 2018

Please return by email to The Ad hoc Committee on Planning of eLearning Infrastructure
mmcd@cuhk.edu.hk

PART I

Project title: Fable-based Learning for Learning Discrete Optimization

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Co-supervisor(s) Peter Stuckey (University of Melbourne)

Department / Unit Department of Computer Science & Engineering

Project duration: From May 2017 to April 2018

Date report submitted: Jun 27, 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 MMCDG project?

During the planning stage, we discovered that the planned 3rd MOOC turned out to contain much more content than expected (similar to the amount of contents for the 1st and 2nd MOOCs). After discussion with the Melbourne partner and senior management, we decided to put off the production of the 4th MOOC and the Capstone project.

As far as the production of the 3rd MOOC is concerned, the project was on track. All videos were shot by October 31, 2017. Post production work, including translation, video editing, assignments, and Coursera website production, was finished subsequently by March, 2018. The new MOOC was launched on Coursera in May, 2018.

2. Process, outcomes or deliverables

Please specify the number of micro modules produced, and the course(s) (with course codes and titles) that have used the micro modules in Part IV, and provide more detailed

descriptions here. Must specify duration of each micro-modules (in terms of students online contact hours), total duration time of all deliverables and style. (With reference to the “Summary of video presentation styles” developed by CLEAR)

Has the nature of the deliverables been changed?

Have you adjusted your timeline?

Overall, was the project completed satisfactorily?

The project produced altogether 49 micromodules, listed as follows:

- Course Promotion (Chinese: 1m43s; English: 1m43s)
- Course Introduction (English only: 2m37s)

- Module 1 Lecture 1 (Chinese: 27m12s; English: 13m33s)
- Module 1 Lecture 2 (Chinese: 47m3s; English: 18m59s)
- Module 1 Lecture 3 (Chinese: 51m40s; English: 21m58s)
- Module 1 Lecture 4 (Chinese: 54m48s; English: 21m52s)
- Module 1 Lecture 5 (Chinese: 60m55s; English: 25m32s)
- Module 1 Summary (English only: 4m38s)
- Module 1 Workshop (English only: 19m4s)

- Module 2 Lecture 1 (Chinese: 54m41s; English: 17m36s)
- Module 2 Lecture 2 (Chinese: 54m21s; English: 20m11s)
- Module 2 Lecture 3 (Chinese: 34m5s; English: 14m03s)
- Module 2 Lecture 4 (Chinese: 39m05s; English: 14m30s)
- Module 2 Summary (English only: 6m30s)
- Module 2 Workshop (English only: 30m34s)

- Module 3 Lecture 1 (Chinese: 58m52s; English: 25m06s)
- Module 3 Lecture 2 (Chinese: 42m32s; English: 17m21s)
- Module 3 Lecture 3 (Chinese: 32m54s; English: 14m38s)
- Module 3 Summary (English only: 4m52s)
- Module 3 Workshop (English only: 26m35s)

- Module 4 Lecture 1 (Chinese: 41m6s; English: 15m34s)
- Module 4 Lecture 2 (Chinese: 31m56s; English: 12m15s)
- Module 4 Lecture 3 (Chinese: 20m14s; English: 6m49s)
- Module 4 Lecture 4 (Chinese: 19m51s; English: 7m6s)
- Module 4 Lecture 5 (Chinese: 22m48s; English: 9m9s)
- Module 4 Lecture 6 (Chinese: 44m16s; English: 28m50s)
- Module 4 Lecture 7 (Chinese: 45m58s; English: 24m36s)
- Module 4 Summary (English only: 8m19s)
- Module 4 Workshop (English only: 30m20s)

The micromodules consists of a total of 20h50m50s of videos for student consumption.

The styles of the micromodules are as follows:

- The course promotion videos are in the style of movie trailer.
- The module lectures are weatherman style lectures with the slides in the background.
- The module summaries are coffee table-style conversation between two teachers.
- The workshops are real-time hands-on coding with pair programming discussions.

The English versions of the micromodules together with the ones developed for the 1st and 2nd MOOCs are used in CSCI5240 (Combinatorial Search and Optimization with Constraints) in the Second Semester of 2017/18.

The nature of the deliverables are exactly as planned. There was no adjustment to the timeline. The project is considered satisfactorily completed.

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?

There were no changes to the evaluation plans. The evaluation is based on (a) course CTE and (b) a survey conducted by CLEAR.

In terms of course CTE, I achieved 5.75 both in Question 17 (Satisfaction with course) and Question 18 (Satisfaction of teacher). The *detailed CTE scores* and *student comments* are attached with this report.

CLEAR also conducted a survey on "[Pedagogical Evaluation of CSCI5240 on Blended Learning and Fable-based Learning](#)" to evaluate the students' perception on (1) Blended Learning, (2) Micro-modules, (3) Flipped learning, (4) Problem-based learning and (5) Fable-based learning. The *CLEAR writeup* is attached with this report.

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 (micro modules) can be adapted to other disciplines.

The produced MOOC course was launched on Coursera in May, 2018. Within a month, the course has already attracted 833 visitors, 128 active learners and 4 payments.

Presentations on the pedagogy and cross-institution collaboration experience were given at the Faculties of Engineering and Business Administration, the Coursera Conference 2017, the 4th Greater China MOOC Symposium (GCMS 2017), 2018 Online Learning Summit at the National Chiao Tung University (NCTU) and an exchange visit to NCTU.

The 3 MOOCs receive a running rating of 4.8/5.0 from learners at Coursera as of Jun, 2018. I quote the following recent “Learner Stories” on Coursera, one by a Program Director for the US NSF in AI and Robotics, one by a non-CS professor and another by a principal solution architect.

(1) *“Dear Peter, Jimmy, and other course staff/mentors (most notably, Diego, Carlos, and Andrew who seemed active in the discussions I needed most!)*

Thank you for a very challenging and rewarding course! I got exactly what I was looking for (and perhaps a bit more!)

I first became interested in MiniZinc when I attended CP/SAT/ICLP in Melbourne. I saw you both there, I think, but I did not have an excuse to meet you (I spent most of my time in ICLP). I am not a researcher in any of those communities. (FYI, I attend such conferences as a program director for the US NSF, where I have cognizance over a very broad range of AI grants). At the conference I was very intrigued by what I saw in MiniZinc, especially its rich declarative modeling language and ability to accommodate so many different solvers. I decided I would learn to model in that environment, mainly for my own curiosity, and for the potential I see to use it for practical problems. But I could not discipline myself to follow Guido Tack's seemingly excellent tutorial to do this. I finally found this MOOC and it was just what I needed to structure my learning and keep a schedule.

Your course is excellent and engaging. Thank you for the care you have obviously put into the course design. I think I probably put much more time into this than I had anticipated, and yet I really enjoyed doing that because you managed to keep me on the edge of my abilities and comprehension of the language features, which I believe is really the place to be for learning such a skill. That says a lot about the course. The workshops were probably the best pedagogical devices for me for most of the course. My particular approach in the workshops was to work through a project, start your solution video until you did something surprising, pause, try to work the new thing out myself, then go on... I even did that in some of the lectures. That got me wondering, if it might be an effective device to work into the videos for future courses -- places where you suggest we stop and work something out before continuing on.

The final assignment was an ideal capstone. It really tied together the important concepts of the course for me. By demanding that we consider and selectively choose modeling and representation choices from all four weeks, the exercise solidified my understanding of the language and helped me develop ways to think about representation. The exercise also showed me how sneaky logic errors can trip me up in declarative modeling. :-/ Really great stuff, keep it coming. I look forward to continuing in the specialization, and applying these new skills on some practical problems!

All the best, Jim Donlon (and sorry for the long note!)"

(2) *"It's not every day that I come across a whole new approach to solving my problems, yet here it is.*

I enjoyed your course greatly, though it has left me cursed. My curse is the constant suspicion that us humble non-CS professors have been arranging the world in non-optimal ways. I now see inefficiency everywhere I look, the question of "Did they even try for the optimal solution? Or did they just take the first one that satisfied the constraints" haunts me daily"

(3) *"I'm a principal solution architect for Sungard Availability Services. My engineering focus is hybrid private cloud. One of the particular challenges, and impetus for the course is optimizing resource assignment. The general approach is to simply over-allocated; hence, avoid the problem. This in a crude way is how AWS, Azure, Google, etc.. avoid the problem; simply have so many resources that's it's something that does not need to be dealt with. Individual corporations who cannot use hyper-scale clouds do not have that luxury. While attempting to solve an architecture with over 1000 virtual machines with multiple constraints I realized that it was impractical to attempt to solve this manually. I discovered your course and watched the first couple lessons.*

The scenario and story based approach is brilliant! Not only is it entertaining, it provides a context to the problem that is both interesting and relevant. I have watched every lesson multiple times, which would not have been enjoyable otherwise. Having completed the first course and solved, though I highly doubt it's as elegant or robust as it could be, my initial use case, your approach and instruction is so entertaining and interesting that I've enrolled in the second.

You both have obviously put a huge amount of effort into developing this course and honestly haven't completed the first course I would have happily paid more for the second course as you're delivering a great amount of value and entertainment.

Thank you."

As mentioned, the same MOOCs are used in my Postgrad level course CSCI5240 in a Blended Learning mode. In terms of course CTE, I achieved 5.75 both in Question 17 (Satisfaction with course) and Question 18 (Satisfaction of teacher). A survey by CLEAR also demonstrates that Fable-based learning, Problem-based learning and Flipped Classroom have good impacts on students' learning outcomes.

The Fable-based learning approach certainly has potential to be applied to courses for developing problem-solving skills. Possibilities include introductory calculus, physics and computer programming (unfortunately this idea was taken up by another project).

PART II

Financial data

Funds available:

Funds awarded from MMCDG	\$ 100000
Funds secured from other sources (please specify <u>Faculty of Engineering & RAC</u>)	\$ <u>200000 + 356000</u>
Total:	\$ <u>656000</u>

Expenditure:

Item	Budget as per application	Expenditure	Balance
3 RAs for script-writing and animations (9 months)	\$100000	\$180208.5	(\$80208.5)
Total:	\$100000	\$180208.5	(\$80208.5)

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?*

The MOOCs will continue to be featured on Coursera and CNMOOC. I'll try to continue to be a good and innovative teacher.

There are a few pedagogical innovations in the MOOCs. First, the Fable-based Learning approach is highly regarded by many learners. The stories/animations at the beginning of each video place subsequent learning in context. Second, learners also enjoy the workshop solution coding videos, which demonstrate how one should go about approaching a problem and what to do when one encounters problems. The videos are also places for teachers to

show modelling tricks. Third, the auto-grading system seems like a tool more for only convenience of the teachers and learners, but students are allowed multiple submissions until they are happy with their answers and grades. This relieves pressure from the learners and encourages them to strive for their best, and is in line with practices in workplaces.

The project received unfailing support from ITSC, in particular Judy Lo, in terms of project management and logistics. CLEAR also provided pedagogical evaluation services. Many thanx to them!

CUHK should give a salary raise to persons doing exceptional good work in teaching and learning!

PART IV

Information for public access

Summary information and brief write-ups of individual projects will be uploaded to a publicly accessible CUHK MMCDG 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 most relevant to your project to least relevant) to describe your micro-modules/pedagogies adopted.

(Most relevant) Keyword 1: Fable-based Learning
 Keyword 2: Discrete Optimization
 Keyword 3: Problem-based Learning
 Keyword 4:
 (Least relevant) Keyword 5:

2. Summary

Please provide information, if any, in the following tables, and provide the details in Part I.

Table 1: Publicly accessible online resources (if any)
<p>(a) Project website:</p> <p>https://www.coursera.org/learn/solving-algorithms-discrete-optimization/home/welcome</p> <p>https://www.coursera.org/learn/lisan-youhua-suanfapian/home/welcome</p>
<p>(b) Webpage(s):</p>

https://www.youtube.com/watch?v=LJGRA1vUq9o&t=21s&ab_channel=CUHKChannel

https://www.youtube.com/watch?v=5XP0lzy6vbQ&t=1s&ab_channel=CUHKChannel

(c) Tools / Services:

N/A

(d) Pedagogical Uses:

The produced micro-modules are essentially used in a MOOC setting (on Coursera). However, the produced videos together with the ones made in the 1st and 2nd MOOCs are collectively used for teaching CSCI 5240 (Combinatorial Search and Optimization with Constraints) with Blended Learning.

(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 & Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>MOOC</i>	<i>May, 2018 - present</i>	<i>Worldwide</i>	<i>Coursera</i>
<i>Dept of CS&E</i>	<i>Postgraduate Students</i>	<i>15-20</i>	<i>Coursera</i>

Table 3: Presentation (if any)

<i>Please classify each of the (oral/poster) presentations into one and only one of the following categories</i>	Number
(a) In workshop/retreat within your unit (e.g. department, faculty)	<i>1</i>
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR workshop, workshop organized by other CUHK units)	<i>1</i>
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	<i>0</i>
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	<i>0</i>
(e) In international conference	<i>2</i>
(f) Others (please specify)	<i>2</i>

Table 4: Publication (if any)

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<i>Please classify each piece of publication into one and only one of the following categories</i>	Number
(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

Please provide a one-page brief write-up of no more than 500 words and a short video.

Massive Open Online Courses (MOOCs) provide a platform for disseminating high quality training rapidly and widely to the mass, benefiting learners of different sectors such as those without ready access to higher learning, those seeking to upgrade their employment skills, and those engaging in life-long learning. A problem with traditional MOOCs is student engagement and retention, since MOOCs are essentially one-way lecturing in nature. This project embraces the pedagogical innovations and experience of a joint venture by The Chinese University of Hong Kong (CUHK) and the University of Melbourne (UniMelb) in the development of three MOOCs on the subject of “Modeling and Solving Discrete Optimization Problems.” In a nutshell, the MOOCs feature the Fable-Based Learning approach, which is a form of problem-based learning encapsulated in a coherent story plot. Each lecture video begins with an animation that tells a story based on the Chinese classic “Romance of the Three Kingdoms” in which the protagonists in the novel encounter a problem requiring technical assistance from the two professors from modern time via a magical tablet granted to them by a fairy god. The new pedagogy aims at increasing learners’ motivation and interests as well as situating the learners in a coherent learning context. Solution coding videos are also provided for workshop problem exercises. Learners should try out the workshop problems first, before viewing the solution videos to compare with their own approaches and see how the teachers would go about approaching the problems and recovering from modeling errors. Last but not least, the MOOCs also feature an auto-grading system allowing learners to submit multiple times, which relieves learners from stresses and encourages them to strive for their best. In addition to scriptwriting, animation production and situating the teaching materials in the story plot, another challenge of the project is the remote distance between the two institutions as well as the need to produce all teaching materials in both (Mandarin) Chinese and English to cater for different geographic learning needs.

Report of the evaluation on the effectiveness and students' perception of a blended learning course CSCI5240

Background

CLEAR was entrusted to conduct an evaluation on the effectiveness of a blended learning course (CSCI5240) that was developed by Prof. Jimmy Lee, Department of Computer Science and Engineering at CUHK in February 2018. A questionnaire (*Appendix A*) was designed to collect students' opinion on their user experience and perception of the blended learning features. The questionnaire was distributed to 17 students through the Google on-line survey system in March 2018. 8 responses were collected as of May 2018.

Findings

Part I: Summary

Respondents' eLearning literacy/experience

This blended learning course was a fairly new experience to the majority of the students we surveyed. While three thirds of them claimed that they were familiar with eLearning prior to taking this course, only half had actually taken a Massive Open Online Course (MOOC), and only one had taken a flipped/blended learning course at CUHK.

General perception of flipped/blended learning vs traditional lectures

Despite being relatively new to flipped/blended learning, over half of the respondents favoured a course delivered through a mix of traditional lectures and eLearning elements. It is noteworthy, however, that there were a few students who preferred a course with only face-to-face lectures. Students also expressed mixed opinions when asked to compare CSCI5240 with other lecture-only courses. For instance, while many considered them equally conducive to surface learning and deep learning, some found traditional lectures more desirable. Results also show that while most students found both CSCI5240 and non-blended courses intellectually stimulating, slightly more of them considered the latter better at grasping their attention. The results suggest that while eLearning is generally welcomed by students, it cannot replace traditional face-to-face lectures entirely.

Flipped classroom implementation

Comments on the flipped learning elements of this course were generally positive. Most students found the length of the micro-modules appropriate and the in-class activities well bridged with the micro-modules. Nearly all respondents agreed that the in-class activities consolidated what they learnt from the micro-modules and strengthened their critical thinking skills. They also found flipped learning fun.

Problem-based and fable-based learning

Students generally agreed problem-based learning enhanced their learning effectiveness; it helped consolidate what they learnt and understand new knowledge.

The fable-based element of the course was also much appreciated. Most students agreed that the use of the tale 'Romance of Three Kingdoms' in the micro-modules raised their interest in learning. They also confirmed that the story facilitated their understanding and recollection of the course content and helped with their problem-solving during the course of studying the micro-modules.

Weekly online surveys

The weekly online surveys gained very positive feedback from students as well. Most students found the length, number and level of difficulty of the surveys appropriate. They also confirmed that the surveys consolidated their knowledge of the course content and helped them keep track

of their learning progress.

Overall experience

Reflecting on their overall experience with the blended course, students generally found the course enjoyable. The majority of them were satisfied with the quality of the eLearning courseware, which they deemed influential to their learning effectiveness. They also considered the bi-weekly meetings essential to their learning. Most students reported that they were able to follow the course progress through self-learning, and had received helpful and timely feedback. Workload was also considered appropriate.

Conclusion

In conclusion, this eLearning course (CSCI5240) was generally well-received by the students. Its implementation of flipped classroom and its incorporation of problem-based and fable-based learning were also highly rated. Also, with good course structure design and class arrangement (i.e., the bi-weekly lectures), the course succeeded in facilitating effective learning. However, it is also noteworthy that students generally preferred a mix eLearning and traditional face-to-face lectures, which suggests that eLearning cannot replace traditional face-to-face lectures entirely. Rather, the two should go hand-in-hand to optimise students' learning experience.

Survey statistics are given in detail in Part II.

Part II: Statistical findings

A: Demographic information

Q1: What is your major programme of study?

	No. of response	Percent (%)
Computer Science	3	37.5
Master of Computer Science	1	12.5
PhD of CSE	1	12.5
Unknown	3	12.5
Total	8	100.0

Q2: What is your level of study?

	No. of response	Percent (%)
MSc	3	37.5
MPhil	1	12.5
PhD	4	50.0
Total	8	100.0

Q3: Your major in undergraduate study was computer science

	No. of response	Percent (%)
No	5	62.5
Yes	3	37.5
Total	8	100.0

Q4: What is your gender?

	No. of response	Percent (%)
Male	8	100.0
Total	8	100.0

Q5: Is it a compulsory course or elective course?

	No. of response	Percent (%)
Compulsory	1	12.5
Elective	7	87.5
Total	8	100.0

Q6: Are you familiar with eLearning before taking this course?

	No. of response	Percent (%)
No	2	25.0
Yes	6	75.0
Total	8	100.0

Q7: Do you have any computer programming skills?

	No. of response	Percent (%)
No	0	0
Yes	8	100.0
Total	8	100.0

Q8: Do you have any experiences in the following activities? [Taking a MOOC]

	No	Yes	Total
Taking a MOOC	4 (50%)	4 (50%)	8 (100%)
Doing a CUHK course which adopts blended learning	7 (87.5%)	1 (12.5%)	8 (100%)
Doing a CUHK course which adopts flipped learning	7 (87.5%)	1 (12.5%)	8 (100%)

B: User experience and perception

Q1: General speaking, which of the following do you prefer most?

	No. of response
A course delivered through the mix of eLearning and traditional face-to-face lectures	5 (62.5%)
A course purely delivered through traditional face-to-face lectures	3 (37.5%)
A course purely delivered through eLearning	0 (0%)
Total	8 (100%)

Q2: Comparing your experience with this flipped learning course and with other courses with traditional face-to-face lectures:

	Both	Flipped learning	Traditional face-to-face lecturing	Neither	Total
a. Which approach is more intellectually stimulating to you?	5 (62.5%)	1 (12.5%)	2 (25%)	0 (0%)	8 (100%)
b. Which helps you understand the course concepts better?	4 (50%)	0 (0%)	4 (50%)	0 (0%)	8 (100%)
c. Which is favorable to surface learning (e.g. memorisation and reproduction of facts)?	3 (37.5%)	2 (25%)	3 (37.5%)	0 (0%)	8 (100%)
d. Which is favorable to deep learning (e.g. understanding reasons behind facts, establishing links between ideas, etc.)?	4 (50%)	0 (0%)	4 (50%)	0 (0%)	8 (100%)
e. Which draws your attention better?	3 (37.5%)	0 (0%)	5 (62.5%)	0 (0%)	8 (100%)

Q3: What do you think about the flipped learning element in this course?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
a. I encountered no technical difficulty when studying the micro-modules.	2 (25%)	3 (37.5%)	1 (12.5%)	0 (0%)	2 (25%)	8 (100%)
b. The length of the micro-modules is appropriate.	2 (25%)	4 (50%)	0 (0%)	0 (0%)	2 (25%)	8 (100%)
c. The in-class activities are well bridged with the micro-modules.	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
d. The in-class activities consolidate what I have learnt from the micro-modules.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
e. The in-class activities enhance my critical thinking skills.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
f. The flipped learning practice increases my learning effectiveness.	2 (25%)	3 (37.5%)	1 (12.5%)	0 (0%)	2 (25%)	8 (100%)
g. The flipped learning practice encourages teacher-student interactions.	2 (25%)	3 (37.5%)	1 (12.5%)	0 (0%)	2 (25%)	8 (100%)
h. The flipped learning practice encourages interactions among students.	1 (12.5%)	3 (37.5%)	2 (25%)	0 (0%)	2 (25%)	8 (100%)
i. I find flipped learning fun.	1 (12.5%)	5 (62.5%)	0 (0%)	0 (0%)	2 (25%)	8 (100%)

4a. What do you think about the problem-based learning element in this course? Which of the following do you prefer: (1) problem-based learning (i.e., learning by problem-solving), or (2) learning the facts before solving problems?

Both	1 (12.5%)
Learning the facts before solving problems	2 (25%)

Problem-based learning	5 (62.5%)
Total	8 (100%)

4b-f. What do you think about the problem-based learning element in this course?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
b. I encountered no technical difficulty when studying the micro-modules.	2 (25%)	3 (37.5%)	2 (25%)	1 (12.5%)	0 (0%)	8 (100%)
c. Problem-solving helps consolidate what I have learnt.	2 (25%)	4 (50%)	2 (25%)	0 (0%)	0 (0%)	8 (100%)
d. Problem-solving helps me understand new knowledge better.	3 (37.5%)	3 (37.5%)	2 (25%)	0 (0%)	0 (0%)	8 (100%)
e. The problem-based learning approach increases my learning effectiveness.	3 (37.5%)	3 (37.5%)	2 (25%)	0 (0%)	0 (0%)	8 (100%)
f. I find problem-solving interesting.	3 (37.5%)	3 (37.5%)	2 (25%)	0 (0%)	0 (0%)	8 (100%)

5. What do you think about the fable-based learning element in this course?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
a. The story raises my interest in learning the subject.	2 (25%)	4 (50%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)
b. The story facilitates my understanding of the course content.	2 (25%)	4 (50%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)
c. The story helps me recall the knowledge I have acquired after studying the micro-modules.	2 (25%)	3 (37.5%)	1 (12.5%)	1 (12.5%)	1 (12.5%)	8 (100%)
d. The story helps me stay attentive when studying the micro-modules.	1 (12.5%)	4 (50%)	1 (12.5%)	1 (12.5%)	1 (12.5%)	8 (100%)
e. The story helps me solve the problems in the micro-modules.	1 (12.5%)	5 (62.5%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)
f. The fable-based learning element increases my learning effectiveness.	1 (12.5%)	5 (62.5%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)
g. The course content blends in well with the story.	3 (37.5%)	3 (37.5%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)
h. The quality of the animation is satisfactory.	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
i. I find fable-based learning fun.	3 (37.5%)	3 (37.5%)	0 (0%)	1 (12.5%)	1 (12.5%)	8 (100%)

6. What is your opinion on the weekly online surveys?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
a. The length of the weekly questionnaires is appropriate.]	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
b. The number of surveys (i.e., twelve in total) is appropriate.	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
c. The surveys help me keep track of my learning progress.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
d. The surveys help consolidate my knowledge of the course content.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
e. The quizzes (i.e., questions on the subject matter) are of appropriate level of difficulty.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)

7. How is your overall experience with this flipped learning course?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
a. The workload of this course is appropriate.	2 (25%)	3 (37.5%)	1 (12.5%)	0 (0%)	2 (25%)	8 (100%)
b. I am able to follow the course progress through self-learning.	2 (25%)	4 (50%)	0 (0%)	0 (0%)	2 (25%)	8 (100%)
c. The bi-weekly face-to-face meetings with the professor are essential to my learning.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
d. I receive helpful and timely feedback.	2 (25%)	4 (50%)	0 (0%)	0 (0%)	2 (25%)	8 (100%)
e. I am satisfied with the quality of the eLearning courseware.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
f. The quality of the eLearning courseware matters to my learning effectiveness.	3 (37.5%)	4 (50%)	0 (0%)	0 (0%)	1 (12.5%)	8 (100%)
g. I enjoy taking this course.	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
h. I will recommend this course to my friends and/or classmates.	3 (37.5%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)

8. Other comments on this course:

- good (x2)
- Meeting every week may be better.
- Students are not nice.
- The contents are well-explained.
- The course is very interesting but I prefer a tutorial who can help students after class.

- Very Good!
- Workload is too heavy

9. Other comments on eLearning at CUHK:

- eLearning allows students to control their own progress, which is good for students who can't wait to learn more.
- eLearning system can also introduce this kind of MOOC style courses.
- Good
- No comments
- No problem.
- OK
- Workload is too heavy

Introduction

CSCI5240 is a blended course featuring flipped, problem-based and fable-based learning elements. The purpose of this questionnaire survey is to collect your opinion on the new teaching/learning approach and hence evaluate the effectiveness of it.

All information collected will be kept with strict confidence and will be used for research purposes only. Should you have any questions, please feel free to contact the Centre for Learning Enhancement And Research (CLEAR) by emailing clear@cuhk.edu.hk.

Since this questionnaire covers a number of eLearning and other non-traditional teaching and learning concepts, you may refer to the following descriptions for your familiarisation with the concepts before the survey begins.

1. Blended learning
Blended learning, or blending, is a kind of eLearning approach with a mix of face-to-face lectures and eLearning sessions. Students may or may not need to study eLearning materials before class, and eLearning elements may be utilized in-class. Under this approach, face-to-face lectures are not replaced by eLearning.
2. Micro-module
Micro-modules are small learning units with versatile formats and features. They may include short lecture, demonstration, hands-on activity, assessment items, etc. Students may access and view the modules before or after class. (Source: p.2, eLearning Policy for implementation in 2017-18, The Chinese University of Hong Kong)
3. Flipped learning
Flipped learning is another kind of eLearning approach under which students are required to study online course materials (e.g. micro-modules) before attending in-class discussions on more advanced topics or other interactive activities.
4. Problem-based learning
Problem-based learning is a learning approach in which students learn about a subject by actively engaging in problem-solving.
5. Fable-based learning
Fable-based learning refers to the learning approach which incorporates a story element in the learning materials. In the case of this course, it is exemplified by the use of the story 'Romance of the Three Kingdoms' in the micro-modules.

Part A: Demographic information

1. What is your major programme of study?

2. What is your level of study? MSc MPhil PhD
3. Your major in undergraduate study was computer science . Yes No
4. What is your gender? F M
5. Is it a compulsory course or elective course?
 Compulsory Elective None of the above
6. Are you familiar with eLearning before taking this course? Yes No
7. Do you have any computer programming skills? Yes No
8. Do you have any experiences in:
 - i) taking a MOOC; Yes No
 - ii) doing a CUHK course which adopts blended learning; Yes No
 - iii) doing a CUHK course which adopts flipped learning? Yes No

Part B: User experience and perception

Please choose the answer which best represents your opinion.

General speaking, which of the following do you prefer most?

- A course purely delivered through eLearning
- A course purely delivered through traditional face-to-face lectures
- A course delivered through the mix of eLearning and traditional face-to-face lectures
- None of the above (please specify your preference: _____)

Comparing your experience with this flipped learning course and with other courses with traditional face-to-face lectures,

- a. Which approach is more intellectually stimulating to you?
 - Flipped learning Traditional face-to-face lecturing
 - Both Neither

Which helps you understand the course concepts better?

- Flipped learning Traditional face-to-face lecturing
- Both Neither

Which is favorable to surface learning (e.g. memorisation and reproduction of facts)?

- Flipped learning Traditional face-to-face lecturing
- Both Neither

Which is favorable to deep learning (e.g. understanding reasons behind facts, establishing links between ideas, etc.)?

- Flipped learning Traditional face-to-face lecturing
 Both Neither

Which draws your attention better?

- Flipped learning Traditional face-to-face lecturing
 Both Neither

What do you think about the **flipped learning** element in this course?

- a. I encountered no technical difficulty when studying the micro-modules.
 Strongly agree Agree Neutral Disagree Strongly disagree

The length of the micro-modules is appropriate.

- Strongly agree Agree Neutral Disagree* Strongly disagree*

(* The modules are: too short too long.)

The in-class activities are well bridged with the micro-modules.

- Strongly agree Agree Neutral Disagree Strongly disagree

The in-class activities consolidate what I have learnt from the micro-modules.

- Strongly agree Agree Neutral Disagree Strongly disagree

The in-class activities enhance my critical thinking skills.

- Strongly agree Agree Neutral Disagree Strongly disagree

The flipped learning practice increases my learning effectiveness.

- Strongly agree Agree Neutral Disagree Strongly disagree

The flipped learning practice encourages teacher-student interactions.

- Strongly agree Agree Neutral Disagree Strongly disagree

The flipped learning practice encourages interactions among students.

- Strongly agree Agree Neutral Disagree Strongly disagree

I find flipped learning fun.

- Strongly agree Agree Neutral Disagree Strongly disagree

What do you think about the **problem-based learning** element in this course?

- a. Which of the following do you prefer: (1) problem-based learning (i.e., learning by problem-solving), or (2) learning the facts before solving problems?
 Problem-based learning Learning the facts before solving problems
 Both Neither

The problems are of appropriate level of difficulty.

Strongly agree Agree Neutral Disagree* Strongly disagree*

(* They are: too easy too difficult.)

Problem-solving helps consolidate what I have learnt.

Strongly agree Agree Neutral Disagree Strongly disagree

Problem-solving helps me understand new knowledge better.

Strongly agree Agree Neutral Disagree Strongly disagree

The problem-based learning approach increases my learning effectiveness.

Strongly agree Agree Neutral Disagree Strongly disagree

I find problem-solving interesting.

Strongly agree Agree Neutral Disagree Strongly disagree

What do you think about the **fable-based learning** element in this course?

a. The story raises my interest in learning the subject.

Strongly agree Agree Neutral Disagree Strongly disagree

The story facilitates my understanding of the course content.

Strongly agree Agree Neutral Disagree Strongly disagree

The story helps me recall the knowledge I have acquired after studying the micro-modules.

Strongly agree Agree Neutral Disagree Strongly disagree

The story helps me stay attentive when studying the micro-modules.

Strongly agree Agree Neutral Disagree Strongly disagree

The story helps me solve the problems in the micro-modules.

Strongly agree Agree Neutral Disagree Strongly disagree

The fable-based learning element increases my learning effectiveness.

Strongly agree Agree Neutral Disagree Strongly disagree

The course content blends in well with the story.

Strongly agree Agree Neutral Disagree Strongly disagree

The quality of the animation is satisfactory.

Strongly agree Agree Neutral Disagree Strongly disagree

I find fable-based learning fun.

Strongly agree Agree Neutral Disagree Strongly disagree

What is your opinion on the weekly online surveys?

a. The length of the weekly questionnaires is appropriate.

Strongly agree Agree Neutral Disagree* Strongly disagree*

(* The surveys are: too short too long.)

The number of surveys (i.e., ten in total) is appropriate.

Strongly agree Agree Neutral Disagree* Strongly disagree*

(* There are: too few too many.)

The surveys help me keep track of my learning progress.

Strongly agree Agree Neutral Disagree Strongly disagree

The surveys help consolidate my knowledge of the course content.

Strongly agree Agree Neutral Disagree Strongly disagree

The quizzes (i.e., questions on the subject matter) are of appropriate level of difficulty.

Strongly agree Agree Neutral Disagree* Strongly disagree*

(* The questions are: too easy too difficult.)

How is your overall experience with this flipped learning course?

a. The workload of this course is appropriate.

Strongly agree Agree Neutral Disagree Strongly disagree

I am able to follow the course progress through self-learning.

Strongly agree Agree Neutral Disagree Strongly disagree

The bi-weekly face-to-face meetings with the professor are essential to my learning.

Strongly agree Agree Neutral Disagree Strongly disagree

I receive helpful and timely feedback.

Strongly agree Agree Neutral Disagree Strongly disagree

I am satisfied with the quality of the eLearning courseware.

Strongly agree Agree Neutral Disagree Strongly disagree

The quality of the eLearning courseware matters to my learning effectiveness.

Strongly agree Agree Neutral Disagree Strongly disagree

I enjoy taking this course.

Strongly agree Agree Neutral Disagree Strongly disagree

I will recommend this course to my friends and/or classmates.

Strongly agree Agree Neutral Disagree Strongly disagree

Other comments on **this course**:

Other comments on **eLearning at CUHK**:

Thank you for completing the questionnaire.

To know more about your personal learning experience with the course, you are cordially invited to a short focus group discussion scheduled in May after the final examination. Your opinion is essential for more comprehensive evaluation of the teaching effectiveness of the course and will be highly appreciated.

Please choose one of the following options to indicate your preference.

I am interested in joining the focus group discussion. My contact information* is as follows:

Name: _____

Email: _____

Tel: _____

I am not interested in joining the focus group discussion.

* The information will be used solely for scheduling the discussion with you and will not be disclosed to a third party.



Faculty of Engineering - Department of Computer Science and En

Course and Teaching Evaluation Individual Report, 2nd Term 2017-2018

Course Code: CSC15240	Course Title: Combinatorial Search and Optimization with Constraints					Teacher: Professor LEE Ho Man				
Class Size: 17	No. Returned: 8					Response Rate: 47.06%				
a. Faculty Affiliation:	ART	BAS	EDU	ERG	LAW	MED	SCI	SSC	OTHER	
	0.00% (0)	0.00% (0)	0.00% (0)	87.50% (7)	0.00% (0)	0.00% (0)	12.50% (1)	0.00% (0)	0.00% (0)	
b. Level	Undergraduate			Postgraduate		Other				
	0.00% (0)			100.00% (8)		0.00% (0)				
c. Year of Study	1	2	3	4	5	≥6				
	87.50% (7)	12.50% (1)	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)				
d. Course Type	Major required		Major elective		Minor	Elective	U Core	N/A		
	12.50% (1)		75.00% (6)		0.00% (0)	12.50% (1)	0.00% (0)	0.00% (0)		
e. Sex	Female		Male							
	12.50% (1)		87.50% (7)							
f. Perceived Primary Language Spoken in Class	English	Cantonese	Putonghua	Others						
	100.00% (8)	0.00% (0)	0.00% (0)	0.00% (0)						
Perceived Percentage of Usage of English	51-60%	61-70%	71-80%	81-90%	91-100%					
	0.00% (0)	0.00% (0)	12.50% (1)	0.00% (0)	87.50% (7)					
Perceived Supplementary Language Spoken (can select more than one)	English	Cantonese	Putonghua	Others	N/A					
	0.00% (0)	25.00% (2)	12.50% (1)	0.00% (0)	62.50% (5)					
g. Time Spent on Course Outside Class (Hrs per week)	0-2.0	2.1-4.0	4.1-8.0	8.1-12.0	12.0+	N/A				
	0.00% (0)	0.00% (0)	25.00% (2)	50.00% (4)	25.00% (2)	0.00% (0)				
h. Grade Self-Expected	A	A-	B+	B/B-	C+ or below	N/A				
	37.50% (3)	25.00% (2)	37.50% (3)	0.00% (0)	0.00% (0)	0.00% (0)				

		Mean		SD	Quartile			Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	Total	Invalid Answers	Mean by Self-Expected grade			
		Raw	Adjusted		Q1	Med.	Q3									AA-	B+/B/B-	C+ or below	
1	Presentation is clear	5.75	5.86	0.43	5.25	6.00	6.00	% 0.00	0.00	0.00	0.00	25.00	75.00			5.80	5.67	0.00	
		5.57	5.72	0.65	5.27	5.83	5.98	# 0	0	0	0	2	6	8					
2	Examples relevant to learning	5.75	5.86	0.43	5.25	6.00	6.00	% 0.00	0.00	0.00	0.00	25.00	75.00			5.80	5.67	0.00	
		5.62	5.76	0.60	5.23	5.92	6.00	# 0	0	0	0	2	6	8					
3	Teacher was enthusiastic	5.88	6.00	0.33	6.00	6.00	6.00	% 0.00	0.00	0.00	0.00	12.50	87.50			6.00	5.67	0.00	
		5.73	5.86	0.53	5.54	6.00	6.00	# 0	0	0	0	1	7	8					
4	Class participation encouraged	5.88	6.00	0.33	6.00	6.00	6.00	% 0.00	0.00	0.00	0.00	12.50	87.50			6.00	5.67	0.00	
		5.57	5.74	0.70	5.22	5.96	6.00	# 0	0	0	0	1	7	8					
5	Communication was effective	5.88	6.00	0.33	6.00	6.00	6.00	% 0.00	0.00	0.00	0.00	12.50	87.50			6.00	5.67	0.00	
		5.66	5.81	0.58	5.33	6.00	6.00	# 0	0	0	0	1	7	8					
6	The course was interesting	5.75	5.86	0.43	5.25	6.00	6.00	% 0.00	0.00	0.00	0.00	25.00	75.00			5.80	5.67	0.00	
		5.58	5.78	0.74	5.32	5.96	6.00	# 0	0	0	0	2	6	8					
7	The course was stimulating	5.63	5.71	0.48	5.00	6.00	6.00	% 0.00	0.00	0.00	0.00	37.50	62.50			5.60	5.67	0.00	
		5.67	5.84	0.64	5.56	6.00	6.00	# 0	0	0	0	3	5	8					
8	Subject knowledge is enhanced	5.63	5.71	0.48	5.00	6.00	6.00	% 0.00	0.00	0.00	0.00	37.50	62.50			5.60	5.67	0.00	
		5.67	5.83	0.63	5.49	6.00	6.00	# 0	0	0	0	3	5	8					
9	The course was well-organized	5.63	5.71	0.48	5.00	6.00	6.00	% 0.00	0.00	0.00	0.00	37.50	62.50			5.60	5.67	0.00	
		5.52	5.71	0.73	5.16	5.88	6.00	# 0	0	0	0	3	5	8					
10	Clear learning outcomes	5.63	5.71	0.48	5.00	6.00	6.00	% 0.00	0.00	0.00	0.00	37.50	62.50			5.60	5.67	0.00	
		5.46	5.65	0.79	5.06	5.83	6.00	# 0	0	0	0	3	5	8					
11	Appropriate assessment method	5.50	5.71	0.71	5.00	6.00	6.00	% 0.00	0.00	0.00	12.50	25.00	62.50			5.40	5.67	0.00	
		5.61	5.76	0.62	5.28	6.00	6.00	# 0	0	0	1	2	5	8					
12	Appropriate workload amount	4.25	4.71	1.98	1.75	5.00	6.00	% 25.00	0.00	0.00	12.50	25.00	37.50			3.40	5.67	0.00	
		5.41	5.62	0.86	5.03	5.92	6.00	# 2	0	0	1	2	3	8					
<i>Amount of workload</i>																			
13	Recommended readings useful	5.33	5.60	0.75	4.75	5.50	6.00	% 0.00	0.00	0.00	16.67	33.33	50.00			5.40	5.00	0.00	
		5.53	5.69	0.66	5.21	5.75	6.00	# 0	0	0	1	2	3	6	2				
14	Content difficulty appropriate	4.57	5.17	1.76	3.00	5.00	6.00	% 14.29	0.00	14.29	0.00	28.57	42.86			4.20	5.50	0.00	
		5.35	5.60	0.88	4.94	5.75	5.98	# 1	0	1	0	2	3	7	1				
<i>Content difficulty</i>																			
15	Supported by library resources	5.50	5.60	0.50	5.00	5.50	6.00	% 0.00	0.00	0.00	0.00	50.00	50.00			5.60	5.00	0.00	
		5.51	5.69	0.72	5.24	5.92	6.00	# 0	0	0	0	3	3	6	2				
16	Supported by IT resources	5.14	5.50	0.99	5.00	5.00	6.00	% 0.00	0.00	14.29	0.00	42.86	42.86			5.60	4.00	0.00	
		5.48	5.68	0.76	5.11	5.83	6.00	# 0	0	1	0	3	3	7	1				
17	Satisfaction with course	5.75	5.86	0.43	5.25	6.00	6.00	% 0.00	0.00	0.00	0.00	25.00	75.00			5.80	5.67	0.00	
		5.59	5.76	0.67	5.26	5.92	6.00	# 0	0	0	0	2	6	8					
18	Satisfaction with teacher	5.75	5.86	0.43	5.25	6.00	6.00	% 0.00	0.00	0.00	0.00	25.00	75.00			5.80	5.67	0.00	
		5.63	5.81	0.65	5.52	5.92	6.00	# 0	0	0	0	2	6	8					

- Notes**
- 'Invalid answers' include (a) non-response and (b) selection more than one category. All other data are considered valid answers.
 - For each numbered question, top row (not shaded) reports Course Statistics, bottom row (shaded) reports Departmental/Programme/School/College Statistics.
 - Definitions: (a) Raw Mean: mean based on all valid answers (b) Adjusted Mean: Mean with bottom 10% valid answers removed; (c) SD: Standard Deviation; (d) Q1: 25th percentile; Med.: Median; Q3: 75th percentile; (e) #: number of respondents selecting the respective category; (f) %: percentage of # divided by number of valid answers; (g) Mean by Expected Grade: Raw mean based on responses of students expecting the corresponding grade.
 - All statistics, except adjusted means, are compiled based on valid answers.

a. Comments for the teacher: 對老師的意見:

Interactive lessons.

b. Comments for the course: 對科目的意見:

Workload quite many.

This Course and Teaching Evaluation (CTE) is conducted as a mandatory activity at the University. The aim of course level evaluation is to enhance teaching and curriculum design and as one element of input for academic staff appraisal. Results are available to students through controlled access. 「科目及教學評鑑」是大學的一項指定活動，以助提昇教學質素及完善課程設計，並會作為評審教學人員表現的其中一項元素。結果可在有監管的情況下供學生查閱。

Thank You 謝謝

a. Comments for the teacher: 對老師的意見:

Very interesting teaching method.

Enthusiastic and energetic way of teaching

encourages students to learn well in the process.

b. Comments for the course: 對科目的意見:

Can talk more about algorithm at first.

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Thank You 謝謝

a. Comments for the teacher: 對老師的意見:

like traditional lecture method
better

b. Comments for the course: 對科目的意見:

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Thank You 謝謝

a. Comments for the teacher: 對老師的意見:

clearly explained.

b. Comments for the course: 對科目的意見:

interesting

This Course and Teaching Evaluation (CTE) is conducted as a mandatory activity at the University. The aim of course level evaluation is to enhance teaching and curriculum design and as one element of input for academic staff appraisal. Results are available to students through controlled access. 「科目及教學評鑑」是大學的一項指定活動，以助提昇教學質素及完善課程設計，並會作為評審教學人員表現的其中一項元素。結果可在有監管的情況下供學生查閱。

Thank You 謝謝