Blended and Experiential Learning in Computers and Society

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Abstract

We experimented with the idea of "Break the Classroom" in CSCI3250/3251 to introduce active group efforts of students to study a unique and relevant topic and share to their classmates in class presentations, and to design interactive games to engage their audience. The topics spread a wide range from technical and practical experiences to alarming social issues on computers and technologies. Students were further encouraged to write up their ideas in blog articles with online collaboration and interaction. With industrial visits, seminars were also no longer limited to be on campus.

Through the process, the teacher became a curator and a facilitator who secures the platform for the easy and efficient exchange of thoughts. In such a collaborative and experiential environment, there were issues on uniformity, consistency, and correctness in student works. Nevertheless, students had positive response, especially in understanding career possibilities, and acquiring practical skills.

1.   Introduction

In 2018, the Faculty of Engineering retired the course bundle[1] Technology, Society and Engineering Practice/Engineering Practicum (ENGG2601/2602), and then the Department of Computer Science and Engineering started to offer Computers and Society/Engineering Practicum (CSCI3250/3251) in 2019 as the successor for students in the department. As a newly-hired lecturer, I was offered the opportunity to deliver the first cohort in 2018–19 Term 2. I unofficially surveyed previous students and teachers of the course in our department. My impression was that neither parties found it fulfilling. Students found the course technically irrelevant and time-wasting, while teachers found their efforts on logistics and guest liaison in vain. Students who enjoyed merely liked the fact that no real effort was needed for the course. The question definitely is, "*what can be done to engage the next students?*"

Curiosity is the best teacher. I considered the need to switch the role of learning initiators to the students. A renovation of curriculum and assessment was carried forward to adopt the ideas of blended learning and experiential learning, into the assigned 3-hour lecture time every week on a drowsy Tuesday afternoon.

2.   Background

Blended learning has been a hit in higher education for more than 10 years. It is usually referring to the "thoughtful integration of classroom face-to-face learning experiences with online learning experiences" [1]. Students in our department are expected to be well-equipped for online learning, yet guidance is inevitable for an effective learning experience, collectively.

Experiential learning was almost a traditional wisdom of "learning by doing", and became more and more advocated by Hong Kong higher education in recent years in curriculum design. The holistic process of learning would not neglect the situations of "conflict, differences, and disagreement" [2] apart from the learning outcomes, and urges of students' self-reflection.

In my previous job, I have handled course preparation with blended learning and experiential learning components. The challenge here, though, was to tailor-make the concepts into a seemingly-dull "blathering" course.

One additional ingredient added into the curriculum redesign was the emphasis of communication skills. I realized from one of the CLEAR Professional Development Course [3] the inconvenient fact of Engineering students having low self-perceived competence in English language, showing the lowest scores in all aspects of writing, reading, listening, speaking, and vocabulary, comparing to students of other faculties. This is one crucial practical skill of future engineers and developers, easily neglected by our students.

3.   Methodology

The learning outcomes of the course were revised to be:

- ◆ To nurture engineers who
    - ▪ employ critical thinking skills,
    - ▪ understand their position, and
    - ▪ are able to explore, collaborate, and communicate

A course project *A Short Introduction to Everything in CSE* was given to the students as the main assessment of the course, comprising:

- ◆ Group presentation in class (10 minutes by 2 students)
- ◆ Interaction with audience during presentation

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[1] The bundle of the two courses of 2+1 credits is thereafter referred to as *one course*, since students were required to be enrolled in both courses, and the logistics were arranged as for a 3-credit course.

- 1 multiple-choice question based on contents to be used in term-end quiz
- Presentation writeup of 600–1000 words
- Individual article of 600–1000 on another topic

3.1. Teacher's role on curation and provision of facilities

In the beginning of the term, I set up a WordPress blog system for hosting all the upcoming articles in the course, and published blog pages to assist students to get familiar with the environment and submit well-organized articles. Systems were also set up for students to sign up for presentations, and to give ratings.

3.2. Students' role on initiating learning

To begin with, students were given a list of suggested topics with guiding questions, in five categories balancing the coverage of social connection and practical skills:

- Social issues
- Hot topics in IT
- Computer Science basics
- Technology company studies
- Career of Computer Science/Engineering

The students could freely choose their partner, and the presentation schedule through the term, as 176 students in the class would contribute to almost 90 groups, i.e. 900 minutes of presentation hours in class to be spread through the whole term. They could also further customize or focus the presentation topics to suit their own interest or expectation. During the presentation, students were required to allocate a few minutes to conduct a self-designed game or interaction with the class, that was relevant to their presentation.

After the presentation, students would extend their talk into a blog article for further elaboration, and perhaps to present statistics they got from surveys during class interaction. They also needed to highlight important points in their article which provides hints for the MC question they made.

3.3. Students' role on participation and reflection

During class, students were requested to enjoy the presentations from their fellow classmates, to give ratings, and naturally to participate in class interactions.

In the blog system, where students can see new articles from classmates every week, they were required to make substantial comments in articles through the term. A sample can be seen in Figure 1. Article authors could join the discussion, and were encouraged to learn from their peers, and continuously polish and improve their articles until the end of the term.

3.4. Teacher's role on guidance

Short lectures on relevant topics were provided ahead of the student presentations, with reference from the course textbook, *A Gift of Fire: Social, Legal, and Ethical Issues for Computing* [4].

Students were recommended to ask for advice since the preparation stage. After presentation sessions in class, I tried to give quick comments or errata of the ideas covered. Besides technical matters, the course further included
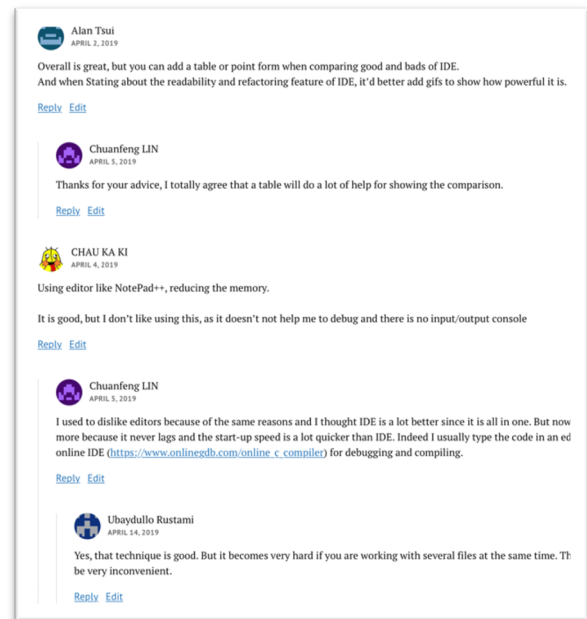

Figure 1: A sample of comments in the blog system

communication issues, such as ways to structure ideas in presentations and articles, or even linguistic style, which are vital for professional correspondence.

3.5. Other course components

Besides the lectures and student presentations, there were other components in the course to offer an extensive experience.

3.5.1. Industrial Visits and Invited Talks

Sitting in the same lecture hall for three consecutive hours could be a pain for most students. With the help of multiple parties, I organized visits to technology companies in Hong Kong and Shenzhen for students to have a better idea of the industry. Some of the visits were held during class hours, and some were arranged on weekends. Guests were invited to deliver talk in the classroom in case visits were not feasible for them. Some were our alumni and students felt more engaged seeing their possible future. Students needed to write two visit reports to these events into the blog.

3.5.2. Collaboration Project on GitHub

One practical training in the course was on the versioning and project management platform GitHub, which is highly popular among engineers and developers. Students were given tasks and they needed to work with a large team of randomly assigned members.

4. Results

According to the *Course and Teaching Evaluation*, the adjusted means for Q12 "Appropriate workload amount" was 3.35, and for Q17 "Satisfaction with course" was 3.77.

4.1. My own observation

Without participation requirements, roughly two thirds of the class showed up regularly. Students were readily aroused by interaction games in the presentations, or excited by bad jokes of the student presenters. They were overall supportive to their friends presenting, and also curious in talks by guests.

In the blog, there were more varieties of student characters. Some students were engaged in sharing ideas, even if occasionally with a slight language barrier. That they being active in posting appealing articles and thoughtful comments undoubtedly encouraged others to participate and reflect in a synergic manner.

4.2. Exit survey

An unofficial survey was done after the course for students' feedback. There were 66 responses from the 176 students within the duration of April 23 to May 29, 2019. Two of the questions that students must answer were:

♦ Q5: "Does this course fulfill your expectation?"

Likert scale from 0 (It's worse than I thought) to 10 (It's better than I thought)

♦ Q6: "How much effort did you spend for this 3-credit course? Please compare the amount of work with other CSCI 3-credit courses."

Likert scale from 0 (No effort at all) to 10 (More effort than expected)

The statistics are shown in Table 3.

Question	Q5 *"Fulfilment"*	Q6 *"Efforts"*
Minimum	0	0
Maximum	10	10
Average	4.76	7.76
Median	5	8
Mode	7	10
Standard deviation	2.81	2.19

Table 3: Statistics for fulfilment and efforts of students

It can be seen that a large number of students considered a high workload in the course, which came from both ends of Q5. Two questions were made to understand the prejudice of students about the course. Two samples from the low end are shown in Table 2, and two from the high end in Table 1.

In general, 25 students reported enjoying "visits" the most, and for what they hated most are mainly "presentations", "workload", and "article". Looking at the results of a question *"Does the course help you on these aspects?"* in Figure 2, many students have gained something from the course.

Q3: Are there any comments you heard about this course BEFORE this semester?	Q4: What are your comments about this course AFTER finishing this semester?	Q5	Q6
This course is useless	This course is not useful and have too much work to do.	1	1
Easy course	Rubbish and wasting time	0	10

Table 2: Samples of responses on impression before and after course of students rating low for fulfilment

Q3: Are there any comments you heard about this course BEFORE this semester?	Q4: What are your comments about this course AFTER finishing this semester?	Q5	Q6
None at all. No one talks about this course. Just knew that had to take this course as a major required course .	Was a very well structured course. Learnt many new things, things I wouldn't have learnt otherwise. Got the opportunity to present in front of a large class. Great experience. The course material preparation was on point.	10	8
Yes that it was pretty chill for them earlier but now it's has changed with a lot of new additions to the course	I think it's nice. Like it is important to learn something in a course and that is exactly what I did. Plus I liked the chill vibe of the course so it was good overall	9	9

Table 1: Samples of responses on impression before and after course of students rating high for fulfilment
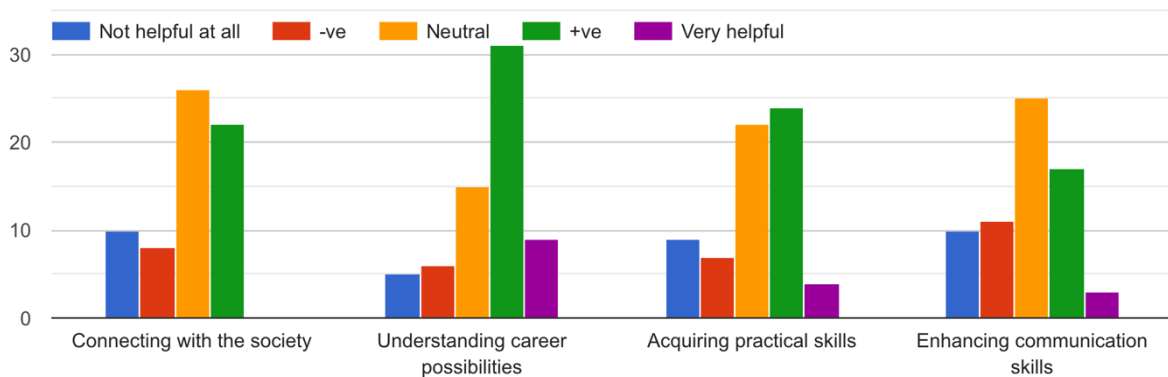

Figure 2: Statistics on course outcomes

5. Discussion

Since the majority of "course materials" that student saw were presentation slides, blog articles, and comments by fellow students, it became an important yet uneasy task to ensure the quality. Often students delivered some contents without careful checking, resulting in biased or malformed arguments, or even misinformation. I had to immediately alert the class after presentations, and to leave appropriate comments in articles.

Yet, the student-led activities often came amazing. Although Kahoot-style games were commonplace and bored the audience, some groups came up with fascinating games, such as physical exercises which everyone standing up to learn about health hazards of IT practitioners. These were very rewarding moments since that could easily make it into students' impression.

6. Conclusion

Some ideas of blended learning and experiential learning were incorporated into our course to answer the question "*what can be done to engage the next students?*", for the non-technical materials in the technical environment. Students had to devise a presentation in class including interaction with audience, write articles on various topics, and discuss on the course blog. Some students appreciated about the new format and contents, yet many complained about the higher workload than expected.

7. Epilogue

In the second year of offering CSCI3250/3251 in 2019–20 Term 2, I had revised the assessment scheme and reduced the requirements on articles. In the Exit Survey I was able to collect 20 responses from 179 students during May 13 to June 11, 2020, with the statistics shown in Table 4.

When the same question on the course outcomes were asked, a similar trend is seen in Figure 3, despite the small percentage of responses received. This might sadly be due to the isolation of students from immediate involvement in class in an online-teaching semester.

Question	Q5 *"Fulfilling"*	Q6 *"Efforts"*
Minimum	3	3
Maximum	10	10
Average	6.85	5.25
Median	7	5
Mode	5	3
Standard deviation	1.96	2.28

Table 4: Statistics for fulfilment and efforts of students in 2020

According to the *Course and Teaching Evaluation* in 2020, the adjusted means for Q12 "*Appropriate workload amount*" was 4.81, and for Q17 "*Satisfaction with course*" was 4.94. Both are with an improvement of more than 1.

8. Bibliography

[1] D. R. Garrison and H. Kanuka, "Blended learning: Uncovering its transformative potential in higher education," *Internet and Higher Education,* vol. 7, no. 2, pp. 95-105, 2004.

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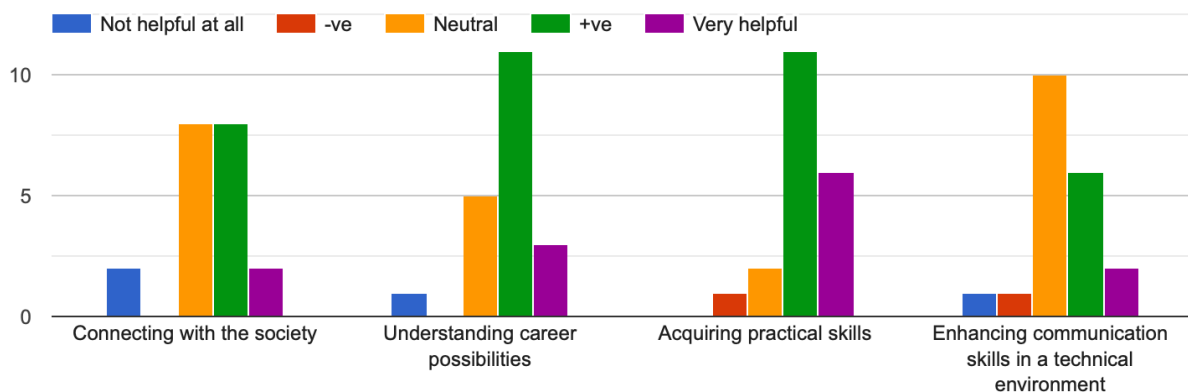[4] S. Basse, A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology, Pearson, 2013.

Figure 3: Statistics on course outcomes in 2020