

## Final Report of Project

Project No. : 2013/0518

Project Title: Using 'Flipping the classroom' to boost student-led learning through an intelligent tutoring systemName of Organization/School: Queen's CollegeProject Period: From 01/2015 (month/year) to 03/2016 (month/year)

## 1. Attainment of Objectives

Table 1: Attainment of Objectives of Students

Objective statement	Activities related to the objective	Extent of attainment of the objective	Evidence or indicators of having achieved the objective	Reasons for not being able to achieve the objective, if applicable
To promote student-led learning by adopting 'Flipped Classroom' pedagogy.	Pre-recorded lecture videos and online quizzes on 5 different topics were uploaded on the online learning platform ( ) before classes.	100 % attained	A survey was conducted after completion of the project, in which students were asked if they thought the "flipped classes" motivated them to look for information on the topics to improve their learning. A mean score of 3.62 out of 5 was recorded. The result shows that students are very positive towards "Flipped Classroom" pedagogy.	N.A.

To promote students' critical thinking	Discussions via case studies were carried out during classes in which students were assigned various roles. Teaching materials were uploaded in order to help them to enrich their knowledge in different issues.	100% attained	A survey was conducted after completion of the project, in which students were asked if they believe student-led discussions in "flipped classes" was helpful for them to develop constructive arguments (arguments with appropriate evidence and reasoning) on social issues. A mean score of 3.53 out of 5 was recorded. The result shows that students believe this pedagogy helps them to promote their critical thinking skills.	N.A.
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Table 1.1 Attainment of Objectives of Teachers

Objective statement	Activities related to the objective	Extent of attainment of the objective	Evidence or indicators of having achieved the objective	Reasons for not being able to achieve the objective, if applicable
Encourage collaboration of teachers in order to refine the school-based Liberal Studies Curriculum in S.2	Each teacher took charge of a specific topic across the entire form with the help of other LS teachers.	100% attained	Discussions were made during the preparation processes. Comments and feedbacks were collected in order to improve the quality of teaching materials	N.A.

## 2. Project Impact On Learning Effectiveness, Professional Development and School Development

### Broadening students' horizon

"Flipped Classroom" increased students' engagement. According to the survey conducted after the project, more than half of the respondents claimed that "Flipped Classroom" made the classes more engaging than the other Liberal Studies classes that adopted a more traditional way of teaching. "Flipped Classroom" offered new perspectives and approaches in teaching and learning including enquiry-based, active and peer learning which focused on the exploration of concepts. Teachers also found that they didn't necessarily have to be the sole instructor in the "flipped classes" as students could also take up part of the teaching role by becoming teachers of their peers, which in turn promoted collaborative learning. Flipped classrooms were able to remodel the traditional classrooms into active-learning classes.

Class time in "Flipped Classroom" were dedicated mostly to class discussions - students enjoyed such kind of learning atmosphere more and agreed that being active-learners were more beneficial for them in learning. A mean score of 3.53 out of 5 was recorded when they were asked if they found the student-led discussion in the "flipped classes" was helpful for them to develop constructive arguments, it showed that they believed their analysis skills become more critical and their reasoning improved. In addition, the pre-class videos had also stimulated them to think more. According to the survey, 46.92% of the respondents agreed or strongly agreed that they had tried to relate more on what they were learning to what they already knew. Last but not least, 43.08% of the respondents tried to relate all the ideas fit in together and make sense when they studied the pre-class videos.

### Increasing students' sense of achievement

In "flipped classes", traditional classrooms transit from a teacher-led to a student-led environment. It was possible for students to increase input and control over their own learning. By providing pre-class videos, students were given the freedom to learn at their own pace. Students could pause or rewind the lectures and write down their thoughts and questions to be discussed with their teachers and peers during classes. According to the interview with students, they believed using "Flipped Classroom" pedagogy gave them more time to digest the difficult course materials without getting left behind. This also allowed students who needed more time to understand certain concepts to take their time reviewing the materials and receive immediate assistance from teachers and classmates. Based on the results of the pre-class quizzes, students showed that they had a decent understanding on the concepts and fundamental knowledge of different issues. The average scores of the five pre-class quizzes were 83.3, 63.4, 73.3, 65.3 and 52 respectively.

### Fostering students' development in their potential and specific abilities

"Flipped Classroom" stimulated students' initiative to learn more than the old cramming method of teaching. This allowed students to gain better understanding of abstract subject matters. More case studies and discussions were conducted in class, which helped build up students' confidence in analyzing complicated cases. Such kind of analytical skills is crucial and essential for students when taking public exams and facing

the university curriculum in future.

Moreover, the information technology skills of students were promoted. 53.08% of the students either agreed or strongly agreed that the tablets used in the “flipped classes” were helpful for their learning. In the classes, students were encouraged to use electronic devices and software tools each us [redacted] and [redacted] to disseminate and share their ideas in the class. With routine practices and hands-on experience, it is believed that they are very familiarized with these IT tools which should be very useful for their life-long learning. Thus having “Flipped Classroom” practiced in junior forms is useful in fostering development in students’ potential and specific abilities.

#### Increasing training opportunities for teachers and enhancing their professional development

“Flipped Classroom” encouraged the co-teaching of the Liberal Studies curriculum - each teacher took charge of a specific topic across the whole form. This greatly reduced the workload of teachers as they did not need to prepare teaching materials for all topics. Before the production of the videos, meetings were held to discuss the content of the videos. The use of different pedagogies were also discussed. These allowed peer learning and knowledge sharing among teachers. For the teachers who were not involved in the production of videos, they could also grasp the ideas of the issue easily. An in-school sharing with all teachers in Queen’s College was conducted in the third Staff Development Day on 13 May, 2016, which was helpful for the teachers to gain a better understanding on the operation of “Flipped Classroom” as well as students’ perception towards this pedagogy.

#### Improving learning atmosphere

According to the interview with LS teachers, in traditional classrooms where the teacher did most of the talking, students’ attention usually starts to drop after 10 to 15 minutes. “Flipped Classroom” could effectively increase students’ attention span and raise their engagement in classes. Students generally liked the way they were not forced to move at the pace set by the teacher and that it was a more relaxed environment. According to the survey, students believed they were more engaged in the “flipped classes” than the traditional classes as well.

#### Inducing collaboration with other schools / professional organizations

The “Flipped Classroom” project at Queen’s College has a consultant to guide throughout the project. The consultant is the Associate Professor under the Division of Information & Technology Studies and the Deputy Director of the Centre for Information Technology in Education at the Faculty of Education of [redacted]. Thanks to his experience in carrying out QEF project at local schools, the advices and suggestions he provided for the project implementation was valuable in optimizing the project. The questionnaire and interview conducted at the end of the project was also assisted by the consultant. This has eased the process of collecting students’ and teachers’ opinions and comments. In addition, with his assistance two teachers in the school were invited to join [redacted] 2016, an international conference co-hosted by [redacted] and [redacted] on 12 April, 2016. In [redacted] 2016, teachers were given the opportunity to share their experience in using “Flipped Classroom” in the secondary school level in front of

the audience from different parts of the world.

### 3. Cost-effectiveness

**Table 2: Budget Checklist**

Budget Items	Approved Budget (a)	Actual Expense till 31.3.2016 (b)
Staff Cost	\$170,100	\$163,698.4
Equipment	\$57,000	\$43,950
Services	\$50,000	\$50,000
General Expenses	\$8,000	\$2,000
Contingency	\$3,500	0
Total	\$288,600	\$259,648.4

#### Utilization of available resources

12 tablets with keyboard dockings were purchased to facilitate students to carry out interactive in-class discussions, so they could look up information and details from the internet right away. With the guidance of teachers, students learned how to utilize online resources in their learning and the correct way of referencing.

A full time project assistant was employed to handle the project. Her job duties included assisting in the using of the intelligent tutoring system, preparing teaching materials and coordinating with various parties, such as the consultant and the school's teaching staff.

#### Unit cost for the direct beneficiaries

Total Expense/Direct Beneficiaries

Total Expense/ (Students + Teachers)

$$\$259,648.4 / (145 + 4) = \$1,742.6$$

#### Sustainability of the learning programme and materials developed

The learning programme and most of the materials developed can be updated and re-used in the following academic year. Given that the curriculum will not undergo drastic changes in the upcoming school years, the recorded pre-class videos on the theoretical part of the topic can be re-used, while the sets of notes and discussions content might need to be updated with more recent issues.

#### 4. Deliverables and Modes of Dissemination

**Table 3: Dissemination Value of Project Deliverables**

Item description (e.g. type, title, quantity, etc.)	Evaluation of the quality and dissemination value of the item	Dissemination activities conducted (e.g. mode, date, etc.) and responses	Is it worthwhile and feasible for the item to be widely disseminated by the QEF? If yes, please suggest the mode(s) of dissemination.
E-learning teaching materials	By using the online platform, learnings are more interactive. Students are more willing to take initiative to pre-study learning materials and discuss them in classes. It is believed that the materials are of good qualities and the dissemination value is high.	A seminar was held on 12 April 2016 in which teachers from Queen's College shared their experience in implementing "Flipped Classroom" with other local teachers and educators.	Sharing by means of seminar can be a worthwhile and feasible way for the item to be widely disseminated by the QEF.
Sets of notes (Including PowerPoint slides and exercises)	Notes on the topics were distributed to students at the beginning of each topic. Students could use the notes as reference during the in-class discussions and their study.	Distributed to 4 classes, 145 students according to the topic they were taught.	The notes were designed especially for the students in Queen's College and Powerpoint slides were prepared in line with the teachers' teaching style. Thus the items may not be suitable to be widely disseminated by the QEF.

### 5. Activity List

Types of activities <i>(e.g. seminar, performance, etc.)</i>	Brief description <i>(e.g. date, theme, venue, etc.)</i>	No. of participants			Feedback from participants
		Teachers	Students	Others <i>(Please specify)</i>	
Lessons on five social issues	Date: September, 2015 – March, 2016	4	145		Students were positive towards “Flipped Classroom” pedagogy with the believe they can learn more by using this pedagogy.
Sharing in International Conference	12 April, 2016	2		Audience : ~60	The audience were interested in the sharing. Questions were asked in relation to this project after the sharing.
Sharing of the Flipped Classroom project	13 May, 2016	58			Colleagues gained a better understanding on the concepts of Flipped Classroom. Some experiences were shared. Many of them believed that it is a useful way to promote learning and teaching effectiveness.

### 6. Difficulties Encountered and Solutions Adopted

Difficulties Encountered	Solutions Adopted
1. Students were not familiarized with the layout of the online learning platform. In addition, they tended to forget how to login to the pages where teaching materials were uploaded to.	A manual was produced to facilitate the students to use the online platform. No further problems were found after this measure.
2. Production of videos consumed a lot of time as teachers were not used to teach in front of the camera.	Some of the videos were filming the notes instead of the teachers. Therefore, teachers were not required to look at the camera while they were presenting the concepts.

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