FOSTERING SELF AND PEER LEARNING INSIDE AND OUTSIDE THE CLASSROOM THROUGH THE FLIPPED CLASSROOM APPROACH FOR POSTGRADUATE STUDENTS

Eugenia M. W. Ng   Lingnan University, Hong Kong SAR   eugeniang@ln.edu.hk

ABSTRACT

Aim/Purpose	The flipped classroom approach is one of the most popular active learning approaches. This paper explores the effectiveness of a new pedagogy, known as FOCUSED, for postgraduate students.
Background	The flipped classroom approach is a trendy blended learning pedagogy which capitalizes on the flexibility of online learning and the stimulating nature of face-to-face discussion. This article describes a pilot study involving postgraduate students who experienced the flipped classroom approach in one of their courses.
Methodology	In additional to online activities, students adopted a newly learned approach to solve a related problem that was given by another group of students during classes. Quantitative data were collected from pre- and post-tests for both self-learned online materials and group discussion during classes so that the effectiveness of the flipped classroom pedagogy could be examined from the perspective of a holistic learning experience.
Findings	It was found that the average scores for the post-test for the self-learned online video were much higher than for pre-test, even though the post-tests for both online and face-to-face learning were higher than the respective pre-tests. The qualitative data collected at the end of the flipped classroom activities further confirmed the value of the flipped classroom approach. Even though students could self-learn, more students valued peer interactions in the classroom more than the flexibility of online learning.
Keywords	blended learning, flipped classroom, online learning, peer interactions, postgraduate students

INTRODUCTION

The flipped classroom approach is one of the most popular active learning approaches that blends online and classroom activities to create an active learning experience. Flipped classrooms reverse the traditional teaching approach in which teachers deliver content while students listen passively in class. Some other terms such as "reverse instruction," "inverted classroom," and "24/7 classroom" have similar connotations (Bergmann & Sams, 2012). Teachers assume the role of designers to select and/or create some learning materials for students to read or watch at their own pace and in their own time prior to attending classes (Cornelius & Gordon, 2008; Woolf, 2010). To consolidate their self-acquired knowledge, students are required to interact with each other to tackle classroom activities so that they receive stimulation and support from their peers (O'Flaherty & Phillips, 2015). At the same time, teachers no longer act as knowledge transmitters but as facilitators, prompting students to explore different perspectives and assisting needy students (Baepler, Walker, & Driessen, 2014; Khan, 2012; Stone, 2012).

Peer interaction has been found to be positively related to academic achievement and college satisfaction (Astin, 1984, 1993). Students have been shown to have high levels of engagement and course satisfaction when participating in a flipped classroom course (Gross, Maddelena, Hoffman, DeSimone, & Burke, 2015), and most students who have participated in a flipped classroom have shown a strong preference for the flipped classroom pedagogy (Goates, Nelson, & Frost, 2017). Students were much better prepared in class when given optional video lectures than when given textbooks to read (De Grazia, Falconer, Nicodemus, & Medlin, 2012). Indeed, pre-recorded lecture videos were particularly useful for slower students because they could watch the online videos multiple times until they had mastered the subject content (Mok, 2014; Ng, 2016). The flipped classroom can also promote self-regulated learning (Ng, 2018b), and most of the participants agreed that the knowledge and skills they developed were useful (McLaughlin et al., 2014). University students learning using the flipped classroom approach out-performed those learning using a traditional learning approach (Baepler et al., 2014; Stone, 2012).

On the other hand, a survey of 17 studies related to flipped classroom practices found that there were mixed feelings about watching online videos instead of attending lectures, although participants felt very positively about group activities in class (Bishop & Verleger, 2013). Furthermore, a survey of 21 studies of the application of the flipped classroom approach to nursing education found neutral or positive outcomes but mixed feelings of satisfaction (Betihavas et al., Bridgman, Kornhaber, & Cross, 2016). The findings were mainly related to the learning outcomes of online learning at the high school level (for example, Fulton, 2012; Kong, 2015) or in undergraduate studies (for example, Betihavas et al., 2016; Lai, Ng, & Yang, 2018; Ng, 2018a), or postgraduate studies conducted in western countries (for example, Butt, 2014; Howitt, & Pegrum, 2015; Lucardie, Berkenbosch, van den Berg, & Busari, 2017), suggesting that some studies of the flipped classroom approach at the postgraduate level in Asia may add new insight to the field.

The author had recently learned about a new pedagogy, known as FOCUSED (http://www.mypolyuweb.hk/~msrobert/Description_of_42_items_on_FOCUSED_DICE_Jan2018.pdf), in a seminar and thought that it could be an interesting pedagogy to try out to enhance classroom discussion when examining the effectiveness of the flipped classroom pedagogy for postgraduate students as a pilot study. FOCUSED is an acronym of the idea as shown in Table 1. It uses seven dice of different colors (see Figure 1), where each dice represents one of seven perspectives and the faces of each dice have some hints related to the pertaining perspective. Peer learning is regarded as a successful strategy for building rapport among team members and maximizing learning (Johnson & Johnson, 1999; Johnson, Johnson, & Stanne, 2000). The following section discusses the research setting of and the findings that were derived from pre-tests and post-tests for online and classroom activities. Finally, conclusions are drawn and future research directions are proposed.

Table 1. Meaning of FOCUSED

Perspective	Meaning
F	Bringing fresh perspective
O	Thinking, feeling and acting like an owner/manager
C	Showing connected-thinking
U	Having a sense of urgency
S	Showing team spirit
E	Being engaged
D	Exercising deliberate practice

Figure 1. Sample of the FOCUSED dices

THE RESEARCH OBJECTIVE

To attain the research objective, the research questions are formulated below:

RQ1: Is watching online videos outside of class an effective approach for self-learning?

RQ2: Is peer learning using the FOCUSED pedagogy an effective approach for solving an ill-defined problem?

RQ3: What are the advantages of using the flipped classroom approach?

METHODOLOGY

THE PARTICIPANTS

The study involved postgraduate students (hereafter, students) enrolled in a part-time master's level program. Most of them were teachers, but a few were administrators in the education sector and one was a trainer for a private company. In total, there were 16 participants in the class, all of whom were female students. Most of them had had a number of working experiences, except one who was a

recent graduate. Furthermore, some of them took this course as the first course in the program, whilst others took it as the last course since there were two admission periods per year.

THE CONTEXT

The participants were taking a course entitled "Creating an effective student learning environment" which was taught by the author (hereafter, teacher) during the study period in 2018. During the course, the students learnt some contemporary concepts of learning theories, with reference to creating a more conducive and inclusive learning environment to address the integration issues arising from the increasing diversity of student populations. This was the first time that the teacher taught this course and she co-taught with some other teachers. She was responsible for teaching certain content, including the following: 1) constructivism; 2) toward a personal theory of learning and instruction; 3) technology informing teaching and learning strategies; and 4) managing teaching and learning of diversity of learning needs.

There is nothing better than experiential learning for understanding different concepts, in particular those related to adopting technology to enhance learning and teaching. Therefore, the teacher thought of adopting flipped classroom strategies for teaching one of the topics. A video recording about "internationalization" presented by an ex-colleague seemed to be a good choice since it was related to the course and it was readily available even though not explicitly in the teaching contents. A website which included pre- and post-tests and the video was created by a research assistant and is shown in Figure 2.

Figure 2. Website for flipped classroom

DATA COLLECTION AND ANALYSIS

The students learned various active learning strategies, including some blended learning approaches, during class. They were instructed to attempt a pre-test prior to watching an assigned online video on their own between the two lessons. The pre-test aimed to help them understand the gist of the video. There were five multiple choice questions, which were the same for both the pre- and post-tests. The questions were related to the online video and they were the following: 1) Which of the following activity is not part of internationalization of the campus at Lingnan?; 2) Which of the following is not part of internationalization of the curriculum language enhancement?; 3) Which of the following is not a benefit of internationalization?; 4) Which of the following is not an approach to internationalization at Lingnan?; and 5) Which of the following practice is inappropriate to cater for internationalization? Students were required to attempt a posttest after watching the video but prior to at-

tending the next class. They were also told that they would be required to apply the self-learned knowledge in discussion when they met again the following week. Students were asked to fill in a paper-based pre-test in which they rated their experiences of solving problems from the seven perspectives, i.e., FOCUSED, using a 10-point Likert scale. Then, the teacher explained FOCUSED and gave examples of solving real-life problems using this pedagogy.

When students attended classes the following week, students were randomly assigned to four groups to come up with a question for their peers to solve. The question was about the difficulty of implementation of internationalization, and students could choose the setting, such as schools, universities, or organizations. To foster peer learning, the question sheets were randomly given to another group of students to tackle. They had to throw dice to obtain the hints for solving the problem from the given perspective. They discussed and jotted down possible solutions onto a worksheet based on the hint indicated on the dice and finally came up with a recommendation for solving the problem. They shared the solutions with the whole class and all the recommendations were deemed acceptable. At the end of the FOCUSED activity, they were asked to fill in the pertinent post-test questionnaire. To further understand the advantages of using flipped classrooms for learning, students were also asked to put short comments online right after the activity. The data collected online and paper-based were analyzed using the functions of Excel. Due to the small sample size, it is inappropriate to perform more sophisticated statistical analysis.

FINDINGS AND DISCUSSION

ONLINE ACTIVITY

In total, 14 students (87.5%) participated in the pre-test and nine (56.3%) participated in the post-test. To maintain a fair comparison, only those students who attempted both tests were compared. The range of the correct scores for pre-test was very wide, ranging from 1 to 5, which was full mark, whereas the post-test had narrower range, between 3 and 5. The average and standard deviation for the pre-test was 2.89 and 1.45, while the post-test average was 4.33 and 0.94 respectively. Table 2 shows that only one out of the nine students had a lower post-test score. The overall difference between the post-test and pre-test was 1.44, suggesting that watching online videos outside of class is an effective approach for self-learning (RQ1) (Cornelius & Gordon, 2008; Woolf, 2010).

Table 2. Comparing Pre- and Post-test Scores of Online Learning

STUDENT	PRE-TEST	POST-TEST	DIFFERENCE
1	5	5	0
2	4	5	1
3	1	5	4
4	3	5	2
5	4	5	1
6	4	3	-1
7	3	3	0
8	1	5	4
9	1	3	2
Average (S.D.)	2.89 (1.45)	4.33 (0.94)	

CLASSROOM ACTIVITY

In total, 15 questionnaires were received for both the pre- and post-tests regarding FOCUSED. As shown in Table 3, the average score and the standard deviation was 8.52 and 0.33 for pre-test and 8.64 and 0.13 for post-test. The average difference between the two tests was only 0.12, suggesting that peer learning using FOCUSED was not an effective approach for solving an ill-defined problem (RQ2). In particular, the post-test scores for "showing connected-thinking" and "showing team spirit" were lowered. A plausible reason for this is that the students were not familiar enough with the approach and were discussing with random peers rather than their friends or colleagues.

Table 3. Comparing Pre- and Post-test Scores of Group Discussion

	Average Score		
Question	Pre-test	Post-test	Difference
Bringing fresh perspective	8.07	8.67	0.60
Thinking, feeling and acting like an owner/manager	8.20	8.47	0.27
Showing connected-thinking	8.80	8.67	-0.13
Having a sense of urgency	8.53	8.60	0.07
Showing team spirit	9.07	8.80	-0.27
Being engaged	8.67	8.80	0.13
Exercising deliberate practice	8.33	8.47	0.14
Average (S.D.)	**8.52 (0.33)**	**8.64 (0.13)**	**0.12**

ADVANTAGES OF FLIPPED CLASSROOM

In total, 15 comments were received at the end of the flipped classroom activities, suggesting that all students submitted their comments. The comments could be grouped into four categories: 1) group discussion which led to new knowledge (six entries); 2) the flexibility of learning outside the classroom (four entries); 3) student-centered learning (four entries); and 4) the learning environment was more relaxing (one entry). The feedback was encouraging despite the fact that the quantitative findings did not suggest that they were able to solve the problem much better after trialing the FOCUSED pedagogy. Nevertheless, their abilities to solve problems from different perspectives were already very high prior to the attempt. Indeed, it was not easy to increase significantly for one trial.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

This article has discussed a pilot study involving post-graduate students who have deepened their understanding of flipped classrooms through experiential learning. Quantitative data were collected from pre- and post-tests for both self-learned online material and peer learning during class discussion. It was found that the average scores for both post-tests were higher than for their respective pre-tests. Indeed, the post-test scores for the self-learned online video were much higher than the pre-test scores (Cornelius & Gordon, 2008; Woolf, 2010). The qualitative data further confirmed the value of flipped classrooms even though more of them valued face-to-face peer learning higher than the flexibility of online learning.

Since this study's findings were based on one application of the flipped classroom approach, future research objectives include the following: 1) to collect qualitative data from focus group meetings; 2) to collect comments regarding the disadvantages of flipped classrooms; 3) to compare the findings with full-time students; and 4) to compare the quantitative data with pre- and post-tests for other classes taught using the traditional teacher-centered approach. For now, however, the quantitative and qualitative findings pertaining to the research questions are positive, which suggests that the flipped classroom pedagogy is an effective and preferred pedagogy for post-graduate students.

REFERENCES

Astin, A. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel, 25*(4), 297-308.

Astin, A. (1993). *"What matters in college?" Four critical years revisited.* San Francisco: Jossey-Bass.

Baepler, P., Walker, J. D., & Driessen, M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers and Education, 78,* 227-236. https://doi.org/10.1016/j.compedu.2014.06.006

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day.* Washington, DC: International Society for Technology in Education. https://doi.org/10.1177/073989131401100120

Betihavas, V., Bridgman, H., Kornhaber, R., & Cross, M. (2016). The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. *Nurse Education Today, 38,* 15-21. https://doi.org/10.1016/j.nedt.2015.12.010

Bishop, J. L., & Verleger, M. A. (2013). *The flipped classroom: A survey of research.* 120th ASEE Annual Conference & Exposition, Atlanta.

Butt, A. (2014). Student views on the use of a flipped classroom approach: Evidence from Australia. *Business Education & Accreditation, 6*(1), 33-43.

Cornelius, S., & Gordon, C. (2008). Providing a flexible, learner-centered programme: Challenges for educators. *Internet and Higher Education, 11,* 33-41. https://doi.org/10.1016/j.iheduc.2007.11.003

De Grazia, J. L., Falconer, J. L., Nicodemus, G., & Medlin, W. (2012). Incorporating screencasts into chemical engineering courses. In *Proceedings of the ASEE Annual Conference & Exposition*, 2012, June. https://doi.org/10.18260/p.24831

Fulton, K. (2012). The flipped classroom: Transforming education at Byron High School. *Technological Horizons in Education, 39*(3), 18-20.

Goates, M. C., Nelson, G. M., & Frost, M. (2017). Search strategy development in a flipped library classroom: A student-focused assessment. *College & Research Libraries, 78*(3), 382-395. https://doi.org/10.5860/crl.78.3.382

Gross, B., Maddelena, M., Hoffman, M., DeSimone, K., & Burke, P. (2015): Flipped @ SBU: Student satisfaction and the college classroom. *Educational Research Quarterly, 39*(2), 36-52.

Howitt, C., & Pegrum, M. (2015). Implementing a flipped classroom approach in postgraduate education: An unexpected journey into pedagogical redesign. *Australasian Journal of Educational Technology*, *31*(4), 458-467. https://doi.org/10.14742/ajet.2439

Johnson, D. W., & Johnson, R. T. (1999). Making cooperative learning work. *Theory into practice, 38*(2), 67-73.

Johnson, D. W., Johnson, R., & Stanne, M. (2000). *Cooperative learning methods: A meta-analysis.* Minneapolis, MN: University of Minnesota Press. Retrieved from https://s3.amazonaws.com/academia.edu.documents/33787421/Cooperative_Learning_Methods_A_Meta-Analy-sis.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1554695412&Signature=Lc0HweutibbBldi6p6WEopKs%2Bac%3D&response-content-disposition=inline%3B%20filename%3DCooperative_Learning_Methods_A_Meta-Anal.pdf

Khan, S. (2012). *The one world schoolhouse: Education reimaged.* London: Hodder and Stoughton.

Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. *Computers and Education, 89,* 16-31. https://doi.org/10.1016/j.compedu.2015.08.017

Lai, Y. C., Ng, E. M. W., & Yang, R. (2018). Teaching ICT with the flipped classroom approach in higher education settings. *Journal of Research in Science, Mathematics and Technology Education (JRSMTE), 1*(1), 29-45. https://doi.org/10.31756/jrsmte.112

Lucardie, A. T., Berkenbosch, L., van den Berg, J., & Busari, J. O. (2017). Flipping the classroom to teach Millennial residents medical leadership: a proof of concept. *Advances in Medical Education and Practice*, *8*, 57-61. https://doi.org/10.2147/amep.s123215

McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., Esserman, D. A., & Mumper, R. J. (2014). The flipped classroom: A course redesign to foster learning and engagement in a health professions school. *Academic Medicine, 89*(2), 236-243. https://doi.org/10.1097/acm.0000000000000086

Mok, H. N. (2014) Teaching tip: The flipped classroom. *Journal of Information Systems Education, 25*(1), 7-11.

Ng, E. M. W. (2016). The flipped classroom: Two learning modes that foster two learning outcomes. *Issues in Informing Science and Information Technology, 13,* 15-23. https://doi.org/10.28945/3462

Ng, E. M. W. (2018a). Explore the effectiveness of using flipped classroom for university students to learn photo editing techniques. In T. Bastiaens, J. Van Braak, M. Brown, L. Cantoni, M. Castro, R. Christensen, … O. Zawacki-Richter (Eds.), *Proceedings of EdMedia: World Conference on Educational Media and Technology* (pp. 1909-1915). Amsterdam, Netherlands: Association for the Advancement of Computing in Education (AACE). Retrieved 28 December 2018 from https://www.learntechlib.org/primary/p/184426/.

Ng, E.M.W. (2018b). Integrating self-regulation principles with flipped classroom pedagogy for first year university students. *Computers & Education, 126,* 65-74. https://doi.org/10.1016/j.compedu.2018.07.002

O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *Internet & Higher Education, 25,* 85-95. https://doi.org/10.1016/j.iheduc.2015.02.002

Stone, B. B. (2012). Flip your classroom to increase active learning and student engagement. *Proceedings of the 28th Annual Conference on Distance Teaching & Learning*, 2012, August.

Woolf, B. P. (2010). *A roadmap for education technology. Research Report 2010.* Retrieved 28 December 2016 from https://hal.archives-ouvertes.fr/hal00588291/document.

ACKNOWLEDGEMENTS

BIOGRAPHY

Prof. Eugenia Ng has extensive teaching and administration experience in local tertiary institutions. As Director of Teaching and Learning Centre, Eugenia provides leadership in all areas of teaching and learning at Lingnan University. At the same time, she has a concurrent appointment as Adjunct Professor at Division of Graduate Studies so that she can maintain her passion in teaching.

As an academic for most of Eugenia's career life, she has successfully secured numerous teaching and research funding. She believes the best way for students to understand different pedagogies is through experiential learning. Many of her publications are related to her accomplishments of adopting information technology to enhance assessment, learning and teaching. Over 100 articles have been published as book chapters, confer-

ence proceedings, journal articles, and newspaper articles. Furthermore, she was the editor and co-editor of three referred books and editor-in-chief for an international journal. Last but not least, she also renders professional services in the local community.