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# Can we flip the formative assessment of students too in flipped classroom?

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**Abstract:** In the study of flipped classroom, researchers considered the different ways of flipping the didactic lectures (or face-to-face meeting) to video lectures and interactive learning tasks provided for students during the contact hours for the aims of promoting active learning. However, a limited work has studied the potential and challenges of flipping the formative assessment by requiring students to produce their own video presentation as a part of their course requirement under a flipped classroom. In this paper, we aim to describe the affordances of flipping the students' presentation in a flipped classroom, and our objective is to find out the general perceptions of students in producing their own video presentation as a part of the course assessment. Through online questionnaire, we have surveyed 17 undergraduate students in two general education courses taught under the flipped approach, and the results show that students are competent in producing video presentation and they find it generally favorable. Yet, some students suggested that more interactive elements and technical supports should be included to compensate for the disadvantages of this assessment activity, which can shed some insights for instructors delivering instructions in flipped classroom.

**Keywords:** Flipped classroom, video presentation, general education, quantitative research, formative assessment

## 1. Introduction

Flipped classroom has been an emerging research area in teaching and learning recently with the help of information and communication technology (ICT). The key objective of conducting the flipped classroom is to highlight the importance of active learning by moving the lectures to outside of the face-to-face teaching sessions through producing video recording, which reserves more time for high-order thinking and learning activities in classroom (Bergmann & Sams, 2012; Bishop & Verleger, 2013). Engaging students in active learning has been considered as innovative teaching practices where passive knowledge inquiry (Butt, 2014; Wong & Cheung, 2015). Many researchers and teachers have conducted different scales of flipped classroom trials in their own institutions (e.g. Hamdan et al. (2013)). Bishop & Verleger (2013) indicates a rising academic interest in flipped classroom in recent years. Thus, how the flipped approach can help students learn more efficiently, effectively and more engagingly remains an interesting researchable question.

Some research works consider the teacher's aspects of research questions in flipped classroom, for instance, how to produce effective lectures in video, what interactive activities could be conducted in class, and what resources could be used for enhancing the teaching quality. Yet, very few of them focus on the effectiveness of different types of assessment particularly designed for flipped classroom (Keengwe, 2014). Active learning has been defined as "the process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas" (Collins & O'Brien, 2003, p. 5). Bonwell and Eison (1991) advise that the active learning activities should involve higher order thinking tasks such as analysis, synthesis, and evaluation. No doubt, it is imperative to focus on the activeness of students in the learning process in order to produce better student engagement both online and offline. Any other low level of activities should be moved outside of the classroom so that more time for engaging activities can be implemented in the face-to-face classroom (Wong & Cheung, 2015).

In this paper, the authors have proposed introducing the student video presentation as a part of the formative assessment for two general education courses taught in undergraduate level in Hong Kong. The hypothesis is that the impact of flipped classroom introduced by the teachers moving the lectures to video can be extended to students, and it is intuitively practical to take the advantages for more high-order thinking activities during the classroom by asking students to present via video. In this approach, students can easily provide more constructive comments to the presenters when the video recordings can be replayed and paused for writing up further responses. Once we move the presentation sessions to online, instructors can make use of the face-to-face classroom meeting for more engaging activities such as collaborative group discussions and competitions.

A questionnaire was administered to find out the perception of students in the learning effectiveness with this approach of formative assessment introduced in flipped classroom. In this paper, our aim is to report the responding results by the 17 participants in order to reflect their learning effectiveness, fun of learning, learning motivation, student engagement, anxiety, peer assessment and comparison with face-to-face presentation.

This paper covers the preliminary results of the quantitative survey with general education students. Background literatures are briefly presented in Section 2, research methodologies data analysis in Section 3. We will then conclude the paper with brief roadmap for future works in Section 4.

## 2. Background Works

The concept of flipped classroom came from the research work by Lage, Platt, & Treglia (2000) when the authors "inverted" their classroom in an introductory economics course at undergraduate level. In order to cater the diverse learning styles of the students, the teachers in the study prepared the lectures on videotapes assisted by the presentation slides narrations for students to watch at home. When students came back to the classroom for the face-to-face sessions, the authors provided more problem solving activities mixed with mini-lectures and Q&A sessions to the students. The authors reported that the majority of the students commented on this approach to be favorable and helpful to their learning. They also observed an increase in the learning motivation among the students. In fact, video learning is not a new concept (Gay, 1986), where the most important aspect of flipped classroom is the interaction and student engagement in face-to-face classroom meeting for high-order of thinking (Wong & Cheung, 2015). Based on this work, the flipped classroom of teaching and learning practices became more popular through Bergmann & Sams (2012) published their book to report their experience in implementing this type of learning in their school. The result showed that the students watched the video lectures at home for their revision and reinforcement and found them helpful, even for the absent students. Wong and Cheung (2015) recently proposed the "4S model with the decision matrix to categorize the four stages of flipped learning for the level of interactions and the level of cognitive processes. This model has guided the implementation of flipped learning in the Hong Kong local primary schools.

In addition, the use of technology is essential in supporting the production and sharing of the video lectures through networked systems (Findlay-Thompson & Mombourquette, 2014). This technology is enhanced with advancements in information and communication technologies (ICT) recently. In particular, the Khan Academy (Khan, 2012), a free online system providing videos covering a wide range of topics and subjects, provided additional facilitation and popularity to the approach (Roach, 2014). On the other hand, Nonacs (2013) mentioned about the importance of flipped the assessment in flipped classroom as "flip the test" where students can be given all the intellectual tools beforehand in order to generate a well-structured and designed solutions to difficult problems.

Video presentation by students can be considered a possible production for assessing their learning (Kearney & Schuck, 2006). Kearney and Schuck (2006) found that self and peer assessment were one strong aspect of using video production as the course assessment because it provided a more authentic learning experience for students, and this can also enhance the students' conceptual understanding and affective outcomes. In the work. It emphasizes the peer review to the video presentation is a significant factor to their motivation. However, the effectiveness of video presentation perceived by students has not yet explored further widely, particularly in a course with flipped learning approach. The pilot study in this paper can inform further how this approach of formative assessment can serve a better part in the flipped classroom learning.

## 3. Research Methodology

### *3.1 Background of participants*

Two general education (GE) courses named "Mathematics Across Cultures and Time" and "Technology, Entertainment and Mathematics" were implemented in Semester 2, 2014/15 in parallel with the flipped classroom pedagogical approach. The registration of these two courses was opened to Year 2 or above students to attend with no prerequisite requirement. The courses were delivered using multiple flipped learning resources such as video documentary resources, online discussion forum, online quiz, collaborative group discussion and other challenging activities in class accompanied by mini-lectures and tutorials. According to the course outline requirement, the assessment included both continuous assessments and written essay toward the end of the courses. Final presentation was required to allow students to present their works to the peers and instructor in order to evaluate the understanding of the students in their own essay works. In the formal practice, face-to-face presentation sessions were given during the last lesson, and students would present their works for about 5 minutes one by one in a roll.

In order to allocate more time during the face-to-face classroom time for more discussion, this final presentation was shifted to video presentation by asking students to produce their own video to share their idea to be written in the paper prior to the submission of the paper. To help students produce the video, a short tutorial and note were given through face-to-face demonstration and the written procedures uploaded to the course learning management system, i.e. Schoology. The students were required to upload the video to YouTube and set it to "Unlisted" for better privacy, and shared the URL to the Schoology for the instructor and/or peer assessment.

### *3.2 Methods and Sampling Size*

In this pilot study, a questionnaire was designed and administered online to be sent to the students in the two courses after the end of the semester. Ten statements were presented with 5-Likert Scale ranging from "Very disagree" to "Very agree". The basic idea of the statements is to find out the perception of the students concerning the video presentation. The ten statements were followed by the questions of asking the number of times in the video production trials and the opinions of video presentation in the course. The questionnaire was implemented using Google form and the consent was obtained electronically.

The total number of students in these two courses together is 35 + 24 = 59, and the total number of participants in the questionnaire is 17 (n = 17). The participation to this questionnaire was completely voluntary where the sampling size in the result is suitable for obtaining initial insight from students.

### *3.3 Questionnaire Results*

The following Figures (1 to 6) summarize some key findings in the questionnaire.

Students found the video presentation helpful. 13 (76%) of the students agree or strongly agree that the video presentation enhances their understanding of the topic (See Figure 1). A little more than half of the students found the video presentation favorable. 10 (59%) students found the video presentation interesting. This is consistent with the other question that the same percentage of students found it funny to produce video presentations (See Figure 2).

Students are diverse about the motivation brought by video presentation (See Figure 3 and 4). 7 (41%) said that video presentation caused them to be more motivated, but another 4 (24%) said the opposite. 6 (35%) students were neural about this. In this regard, 11 (65%) students agreed or strongly agreed that peer assessment of the video presentations could motivate them more, yet 2 students (11.8%) strongly disagreed with this. Students were slightly positive about doing video presentation again in the future. Nearly half of them (8, 47%) said that they would like to choose video presentation again in the future. Another 6 (35%) were neutral about that, while 3 (18%) said they would not choose it. The reasons were yet to be explored in further study.

According to the result, it seems not too challenging for the students to produce the video presentations, but it is time consuming. 10 students (59%) agreed that it was not difficult to produce the video presentations, but 2 (12%) disagreed with it. The remaining 5 students (29%) were neutral about

this aspect. However, they normally took a lot of time to produce the video presentations. 3 (18%) say that they have made 4-5 attempts, while 4 (24%) say that they have made 6 or more attempts (See Figure 5).

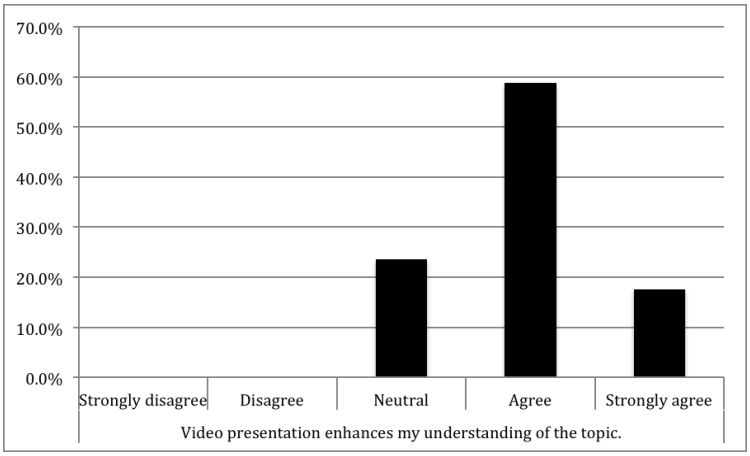


Figure 1. Enhancement of Learning Quality through Video Presentation.

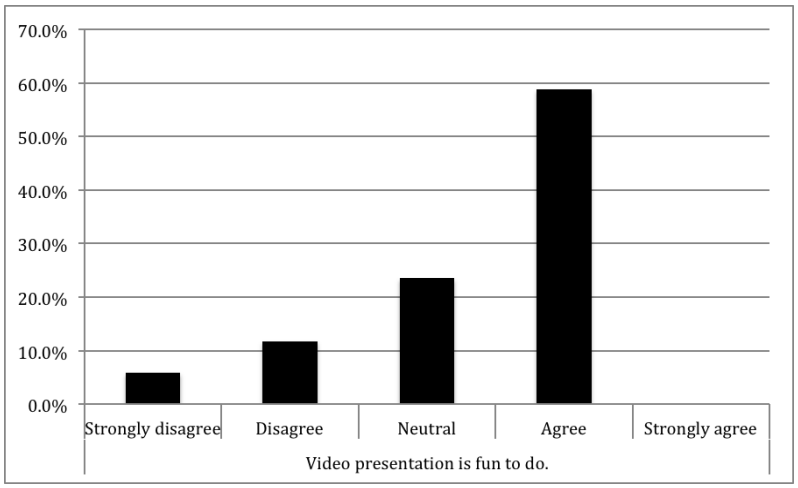


Figure 2. Enjoyment of Making Video Presentation as Assessment

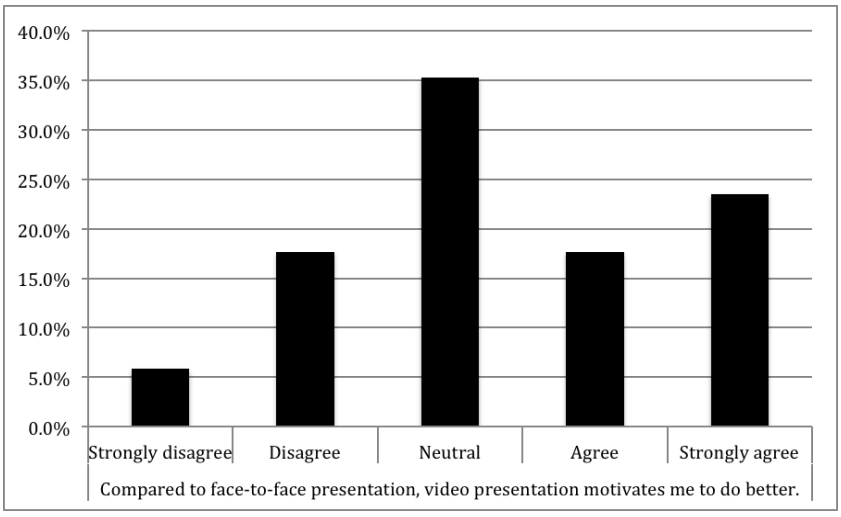


Figure 3. Learning Motivation through Video Presentation Compared to Face-to-Face Presentation.

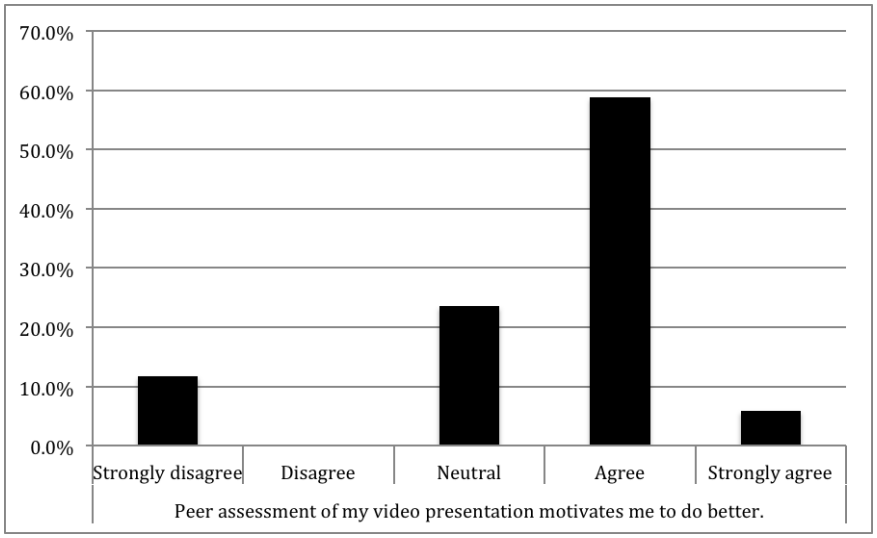


Figure 4. Learning Motivation through Peer Assessment to Video Presentation.

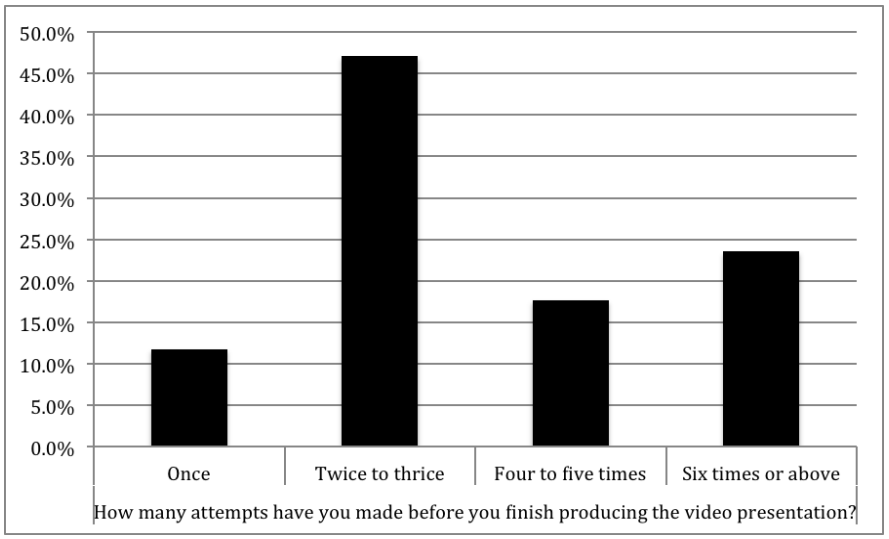


Figure 5. Number of Attempts in Video Production Before Submission.

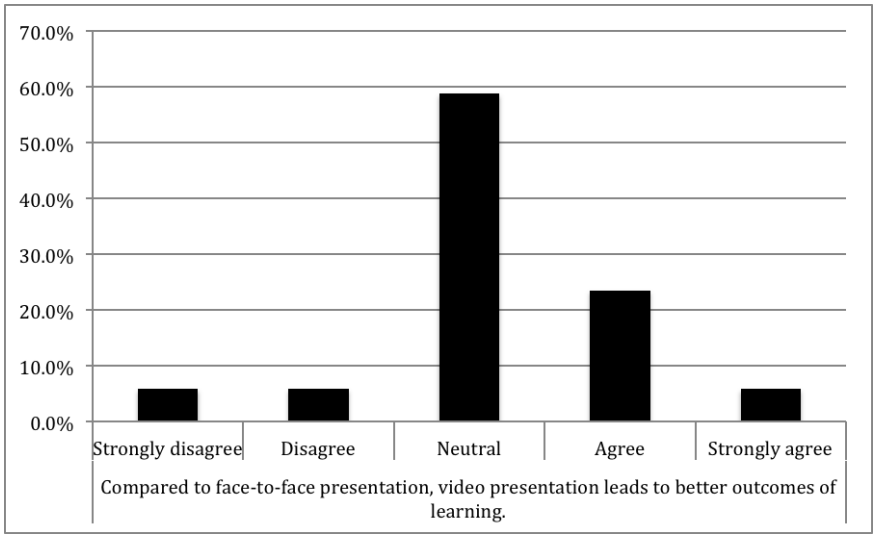


Figure 6. Achievement of Learning Outcomes through Video Presentation.

Comparatively, there is no attraction of video presentation over face-to-face presentations. When asked in comparative terms, the students are diverse about whether they find video presentation or face-to-face presentation more favorable. The distribution is more or less uniform. 12 (71%) say that video presentations make them less nervous. However, 1 student expresses strong disagreement with this. In fact, there is not a strong indication that the video presentations (perceivably) produce better educational outcomes than face-to-face presentation (See Figure 6). 5 (29%) say that it is better than face-to-face presentation. 10 (59%) are neutral about that.

Based on the results from the open-end questions, it shows that the biggest advantage of video presentations are: Less nervous/more relax, multiple attempts possible before publishing, better understanding, flexible schedule, more objective peer review, and more motivated to listen to others' presentation due to peer review. On the other hand, students said that the biggest disadvantages of video presentations are: Technical difficulties, more time consuming in video production, lack of interaction, lack of non-verbal contact, lack of instant feedback and more demanding on resources.

## 4. Conclusions

In this paper, the student's perception of video presentation as a type of formative assessment was presented. In our future work, it is our intention to continue to explore different types of formative as well as summative assessment in flipped classroom to help enhance the learning experience of students. New pedagogical approaches should be accompanied with essential assessment methods in order to help evaluate the achievement of learning outcomes.

This pilot study illustrated the potential of video presentation implemented along with flipped classroom. It is the goal of this mode of learning to promote active learning, which allows students to learning collaboratively and cooperatively. Video presentation offers a set of affordances for learning such as learning motivation, enhancement in knowledge understanding and excitement in learning. Intuitively, it brings a new phase of digital literacies as students learning how to produce video for knowledge delivery and dissemination through online platform. Yet, more works need to be done.

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