Flipped Classroom in the Realm of Higher Education: Potential and Challenges

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Abstract: - The advent of new technologies open infinite opportunities for educational endeavors. One such opportunity can be seen in the so-called 'flipped classroom', also known as 'reverse teaching'. This paper examines the potential of flipped classroom in the realm of higher education by scrutinizing its potential benefits along with challenges that need to be attended to. In particular, this paper argues that flipped classrooms can potentially address a number of classical predicaments associated with conventional lectures. Additionally, it is argued that flipped classroom can potentially make face-to-face time with the teacher more efficient and well-spent while, at the same time, allow for more flexibility, more convenience, and more time for learning outside of the 'brick and wall classroom'. However, in order for a reverse classroom to work, teachers need to appropriately decide on the types of learning activities that need to be flipped (what activities are conducted outside the class meeting and what activities are conducted during class meetings). Inappropriate flip of these activities may result in the learning being hampered. Implications of flipped classroom on education will be examined in this paper.

1 Introduction
Typically, conventional face-to-face classroom tuition is used to deliver course materials, whereas assignment or project related to the topic is done at home (homework). The assignment is generally designed to give an opportunity for students to apply new knowledge or concepts they have learned in class for real life purposes or to solve problems designed to further deepen their understanding of the topic [1]. Simply put, conventional classroom instruction is characterized by course materials delivery by the teacher,

followed immediately by the giving of assignments related to the topic to be done at home.

However, such classical instructional rituals have some drawbacks. For example, there may be students who miss classes due to other commitments. In this case, recorded lectures uploaded on the net could enable these students to have full access to lectures they missed [2, 3]. Even those who attend conventional face-to-face lectures may still benefit from pre-recorded videos, especially those students who may have difficulties taking notes during in-class lectures. It was this practice of recording lectures and uploading the recorded videos on the net back in 2007 that triggered the birth of flipped classroom (hereafter FC), also known as reverse teaching [1].

2 Problem Formulation

A number of classical predicaments associated with conventional classroom lectures include (a) absent students due to other commitments or illness, (b) some students having problems taking notes in a 'closing to light-speed' lecture, (c) limited time to discuss assignment with the teacher,(d) insufficient time available to grasp lecture contents and, in some cases, (e) uncomfortable learning environment, especially with large classes. A solution is needed to address the above predicaments.

3 Problem Solution

This paper argues that the aforementioned problems can potentially be addressed by means of FC utilizing new technologies. The potential and challenges of FC is discussed in light of teaching and learning at higher education.

To begin with, Bergmann & Sams [3], regarded as the proponents of FC, define FC as "(a) the professor's lecture is delivered at home and (b) the student's homework is done in class". Thus, in a flipped classroom, materials delivery is conducted outside of the classroom by means of pre-recorded video [4] or downloadable video from Youtube or other sites. Correspondingly, what is typically the homework becomes in-class activities.

While watching the video at home, some students who have already understood certain parts of the lectures may skip those parts simply by pressing the 'fast forward' button to move on to other parts, while some students may start from the very beginning of the video [5]. Thus, FC enables flexibility, in that each student can work at their own pace. While watching the video, students are

to take notes regarding the lecture they've just 'attended' (5).

In comparison, class meeting may be used for activities related to the application of the concept [6], exercise, and discussion [7]. For the sake of discussion, imagine that an EFL (English as a Foreign Language) teacher is delivering a Grammar class focusing on "Subject-Verb Agreement". Prior to class, the teacher would upload the recorded video of him lecturing on the topic and his students may download the video onto their laptops (or directly copy the video from the teacher) so that they can watch the video outside the class hours at their convenience.

During class meeting, learning activities are geared towards more complex activities. For example, students are given a passage to read and they are to identify problems related to subject-verb agreement in that passage. Note that identifying problems of concord is more challenging than mastering the rules. The teacher may also proceed to a more challenging activity such as to get students write a set of rules regarding subject-verb agreement in English, present their own rules in front of the class and challenge one another's rules. While students are doing these exercises, the teacher may walk around the class and assist those who are in need of assistance [3]. This, in turn, will enable teachers to provide assistance tailored to the nature of the problems encountered by each individual student [8]. Apart from obtaining feedback from the teacher, the students can also obtain feedback from their peers.

When the assignment is done at home, however, assistance may not be easily available at times when it is desperately needed by the students as what commonly happens in a conventional classroom. Provision of help is critical especially when students are required to perform a more complex task (getting students to apply the concept they have learned to solve problems is more complex). In fact, one of the advantages of FC over conventional instruction is that the teacher is there with the students when the task gets more intricate and more challenging. Imagine how frustrating it is for the students to do convoluted homework on their own. Since help is easily accessible in FC, learners can potentially grow in accordance with their *zone of proximal development* [9-12]. Thus, FC is useful for both low achievers and high achievers. A comparison of these two class versions is depicted in the following picture:
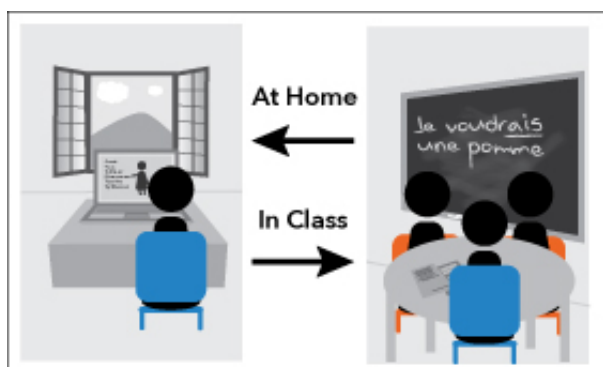
Figure 1. At-home and in-class activities of an FC
Source: http://fltmag.com/the-flipped-classroom/

FC is generally considered superior to conventional classroom [13]. For example, in a video-based FC mentioned earlier, students can review the lectures recorded as often as they want by pressing on the replay, rewind, or fastforward button. In this case, each student can focus on certain parts of the video which are more difficult for them. Such benefits as students listening to lectures over and over again and listening to certain parts of the lectures at their own convenience and pace are not possible in conventional lectures. In short, FC offers a number of potential benefits that may eventually lead to improved learning [14].

There are at least three options available regarding which video to choose. First, the teacher may make their own videos using open source applications such as Jing, Camstudio, and many others. Second, the teacher may use existing video on the net from such sites as Youtube, TeacherTube, TED-ED, Educreations, Tegrity or ShowMe and, third, the teacher may use a combination of self-made and existing videos.

In addition to the video, other materials such as open access e-book, modules, Powerpoint, journal articles can also be uploaded on the net. These materials are all provided to ensure that students can have access to a wide array of relevant materials to enable them to gain a deeper grasp of course materials while studying at home.

Thus, before coming to a class, students are all expected to have had studied course materials, either by watching the video or by reading the e-book or other sources prepared by the teacher. At this stage, the teacher may want to upload quizzes as well to check students' understanding of the topic after watching the video or reading other sources [5].

Whereas FC offers exciting advantages, it also requires more meticulous preparation compared to conventional lectures. For example, the teacher should ensure that the video is of high quality with small file size. Additionally, the teacher should also ensure that recorded lectures are short, clear, understandable and unambiguous. It is for this reason that trying out the video is highly recommended prior to its release to ensure that a good video has been created.

Apart from the making of the video, internet connection should also be taken on board, especially when uploading a large video file. In anticipation of slow internet connection, a copy of the video and relevant materials should also be made available on desktop so that the students may choose how they would like to access the file (whether they want to download the video from the Internet or whether they want to copy it from the desktop). This gives the students some sort of flexibility in terms of how they want to access the materials. Unless students have reliable internet connection (broadband), we would recommend that the video be stored in a desktop for students to copy.

Furthermore, another important component of successful implementation of FC is teacher training. In fact, this is probably the most challenging part of all. Deciding on which activities to flip is critical to successful implementation of FC. Such a decision should be grounded on a strong learning theory and understanding the interconnectivity between contemporary learning theory and technology is critical as far as FC is concerned.

Thus, in order for a FC to succeed, regular training should be provided to both teachers and principals. Needless to say, the shift from teacher's lecturing in a classroom to teacher's lecturing at home as well as assignment done at home to assignment done in a classroom requires some sort of pedagogical adjustment.

In addition to the aspect of pedagogy, teacher training should also cover issues such as basic IT. For example, prior to implementing FC, teachers should be trained on how to make videos using a wide range of open source applications and how to upload such videos onto a Learning Management System. Additionally, there should also be a mechanism regarding provision of support to both teachers and students to ensure that the shift in the learning activities does not hamper learning in one way or another.

Whereas FC is gaining immense popularity and is widely recognized as a useful approach to instruction [1] and is deemed to positively impact on students learning, there is no single accepted model available as yet [6]. One model has been proposed by Wagner, Laforge, & Cripps [15]. This

model consists of three different types of activity: first, online lecture (video + support material) given 1-2 days prior to class meeting; second, in-class activity (assignment, group discussion, presentation), and third, assignment completion. The schematic representation of this model is depicted below:

| Online Lecture (Video + Support Material (1-2 days prior) | In-class activity (assignment, group discussion, presentation) | Assignment completion (Graded if required) |
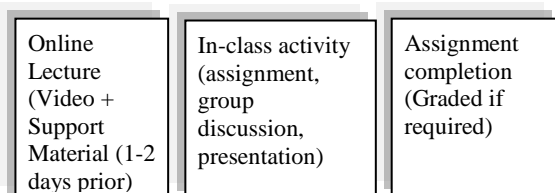
Perhaps most current FC models work in accordance with the above framework. What is missing from this model, however, is the vague interconnectivity between classroom activity and the follow-up activity (at-home activity after class) and the relevance of follow-up activity with the next online lectures.

As the popularity of FC continues to raise at an almost exponential rate, a number of scholars begin to question the empirical evidence supporting the effectiveness of such a classroom [16, 17] in spite the fact that anecdotal evidence appears to support its merit. Needless to say, a thorough examination of FC is required before a solid conclusion regarding its value can be drawn with a higher degree of certainty. When examining the merit of FC, a number of variables are worth scrutinizing. These include, but not limited to, students' and teacher's perception of FC, how such a classroom may impact on students' learning and learning experience (directly or indirectly) and how FC may affect their motivation to study. As educational institutions across the globe are rushing towards this promising type of 'new classroom', it is important that research studies be constantly conducted across different cultural contexts and educational levels to better understand how to make the most of FC. Only then can we benefit from such educational endeavors.

4 Conclusion

FC making use of new technologies offers unlimited possibilities and formidable potential for educational endeavors. With appropriate instructional design, FC may provide enlightenment to along heated debate pertaining to how to best utilize hybrid instruction combining the strengths of both face-to-face and online strategies.Throughout this paper, we have argued that flipped classroom can potentially make face-to-face meeting time with the teacher more efficient and well-spent, while at the same time, allow for more time, more flexibility, and more convenience for students to learn.Needless to say, since FC is still in its infancy, more research is needed to uncover its full potential.

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