Preliminary Help to Flip Classes in Higher Education

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Abstract: The flipped classroom is an innovative educational model that has attracted more attention recently, especially at universities since academic subjects requires more scientific approach by students. In the flipped classroom, course content is delivered via online videos or pre-recorded lectures that can be watched by students at home. It can free up the class time that lecturers are able to devote for learner-centered activities such as problem solving and active learning. This article is motivated by the flipping model with an aim to engage students' learning outside of the classroom as well as respond to the challenges of teaching academic subjects, which reflect difficulties in delivering all the materials given the limited time period of a class. An online tool called "EDpuzzle" is introduced to facilitate flipping the class. Also, flipping a class involves design of various types of activities, including in-class and out-of-class, which are all vital for an effective flipped classroom. This paper informs how to design, implement and evaluate the flipped classroom in subjects taught at universities.

Keywords: Flipped classroom, science teaching, online videos, EDpuzzle, active learning.

INTRODUCTION

More and more evidence shows that the traditional classes in Higher Education is no longer the most effective way of delivering the course content to students. With the rapid technological changes, students' learning approaches in this electronic age are different from those before. Over the years different teaching strategies and methods have been explored to improve student learning. It has been widely recognized that students are not passive leaners but should be active in their learning process. Various tools have been developed to facilitate the interactive education in the classroom as well as to stimulate the interest and engage students, such as "Digital Ink" [1], "Nearpod" [3], "Kahoot!" [7] and many others. However, bounded by the limited time available for a class period, lecturers always find it difficult to allocate more time toward in-class activities and discussion. For this reason it has become at the core of the discussion regarding how to allocate class time between lecturing and doing active learning exercises.

Due to increased access to the Internet and the wider availability of online videos as well as screen capture technology, it has become entirely possible to shift teaching outside of the classroom through the use of "flipped" learning. A flipped classroom is an educational technique that consists of two parts: interactive group learning activities inside the classroom, and direct computer-based individual instruction outside the classroom [2]. Instead of spending all the time in class watching a lecture, students can watch online videos or pre-recorded lectures outside of the classroom at the time and location of their own choice. Then lecturers can allocate more time in class toward opportunities for integrating and applying their knowledge via a variety of active and collaborative learning exercises. Consequently, the flipped learning model can enable lecturers to make the shift from teacher-driven instruction to student-centered learning [5].

DISCUSSION

The vast majority of students have not studied many of scientific subjects before they come to the university. Due to the lack of prior knowledge, the students have been struggling with understanding the course content. Consequently, the lecturers have to devote most of their class times in explaining the basic concepts, losing the opportunity to explore relevant contexts and let students work on applications of the theory as well as exercises designed to help their comprehension [8]. In addition, students may not gain the same level of understanding while passively listening to lectures, meaning that some of them can get more frustrated and more likely to drop out of their studies [8].

Ideally, students are expected to prepare outside of the class. Assigning textbook readings prior to class for undergraduates can be useful to help them understand the content because it is often impossible to present all necessary course material during class time [6]. Since plenty of online videos have become available on the Internet and more attractive to the new generation of students [10], assigning videos to watch can also help prepare students before they come to the class.

However, there is concern regarding the pre-class preparation that students often do not complete reading assignment or do not watch videos before the lecture due to insufficient motivation. Online quizzes can be one of the solutions to check on assigned textbook readings [6]. To check on students' completion of assigned online videos, an online site called "EDpuzzle" can be used. It has got good reviews by students, as they find it very useful to track their activities at home, i.e. whether they have watched videos or not. Although some commonly adopted course management software by universities like Blackboard, Moodle or Canvas can do the same job, i.e. tracking students' activities, EDpuzzle has some other features that can better motivate students such as inserting formative assessment anywhere in the videos and providing instant feedback as well as preventing students from skipping content not yet watched. These features are particularly helpful for lecturers to make sure that students have watched all the content required and identify students' varied levels of understanding so that lecturers can tailor lecture content accordingly. In addition, EDpuzzle can also customize the video by trimming the video to use the parts that are most important and needed. To test the waters of student engagement outside of the classroom and explore the possibility of switching a lecture from a traditional style to a flipped one, that is not flipped a class completely, but has started the trial with a very small part of each lecture. It is important to gather students' reaction and feedback before wider scale adoption [8].

The flipped classroom can engage students' preparation for the lectures and give them more time to understand and digest course content and consequently they will be able to explore relevant contexts and applications. As part of the preparations, videos can be chosen for each lecture from online sources. For example, Youtube, which explains some key theory or concept that will be covered in class. The video selected should be uploaded to EDpuzzle for editing.

EDpuzzle is used prior to class. EDpuzzle is a free online site that allows users to select videos from a wide range of sources, such as YouTube, KhanAcademy, TED and so on, or even upload personal videos for editing. Consequently, it enables lecturers, who consider flipping their classrooms and engaging students learning outside of the classroom, to deliver the content of a course to students by use of videos. One of the very useful features of EDpuzzle is that lecturers can track students' activities, whether or not they have watched the videos as well as students' answers to the questions inserted anywhere needed in the videos by lecturers [8].

There are some instructions on how to use EDpuzzle effectively. To get started, go to EDpuzzle (https://www.edpuzzle.com) and create a teacher account, which is completely free. After signing up, a unique class code will be given, so students can join the class by introducing this code from their account. Clicking on "My Content" will bring the lecturer to the place where all the existing video lessons are stored. From the drop down "Create" menu, the lecturer can choose the videos either by searching various channels using keywords or a URL or by uploading his/her own videos. After reviewing the video, the lecturer can then customize the video with EDpuzzle tools, i.e. "Crop" (trim the video to use those parts you want students to watch), "Audio Track" (add audio clips throughout a video or narrate the entire video to explain the content with personal approach or another language), "Audio Notes" (insert an introductory comment, a conclusion and etc.), and "Quizzes" (insert formative assessment, i.e. open-ended questions or multiple choice questions, anytime during the video). After editing the video, the lecturer can also choose to prevent students from skipping content not yet watched and/or set a due date for students to watch the video.

Once the EDpuzzle lesson is ready, it can be shared with the students and embedded on Moodle or on any webpage of a university. After logging in as a student, students can join a class by entering the unit class code given by the teacher. Once the question is answered, the students have the options to re-watch a part of the video or to continue to the next part. Furthermore, EDpuzzle makes it easy for lecturers to monitor each class, i.e. whether students have watched each flipped lesson and how many students have answered each question correctly.

During the first lecture, students must be explained how to use EDpuzzle and set expectations about pre-class preparation, for example, students can be required to watch the video (5 to 10 minutes) before each lecture. Students can be also told that the video will explain the key theory covered in the lecture. Since this is a pilot study on flipping a class, only 15 minutes can be reserved for each partially-flipped class. The remaining time of the lecture could be delivered as normal as in a traditional lecture format. The first 15 minutes of each lecture can be used for clarifying any confusion and misunderstanding of the content in the video, based on the statistics collected from EDpuzzle which enables the lecturers to identify the areas of weakness and students' varied levels of understanding [4]. Rather than to introduce the course materials, the lecturers could devote more time to in-class activities. Some active learning exercises are designed to engage students with the material being covered in the video, for example, it can be used student response system that is Kahoot! [7], to test students understanding of any academic subject. Moreover, questions and prompts could be used to increase student-teacher interaction through group discussion.

Although, flipped classes are an effective way of learning, similar to other teaching methods, it depends heavily on students preparing before coming to the class. Watching videos is a means of preparation. But if some students fail to do so, should the lecturer spend class time on going through the material in the video again? Clearly, the flipped classroom does not work anymore if that is the case. After all, the flipped classroom is designed to save class time that can be devoted to engage students in learning through active learning experience. As the student survey implies assigning course credit to the homework can be an easy solution, but the best way to improve students' participation is to get them interested in either the materials in the video or the application of the knowledge to the in-class activities. The practice of flipping involves the use of videos and design of activities. Technologies, like EDpuzzle, may be used to enhance delivery of instruction, but what is more important is how to best use the in-class time with students. As we only partially flip our class, the students might not be able to fully understand the connection between pre-class preparation and in-class activities.

Admittedly, a lack of experience of using this new teaching technique may be another reason for students' losing their interest in watching videos. But still some students do appreciate helpfulness of watching videos in terms of better preparation for the lectures and reinforcement of understanding [8].

Traditional teaching generally takes place in classrooms with most of the time allocated toward lecturing. Although a growing number of studies show that practice, active involvement and feedback are essential elements for student learning process, they are all constrained by the limited class time. As one of the solutions to the time constraint in a class, a new pedagogical approach called "flipped classroom" is proposed, which suggests moving course content from the classroom by asking students to watch the online videos or pre-recorded lectures before a class and then use class time for active exercises and engaging activities.

CONCLUSION

When we talk about the flipped classroom, focus might be given to the production and use of the videos as well as the selection of the online videos. As a matter of fact, the essence of a flipped classroom is not only the videos, but also the design of the active learning exercises and how to engage students in preparation prior to class. Flipped learning can be considered more of a complement, rather than a substitute [9], in particular, when teaching academic subjects who need more help from lecturers to understand the basic concepts. In addition, there are some research where some students can find very helpful to watch those videos, and vice versa, the majority of students would not like to have the completely flipped classroom of watching the recorded lectures and then have in-person interaction and problem solving due to lack of experience in using such an innovative teaching and learning approach.

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