Turning the Tables on History Education in Singapore:
The Flipped Classroom Experience in NUS High School of Math and Science

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Introduction

Before the late 1990s, the traditional pattern of secondary History education in Singapore schools was largely a teacher-centred, didactic experience. However, since the late 1990s, the Singapore Ministry of Education (MOE) has implemented new initiatives such as “Thinking Schools, Learning Nation” in 1997 and “Teach Less, Learn More” in 2004 in order to better engage students and prepare them for life (MOE, 2009). This is aligned with the goals of the MOE document, the Desired Outcomes of Education, which seeks the cultivation of self-directed learners and active contributors who are able to work effectively in teams (MOE, 2009). To achieve this, various teaching strategies such as Group Cooperative Learning (Sharan, 1999) and inquiry-based learning have been taught at the National Institute of Education to trainee History teachers. Simultaneously, efforts to integrate Information and Communication Technology (ICT) into the classroom also gained momentum with MOE’s Third Masterplan for ICT in Education. Under the Third ICT Masterplan, a key effort was made to transform “the learning environments of our students and equip them with the critical competencies and dispositions to succeed in a knowledge economy” (MOE, 2008).

With this context in mind, this article highlights the results of the implementation of a flipped classroom approach that was used by the Humanities Department of the NUS High School of Mathematics and Science in Singapore for its Integrated Humanities module in 2012. The discussion of the approach will hopefully allow educators to be aware of an exciting pedagogy that uses an engaging medium for students.

A brief explanation of the flipped classroom pedagogy is provided first, followed by a discussion of its implementation in NUS High and how the students felt about it. Its benefits are highlighted and an evaluation of its limitations is also underlined to assess its overall utility.

The Flipped Classroom

In broad brushstrokes, the flipped classroom inverts traditional teaching methods by carrying out instruction or delivery of the subject matter online (outside of classroom time), while “homework” is simultaneously moved into the classroom (Pitler, Hubbell & Kuhn, 2012). Essentially, students watch recorded lectures for knowledge information at home at their own pace, while concept engagement takes place in the classroom where they engage in applying what they have learned to solving problems and other forms of practical work under the teacher’s guidance. The role of the classroom teacher is to tutor...
students when they become stuck, rather than to impart the initial lesson. This transforms the teacher from a “sage on the stage” into a “guide on the side” who spends more time on answering questions, working with small groups, and guiding the learning of each student individually (Pitler et al., 2012). This flipped classroom approach was brought to greater prominence in 2007 by Jonathan Bergmann and Aaron Sams, two teachers from Woodland Park High School in Colorado (Pacansky-Brock, 2013). It has also found acceptance by the Stillwater Area Public Schools’ Board of Education after a pilot run in Mathematics classrooms in 2011 revealed an increase in students’ enjoyment of lessons. Likewise, Clintondale High School in Michigan reported improved test scores, graduation rates, and college attendance along with student engagement and a corresponding decline in disciplinary problems with the implementation of the flipped classroom approach (Stillwater Area Public Schools, 2012; Pearson Case Study, 2013).

Implementation

In NUS High, three classes of 25 students each who were reading the Integrated Humanities 1103 (IH 1103) module were selected for a pilot of the flipped classroom approach. The students were between the ages of 13 and 14, and were highly motivated, academically able and hardworking. Admission into NUS High is based on a rigorous selection process, consisting of a Math and Science paper and a one-day science selection camp held on campus. Limited places are reserved for students who wished to enter using their Primary School Leaving Examination (PSLE) results. The decision to implement the flipped classroom approach was made after a Humanities department meeting that concluded with the agreement that pedagogies that encourage self-directed learning should be initiated. The following section goes on to highlight how the flipped classroom pedagogy was implemented at different stages of pre-lesson, lesson and post-lesson follow up.

Pre-Lesson Preparation

The first step towards the implementation of the flipped classroom was the recording of lecture videos, using the software known as Camtasia Studio, for the students to view before they came to class. Camtasia Studio is a video screen capture shareware that allows users to record whatever is being shown on a computer screen while capturing audio. As such, to record a lecture, a teacher simply needs to run the Camtasia Studio programme while he or she is narrating through the slides and providing explanations. Apart from the ability to record, the software also easily allows its users to edit any errors and to upload it directly onto their Youtube channel. The videos were usually uploaded a week before the flipped lesson was conducted to give students ample time to watch the recordings as well as read the supplementary readings that were distributed in the course packs at the beginning of the term.

Once the video was uploaded, students were informed to view the recorded lectures at home while simultaneously doing a task associated with the recording. This task, found in the course pack, came in a variety of forms – from study notes with blank gaps in information to completing a mind map – but the main aim was to ensure that annotations were made so as to strengthen learning (Hativa, 2001). Such study notes also help to engage students in meaningful ways and enables them to create a set of revision notes for future reference at the end of the exercise.

The Flipped Lesson

As a general rule of thumb, the one-hour in-class sessions were exclusively used for students to critically apply what they learned from the videotaped lectures. Teachers, however, spent some time clarifying the content of the lecture at the start of each
lesson. For example, during the lesson on Singapore’s separation from Malaysia, the teacher explained the economic, political and security factors (provided in the video recording) in order to correct misconceptions and fill in gaps in the students’ understanding. Teachers regularly used activities such as a quick Think-Pair-Share or a pop quiz.

Next, students then applied what they learned to the main task of the lesson. With knowledge of the factors that led to separation of Singapore from Malaysia, students were asked to evaluate which was the most important factor. This could be done either in pairs or groups so that students can benefit from sharing their perspectives and then presenting their findings to the class (Hyland, 2004). However, in order to check for individual understanding, the teacher then assigned the given question in a modified form as an individual task to monitor the progress of individual students. Table 1 shows the learning objectives, questions and checks for learning and understanding in the lesson described above.

Table 1: List of Learning Objectives, Questions and Checks for Learning in the Flipped Classroom using Singapore’s Merger and Separation as Case Study

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Possible Questions</th>
<th>Checking for Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prior to Class</strong> (students to watch recorded lectures)</td>
<td>Students are able to list the factors that led to separation.</td>
<td>What were the factors that led to Singapore’s separation from Malaysia?</td>
</tr>
<tr>
<td><strong>During Class</strong> (students to apply what they know)</td>
<td>Students are able to evaluate which is the most important factor.</td>
<td>Which was the most important factor that led to separation?</td>
</tr>
<tr>
<td><strong>After Class</strong> (students to demonstrate what they know in individual tasks)</td>
<td>Students are to evaluate the importance of a factor based on a statement.</td>
<td>“Historians believe that the political factor was the most important factor that led to separation.” To what extent do you agree with this statement?</td>
</tr>
</tbody>
</table>
Post-Module Feedback

At the end of Semester Two in 2012, students were required to complete a Module Feedback Survey. In the survey results, over 90% of the students indicated that they enjoyed the lessons that were flipped and found the recorded lectures to be useful in terms of lesson preparation and for revision as well. A focus group of about 20 students also shared with me their experiences with the flipped classroom model, and how they felt that it had benefited them. Here, I select the top three benefits that the students identified in the whole experience of the flipped classroom.

Learning at their own Pace

By and large, one of the greatest benefits of the flipped classroom is that it allowed the students to learn and revise at their own pace within the comfort of their homes. With the recorded lectures, students now have the ability to pause the lesson to take a break or to revisit parts that they were uncertain of or were not able to grasp the first time round. Students feel greatly empowered when they are given greater control of their own learning (Jenkins & Walker, 1994). Simultaneously, this also allows for differentiated learning as the different abilities of the students are accommodated through the use of the recorded lectures: the weaker students can pause and revisit parts that they are uncertain of, while the more able students are given the opportunity to proceed at a faster pace to master the content.

A Revision Tool

At the same time, students found the recorded lectures to be an extremely useful source of revision for the final year exams. Many commented that by re-watching the videos, it allowed them to easily revisit information that was taught as long as fifteen weeks earlier. The demands of having to study for six to seven subjects for the final year exams might take its toll on students’ cognitive abilities and therefore the recorded lectures afforded them the opportunity to tap into their prior learning and address gaps in knowledge. The recorded lectures served as an alternative to the traditional revision lesson conducted by the teacher though in this instance, students now take ownership of their learning and revision is literally a click away.

Application of Knowledge in the Classroom

Educators need to take into account the students’ contextual knowledge in order to generate a more effective learning environment (Bowers & Keisler, 2011). The students from NUS High are highly motivated and because of their backgrounds, may possess a significant amount contextual knowledge. For example, many NUS High students graduated from the primary Gifted Education Programme (GEP) where they had already been taught the history of Singapore. For this segment of students, our main considerations were to ensure that they remained engaged with familiar content and to add value to their learning.

Hence, the flipped classroom model affords teachers the ability to pitch lessons at a level that requires students to apply the knowledge they have learnt (or already know). As mentioned previously, the first ten to fifteen minutes of the classroom session was devoted to a brief recap of content of the lecture to ensure that everyone in class was equipped with the same level of information, and to correct any misunderstandings. Students were then required to use their knowledge to construct their own understandings based on reasoned arguments. This was done either individually or through paired or group work, but the main idea was to get students to apply what they know to answer a question that requires critical thinking and interpretation. Instead of simply listing the factors that led to Singapore’s separation from Malaysia, students were asked to evaluate and identify the most important factor that brought about separation. In other
words, the lesson structure can be segmented according to Bloom’s Taxonomy of Learning (Bloom, 1956). While one initially learns key knowledge and develops comprehension, their learning should be scaffolded towards application, analysis, synthesis and evaluation.

**Implications and Considerations**

While the flipped classroom – if carefully adopted – can potentially unlock a higher level of engagement for students, educators need to realize that the flipped classroom is also not a magic pill. While pedagogies such as collaborative learning, inquiry-based learning and even didactic teaching have their unique benefits, educators need to realize that an over-reliance on any single pedagogy in all lessons could make students less engaged (Kelly-Jackson, 2008). There is a time and place for certain pedagogies to be used and thus, educators need to be able to tailor their teaching strategies to the abilities and needs of the learners.

The flipped classroom model is an addition to the tool kit of the educator, but the tool needs to be used appropriately to achieve the best results. Based on the lesson plan shared in this article, the flipped classroom model has to be augmented with other teaching strategies (pair/group work, presentations, initial didactic teaching, and individual homework) in order to be highly effective. A tailored approach that consists of teaching strategies used in different combinations that engage or appeal to the students should be an effort undertaken by educators.

*Table 2: List of the Processes of Bloom’s Taxonomy (1956) Related to Each Lesson Segment*

<table>
<thead>
<tr>
<th>Before Coming to Class</th>
<th>Learning Objective</th>
<th>Possible Questions</th>
<th>Processes of Bloom’s (1956) Taxonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are able to list the factors that led to separation.</td>
<td>What were the factors that led to separation?</td>
<td>Knowledge, Comprehension.</td>
<td></td>
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<th>During Class</th>
<th>Learning Objective</th>
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<tbody>
<tr>
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<td>Which was the most important factor that led to separation?</td>
<td>Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation</td>
<td></td>
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<td></td>
</tr>
</tbody>
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**Measurement of Learning**

While the implementation of the flipped classroom model was met with great enthusiasm in NUS High, genuine concerns have also surfaced. For example, colleagues have asked me how I ensure that students have watched the recorded lectures before coming to class. By placing my recordings on Youtube, there is no clear way for me to track which students have watched my videos before coming to class. This – it was claimed – would have been counter-productive since the flipped classroom as an instructional strategy requires students to come to class prepared and the inability to track the students’ engagement online suggests that the model perhaps failed to meet its objective.

Indeed, there is no way for me to measure if my students have seen my videos before coming to class. However, I find this question – How can we check if our students have watched the videos before coming to class? – rather troubling and think perhaps it is the wrong question to ask. Instead, one should ask: How can we check if our students are learning? Even if one is able to track the students who viewed the videos, this is not a checklist of learning but is instead merely a checklist of who has clicked on the link.

Thus, one needs to realise that the recorded lectures are meant to be used to complement learning. There is therefore a need for checks in the classroom to ensure that students are learning and that they do come to class having watched the recordings. Such checks can occur in the first ten to fifteen minutes of the lesson when a teacher can simply walk around to check if the students have at least filled up their notes or can be checked via a quick quiz. Indeed, the recorded lectures are by no means a magic pill that would immediately increase motivation, but at the very least, it offers students the ability to take greater ownership of their learning and revision as they would have easy access to it at any point in time.

**Flipped Classroom – Merely a Buzzword?**

Another common refrain in relation to the flipped classroom model is that it seems to require teachers to do more work for an instructional strategy that, from a certain perspective, does not quite bring anything new to the table. In a nutshell, the flipped classroom model is simply about getting students to come to class prepared with a set of knowledge.

Therefore, one needs to consider the benefits and affordances of technology. A recorded lecture or video has been found to engage the attention of students more effectively compared to other traditional forms of media (Smyth & Volker, 2013). They can also be a useful tool in e-learning, especially in situations where prevailing conditions may require closure of schools.

Meanwhile, the recorded lectures can expose students to a world of multi-literacies, helping them to make meaning through a combination of audio, visuals and texts. Indeed, literacy now goes beyond having the skill to interpret a string of words on a piece of paper as we now process and interpret information from images, sounds, and other forms of multimedia. Therefore, to be literate means being able to critically appreciate the powerful and complex texts and sources of information in a multimedia world as well as being able to express ourselves in multiple media forms (Iswaran, 2009). To a large extent, the flipped classroom can complement such a desired outcome.

**Conclusion**

The use of ICT in the classroom, as showcased by the flipped classroom model, can potentially make teaching and learning more engaging and effective. However, any attempt to implement this approach must take into consideration the learning needs of the class. There is no “one size fits all” formula and despite the clear benefits of the flipped
classroom, educators need to realise that its effectiveness would ultimately depend on one’s ability to tailor it appropriately for their classes. Any pedagogy may illuminate as much as it darkens, so it is therefore the prerogative of the educator to strike a fine balance with the strategies that are being used. Just like any teaching tool available, the flipped classroom model needs to be carefully harnessed and judiciously applied in a classroom setting in order to engage our students while adding value to their learning.

References


The Integrated Humanities curriculum serves to lay the foundation for the three Humanities disciplines taught by the Department. Concepts and skills fundamental to the respective disciplines are taught to prepare students to manage the subjects at higher levels. In Year 1, the first module focuses on the significance of cultures in shaping a society and influencing its identity, and students develop an understanding of fundamental economic concepts and systems. The Singapore Story of nation building - the trials and triumphs, and her arduous journey of economic, industrial and urban development, demographic transition and evolving challenges are covered in the second module. The Year 2 module builds on the content of the previous modules. Students develop a deeper understanding of leadership and governance, and examine the role of the community and organizations at the local and regional scales. In Year 3, students take a final module in Integrated Humanities which looks at global issues of economic competitiveness, international relations, and current challenges of environmental sustainability and terrorism.