2015, 37: 327–330 MEDICAL TEACHER

HOW WE...

How we flipped the medical classroom

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Abstract

Flipping the classroom centres on the delivery of print, audio or video based material prior to a lecture or class session. The class session is then dedicated to more active learning processes with application of knowledge through problem solving or case based scenarios. The rationale behind this approach is that teachers can spend their face-to-face time supporting students in deeper learning processes. In this paper we provide a background literature review on the flipped classroom along with a three step approach to flipping the classroom comprising implementing, enacting and evaluating this form of pedagogy. Our three step approach is based on actual experience of delivering a flipped classroom at the University of Hong Kong. This initiative was evaluated with positive results. We hope our experience will be transferable to other medical institutions.

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Introduction

Flipping the classroom centres on the delivery of print-, audio- or video-based material prior to a lecture or class session. The class session is then dedicated to more active learning processes with application of knowledge through problem solving or case based scenarios. The rationale behind this approach is that teachers can spend their face-to-face time supporting students in deeper learning processes. In this paper we provide a background literature review on the flipped classroom along with a three step approach to flipping the classroom comprising implementing, enacting and evaluating this form of pedagogy. Our three-step approach is based on actual experience of delivering a flipped classroom at the University of Hong Kong. This initiative was evaluated with positive results. We hope our experience will be transferable to other medical institutions.

Professor Eric Mazur of Harvard University is one of the best known proponents of flipping the classroom. Mazur first thought about the approach when he realized that lecturing – a form of information transmission – was not effective in developing students' capacity to use the information that they were receiving (Mazur 2009). This is a well-known issue in education where researchers have identified that students are unable to retrieve abstract knowledge to solve real life problems (Herrington & Oliver 2000). Pedagogically the solution is to create learning environments where students deal with real life problems that must be solved using knowledge that they have previously gained. This indicates the potential of the flipped classroom model where students can gain the abstract knowledge out of class and apply it in class with the support of teachers who act as facilitators and advisors during, for example, working through problems or working through cases. Pedagogically this makes complete sense as students can work through the material before class at their own pace and view material as often as they need to view it (DaRosa 2013). Secondly, and just as importantly, students need far more help when assimilating information as compared with processing basic information (Talbert 2011). In this scenario students are active learners receiving constant feedback based on their actual level of understanding (Mazur 2009). The positive results – measured in terms of learning gains – have been well documented for teaching approaches that engage students as active learners (Crouch & Mazur 2001).

Salman Khan of the well-known Khan Academy has popularized the use of YouTube videos to enhance the teaching and learning process. These videos are utilized by teachers who are flipping their classrooms (Straumsheim 2013). However, from a pedagogical perspective we need to be aware that our learners have different learning styles. An early study of the flipped or inverted classroom recognizes the

Practice points

- Keep it simple – flipping the classroom does not require fancy technology. Keep it simple through use of readily available software such as PowerPoint or Microsoft Word
- Avoid information overload – There is no need to detail every aspect. The use of short video clips or audio material should focus on areas that are not simply textbook based in order to provoke higher thinking.
- Engage with your audience – the flipped classroom can help to avoid the monotony of didactic lecturing and can be used to keep your audience engaged if done right
- Reflect – your first attempt may not be so smooth sailing. Ask your students their views and what improvements they feel can be made

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ISSN 0142-159X print/ISSN 1466-187X online/14/040327–4 © 2014 Informa UK Ltd.
DOI: 10.3109/0142159X.2014.923821

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benefits of spending class time in active learning whilst also recognizing that technologies offer the opportunity to deliver content in a variety of formats – video, audio, text, images – to meet the different learning styles of students (Lage et al. 2000). The same study surveyed students regarding their perceptions of the inverted classroom with favourable results. Students responded positively to questions concerning their preference for the inverted approach to teaching and to questions concerning their learning in the inverted classroom. The study also found that students tended to be more motivated in the inverted classroom. This is an important finding as motivation and active learning are both necessary for student engagement (Barkley 2010). One issue with the flipped classroom is students' perceptions that the workload is too high. However, in the study by Lage et al. the majority of students did not indicate that they worked more out of class or more in class. Furthermore, the fact that teachers can identify students' problems immediately potentially saves students hours of frustration and pointless work (Talbert 2011). On the teacher side, there may well be more work in preparing for the flipped classroom and teachers will need support in use of the technologies – amongst other things – when moving to the flipped model (DaRosa 2013).

There has been little evidence gathered on the utilisation of this teaching format in the medical education context, a fact that is recognized within the medical community (Kennedy 2014). Despite the lack of evidence, Salman Khan, already mentioned as the founder of the Khan academy, has co-published a paper in "Academic Medicine" re-imagining the medical curriculum in terms of the flipped classroom approach (Prober & Khan 2013). From a pedagogical perspective the model has the elements already described, gaining basic content outside of class and engaging in rich interactive exercises in class. A difference with this model for the medical curriculum is the view that students should be able to pursue knowledge in terms of their own particular interests. Thus, beyond the core curriculum students would be encouraged to take "deep dives" into knowledge areas that, for example, they believe that they might want to specialise in later in their careers. In terms of evidence, Prober et al. at Stanford noted that the use of the flipped classroom during the delivery of a biochemistry course increased attendance from 30% to 80% (Prober & Heath 2012). In addition, Pierce et al. observed that the use of the flipped classroom during the delivery of a renal pharmacotherapy module significantly improved students' performance compared to performance of students the previous year that underwent the same module in a more traditional setting (Pierce & Khan 2012).

How we flipped the classroom

What we did

Our flipped experiment centred on the field of rheumatology, specifically mono and polyarticular joint disease. One week prior to class, paper author CSL alongside DH recorded short 10–15-minute video clips relevant to this field. Areas of interest included osteoarthritis, rheumatoid arthritis, Systemic lupus erythematosus (SLE), gout, pseudogout and the benign joint hypermobility syndrome as examples. These clips were subsequently uploaded to YouTube and emailed to students.

On arrival to the class session, 106 students were divided into 15 groups, with each group given a set of A-E response cards. The lecture then focused on case based problems relevant to the video material they had been sent. Each case scenario required choosing the most appropriate response from questions allied to investigations, management and diagnosis. Each group were allowed a few minutes to discuss these questions with their peers before being asked to raise the appropriate response card in synch with the other groups. Any discrepancy in responses were then discussed with the instructor (CSL).

What do to next

Based on our initial pilot study the next section discusses what we learnt from the process and our advice to anyone willing to undertake this form of pedagogy.

One step at a time

All educational innovations take time to implement and flipping your teaching is no exception. Start small by flipping perhaps one or two classes and then reflect and learn from the experience, building on any successes and addressing any perceived shortcomings. These smaller innovation steps are much easier to put into place than trying to implement change across a whole semester of classes.

Allow plenty of time

Flipping a class is not an easy task. A lot of preparation time is required to ensure that the relevant content is covered and that the "classroom" activities engage students in higher order thinking skills. "Teachers" often find it unusual to record themselves narrating content and they tend to be overly critical of their recorded narrations. Therefore allow plenty of time to ensure that these elements are well constructed. As the old saying goes: "If you fail to prepare, prepare to fail."

Get students on board

Many students feel that the point of attending a lecture should be to receive all the necessary information needed to pass the exam. Students may therefore view flipping the classroom as an unnecessary addition to their workload. In order to alleviate students' concerns, it is important for instructors to get students on board by explaining the rationale behind flipping the classroom and by allowing students to understand the long term advantages of this form of learning.

Keep it simple

There is often a concern that flipping a class necessitates the latest technology software and mastery of IT. This is certainly not the case. In fact video material may not even be needed. A flipped classroom could utilize audio material recorded in the native Microsoft sound recorder or a recorded PowerPoint narration recorded using PowerPoint's built in narration capability. These software solutions are very easy to use and,

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as Microsoft Office products are usually the default choice within institutions; help will not be far away if needed.

Avoid information overload

There is often a tendency in medical lectures to detail every little aspect of a condition right down to the historical details of when the condition was first described in the literature. The flipped classroom is designed to engage students in higher order thinking – particularly the application of knowledge – in order to produce doctors who are able to deal with patients, i.e. real people. It is therefore important to steer away from minutiae and to set students activities that will require them to think at a deep level. As Sir William Osler once said: "To study the phenomenon of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."

Engage your students online

In classroom activities, teachers strive to engage students and encourage active learning; the same should apply online. If you post a video lecture online, you can also include a couple of questions for students to think about while they watch. If you embed the video on the university's Learning Management System (LMS) you can also include a brief pre- or post-video quiz to get students thinking more deeply. Ultimately, the learning experience should be engaging from start to finish.

Know your e-learning

Whilst many of the 'best practices' from face-to-face teaching still apply when moving course content online, there may also be new considerations. A one-hour live lecture can be an enlightening event but experience tells us that online attention spans are often much shorter, with 10–15 minutes being an acceptable length for an online lecture. Furthermore, try to resist the temptation to include everything from a face-to-face lecture in its online counterpart. Including one or two key concepts per video should be sufficient as the post-lecture classroom activities are where the depth of learning should come from.

Introduce variety

The flipped classroom will at first be a novel experience for students. However, it can quickly become "stale" if the same format, e.g. recorded lecture and a case study is used on every occasion. Make use of different media, e.g. video, audio, documents, web pages, animations etc. and engage students in a variety of activities, e.g. cases, problems, collaborative mind mapping, concept mapping or visual web creation. A web search using the key words "active learning activities" will yield a host of ideas for engaging students in the classroom.

Appreciate your new role

Flipping the classroom for the first time will be a challenging experience. Be prepared to learn from the experience and be prepared to keep on learning. Know that your role will have changed from one of delivering content to one of facilitating learning. You will be in the midst of your students as they engage in a process of intellectual enquiry. Your role will be more of enabling student learning and this will bring its own challenges. For example, students will likely have access to a wealth of information on the Web as they engage in cases and you can be asked anything at any time.

Create appropriate assessments

The basic rationale behind flipping the classroom is to engage students more deeply with content, with one another and with the teacher. The overall aim is to have students think at a deeper level through engaging in, for example, solving problems or cases. This means that assessment practices need to align with the learning activities. In other words assessments must test higher order thinking skills. If assessments do not change – for example, standard multiple choice assessments are given – then students will not be motivated to engage in flipped activities because the assessments will not align with the learning activities.

Evaluate

If you are going to spend time flipping your classroom you are going to want to know whether or not your new approach has been effective. Evaluate using a questionnaire that, e.g. captures student perceptions of the value of the new approach. Ask students questions concerning depth of learning, gains in knowledge, satisfaction with media, overall satisfaction etc. Make sure to include open ended questions such as "In what ways has this teaching approach benefited your learning" and "What could be done to make this learning experience more effective".

It's good to share

In education there is little to be gained from working in isolation and much to learn from sharing as you innovate in your teaching. Just as you will seek input from various sources prior to flipping a class, why not share your experiences after the intervention with faculty and colleagues. The ensuing discussion can provide a rich opportunity to contribute the insight gained from your experiences and learn from others' as you work towards the ultimate goal of enhancing student learning.

Conclusion

This paper is cemented courtesy of personal experience of the flipped approach. We are by no means experts in the field but having gained knowledge of this teaching approach were prepared to dive straight in and take a risk. Our risk paid off, as we noted positive results from our first trial and we are keen to pursue this method of instruction in future sessions. We are confident that our advice above will enable any instructor to feel willing enough to instigate a flipped classroom and invite you to share your experiences, whether good or bad, as well as your recommendations with us. Results from our pilot study can be found at http://mededworld.org/MedEdWorld-Papers.aspx?search=flipped+classroom.

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Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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