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FLIPPING YOUR CLASSROOM: A METHODOLOGY FOR SUCCESSFUL FLIPPED CLASSROOMS

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ABSTRACT

As higher education reinvents itself to respond to the needs of a new generation of learners and novel workplace demands, it pivots towards student-centred pedagogical approaches and focuses on the promotion of active and lifelong learning. The flipped classroom model emerges in this context to address the limitations of the traditional classroom. When successfully implemented, it can provide students with the opportunity to learn at their own pace and to develop self-learning competences that are useful both academically and professionally. This paper proposes a methodology for the effective deployment of the flipped classroom that aims to assist educators in their efforts to flip their classrooms. The methodology comprises five core aspects: pre-class content delivery, pre-class assessment, in-class content review, classroom active learning and in-class assessment.

KEYWORDS

Flipped Classroom, Blended Learning, Higher Education

1. INTRODUCTION

The incorporation of active learning activities within a classroom is often hindered by time constraints. Classes have a limited time period and teachers are faced with the intricate mission of delivering lectures and presenting active learning tasks. Flipped classrooms are being used as a method to increase the level of active learning during the classes (Kim et al., 2014). The flipped classroom refers to a pedagogical model that consists in delivering content via online lectures that the students can review at their own pace, before coming to the class, that assists them to be prepared to engage with the content during in-class learning activities (Mortensen and Nicholson, 2015). Despite the fact that the flipped classroom can be designed in learning settings that do not resort to the support of technology, they are primarily established in blended learning settings (Thai et al., 2017).

The flipped classroom is a student-centred learning approach that promotes students' independence and the development of active learning activities (McLaughlin et al., 2014). The core objective of adopting the flipped classroom method is to offer students the possibility to access the course content at their convenience, before they attend the class. This allows them to be prepared to actively engage with the materials in class, maximising deeper learning (Moraros et al., 2015). The evolution of technology facilitates the process of recording the video lectures to deliver content to the students prior to the class (Zappe et al., 2009), but they are not in themselves the centre of this methodology. It is rather the way in which they are incorporated into a different approach (Tucker, 2012). Adopting a flipped classroom approach provides the opportunity to break with the conventional structure of lectures that are based on the transmission of information by the teacher and the passive reception of this information by the students (Hutchings and Quinney, 2015).

The need to develop a methodology to guide the process of flipping a classroom derives from the fact that there is a variety of activities that can be associated with pre- and in-class activities, which can cause educators to be confused as to what type of activities actually work. Also, by learning from previous experiences it is possible to identify the aspects that are more effective to successfully flip a classroom. This paper begins by examining the flipped classroom model and then proposes a methodology for its successful implementation.

2. THE FLIPPED CLASSROOM APPROACH

Current evaluations of the flipped approach present differing opinions, but generally speaking the assessment they make is positive (Bishop and Verleger, 2013). Among the multiple existing definitions of the flipped classroom, Abeysekera and Dawson (2015) provide a summary of what it entails and define it as "a set of pedagogical approaches that: (1) move most information-transmission teaching out of class; (2) use class time for learning activities that are active and social and; (3) require students to complete pre- and/or post-class activities to fully benefit from in-class work." (p. 3). There is a wide variation between what different studies report having used as the pre-class content delivery assignments, although the majority seems to use a combination of asynchronous online video and quizzes or closed-ended problems. This variation exists equally in the type of activities that the teachers design for the in-class engagement with the material. Most studies seem to have a preference for using interactive learning tasks based on group work (Bishop and Verleger, 2013).

The flipped model popularity is associated with the multiple benefits it represents. It contributes to the empowerment of learners by endowing them with more control over their learning in the pre-class work that they can complete at a time they choose, in the classroom through their active participation and in the improvement of their lifelong learning aptitude (O'Flaherty and Phillips, 2015). The control that the students have over how they engage with the video lecture, what segments they review or are more interesting to them, is also an enabler of personalised learning (Danker, 2015, Moffett and Mill, 2014). The flipped classroom can enhance student-student and student-teacher interaction (Phillips and Trainor, 2014), foment student engagement and participation in the classroom and it can improve their learning outcomes (Thai et al., 2017). Previous research has showed that flipped classrooms are a valuable strategy to promote active learning also within the context of large classes (Danker, 2015). The fact that students have the possibility to prepare for the class in advance, makes them more available to expand on the material and interact more deeply with it (Kurtz et al., 2014). Time becomes less of a constraint, since the students can learn the material at their own pace, using as much time as they need (Bergmann and Sams, 2014). Moreover, since the students complete the assignments, which were previously allocated as homework, inside the classroom they can benefit from the direct help of their teachers and their peers (Danker, 2015). Traditionally, the teacher is present at the time of the delivery of content, but not when the students have to apply what they have learned during the completion of the homework assignments (Moffett and Mill, 2014).

The adoption of the flipped classroom implies changes to the role of the teachers. There are changes also at the level of the student's role. The students can assume an active and collaborative stance towards learning and engage more richly with the content of the class (Hutchings and Quinney, 2015). During the classroom the teachers predominantly assume the role of a mentor, guiding both individual and group work and prior to the class they are required to deliver learning content by using their technology competences (Dennen and Spector, 2016).

The implementation of the flipped classroom model requires educators to maximise its benefits, but also to understand the challenges it poses. Despite some claims that the effort of flipping the classroom is more substantial the first time the course is flipped (Moffett and Mill, 2014) and that it solely involves the reformatting of existing content (Bergmann and Sams, 2014) the time effort that it requires from educators is often cited as one of its most relevant challenges (Findlay-Thompson and Mombourquette, 2014, Ferreri and O'Connor, 2013, Mason et al., 2013). The pre-classroom preparation that is demanded of the students can similarly constitute a difficulty. In order for the flipped approach to be effective, the students have to learn to be self-learners (Findlay-Thompson and Mombourquette, 2014) and to review the materials before attending the classroom (McLaughlin et al., 2014). For those teachers who decide to deliver the content via online videos, the production of the lecture might prove challenging, as they have to convey the content with clarity and succinctness (Tucker, 2012). Another difficulty that may arise from delivering content online is the fact that not all the students have access to an internet connection. In these cases the accomplishment of the pre-class work might become compromised (Danker, 2015).

3. METHODOLOGY FOR FLIPPING CLASSROOMS

A flipped classroom can be organised in a variety of manners. The only constant among the different cases of flipped classrooms is the delivery of content prior to the classroom and the use of the classroom time to engage in active learning activities. The methods for delivering the content and the organisation of the in-class activities vary greatly, but it is important to establish a coherent link between the activities that are performed in the classroom and those that are completed outside, so that they can be mutually supportive. Also offering clear instructions and a guiding structure is key to ensure that the students always know the learning objectives (Kim et al., 2014).

In their study about a flipped psychology course, Isaias et al. (2017a) describe how these two components of the process can be successfully executed. In the case of the course in question, the content was delivered via online videos and the classroom activities were conducted in workshops and tutorials, where the learners had the opportunity to debate and interact with the content and work on their assignments.

To successfully deploy the flipped classroom method, teachers need to offer students with the possibility to have exposure to the content before the class, by providing learning materials (Kim et al., 2014). Likewise, it is essential to provide the flipped classroom with meaning and structure to assist the students in this transition from a passive attitude to the adoption of an active role (Moffett and Mill, 2014). In order to effectively flip a classroom, it is important that the students understand the objective of this approach, how it works and that they know and welcome their new responsibilities. Also, the teachers must accept this shift from conventional teaching practices and may require training on how to implement this technique, which cannot be reduced to a mere inversion of tasks with the support of video (Findlay-Thompson and Mombourquette, 2014).

The methodology that this paper proposes comprises five core aspects: pre-class content delivery, pre-class assessment, in-class content review, classroom active learning, in-class assessment. Each of these elements of the methodology is supported by core guidelines (Figure 1).

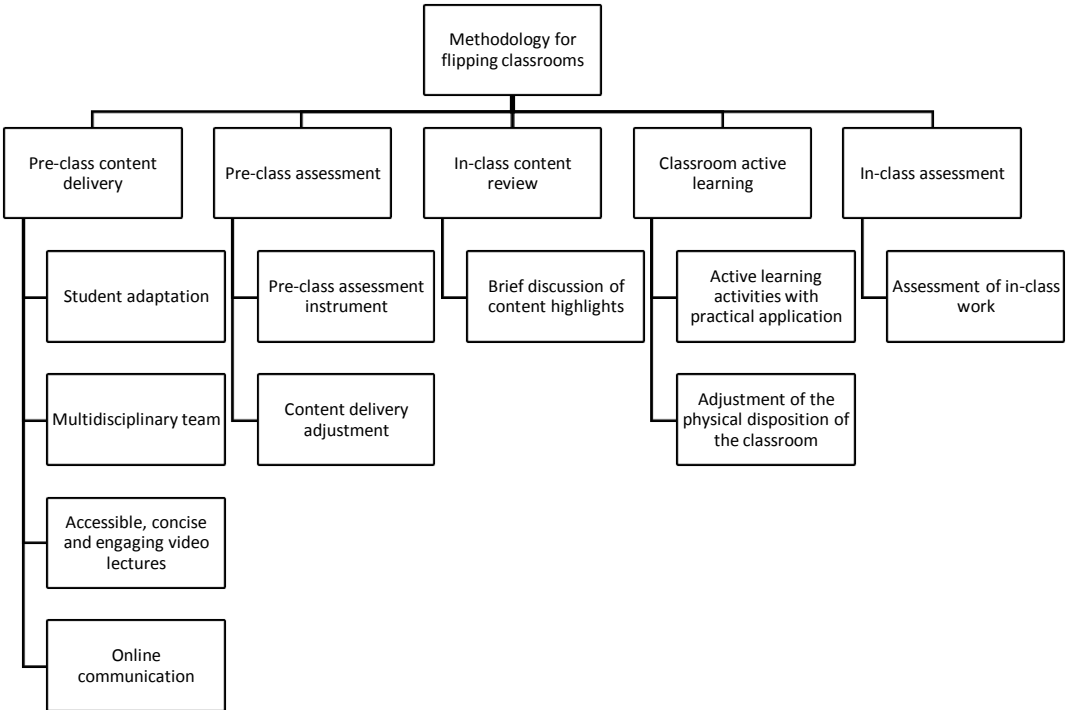

Figure 1. Methodology for flipping the classroom

3.1 Pre-class Content Delivery

When developing the pre-class activities, it is important to account for the students' workload and to design them to be engaging and brief. In previous studies, some students considered that the review of the online lectures required a significant time commitment (Isaias et al., 2017a). Teachers should ensure that the workload of the students is merely distributed between pre- and in-class and not increased (Loveys et al., 2016). In order to achieve an effortless transition to the flipped model, the teachers should limit the number of initial content topics, which will increase the amount of time that the learners have available to adjust to this new pedagogical approach. Also, the students should be encouraged to develop different learning strategies and to face the online preparation as an integral learning package (Isaias et al., 2018).

Before starting the flipped course, there is a need to assemble a multidisciplinary team that can bring different expertise to the process. The content must be delivered in a different format and that conversion requires knowledge at the level of the content, learning design and technology. Academics will need the assistance of other professionals to accomplish a successful flipped classroom. Also, the teaching team should have enough members to create and supervise the novel activities that are required in this approach (Isaias et al., 2018). Interdisciplinary teams are important to gather different types of experts that can account for all the aspects of designing a flipped classroom (Loveys et al., 2016).

There are three main aspects that video lectures should consider: access, conciseness and student engagement. In terms of access, it is crucial that the lectures are accessible to the students (Isaias et al., 2018). The development of technology has caused access to be facilitated. At the same time, learning management systems such as Blackboard, provide secure platforms for uploading the video lectures (Zappe et al., 2009). It is equally important that the lectures are accessible for the students to review at their convenience. Educators should equally resort to technology that is familiar and that the students can easily access, to decrease technological barriers (Kim et al., 2014). The employment of simple technology assists the pedagogical reliability of the flipped model (Loveys et al., 2016).

Conciseness, refers to the video lecture length, a subject where there are several recommendations deriving from previous research. The general advise to educators is to create brief videos (Bergmann and Sams, 2014). Zappe et al. (2009) concluded that the students would be more reticent to reviewing one hour video lectures and established that the ideal size should be kept maximum to 20-30 minutes. Kurtz et al. (2014), on the other hand, used videos that lasted a maximum of 10 minutes. In the context of MOOCs, for example, Guo et al. (2014) recommend dividing the lessons into videos with no more than 6 minutes. Isaias et al. (2018) underlined the importance of conciseness and created online lectures that lasted on average 3 minutes.

Student engagement, concerns the need to regard the creation of videos as an opportunity to deliver a lecture that transcends the options that are available in a classroom. Hence the videos should not be restricted to a delivery method where the teachers record themselves talking about the content. It is crucial to employ several resources, namely demonstrations and interviews, and take advantage of the technology that is available in terms of video production and animation. Moreover, the online lectures should include transcripts and use text in the video to highlight the most relevant content and help the students in following the lecture (Isaias et al., 2018). A valuable strategy to maintain students' interest about and engagement with the course content is to incorporate multimedia into the online lectures (Zappe et al., 2009). Teachers do not have to limit the presentation of the lecture to the use of video, they can create podcasts and use web-based whiteboards (Moffett and Mill, 2014). High quality content is also important. The teachers need to ensure that the content in the lecture is up-to-date, safe in terms of copyright and that it has been reformatted to fit this model. The video should also have a professional look (Isaias et al., 2018). The innovation afforded by the flipped classroom should not compromise the accuracy of content standards (Bergmann and Sams, 2014).

The teachers should determine if their subject can benefit from a flipped classroom format, since not all subjects are easily reformatted into this method (Isaias et al., 2018). The usefulness of videos for learning isn't universal, not all subjects benefit from the visualisation of videos, so it is important to develop other methods that can assist students to obtain a deeper understanding of content (Bergmann and Sams, 2014).

Since the flipped approach extends the classroom to online environments, it is valuable to guarantee that social interaction in these settings is assisted by social technology such as forums and social polling (Isaias et al., 2017a). Teachers should focus on promoting the creation of a learning community, by facilitating collaboration among the students (Kim et al., 2014). Furthermore, the creation of an online forum provides

the teachers with an important communication channel that allows them to provide timely responses to the students questions before they attend the class (Moraros et al., 2015). Resorting to forums can equally be valuable in terms of information search and for assignment resources (Miranda et al., 2013). The use of social technology transcends the classroom and enables the students to contact with their colleagues and with other students worldwide and provides them with access to various opinions. When using forums, it is important to ensure that group discussions are facilitated and that there are features available, such as the possibility to add tags, to create more communication and to limit the occurrence of single posts. The interaction between students and teachers must also be assured (Isaias et al., 2018).

3.2 Pre-class Assessment

To ensure the students' preparation, teachers can resort to the use of online quizzes that the students should complete before attending the classroom. Compliance with the pre-class activities is vital as the better the students are prepared, the more they will be capable of learning (Herreid and Schiller, 2013) and the more they will benefit from the classroom activities. The activities for outside of the classroom can also include brief illustrative problems that the students are asked to complete after watching the videos (Zappe et al., 2009). Providing an incentive for the preparatory work, such as grading students' online comments on the videos is essential. It is fundamental to develop instruments to evaluate the students understanding of the material, like creating quizzes (Kim et al., 2014). The online quizzes represent a key element of assessment. Some students prefer them over a summative final exam and argue that they cause them less stress and help them to remain on track (Isaias et al., 2017a, Isaias et al., 2018).

With concern to content delivery adjustment, the online quizzes are equally useful to assist the teachers to use their results to determine the aspects that were less clear to the students and adapt the in-class activities according to those difficulties (Zappe et al., 2009, Phillips and Trainor, 2014).

3.3 In-class Content Review

Given that the videos are to be viewed prior to the classroom for student preparation, they shouldn't be replayed during the class (Phillips and Trainor, 2014). The in-class activities should be preceded by the teachers' report on the students' answers to the online questions and address any salient aspects of the online content. In the flipped classroom format, the teacher has the responsibility to examine the pre-class activities and ensure that any misunderstandings are cleared (Loveys et al., 2016).

The fact that the teacher is not present to personally transmit the concepts, might cause students to misunderstand the resources. They may equally feel overloaded with the study of the contents and may lack the confidence for self-study, which can hinder their learning progression (Kurtz et al., 2014). Hence, although the students watch the videos prior to coming to the classroom, it is beneficial to include a short review of the content of the video lectures before beginning the in-class activities (Isaias et al., 2018). This review should simply underline the most significant aspects of the content, rather than go through all the information of the video lecture. This reminds the students of the key aspects, enabling them to complete the classroom activities more proficiently and allows them to ask questions (Zappe et al., 2009). Moreover, in scenarios where the in-class activities will be assessed the absence of this discussion of content might prove detrimental to the students' learning. The students can become overly concentrated on and pressured by their assessment and miss the opportunity to really debate the content (Isaias et al., 2018).

3.4 Classroom Active Learning

The activities in the classroom should establish a connection between the online content and real-life scenarios (Loveys et al., 2016). The inclusion of practical situations for the application of the knowledge is essential to consolidate the content that the students' have reviewed. Also, the use of several active learning methods in flipped classrooms seems to be more beneficial for the students (DeLozier and Rhodes, 2017).

The classroom activities can be structured as tutorials. This format should be used to present the highlights of the video lectures, to develop engaging activities and to engage the students in interesting discussions of the content (Isaias et al., 2018). Loveys et al. (2016) described how they resorted to the creation of a tutorial to provide the students with the competences that they required to write a laboratory

report. The students were asked to complete the pre-class activity and then attend the tutorial. In the tutorial they were presented with a brief lecture about writing reports and they were asked to review their pre-class assignment in pairs. In the case of the tutorial sessions conducted by Moraros et al. (2015), although they were in a classroom (a tutorial room), they were characterised as being post-class, since the students attended them after the classroom activities. In a study by Butt (2014), tutorials were also used to supplement the lectures. They lasted one hour and they were offered once a week in a computer lab to guarantee computer access to the students. During the tutorials the students were required to complete exercise.

The in-class activities can also assume a workshop format to engage in authentic activities with real life scenarios (Loveys et al., 2016). A central elements of using workshops is to assist the students to apply knowledge to practical and real world situations so that they can debate and reinforce the information that they've learned (Isaias et al., 2018). In Moffett and Mill (2014) study of a flipped classroom course, the in-class activities were organised in workshops, where an initial overview and discussion of content was followed by active learning tasks that were monitored by an audience response system. In Isaias et al. (2017a) study the authors used both tutorials and workshops for in-class activities. The tutorials were mainly used for assisting the students to complete their laboratory report and the workshops were created for the development of activities about the three main content areas developed of the course.

Active learning activities demand an adjustment of the physical space of the classroom. The traditional lecture theatres limit the possibilities of engaging in discussions due to the fact that the students are facing the front, so educators must choose rooms that are already arranged to foster discussion among the students or that can be set up that way (Isaias et al., 2018). Group work requires flexible spaces for learning (Hutchings and Quinney, 2015) and large lecture amphitheatres have fixed seating and hinder collaboration. Despite the fact that classrooms for active learning have a reduced student capacity, in comparison to larger lecture halls, they result in a more proficient use of space, since they improve the students' perception of the learning settings (Baepler et al., 2014). Houston and Lin (2012) describe how a room was rearranged to accommodate a conference table that enhanced the students engagement with the material and increased the discussion among students. The different set up of the room had a deep positive impact on interaction.

3.5 In-class Assessment

The workshops can also be used for preparing the learners for their assessment (Loveys et al., 2016). When organising the classroom structure, it is advisable to allocate enough time for assignment completion to enable students to apply the material they've reviewed in advance (Kim et al., 2014). For teachers who opt to use group activities, assessing the group discussions precludes the students from assuming a passive stance and it enhances their participation. Also, teachers should provide students with feedback on their assignments' drafts and ensure that enough support is available to assist their completion (Isaias et al., 2018). Is advisable to provide immediate and adaptive feedback on both individual and group work, to improve the work and for engagement (Kim et al., 2014). Moraros et al. (2015) required the students to collaborate in groups around a relevant topic and present their work to the class. This work was then assessed with a grade by the teacher. A strategy that can be employed to provide students with feedback on their workshop responses is to create a video after the completion of the assessment of the students to offer them examples of what the teachers expected of their answers. The video would elucidate the students on the feedback that they received and at the same time it would serve as a content debriefing (Isaias et al., 2018). The in-class assessment can equally be supported by the use of clickers to capture the students' answers (Ferreri and O'Connor, 2013, Zappe et al., 2009). The use of electronic assessment offers numerous advantages and it is widely employed by teachers, namely due to marking automation (Isaias et al., 2017b), which is a time saving feature.

4. CASE STUDY FOR THE PROPOSED METHODOLOGY

The work of Isaias et al. (2018) constitutes an example of the implementation of the methodology that is proposed. The authors described the process of flipping a psychology course in an Australian university (PSYC1030). Traditionally, the course was composed of a conventional lecture (2 hours) and one tutorial (1 hour) per week in a total of 12 weeks. In the flipped format, the content was delivered via a small private

online course (SPOC) and the classroom time was divided into workshops and tutorials. This flipped approach was subject to a comprehensive evaluation that was provided by the students, the tutors and the course development team, through surveys and semi-structured interviews. Both the process that was followed and the evaluations support this methodology, as is portrayed in table 1.

Table 1. Case study's application of the methodology

Methodology elements	**Guidelines**	**Evaluation and Procedures**
Pre-class content delivery	Student adaptation to model	– Need to reduce the number of initial topics – New learning strategies for students are required
	Multidisciplinary team	– Lead course academic – Course academics – Media team – Technical team – Learning designer – Faculty project officer – Team of beta-testers
	Accessible, concise and engaging video lectures	– Accessible online – Average of 3 minutes – High quality and current content – Inclusion of transcripts
	Ensure online communication	– Forum – Social polling
Pre-class assessment	Create a pre-class assessment instrument	– Online quizzes
	Use the results of the assessment to adjust content delivery	– Need to identify areas of difficulty
In-class content review	Discuss the highlights of the pre-class content briefly	– Content discussion required
Classroom active learning	Develop active learning activities with practical application of the content	– The tutorials assisted the students with their laboratory report – The workshops included group work and the application of knowledge to practical scenarios
	Adjust the physical disposition of the classroom to suit active learning	– Tutorial rooms
In-class assessment	Assess the work that the students do in the classroom	– Individual and group assessment

In terms of pre-class content delivery one of the aspects that emerged from the evaluation of the course creators was the need for the students to adapt to the model. According to their assessment, it is important to assist the students in their transition to the flipped approach by restricting the number of initial topics that are to be covered in the content. Additionally, the students should be instructed to adjust their learning strategies to meet the demands of this new model. With regards to the composition of the team, it was multidisciplinary

and it included a lead course academic, who produced the slides and some of the video resources; course academics, who perfected the scripts for the videos and designed interactive activities; a media team, responsible for the recording and edition of the videos; a technical team, in charge of developing tools for formative assessment; a learning designer, who developed the videos and the activities for formative assessment to build the SPOC; a faculty project officer, responsible for building the summative quizzes; and a team of beta-testers who revised the SPOC. The video lectures were made available online so that the students could easily access them. The team ensured that they consisted of current and high quality content, supported by transcripts. Demonstrations and interviews were equally included to convey the content in an engaging manner. Finally, the online communication between the teacher and the students and among the students themselves, was assured by the use of forums and social polling. The use of these communication tools was seen as positive by the course creators' evaluation, who claimed that the type of engagement that they foster is not possible to achieve in the traditional classroom.

With concern to the pre-class assessment, when flipping PSYC1030, the team developed online quizzes that the students were asked to complete. One quiz was done before they watched the video lectures, which was formative and after they viewed the videos they would complete another quiz, which was summative. Both the tutors and the students provided a positive evaluation of the use of quizzes. For the tutors they were one of the most effective aspects of the model and they endowed the students with a significant understanding of the main course concepts. The students claimed that the quizzes were a valuable tool to assist them to manage the course content. Furthermore, the evaluation of the course creators made it clear that it is fundamental to detect the areas that the students found more difficult and adapt the delivery of that content accordingly. Their viewpoints highlight the use of the results of the quizzes, as it is proposed in the methodology, as a valuable strategy to identify the content that needs further explanation.

According to the appraisal of the course creators it is necessary to allocate more time in the workshops for the discussion of the content. Some students also found this to be true in the tutorials. Hence, to address this shortcoming of the flipped PSYC1030, and reiterating the guidelines of the methodology, there is the need to include a brief discussion of content in the classroom.

In the flipped PSYC1030 the classroom time was divided into workshops and tutorials. According to the course creators' evaluation one of the key aspects of the experience was the use of the workshops for the application of the content. The workshops also enabled more time for discussion with the teacher and the inclusion of group work demanded the active participation of the students. The tutors' appraisal highlighted the importance of the workshops for promoting discussion, problem solving and critical thinking and the fact that they increased student participation. In terms of the tutorials, some students claimed that they were valuable for explaining the laboratory report and for providing assistance with their assignment completion. In the flipped PSYC1030, the physical space for the classroom activities was important to enable student discussion. The course creators underlined the fact that lecture theatres do not foment discussion. The teaching team used tutorial rooms and rooms that could be rearranged to fit the workshop format.

Finally, with regards to in-class assessment, as per the methodology, in the flipped PSYC1030 course, the students were assessed on the outcomes of their group work. They were asked to apply their newly acquired knowledge to the resolution of a practical problem that they had to address as a group and their collective answer was assessed. Individually, they were assessed on their laboratory report.

5. DISCUSSION

The process of flipping a classroom can be associated with the misconception that it requires merely an inversion of the events that occur in-class and outside the classroom. Flipping a course requires preparation and an understanding of the effort it demands. As more educators are implementing this pedagogical strategy there is a growing awareness of the time commitment it implies and of the different moving parts that together create a successful flipped classroom.

The methodology that is proposed in this paper presents a flexible structure that can assist teachers in their efforts of flipping classrooms. While it is composed of five key elements that are essential for the success of the flipped classroom it provides sufficient latitude to be adapted to several types of subjects, teaching styles and learning goals. This methodology is not to be taken as an attempt to provide a cookie-cutter approach, but as a guiding frame for those who wish to flip their courses.

Firstly, a pre-condition of the flipped classroom is the delivery of content prior to the classroom. The students must have access to pre-class content in order to prepare for the classroom activities. The content needs to be redesign to fit online delivery and independent learning and it must engage the students. It is valuable to resort to social technology to support this online portion of the flipped classroom to ensure that the students have appropriate communication channels to interact with the teachers and their peers. Secondly, the online delivery of content should be accompanied by one of more methods of assessment. The assessment is advised both to guarantee that the students complete their pre-class preparation and to provide the teachers with a depiction of the areas where the students had more difficulties. The creation of quizzes has been amply cited in existing studies as a valuable option for this type of assessment needs (Kim et al., 2014, Zappe et al., 2009, Phillips and Trainor, 2014, Isaias et al., 2017a).

Thirdly, the in-class activities should be preceded by a brief review of the content of the online lectures. The review has the objective of reminding the students of the highlights of the content and to respond to any difficulties that may arise with parts of that content. The teacher should equally use this time to provide the students with feedback to their pre-class assessment. Fourthly, the classroom can be structured as workshops and tutorials to promote a more active discussion of the content, to enable group work and to create active learning activities based on real scenarios. These formats are more conducive to active learning and peer discussion than the large lectures conducted in traditional amphitheatres. The activities can assume a variety of forms, but their underlying principle should be the practical application of the content and the promotion of active learning. Finally, to ensure the success of the flipped classroom model, educators are advised to create assessment methods for the in-class activities, to potentiate the students' participation. Both individual and group work can be assessed namely by resorting to electronic assessment.

6. CONCLUSION

The promise of a student-centred, active learning offered by the flipped classroom is driving educators to adopt this approach in their courses. The increasing popularity of this pedagogical method and its potential to improve the learning experience of students requires teachers to reflect about new teaching practices and to redesign their classes.

This paper intended to contribute with a methodology to guide teachers through the process of flipping their courses. Flipped classrooms can be designed in a variety of forms and they can be supported by multiple activities. Nonetheless, it is important to establish a guiding structure to ensure that the redesign of the courses into the flipped format actually results in an enhancement of active and deep learning and represents an improvement of the traditional classroom. Specifically, it is key to the flipped classroom format that the students have access to engaging content prior to the classroom; that they are asked to complete some form of assessment to ensure that preparation; that the content is briefly reviewed in the classroom to address any difficulties; that the in-class activities are comprised of active learning exercises based on real-life scenarios; and that these activities are assessed by the teacher to encourage student participation.

The rising importance of this format for education demands new and improved design and evaluation efforts that can attest its effectiveness. An important limitation of this paper concerns the use of findings from data collection methods that are based on the respondents' self-evaluation. While self-evaluation is valuable to gain insight into the different stakeholders' standpoint, it fails to provide an objective and quantifiable account of the experience. Future research ventures should focus on improving and providing a more empirical support for the methodology that is presented in this paper, namely by collecting the opinion of experts in this subject and resorting to more objective measurements pertaining to the specific learning outcomes.

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