'TECHNOLOGIZING' THE POSTGRADUATE CLASSROOM

Sara Smith, Martin Khechara

Faculty of Science and Engineering. School of Biomedical Science and Physiology, University of Wolverhampton (UNITED KINGDOM)

Abstract

The MSc Biomedical Science award like many other awards at Masters Level attracts students from a range of undergraduate studies as well as a large number of international students. Transition from undergraduate to postgraduate learner is challenging for most students. For those who have studied on generic UG courses or those with non-UK degrees, this transition is potentially more difficult, and students often struggle with the specialist context of this award.

We describe an investigation which evaluated the use of two current technologies available to support learning and teaching to enhance the student experience and consequently engagement. Panopto software allows lectures to be captured by tutors and watched by students outside of taught sessions (flipped). This provides more time during class to focus upon application of knowledge, to address more complex topics, develop problem solving skills and for students to benefit from peer and tutor support during contact time. Socrative enables the use of instantaneous questioning and feedback of students' responses using mobile devices. It provides the tutor with an insight into levels of understanding, as well as allowing students to evaluate their own progress.

Evaluation and comparison of the non-traditional vs. traditional delivery was undertaken via questionnaires and focus group interviews with students. Analysis of the data illustrates that although the use of technology is identified as being a valuable addition to the learning environment, it is the relationships built in the safe space of group working tasks afforded by the technology that is most beneficial in aiding engagement. Indeed, many factors that influence student sense of belonging also in turn promote success; attainment and engagement and are identified as being enhanced by the approach used.

Keywords: Flipped, Socrative, Panopto, Engagement, Belonging.

1 INTRODUCTION

Post-graduate education is designed to support the development of greater subject or specialist knowledge as well as developing the capability of the individual [1]. Our post-graduate science awards at the University of Wolverhampton attract students from a wide range of undergraduate studies as well as from a wide range of countries. For most students, the transition from undergraduate to postgraduate learner can be challenging. However, for those who have not previously studied in the UK, this transition is potentially more difficult [2]. The challenge for tutors delivering such courses is to ensure that the diverse needs of each cohort of students are addressed, allowing students to graduate with the knowledge and professional skills required at this level of study.

An environment that promotes deep learning and encourages learning via active involvement is more likely to support student transition and success; helping individuals to question the assumptions that inform their capability and practice [3]. The traditional lecture format is still adopted by many science based courses resulting in a range of challenges for both teaching and learning; often promoting passive learning and a superficial grasp of topics rather than active involvement by students [4]. More importantly, lectures often fail to stimulate student motivation and enthusiasm for the topic area [5].

1.1 Background to study

In this paper we describe the development and implementation of an instructional design that focuses upon bringing multiple forms of active-learning and student-centred pedagogies into a traditionally lecture-based introductory MSc module – Principles of Biomedical Science (PIBS). Our study was motivated by student and tutor perceptions of the module. Although commended for introducing a range of topics, mid module evaluations consistently highlighted that students were not satisfied. Poor student attendance at lectures also reflected this negative attitude to the module. In addition there was limited student participation in class as well as suboptimal performance in assessments. As tutors, we

found ourselves demotivated when preparing for delivery of the module; the module provided a particular challenge with regards to promoting engagement and success. It was clear that a paradigm shift in the approach to teaching on the module was required to address the "*Oh no! It's that module again*" situation.

We hypothesized that the introduction of technology based tools allowing us to re-design our instructional approach and to incorporate active-learning and student-centred pedagogy would improve student attitudes and also their enjoyment of the material. We also hoped that this would improve our own experience of delivering the module. Active learning is defined as an approach that:

> *….engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work* [6].

Our approach focused upon interactions between peers and instructors through cycles of activity and feedback. By adopting an active learning approach we shifted the focus from teaching to learning, aiming to promote a learning environment more amenable to the metacognitive development necessary for students to become independent and critical thinkers [7].

1.2 Approach

We primarily focused on the use of two different technologies. Firstly, 'flipping' or 'inverting' the classroom using Panopto, a software package which allows lectures to be captured by tutors easily on their desktop or laptop and watched by students outside of contact time. A range of studies have evaluated 'flipping' using different approaches [8], [9], [10] but they all follow a basic format of students accessing 'virtual lectures' in the form of video or audio web casts outside of contact hours allowing time for students to engage in activities during class without sacrificing time to cover course content. Secondly, we used Socrative, an on-line application that enables the use of instantaneous questioning and feedback of students' responses via mobile devices. This activity provides the tutor with an insight into levels of understanding, as well as allowing students to evaluate their own progress. Studies suggest that Socrative affects student collaborative learning and enhances student learning experiences [11].

2 METHODOLOGY AND METHODS

An action research approach informed the inquiry, situated within the constructivist paradigm and focusing upon participants as co-creators of understanding within the area being investigated [12]

2.1 Module delivery

PIBS is delivered by five tutors, each covering their specialist area of expertise in biomedical science. It is a 20 credit module with taught sessions delivered over a 12 week period. Teaching is organised into 4 hour sessions with each tutor delivering their sessions in 2 hour blocks. For this study three of the tutors delivered the module via the traditional lecture based approach and two used technology based tools to re-design the delivery of our content. 'Flipping' and Socrative were, therefore, delivered in 6 of these 2 hour sessions. On one occasion (session 4) these ran concurrently. In addition a 2 hour revision session was delivered by each tutor at the end of the module. Figure 1 shows the approach we took for each of our 'technologized' lecture sessions.
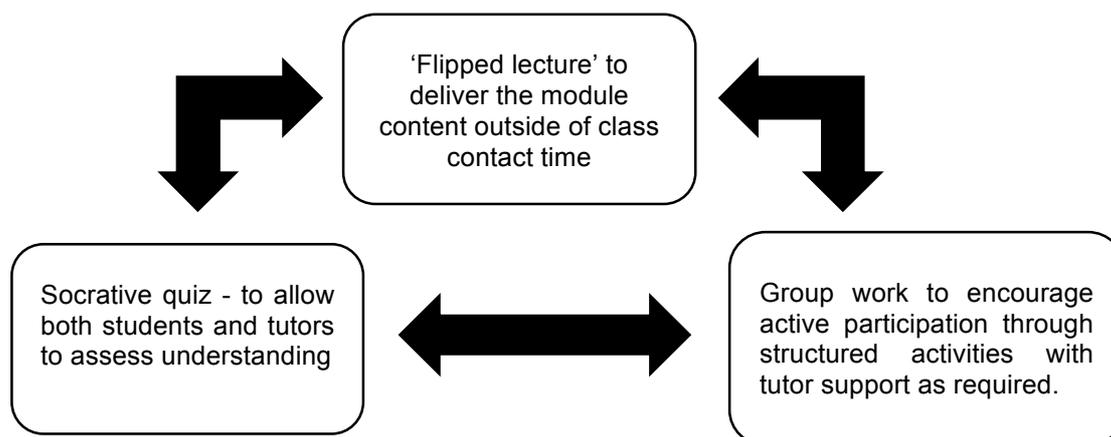
Figure 1. Approach used when delivering a technologized classroom session.

We decided not to be prescriptive about the 'running order' for each session; allowing the topic area, material to be delivered, student feedback via questionnaires and reflection on our own experience from previous sessions to dictate how the tools above supported delivery of the sessions.

2.2 Questionnaires

Questionnaires adapted from the Student Course Evaluation Questionnaire [13] were completed by students at the end of each session enabling us to monitor delivery of our sessions and ensure students were not disadvantaged by the re-structuring. A Likert scale (1-5) was used for comparison of responses. The questions focused upon the students' perception of the quality of material provided, their engagement with this material outside of the lecture, and their in-class experiences: motivation, ability to ask questions and perceived understanding of the topic area/achievement of learning outcomes.

2.3 Mid-Module evaluations

This evaluation was independently administered by the module leader after all of the flipped sessions had been delivered. Students were asked to comment upon what they had 'liked' and 'disliked' about the module as well as identifying areas for improvement.

2.4 Focus groups

Five student volunteers took part in the session allowing us to gain a more in-depth understanding of the students' experiences on the module. Discussions were directed initially by the questionnaire analysis and mid-module evaluation responses. The use of reflective dialogue during the focus group session enabled shared understandings to emerge. Discussions were recorded and transcribed to allow thematic coding to be undertaken.

3 FINDINGS AND DISCUSSION

Students' initial feedback (questionnaire and module evaluation) indicated that there were no negative consequences of changing the module delivery and that there was increased satisfaction.

Did 'technologizing' the classroom lead to improved student perceptions of the module? To answer this question key areas highlighted in the feedback were investigated in the focus group session.

Analysis of the transcript allowed a range of themes to be identified. These were grouped into three thematic areas relating to physical factors of session design, emotional aspects facilitated by the approach and finally the 'worth' or added value students perceived from the sessions. These are summarised below (figure two) demonstrating how each of the themes emerged from the gathered data;
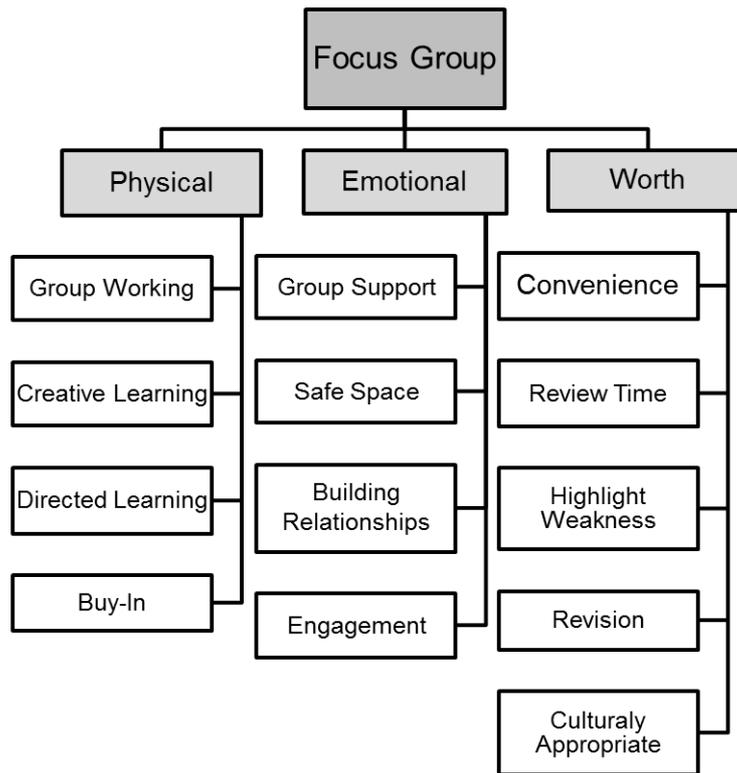
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                    ┌─────────────────┐
                    │   Focus Group   │
                    └─────────────────┘
        ┌───────────────────┼───────────────────┐
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  │ Physical  │       │ Emotional │        │   Worth   │
  └───────────┘       └───────────┘        └───────────┘
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Physical	Emotional	Worth
Group Working	Group Support	Convenience
Creative Learning	Safe Space	Review Time
Directed Learning	Building Relationships	Highlight Weakness
Buy-In	Engagement	Revision
		Culturaly Appropriate

Figure: 2. Identified themes from analysis of focus group responses. Analysis identified three main themes with associated secondary categories.

3.1 Physical

Discussions acknowledged the importance of the student role or student 'buy-in' to facilitate the success of the flipped approach,

> …I would encourage somebody to do modules with this approach [use of technology and flipping] but to just be prepared to do your share of the work (LI)

They identified that it is a shared journey and that the student cannot be a passive passenger. These comments support the findings of other studies which identified that success is dependent upon students being prepared to take part [9], [14]. Students readily recognised the opportunities the approach afforded:

> …I think for the student who is willing to give the time and to listen it is great. To have the videos and your support is brilliant; it then just depends on the student (EC)

When this was discussed further students identified group-work consisting of creative learning tasks and structured or directed learning as useful adjuncts to the sessions. One student commented that the creative activity in session four aided in retention of conceptual information.

> …I think the practice with the apples was really good because when you see something and when you do something even when it is not related it fixes much better into your mind the information (WS)

Students found that the use of an everyday object to demonstrate a concept fun but that it also allowed them to visualise and understand application to practice. Another student commented on the value of having time to undertake a microscopy activity:

> Even with photos and that in the lecture it is different when you do it yourself (EC)

Creative exercises such as those used in this session provide a powerful tool for learning. Although not directly simulating the process they may affect cognitive process and develop relevant skills, divergent thinking and evaluative ability leading to better understanding and a deep level of learning [15]. The questionnaire responses and focus group discussions highlighted that students felt more confident with the subject and were facilitated to understand it better by the higher order thinking provided by the creative process.

3.2 Emotional

Students identified the emotional connections built within the community of the classroom (peer-peer and student-tutor) and the engaging teaching style the approach promoted as important aspects of sessions. These communities provided 'safe spaces' in which to learn:

…Another thing that I have noticed is that especially with this class students tend to be quite shy. They won't speak up and they don't want to answer questions and they don't want to ask. When we're in groups and talking to each other we are a lot more open and a lot more comfortable (LJ)

A safe academic space, as described above, is an inclusive and effective learning environment that promotes opportunities for complex cognitive, intrapersonal and interpersonal development to occur. Such spaces promote learning and affect what and how students learn [16]. Group work clearly promoted a feeling of safety and allowed students to interact with staff to check their understanding: time for such activities is not possible during the traditional lecture sessions.

The effectiveness of the 'flipped' approach and promoting engagement and student-tutor relationships was highlighted by one student who discussed the problems of studying a range of topic areas on an award. They identified that some topic areas were not of interest to them and so they found it hard to engage. However, they suggested that the 'flipped' approach,

...awakes your interest, even if you are not interested in it you start to get interested in it because of the way you teach it (WS)

The additional support and collaborative nature of the sessions was identified as supporting interest, leading to participation and learning;

… we don't know it all yet that's why we're students…so [with this approach] it feels like we are actually gaining something, we are getting guidance… so when you actually have somebody who gives you some guidance then it is appreciated by most of us (LJ)

3.3 Worth

Students identified the convenience of having videos to allow review of content and revision outside of the classroom as important. Learning through video was also seen as being culturally appropriate; many students identified that they regularly accessed available lectures/videos on-line in addition to books and other resources to support their studies. Socrative was not mentioned in the questionnaire responses. However, in the focus group, students were very positive about the App. The main benefit they identified was its ability to highlight any weakness in their knowledge. As tutors, we were worried that the use of 'true/false' options and simple multiple choice questions may be seen as too simplistic or even patronising by the students. Interestingly students appreciated this technology and viewed it as an important tool, supporting their learning:

[Socrative] …Its great. It put it more easy. At master level you think it is going to be very tough and difficult…. and this dynamic we get with socrative it is an easy way to put the topic…and to check [learning] (WS)…….it gives us help at that point of what we should concentrate on or be aware of (WC)

The use of Panopto and Socrative provide items of 'functional currency'; important extra value items for students.

[Panopto]….I also think it is more convenient. If you have a lecture you actually have to sit down and look through the power point slides where as if you have video you can just sit and play while you are multitasking (LJ)

This suggests that the provision of videos allows students to adopt a style of learning that suits their circumstances and preferences.

The overall value perceived by a student is an evaluation made of the utility of a service provided based on a perception of what is received and what is given [17]. Students appear to consider the provision of videos and the use of Socrative as a valuable extra, leading to an increased perceived value. When asked in the mid-module evaluation '*What are the key things that are positive about the module?*' students identified features of the 'flipped' sessions

…Good interactions between tutor and student

…class group tasks encouraged me a lot in understanding some aspects of this module

The panopto video and other materials available

Previous studies have shown that levels of student satisfaction are positively influenced by the perception of increased added value on their course [17].

4   CONCLUSIONS

The findings from our study illustrate that changing instructional design and delivery using technology, without changes to course content, achieved our aim of improved student attitudes and our own enjoyment of the module. Although the use of technology to support learning was identified as beneficial by students, it was the greater engagement and participation during contact time that had the most impact. Fostering a different teaching dynamic provided time for group work and creative tasks which students identified as increasing their understanding and retention of important concepts: above all it provided a safe space for learning 'out-of-the-spotlight' of the traditional classroom dynamic.

Benefits identified by students during the focus group have previously been identified as factors promoting student belonging which in turn promotes success [18]. Further work is required to enable a greater understanding of how each of the identified themes supports engagement and learning and importantly how they may facilitate students to graduate with the knowledge and professional skills required at this level of study.

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