Enhancing student engagement and active participation via a flipped learning approach

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SUMMARY

The aim of this discussion paper is to consider whether a Flipped-Learning approach may improve student engagement on a Physics Module within an Engineering Foundation Year Programme. The students enrolled on the module originate from a diverse range of academic, social and demographic backgrounds and are taught in large groups of between 100 and 300 students.

BACKGROUND

Over the past few years Flipped-Learning approaches have become increasingly popular within Engineering Education; providing students with the means by which they can prepare for lectures in advance, whilst making time in lectures for deeper exploration and explanation of concepts. Identified as an ideal platform for enhancing independent learning and logical reasoning, Flipped Learning is a pedagogical approach whereby the direct teaching moves from the 'group' learning space to the 'individual' learning space, resulting in greater student engagement and increased interaction between the teacher and students. It is this shift in focus that motivated the intervention discussed here.

AIM AND OBJECTIVES

The main objective of introducing Flipped-Learning is to investigate whether the approach is suitable at Foundation Year level in terms of enhancing student engagement and attainment in what is generally perceived to be a 'difficult' subject (Physics). Concurrently, using Action Research Methodologies an Engineering Education Research study is being conducted in order to critically evaluate the effectiveness of the approach and its impact on learning. The Action Research Study is not the focus of this paper as the work is very much in the early stages.

RATIONALE

As with much teaching in Higher Education, a lack of student attendance in Lectures at Foundation Year level has the potential to severely disrupt students learning – particularly when introduced to new topics or concepts. Flipped-Learning aims to

eradicate this interruption, providing the means by which an individual's absence from the classroom can be taken account of in such a way so as not to detract from them learning the material. Likewise, should the module tutor be absent, learning can continue with minimum disruption (Barkley, 2005).

Whilst that the approach requires students to adopt a proactive and independent approach to their studies, the responsibility for preparing the materials and planning the learning activities remains very much with the tutor. Thus in introducing Flipped-Learning at Foundation Year level, much thought, care and attention was paid to assure that the Learning Outcomes could still be achieved.

METHODOLOGY

In adopting a Flipped-Learning approach to teaching Foundation Year Physics, a short video lecture is provided in advance of each session outlining the main concepts and theories. This allows the students with the means by which they can access the material at their own pace and in their own space. The video is supported by a number of bespoke digital and online resources, all of which are made available via the VLE. Students are instructed to watch the video and access the materials prior to the lecture. They are also required to make a short note of any questions raised by the material which, together with a summary of their learning, they are required to bring to the lecture.

To keep track of progress an on-line multiple-choice assessment tool has been introduced. This provides direct feedback to students regarding enabling them to reflect and act upon any difficulties whilst allowing the lecturer to adapt the subsequent lectures accordingly.

In the classroom itself, students are split into two separate groups dependent on 'ability'; each group was then further divided into smaller 'work-groups'. The Flipped-Learning approach means that the classroom sessions provide the means by which students are able to learn collaboratively, applying their skills to a range of activities using higher order thinking. 'Tutors' are given time to work with students on a small-group and one-to-one basis, whilst student-centred group activities in the classroom allowed students to explore their thoughts in a supportive environment.

DISCUSSION

Foundation Year students bring with them a unique set of challenges; many of them have not achieved the required pre-requisite GCE 'A' levels needed to enter directly onto their chosen undergraduate programme; whilst others have previously studied for different qualifications (including BTECs) at College. Finding a teaching method which encourages independent learning and promotes student engagement at Foundation Year level is not easy, particularly when there can be up to 300 students in the classroom.

The Flipped-Learning approach discussed here is very new, having been developed for use in this academic year. Hence it is too early to say whether it is working as

such. However, the approach will be fully evaluated at the end of the academic year and a comparison made with previous years in terms of overall module scores, student satisfaction and progression.

CONCLUSION

Whereas with the traditional teacher-centred model, the teacher is the key source of information, the "sage on the stage" (King, 1993), with Flipped-Learning there is a deliberate shift from a teacher-centred classroom to a student-centred approach, where in-class time is meant for exploring topics in greater depth and creating richer learning opportunities.

At Foundation Year level students move from being the product of teaching to the centre of learning; Flipped-Learning allows students to become actively involved in knowledge formation, providing opportunities to participate in and evaluate their learning in a manner that is personally meaningful. In conclusion, whilst the approach appears to be working well, with students reviewing and learning content prior to attending the lecture, it will be some time before the value of Flipping-Learning in the Foundation Year Physics Classroom will be fully understood.

REFERENCES

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