Teaching to Increase University Student Engagement: Is Active Learning Always the answer?

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Abstract

There is mounting evidence to suggest that traditional lecturing styles are a relatively ineffective pedagogical approach for promoting understanding of concepts, engagement and application of new information to problems. Disengaged students take a surface approach to learning through taking notes, focusing on specific facts and accepting those, whereas deep learning experiences lead to improved learning, retention and understanding of curricular relevance, as well as increased self-confidence and motivation. In order to evaluate various teaching approaches, undergraduate students were given a traditionalist approach to learning, followed by a session using techniques aimed at promoting active learning. The effectiveness of each approach was then discussed using information gathered from questionnaires and focus groups. This study found that sessions with significant engagement benefitted the majority of students and widened participation, however there must be opportunities for both autonomous and active learning styles in order to develop a motivated, confident and successful student.

1. Introduction

Traditionalist approaches to teaching - consisting mostly or entirely of verbal presentation by the lecturer - are outdated, producing students who are ill-prepared for post-university life. Evidence suggests that such pedagogical approaches are relatively ineffective in promoting understanding of concepts, engagement with teaching and the ability to apply new information to problems. Delivering extensive knowledge of a topic through a traditionalist lecture does not necessarily prepare students to embark on a career in biology or a related discipline since in a work environment they will be expected to apply taught knowledge to practical problems, often as part of a team[1]. It is the responsibility of the educator to produce well-rounded, capable people who possess an array of skills learnt at university enabling them to succeed in the workplace.

Lectures tend to lead to disengaged students who take a surface approach to learning, such as taking notes, focusing on learning specific facts by rote. On the other hand, deep learning experiences which promote engagement and create a comfortable learning environment for academic discussion tend to be more effective[1]. Active learning is defined as "anything course-related that all students in a class session are called upon to do other than simply watching, listening and taking notes"[2]. Although there is growing evidence of the success of active learning, students must feel comfortable with taking part during sessions in order for active learning approaches to be successful[3][4]. The lecturer needs to understand the aims of the active learning session in order for students to have deep learning experiences, resulting in higher retention, understanding of curricular relevance, self-confidence and motivation[5]-[8]. Therefore, active learning is thought to be a more successful alternative to the traditional lecture when applied correctly[9].

Universities are increasingly focussed on fostering a diverse student community. Strong student engagement has been shown to widen participation, which may benefit 'non-traditional' students who may not have previously taken up a university place. This has become an increasingly important issue in recent years following the introduction of UK government targets for up to 50% of under-30s to enter higher education. The use of an array of pedagogic practices can improve equality and social justice[10], especially in universities with a significant number of students who attained C grades or lower at A Level. In addition to the various benefits to the student, there are incentives for the educational institution, where a high degree of engagement can improve the university's reputation. It was suggested that "what the institution does to foster engagement can be thought of as a margin of educational quality"[11]. The benefits of active learning are clear, therefore "teaching for conceptual understanding and analytical skills while encouraging collaborative activities makes increasing sense in undergraduate courses"[1]. However, with a vast number of pedagogic approaches falling under the umbrella of active learning, there is a need to compare these approaches in order to evaluate their relative success. Thus, in this study, collaborative learning, cooperative learning, and problem-based learning are compared.

2. The Survey

The objective of this study was to determine whether:

- student comfort and confidence plays a significant role in learning
- cooperative, collaborative or problem-based learning is the most successful technique
- active learning is always the answer

In order to evaluate various teaching approaches, undergraduate students were given a traditionalist approach to learning followed by an active learning approach. The effectiveness of each approach was then discussed using information gathered from questionnaires and focus groups. Participants were students from the School of Human and Life Sciences at Canterbury Christ Church University, UK, where Geography and Science students were undertaking a level 5 (2nd year undergraduate) module in Biogeography and Landscape Ecology. The module covers a wide range of disciplines, including biology, chemistry, physics, geology, economics and sociology.

Prince[12] defined collaborative, cooperative and problem-based learning. He suggested that collaborative learning involves students working together in small groups toward a common goal. This differs from cooperative learning, where students are instructed to work in a structured group toward a common goal while being individually assessed. Additionally, problem-based learning involves introducing a problem at the beginning of the session, which is then used to provide the context and motivation for learning. Thus, during each two hour session, students were given a traditionalist approach to learning for the first hour, followed by hour-long sessions using cooperative, collaborative or problem-based learning techniques. In the cooperative session, students discussed the task as a group before working individually, and then encouraged to compare and discuss their work with their peers. During collaborative learning, students worked on a problem in groups before discussing their group results as a class. The problem-based learning session involved an initial briefing by the lecturer to introduce the issue, before students debated resolutions as a class.

The effectiveness of the use of the various pedagogic practices were evaluated by students through a questionnaire, where students gave a value for how strongly they agreed with five statements using a five-point scale (where 1= strongly disagree and 5=strongly agree). In addition, the questionnaire provided three open-ended questions (see table 1). Finally, informal interviews were carried out to support questionnaire data. In this study, pedagogic practice was deemed effective when students stated that the session had increased motivation, self-confidence, understanding, ability to work with others, comfort, and/or engagement.

3. Does student comfort and confidence play a significant role?

Student engagement is higher in a comfortable learning environment where students are able to freely take part in academic discussion, but where the lecturer expects high standards[3]. Moreover, it is important that students consider a lecturer to be approachable, well prepared and sensitive to the needs of the students[4]. As a result, students are more committed, benefit more from the session and are more willing to express their opinion. When comparing all three sessions, students felt less comfortable working with others and discussing results, both as a group and a class, during the cooperative learning session. Questionnaire data from this session shows that 25% of students suggested that the lecturer should ask more open ended questions to the class. They suggested that open-ended questions allowed for the lecturer to lead the discussion, encouraging debate between peers "in an environment where [students] felt comfortable to speak out". Equally, the problem-based learning session – which included many open-ended questions – scored highest on how comfortable students were working with others in a structured debate where "everyone could have their say", as opposed to a student-led discussion.

In addition to the style of questioning from the lecturer, feedback after the cooperative learning session suggested that students are less willing to discuss differences in their own results than findings of group work due to a lack of confidence and fear of being 'wrong'. This could also be more apparent when they may contradict their peers' findings during a discussion or debate, rather than when stating their opinion to the lecturer. It has been stated that engagement is "the time and effort students devote to activities that are empirically linked to desired outcomes of college and what institutions do to induce students to participate in these activities" [11]. Therefore, if students are unwilling to engage in a debate as a result of discomfort, the active learning session in not as beneficial. A cooperative approach may be less successful in an environment where the level of student comfort is not already high.

4. Is cooperative, collaborative or problem-based learning the most successful technique?

From questionnaire and focus group responses, students tended to engage better during debates when they had been able to discuss the task with peers in small groups before voicing these to the class (as with collaborative learning and problem-based learning). Students suggested that a positive aspect of debates was the "interactive nature", with higher engagement in a structured debate where "everyone could have their say", allowing them to "look at other people's side" of an argument. Therefore, it could be suggested that by having a better understanding of other points of view, teamwork skills and communication skills would be beneficial for students. However, the effectiveness of active learning approaches using group work is also related to the interactions within a group, thus the results of evaluation will partly depend on these relationships[13].

Problem-based learning can be differentiated from other collaborative learning techniques. The nature of this technique forces students to acquire new information, attitudes, reasoning processes and skills[14]. Moreover, students are more likely to be participate and have increased enthusiasm[15]. Although participation and enthusiasm were greatest during problem-based learning, students rated the collaborative learning session more highly overall. This may be due to unsuitable resources to provide the appropriate context and motivation for learning[16]. In addition, students prefer "to discuss within smaller groups then as a whole". Therefore it could be more strongly influenced by differences in group work for each session than the type of active learning.

5. Is active learning always the answer?

When giving a lecture followed by a case for discussion by the class, the lecturer can raise interest in a given topic, encourage students to use previous knowledge and build upon this knowledge during the session[17]. However, the majority of learning focuses on concepts, principles and facts rather than the procedures for application of this information[14]. The importance of illustrating applications of information was highlighted by Wilkerson and Felleti, stating that "the most compelling problems are real ones that stimulate students to search for possible explanations and solutions" [14].

From the questionnaire data, every student agreed with the statement that the active learning session has improved their understanding of the topic for all three sessions, which "helped clarify" concepts from the lecture. Moreover, use of active learning gave students "a better understanding of what it would be like in real life". This is an important issue since the traditionalist lecture does not give students the skills for a career after university[1].

Despite these findings, this does indicate that the traditionalist lecture is useful. The highest level of participation in a debate involved approximately two thirds of the class. However, although a positive outcome in the students' opinion was that "everyone could have their say", a third of the class did not actively participate. However, some students suggested a more detailed lecture prior to the active learning session would be useful. Thus, rather than suggesting that there was no benefit of the initial lecture, a combination of teaching styles aided learning and engagement more than either session individually as this approach may not always beneficial to students[18]. This is supported by statements from students suggesting that "I like that you give us all the important information in the first hour, so that we have time to do a task related to the topic". Although a complete shift in teaching is unlikely, even a moderate change to create a more interactive and cooperative learning environment can lead to increased engagement, and therefore marked benefits to student learning[1].

6. Conclusions

From this study, and previous research findings, several conclusions can be made in relation to the research questions set out in the introduction. First of all, this study suggests that strong student support and an attentive lecturer will improve student comfort. Involving the students, through asking open-ended questions and ensuring that there is an inclusive nature to the sessions is key to attaining high levels of engagement in active learning sessions. Furthermore, it suggests that in an environment where the lecturer is teaching a student community with diverse learning styles, one session may be more favourable to one student but not the other. Therefore, a range of pedagogic practices are required to ensure that all learners are catered for. Finally, despite there being clear advantages of using active learning sessions over the traditionalist lecture, particularly for non-traditional students, neither style should be used exclusively. It may be difficult to put across certain information in any other way than by verbally explaining a given theory or concept, but these ideas can be built upon and solidified using active learning session.

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