Reframing perceptions of the lecture from challenges to opportunities: Embedding active learning and formative assessment into the teaching of large classes

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Teaching and assessing large classes can be reframed from focusing on overcoming difficulties with large classes, to seeking the unique educational opportunities provided by such learning environments. We discuss data and examples illustrating how active learning and formative assessment can be successfully embedded into the teaching of large groups. Students evaluated these approaches favourably, and recognised that their own learning was enhanced through being active participants in lectures and having opportunities to receive feedback on their understanding within lectures. Furthermore, the experiences of teaching staff using these techniques were found to be largely positive, demonstrating awareness of the benefits for students as well as benefits for their own engagement and development. These data suggest that if we find the unique opportunities for learning afforded by large groups, the lecture has the potential to become a powerful learning environment.
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AS STEM subjects such as psychology increase in popularity, it is likely that instructors in higher education will be faced with the challenge of effectively teaching ever-increasing class sizes. Large group lectures are often seen as the poor relation to small seminar groups, yet the large lecture provides many unique opportunities to promote active learning and dialogic exchange. Lectures are often viewed as promoting a one-way transfer of information from the lecturer to the students, who adopt a passive role within the learning environment (Fry, Ketteridge & Marshall, 2006). Whilst lectures are seen as effective for transmitting information to a large cohort of students, they are seen as possessing limited efficacy for developing higher-order thinking skills (Bligh, 1998). Active learning is seen as more powerful, yet is much easier to implement within smaller groups of students.

According to Race (2005), lectures can be effective in developing higher-order thinking skills if lecturers adopt a problema-

tising stance and use lectures as a way of enabling learners to ask and find answers to questions. Involving students in lectures and requiring them to be active constructors of understanding rather than passive receivers of knowledge both have the potential to personalise the large class (Benjamin, 1991), and active involvement in lectures can better enable students to achieve specified learning objectives. Research demonstrates that active learning enhances learner engagement and improves retention of information (e.g. Huxham, 2005; Prince, 2004), and students value the opportunity to learn through doing (e.g. Machemer & Crawford, 2007). However, discussions of active learning in large lecture classes are often framed as ways of trying to improve learning in what is a challenging learning environment. For example, Machemer and Crawford (2007) argue that 'active learning techniques transform the passivity of a traditional lecture-based class into a student-centred learning environment… and reduce reliance on the

lecturer and professor as conveyor of all knowledge' (p.11). This is true, but adopting a 'fix-it' approach to improving lectures, and considering active learning in terms of this deficit model, is limiting in terms of the opportunities it provides for developing innovative practice.

Furthermore, there is evidence in the literature that the predominant framing of active learning is that it is not suitable for use in large group teaching. For example, at the end of an interesting article on active learning in large groups, Benjamin (1991) concludes that 'I hope I convinced you that active learning is *possible* in the large class' (p.73; emphasis added). Whilst there is evidence that the teaching of psychology can make good use of active learning (e.g. Meyers, 1997), its use is still framed as a 'fix-it' strategy and the emphasis is still very much on small group teaching, or adopting activities that the large class completes in small groups. We believe that rather than seeing active learning techniques as ways of trying to make the lecture more effective, the lecture itself is a way to make effective use of active learning, by adopting techniques that include, and indeed require, a large group of students. In other words, we propose a reframing of the lecture from a focus on the challenges of effectively teaching a large number of students, to considering the lecture as affording unique opportunities to promote active learning in a student-centred environment.

Another key concern with the large lecture is that it provides few opportunities for learners to receive feedback on their understanding. Many lectures are structured around specific learning objectives, for example, 'by the end of the lecture, students should understand X and Y and be able to critically discuss Z'. The problem here is that students have no way of evaluating their progress towards the learning objectives, and worse still, they may be confident that they have achieved them when their perception of 'understanding' differs markedly to the lecturer that will mark their assignments and

exams. As stated by McAlpine, (2004), 'All too often, students are provided with an introduction to a topic… and left to achieve the learning on their own with… no formative feedback' (p.128). Instead, it is recommended that the learning process should rely on feedback, where learners need to be able to evaluate their own understanding.

Formative assessment, defined as 'information communicated to a learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning' (Shute, 2008, p.154), has the potential to overcome this problem, if implemented appropriately. Formative feedback is not evaluative in the sense that it provides a grade, but provides guidance for learners in terms of future modification and development (Black & Wiliam, 1998). Feedback is incredibly important in terms of student motivation; feedback is crucial in signalling a gap between current and desired performance, which the student wants to close (Song & Keller, 2001). Research also tells us that students are not simply motivated in extrinsic terms by the actual mark that they receive; students genuinely desire feedback that supports a deeper understanding of their subject (Higgins, Hartley & Skelton, 2002). Whilst courses may incorporate opportunities for formative assessment, formative feedback is most effective if received immediately after the learning has taken place (e.g. Dihoff et al., 2003). As Bruner (1970, p.120) argues, 'learning depends on knowledge of results, at a time when, and at a place where, the knowledge can be used for correction'. This is echoed by Shute (2008), who argues that the efficacy of feedback depends on motive (students need it), means (students are able and willing to use it), and opportunity (students receive it in time to use it).

The most ubiquitous feedback practices involve summative feedback on written assignments. The key motive for students when work is summatively assessed is the mark itself (e.g. Taras, 2001). If students are satisfied with the mark, they may not feel the

need to read the feedback. If they are heavily dissatisfied with the mark, they can block out the feedback as a defence mechanism. Thus, Shute's criterion of 'motive' may not be met by this form of feedback. Summative feedback may not also satisfy the criterion of 'means'; students' ability and willingness to use feedback is constrained by the fact that feedback on a piece of summative work is decoupled from the learning event itself in both space and time. Furthermore, the time it takes to assess the written work of an entire cohort means that in terms of 'opportunity', the feedback often comes too late to support key developmental objectives, despite the best efforts of academic staff to turn round feedback in as short a time as is feasible. So what can we do to provide the 'motive, means and opportunity' to use feedback to support development?

Yorke (2003) argues that whilst formative assessment is effective, increasing staff-student ratios in higher education limit the opportunities to provide such feedback to students on an individual level. Yorke suggests that in order to increase the use of formative assessment, the use of formal lecturing should be reduced. However, there is no reason why the large lecture and formative assessment are in competition for curricular time. Indeed, what better time to provide this formative, developmental feedback, than when all students are together, and directly after material has been learned?

One common method for the delivery of formative assessment in lectures is through the use of electronic voting systems and delivery of multiple choice questions (e.g. Draper, 2004; Gier & Kreiner, 2009). However, there are constraints on the type of learning that can be assessed in this way and the type of feedback that can be given (e.g. whether an answer is right or wrong). Therefore, we wanted to find ways of being more creative in the delivery of formative feedback within the lecture context.

In our undergraduate programme in psychology, we embarked on a project to develop creativity in promoting student-centred active learning in groups of over one hundred students, and to include formative assessment techniques as a normal part of the teaching process. These assessment techniques give students the opportunity to reflect on material as they are acquiring it, and to evaluate their own understanding of the material presented. The use of active learning in lectures is promoted (e.g. Benjamin, 1991), but the emphasis is typically on activities that students do in pairs or groups. This is a way of making the lecture more effective (it can make a large class more like a small class), but our view is that in order to make effective use of active learning we do not need to make the large class like a small class. This implies that smaller is better. Instead, we wanted to look for ways of taking advantage of the large group size, and consider what things can be done with a large group that are harder to do with smaller groups. These endeavours were part of our reframing of the lecture from a focus on challenges to a focus on opportunities. This paper reports an evaluation of lecture-based active learning and formative assessment techniques, from the perspectives of students and lecturers.

Study 1: Student perspectives

Common sense would lead us to expect that students would favour active learning over traditional lecturing; however, reports in the literature are mixed. Some research suggests that students are less positive about active learning than traditional lecturing (Lake, 2001), perhaps because some students like the passivity of the traditional lecture. Some reports are more positive, suggesting that students value active learning (e.g. Huxham, 2005). Some evidence is equivocal; Machemer and Crawford (2007) found that students were no more positive in their ratings of active learning than of traditional lectures.

The majority of studies exploring students' perspectives of active learning rely on ordinal rating data. This limits our understanding of what students actually think

about these methods, and does not reveal whether positive perceptions of active learning are supported by any insight into the benefits of active learning beyond being 'more interesting'. Equally, it is important to know whether students show insight into the benefits of receiving formative feedback in lectures. The present study aimed to address these issues.

Method

This project investigated how students experience the use of active learning techniques and formative assessment within large lecture classes. Whilst students rated the overall effectiveness of the lectures on quantitative scales, the focus here is on the freeform comments that students made in response to the question 'What was good about this module? Please say why'. This is because this question did not specifically ask students about the active learning techniques and use of formative assessment, and we were interested in whether they would view these aspects of the module as part of their positive evaluation of the module overall. It is important to note that students were also asked 'what aspects of the module could be improved' but few responses were given in this section, and of those that were given, none made reference to the active learning or formative assessment techniques, so are not considered further. The evaluation reported here is based on a level HE1 personality theory module, delivered to a cohort of approximately 120 students. This course is taught using lectures only, with a two-hour lecture every week for a period of 11 weeks. There are two summative assessments: a coursework essay and a multiple choice exam.

Class activities
Active learning
The definition of active learning we adopted was inspired by Bonwell and Eison (1991); learning is considered to be active if students are engaged in meaningful learning activities that require higher-order thinking,

rather than just listening, and are provided a learning environment that enables the development of skills rather than just absorption of information. Our further criterion was that the activities should not be things students could work on in pairs or small groups, but an activity that by necessity included all students simultaneously, meaning that no student could either dominate the activity or disengage from the process.

Examples of the kinds of activities undertaken during lectures that were used to involve the whole class in active learning simultaneously included research modelling, role-plays and problem-based learning. In research modelling activities, the whole class played the role of research participants in a published study, with different groups of students undertaking the experimental tasks experienced by different groups of participants in the original study. The results from different groups were collated, analysed and discussed, in order to encourage students to critically evaluate the methods of the study and the conclusions drawn by the authors. An example of a large-scale role playing exercise involved an evaluation of different sources of information about a person's personality. Students were divided into teams and each team had to build up the most accurate personality profile of a fictional person. Some teams were able to base their judgements on psychometric data, such as personality test assessments, some had just observational data of the person's behaviour, and some had to use life record data such as health records, bank statements, and personal possessions. The accuracy of each profile was judged, before a discussion of which type of data was most useful and why.

Formative assessment
Different techniques were used to deliver formative assessment to students within the context of the lecture. For example, after the lecturer had presented a particular concept or series of studies, students were presented with a '60-second exam question' relating to

the material that had been presented. Students had to plan how they would respond to that question, using material from the lecture, in just one minute. Students then discussed their answer with a peer, before the whole class discussed what could be included, with the opportunity to clarify any misunderstanding about the material. Students then passed their answer to a peer again, who provided suggestions for how the answer could be improved.

A further use of formative assessment used within lectures involved student-centred lecture plenaries. Instead of the lecturer summarising the material at the end of the lecture, students were asked to write down what they felt were the three key messages of the lecture. Again, students provided peer feedback and a class discussion followed, in which students were able to check that the key messages they were taking from the lecture were comprehensive and met the learning objectives.

Delivery of formative assessment in lectures often makes use of multiple-choice questions (e.g. Draper, 2004; Gier & Kreiner, 2009). Rather than giving students multiple choice questions to answer, one of our formative assessment techniques required students to write a multiple choice question based on something covered in a section of the lecture. The aim was to force students to consider some of the likely common misconceptions surrounding a topic, of the kind that an examiner might use as foils in a multiple choice question. Thus, the writing of the question served an important function, but then students were also able to test their own understanding by answering a question written by a peer. Students then discussed why they had put particular response options within their question.

Data collection
Module Evaluation Questionnaires distributed at the end of the module asked students to rate various aspects of the module and the teaching, as well as provide freeform comments about the positive aspects of the

module and ways in which the module could be improved. The overall response rate for this cohort was 84.3 per cent. The University Ethical Guidelines permit the analysis of student evaluations for purposes of pedagogical research.

Data analysis
Freeform comments from students were subjected to thematic analysis (Braun & Clarke, 2006). This type of analysis is flexible and thus applicable to many types of qualitative data, and is ideal for considering similarities and differences in subjective experience.

Results
Experiences of active learning techniques
In students' responses to the question 'What was good about the module? Please say why', students made frequent reference to the active learning techniques. These comments fell under two broad themes: engagement, and retention of material.

Engagement
First, students found the active learning techniques engaging, and felt that active involvement renewed their interest in the topics:

> When we are part of the process, the material comes alive. Psychology is about people, so we need to experience it for ourselves!
> I was made genuinely interested in material I would otherwise not have enjoyed.

These students seemed to value the opportunity to move beyond the 'conveyor belt' of teaching, where material is delivered and then regurgitated. Student comments also showed evidence of insight into why active learning is beneficial:

> [Active learning] *stimulates independent thinking, and shows the relevance of course material. Lectures were EXCITING!*
> *I do not feel spoon fed but have the confidence to build my own representation of the topics.*

Here, reference is made to higher-level independent thinking, the application of course material to other areas of the curriculum,

and student independence. Students also showed insight into the benefit of the activities for self-reflection and perspective taking:

> *Students are interactively involved in what we are learning – through looking at ourselves.*

It is also of note that many students, when discussing the active learning techniques, made strong use of collective terminology (e.g. 'we, us') rather than 'I' or 'me', perhaps indicating that these active learning techniques were framed collaboratively in terms of student perceptions and experiences.

Retention of material

The second theme that emerged from analysis of student comments about active learning was retention of material. Beyond engagement with the material, students also felt that active learning helped them to remember material; by thinking back to the context in which it was learned, the content itself is more memorable:

> *Tasks were helpful for understanding and remembering concepts.*
> *Tasks are relevant and help learning.*
> *The opportunities to interact helped me to learn.*

These comments do not suggest that students feel anxious by not having been taught material directly; instead, students show insight into the value of first-person experience with material for engaging with it on a deeper level that then supports long-term understanding. Students also appreciated the relevance of the activities; far from seeing them as additions to taught material, they show an appreciation of the integral nature of the activities to the learning experience.

Experiences of formative assessment

Student responses that made reference to formative assessment techniques fell under two themes: personal development, and consolidation of understanding.

Personal development

First, students felt that the opportunity to receive formative feedback in the lectures helped them to develop as learners:

> *Feedback and opportunities for advice helps learning and personal growth.*

This indicates that the development afforded by lecture-based formative assessment does not solely operate on an academic level, but also contributes to wider personal development. In addition, other students indicated that the benefits of formative feedback were not restricted to the understanding of lecture content:

> *Reviews and feedback have helped me to develop more effective learning strategies.*

These students show insight into the benefits of formative feedback for their own development, and make reference to its value beyond the immediate context of the course in which it was delivered.

Consolidation of understanding

Students acknowledged that the opportunities to receive feedback in the lectures helped them to understand and consolidate lecture material:

> *Getting feedback in the lecture helps you to connect it with what you have been learning, which is still fresh, so you can integrate it better.*
> *…the opportunity to test my understanding means that the material glues together and when I leave it's still in place!*

Here, there is evidence of clear insight into the value of receiving feedback on one's understanding in the context in which that material has been learned, and immediately after that material has been presented.

In sum, beyond just saying that they 'liked' these techniques, student comments showed clear evidence of insight into *why* these techniques were beneficial for them as learners.

Study 2: Lecturer perspectives

If the large lecture is to be viewed in terms of 'opportunities' rather than 'challenges' this needs to be explored from the perspectives of lecturers as well as students. Do these techniques provide *opportunities* for teachers or are they more of a *challenge*?

On a purely practical level, delivering a standard lecture is easier than incorporating

active learning into the lecture (Benjamin, 1991); designing and implementing active learning techniques increases preparation time. It is also the case that a standard lecture is the 'safer' option; lecture activities, particularly those conducted on a large scale, bring with them the risk that things can go wrong, and this can be a source of anxiety. Furthermore, Machemer and Crawford (2007) report that staff concerns regarding the use of active learning include: ensuring coverage of material; maintaining control in the classroom; and promoting higher level thinking. Furthermore, the shift in the role of the lecturer from 'deliverer of knowledge' to 'facilitator of understanding' can cause just as much anxiety on the part of the lecturer as on the part of the student. Thus, it was felt that in order to fully evaluate the efficacy of lecture-based active learning and formative assessment, the perspectives and experiences of lecturers using these techniques should also be sought.

Method
Data collection
The views of two psychology lecturers using active learning and formative assessment techniques in large group teaching were sought using a survey which very simply asked them to comment on what they felt were important aspects of their experience with these teaching methods. For similar reasons to those discussed for study 1, we did not want to constrain the responses of lecturers when considering their use of these methods.

Data analysis
The comments made by lecturers were subjected to thematic analysis for similar reasons to those outlined above.

Results
The perspectives voiced by the lecturers were largely positive. The lecturers discussed both the advantages of these techniques for students and for teaching staff, but also commented on some of the challenges they had experienced.

Advantages for students
When discussing the perceived benefits for students, the lecturers mirrored some of the views voiced by students themselves. The advantages for students mentioned by the lecturers fell under two broad themes: engagement and motivation.

Engagement with material
Lecturers expressed their belief that personal experience of and engagement with the material can be more powerful than passive reception of content:

> They can have an epiphany moment where they suddenly get something – this comes from personal experience with it.
> There is something visceral about doing something. It also enhances long term memory and retention. In an exam they may remember the class and the activity, which helps them to remember the concept and the theory.

These comments illustrate that rather than active learning impeding the coverage of course content, the lecturers using these techniques feel that instead, memory and understanding can be enhanced through first-person experience.

Motivation
Lecturers also discussed the benefits of active learning for students in terms of enhanced motivation. Reference was made to the importance of personal agency that can come from active involvement with the material:

> [Active learning provides] freedom and autonomy to learn, sense of power, more interesting from their perspective, sparks their curiosity…

In addition, formative assessment was also discussed in terms of increased motivation:

> I've seen evidence that if students can leave the lecture thinking, 'Yes, I understand that and I know I do because I got feedback', it can be a real confidence boost, and it can make them want to get straight on with the reading and write up their notes.

Here, the lecturer shows a clear awareness of why lecture-based feedback can be highly

beneficial in encouraging students to take responsibility for their own learning.

Advantages for staff

The perspectives voiced by lecturers also made reference to the benefits to them personally; again, these comments fell under two broad themes: engagement and personal development; and perspective taking.

Engagement and personal development

Lecturers expressed how incorporating active learning into their lectures was beneficial in terms of supporting their own engagement with the subject:

> *Using active techniques keeps you refreshed – thinking of new ways to incorporate student activity is a constantly evolving process.*

Here, reference is made to the use of active learning as continuous and cyclical, but also how developing activities can make the teaching process more interesting. Lecturers also indicated that because active learning requires creative thinking, it can be advantageous in terms of personal development:

> *It keeps you on your toes and stops you becoming complacent as a teacher.*

Here, the lecturer expresses how avoiding the 'comfort zone' of more traditional lecturing can be beneficial.

Perspective taking

Lecturers discussed how, by engaging students as active participants in the lecture, and assessing their understanding in that context, they were able to get a better idea of the students' abilities:

> *It makes it easy for lecturers to know students, their interests, their levels of knowledge and understanding.*

Beyond understanding the abilities of students, one lecturer commented how the use of these techniques enabled them to consider the whole learning experience from the perspective of the students:

> …[using active learning] *helps me to better understand the psyche of the students, this helps to adapt the delivery of the content to the students.*

It seems that just as these techniques encourage students to reflect on their own learning, they also force lecturers to see students as occupying a more central role in the learning process.

Challenges

Whilst the perspectives of lecturers using lecture-based active learning and formative assessment were largely positive, they did make reference to some of the challenges they had experienced: increased preparation time; and anxiety.

Preparation time

Both lecturers discussed how incorporating active learning and formative assessment into lectures can increase preparation time, in comparison to preparing a standard lecture:

> *Unfortunately, active learning increases your preparation time. It requires thinking. But this preparation time has benefits for me as well, as it forces me to think about the topic in new ways.*

Here, the lecturer seems to adopt a positive stance to the increased preparation time, considering how the extra time spent on preparation can have personal benefits. The other lecturer also discussed the increased preparation time created by these techniques, but did not necessarily view this in a negative way:

> *It may take more time, but it is a completely different kind of preparation. I want students to see a concept in action, so I start from this end point and work back in planning.*

Whilst the use of lecture-based active learning and formative assessment can be challenging in terms of increasing preparation time, the experiences of lecturers seem to indicate that this can be advantageous, rather than an inconvenience.

Anxiety

Both lecturers did make reference to the differences between active learning and standard lectures, and acknowledged that active learning can take them out of their 'comfort zone':

> *This type of teaching can create more anxiety because it is less structured. Planning a PowerPoint lecture reduces anxiety because it is all there for you.*

However, one lecturer explained how this initial anxiety can be reframed to represent a positive influence on teaching development:

> *…it's also risky, and it's hard when you first do it. Then it becomes more a constructive challenge to incorporate active things, rather than a source of anxiety.*

Thus, lecturers were largely positive about the use of these techniques, seeing clear benefits for themselves and their students. In addition, even where challenges were discussed, these were reframed in positive ways, identifying the opportunities within the challenges.

Discussion

This evaluation represented the first stage in taking advantage of the large lecture learning environment to promote active learning and provide formative assessment to students. Analysis of student evaluations illustrated that students experienced these techniques in a positive way. Not only did students enjoy the opportunities to be active participants in the lecture, they showed insight into the benefits of these activities. For example, there is objective evidence in the literature that active learning can enhance long-term retention of course material (e.g. Huxham, 2005). Students in our study showed awareness of this benefit, being able to explain why active learning was beneficial for their development as learners.

These findings suggest that not only can active learning be used in a lecture to involve the whole class in a task simultaneously, but that also students are positive about these activities and see them as both engaging and useful. Whilst active learning in lectures is useful in personalising the large class (Benjamin, 1991), only the large lecture provides the means to include all students in large-scale activities. Thus, students are involved not only individually but as a cohort, enabling them to learn from one another and fostering a collaborative approach to understanding course material. Far from active learning being merely *possible* in large classes (Benjamin, 1991), from our perspective, it can also be *dependent* on large classes. Some activities require all students to be involved simultaneously. For example, our research role-play exercises require good group sizes to represent different experimental conditions if group scores are to be meaningful.

The use of formative assessment was also perceived positively by students, whereby students saw how receiving feedback in lectures influenced their learning strategies, and contributed to enhanced consolidation of the material. The findings indicate that incorporating more opportunities for formative assessment within the curriculum does not require a reduction in large group lecturing, as Yorke (2003) suggested. Instead, the large lecture can be seen as an ideal forum within which a large group of students can simultaneously receive feedback on their understanding, in the context in which they have learnt the material. If effective formative feedback requires motive, means and opportunity (Shute, 2008), the large lecture provides an environment in which all three requirements can be met. Students need feedback (motive) in order to chart their progress towards meeting the learning objectives; the opportunity is ideal, since students receive feedback in time to use it whilst their understanding is still malleable; and the lecture provides highly effective means to deliver formative feedback, as students are in the optimum environment to be able and willing to use the feedback. Effective feedback can also be delivered to the entire cohort simultaneously.

When considering the perspectives of lecturers using lecture-based active learning and formative assessment, lecturers showed clear insight into the benefits of these techniques for students, mirroring some of the insights made by students themselves. Perhaps what was most interesting was that, in considering their experiences, lecturers

did not only consider the benefits for students. They also seemed to be reflecting on the 'What's in it for me?' question, and here indicated that these techniques are advantageous in terms of both personal and professional development. Despite mentioning some of the challenges inherent to the use of these techniques, most notably an increase in preparation time, these difficulties were offset by the benefits noted above. Thus, the lecturers were very clear in seeing the opportunities provided by the challenges.

Despite the fact that staff were positive and framed the use of the techniques in a positive way, it is important to consider this approach from a critical stance. First, this evaluation represents subjective opinions only. In future work it is important to consider the effects of these techniques in a more objective way, and to consider the long-term impact of these forms of learning and teaching. Furthermore, the use of these techniques is not straightforward. Active learning requires experimentation; a willingness to take risks, evaluate the outcomes, and modify the activities accordingly. Lecturers also need to be aware of the risks associated with the use of formative assessment in lectures. Whilst there is the potential for students to leave the lecture feeling confident in their understanding, having clarified anything they did not understand, there is also the potential for students to feel anxious about their lack of understanding. As Yorke (2001) argues, effectively implementing formative assessment is not easy: 'Done well, and the student will flourish: done badly, and the risk of student discouragement or failure is increased' (p.124). Strong support from peers and an emphasis on what is understood, and encouragement to seek clarification within the lecture context, are likely to be crucial when implementing lecture-based formative assessment effectively.

Whilst the kinds of techniques we have described here could be successfully applied to the teaching of any subject in higher education, it is important to consider the extent to which the findings here might be influenced by the subject matter taught within the psychology curriculum. The student who reminded us that as psychology is about people, students need to be involved in the learning process, provides an insight that reminds us that creativity in delivering material within the discipline of psychology is provided an advantage by the fact that the subject matter and the learners are often one and the same. We need to find new ways to exploit this unique advantage to allow students to critically engage with the material on a personal as well as academic level.

Finally, one factor that is likely to have a large impact on the effectiveness of active learning and formative assessment are student individual differences, including approaches to study, motivation, and self-efficacy. Future research needs to consider these factors in more detail, as there is evidence to suggest that appraisal of active learning is dependent on a student's own learning orientation (Struyven, Dochy & Janssens, 2011). It is important to ascertain whether the use of these techniques might be able to motivate those who are typically less engaged with course material, whilst not harming the motivation of those who are naturally deep learners.

Taken together, the findings reported here are promising. They illustrate that creativity in teaching and learning has recognisable benefits. However, we also need to be mindful of the inherent challenges, and remember that widespread use of these methods will require a course-wide restructuring of perceptions. Nevertheless, reframing perceptions of the large lecture from emphasis on *challenges* to emphasis on *opportunities* has been effective in enhancing the learning experience from the perspective of both students and lecturers.

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