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LECTURES

DO WE NEED THEM AT ALL?

Alastair JS Summerlee

INTRODUCTION

Other chapters in this book explore ways to make lecturing to large classes more effective – and there may indeed be a case for improving the learning experience in large classrooms. Yet, time and again, evidence has shown that while lectures may be an appropriate method for broadcasting information (literally for ‘teaching’), they fail utterly to stimulate effective (deep) learning; fail to motivate students to think critically; and even fail to inspire students to be engaged. So, instead of thinking about how to improve the quality of the lecture experience, we should be asking a more fundamental question: why do we persist in using lectures at all?

The current paper (i) explores the history of the lecture as the pre-eminent form of delivering information to students at universities; (ii) reviews the evidence for and against lectures as an effective and efficient means of disseminating information; (iii) highlights the substantial current pressures on universities for pedagogical change; (iv) offers an alternative approach to promote effective learning that could replace lectures; and (v) suggests how we might move forward.

THE LECTURE FROM THE MIDDLE AGES TO THE 21ST CENTURY

Universities were first established in Europe during medieval times. They served as bastions of ideas, repositories of knowledge, and training grounds for intellectuals and professionals in theology, law, and medicine (Altbach 1999; Rait 1912; Summerlee & Christensen Hughes 2010). Controlling philosophical thought and ethical debate, they stood as the moral and social conscience of society. As access to the written word was limited, teachers read from texts as a means of disseminating information, and so the lecture was born.

During the 19th century, the mandate of universities changed as Germany positioned institutes of higher learning to be the basis of ‘nation-building’ through research and doctoral education (Altbach 1999). Institutions in other countries quickly followed suit

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and the nature of universities swiftly changed around the globe (Altbach, Reisberg & Rumbley 2009). This utilitarian approach lodged neatly with the concept of the lecture as an organised information framework that could underpin the concept of nation-building. Robinson (2010) links the structure of modern-day universities and university education to the Industrial Revolution more clearly, arguing that the principles of commodification that underlay the Industrial Revolution were also applied to education. Learning was broken down into its component parts, which, like widgets in a factory, could be put together to form a final ‘product’ – a body of knowledge. This reinforced the concept of the lecture, because knowledge, like industrial widgets, could be parcelled into convenient packages for delivery to students. It is easy to see how the Victorians, and particularly the Germans, found comfort in this orderly approach to education. However, we now know that learning is far from orderly or consistent. It is a messy, nebulous process that affects individuals differently at different times. Sadly, industrial functionalism ran roughshod over the medieval purpose of the university, that is, to be the moral and social conscience of society (Dewey 1897; 1916).

In the mid-1900s, there was another shift in university education. It emanated from the United States, where the Servicemen’s Readjustment Act of 1944 and the Veteran’s Readjustment Assistance Act of 1952 sparked increased access to education. In order to find a way of returning veterans to the workforce after the Second World War, there was an unprecedented increase in access to higher education (Cuban 1999), and so the concept of the ‘massification’ of higher education was born (Altbach *et al* 2009). Faced with increasing pressure to educate more students while continuing to place emphasis on groundbreaking research, higher education institutions relied ever more on the lecture as the principal mode for the apparently efficient imparting of information. On the surface, it appeared to be an effective tool for disseminating information to the large number of students attending university, but already evidence to the contrary was beginning to accumulate: the lecture was efficient for teaching, but not for learning (Gibbs 1981).

Throughout this long history, universities have remained the repositories of knowledge; their faculties the keepers of the keys to unlocking those stores; and the lecture (the distilled wisdom of the faculties’ content experts) the principal mode of delivery. Yet, the fundamental flaw is that simply ‘telling’ information – simply talking in front of a class – does not equate to effective or efficient learning (Marton & Säljö 1976a; Wieman 2007). Everyone learns in a unique and different way that is a complex interface of motivation, capacity and curiosity, and it is impossible to use a standard approach to reach each and every person. For learning to be effective – that is, for information to be truly retained and understood – we now know that it needs to be ingrained into the thinking process of the individual, so-called deep learning (Marton & Säljö 1976a; 1976b). In fact, Wieman (2007) has convincingly shown that lectures, however interactive and even entertaining, result in the reverse: they encourage students to focus on surface or superficial learning, which is the very antithesis of their intended purpose.

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Several arguments have been mounted to boost the relevance of lectures. Among others, they include the idea that lectures are the most efficient means of disseminating information; that students learn better in concentrated periods (almost universally set as an hour); that students need some background in a particular subject before they can 'think' effectively; that lecturing encourages students to learn how to think; that, after a lecture, students have a 'proper' set of notes from which to learn material; and that lectures inspire students to learn (Gibbs 1981). Sadly, there is little evidence to support any of these contentions – and a lot of evidence to the contrary.

DO LECTURES PROMOTE LEARNING?

The lecture is, indubitably, an effective vehicle for broadcasting information. It constitutes efficient use of lecturers' time, as it allows them, with the body of knowledge at their disposal, to construct a logical and sequenced discourse on a given subject. However, there is a huge gap between successfully broadcasting information and that information being received, processed and understood. In other words, the key test of the effectiveness of a lecture should be the level of learning at the end of the day – the outcome of the process and not the input (Marton & Säljö 1976a). There is no doubt that the process of disseminating information and raising the listener's level of arousal may be optimised in order to improve the possibility of deep learning (see other chapters in this book), but the fundamental problem is that lectures are not geared towards outcomes.

In 1981, Graham Gibbs published an article entitled 'Twenty terrible reasons for lecturing', in which he debunked many pervasive 'beliefs' about lecturing. He took twenty arguments often used in support of the lecture and presented evidence to the contrary. The arguments ranged over a number of assumptions. One was the idea that the one-hour lecture format was effective, when evidence showed that a speaker cannot maintain the same level of motivation and enthusiasm for this length of time (Macmanaway 1970), and that the listening capacity of even the most dedicated student flags over the course of an hour; in fact, Gibbs cited evidence that a listener's power of concentration wanes after twenty minutes of hearing someone speak (Johnston & Calhoun 1969; Lloyd 1968; Thomas 1972). He also challenged the notion that lectures induce students to think: there is no evidence that this occurs (Bloom 1953). He questioned the belief that lectures provide appropriate frameworks for learning by citing evidence that showed that a large proportion of the class either mishears information or takes inaccurate notes. (Wieman (2010) expanded this observation by showing that lectures preferentially promote surface learning among students. Furthermore, in many cases students in a large class do not record the information provided correctly in their notes.) Finally, Gibbs reported that students had indicated that the vast majority of lectures (even those presented by award-winning lecturers) were 'tolerated' and not deemed inspirational at all (Blight 1972).

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The evidence was, and is, unequivocal: lectures are neither effective nor efficient at promoting learning. In contrast, there are methods of learning that have been shown to be effective, and universities need to use these data. We need to re-examine our reliance on the lecture.

NEW PRESSURES FACING UNIVERSITIES

In a report on the future of education for the United Nations Educational, Scientific and Cultural Organisation (UNESCO), Philip Altbach and colleagues (2009) identified a number of new and emerging issues facing universities that demand pedagogical change. These challenges include:

- New forms of inter-institutional/transnational collaboration, such as the Bologna Process and the Lisbon Strategy;
- Standardisation of the language of communication in English, especially for scientific communication;
- Changes in student demographics, ranging from a gender shift from male to female, to a definite change in computer literacy and increasing connectedness between students and the world they inhabit (Tapscott 2009);
- Changing expectations of students with regards to access to information (Lorenzo & Dzuiban 2006), immediate feedback and responsiveness by faculty with respect to academic integrity (Christensen Hughes & McCabe 2006), and even the responsibility for learning – the ‘I don’t know the answer to this; you never told me’ mentality;
- Changes in the expectations of employers (Evers, Rush & Berdrow 1998);
- Continued massification of higher education: enrolment increased by more than fifty per cent in the first decade of this century and many countries have set aggressive targets for increased accessibility in the coming decade;
- Concentration: there are currently twenty-four mega universities (universities with over a million students) around the world, as well as a number of emergent mega ‘distance only’ educational institutions;
- Growing inequality of access and economic barriers to participation;
- Increasing student mobility: it is estimated that more than seven million students will be studying abroad by 2020;
- Growing numbers of individuals identified with processing difficulties;
- Increasing ubiquity of information afforded through the Internet (Tapscott 2009);
- Staggering increases in the volume of information that is readily available and the challenge of sorting the wheat from the chaff; that is to say, establishing what is relevant and what is either confusing, irrelevant, unsubstantiated or incorrect;
- Increasing prioritisation of quality assurance and accountability frameworks by government, including increased pressure to provide documented evidence of learning outcomes;

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- Changes in the social contract, with higher education being increasingly seen as a private good, largely benefiting individuals, and students demanding evidence that what they are learning is relevant to their future.

Since the global economic crisis of 2008/2009, a number of articles have been published attesting to the dire financial situation faced by universities worldwide. In the United States, these fiscal pressures are exacerbated by an over-reliance on endowments to support educational and research programmes (Davidoff 2009). Elsewhere, as a result of economic pressures and changes in the social contract, academic institutions and their students are being expected to pay a larger portion of the actual cost of education. At the same time, there is growing pressure to conduct research with the potential for commercial application, which impacts faculty time and availability. Class sizes and teaching loads are increasing; part-time faculty members are replacing full-time academic staff; and universities are being directed away from their “traditional social role and service function” (Altbach *et al* 2009).

The writing is on the wall; something has got to change. Universities cannot continue to plough the same furrow and expect to survive. Yet, across the globe, the institutional response to these challenges have generally been to retrench and rely on methods of operation that have persisted through the ages, namely to reaffirm the importance of the residential nature of universities; to solidify the need to credentialise learning by means of degrees; and to persist in upholding the pre-eminence of the lecture as the principal method of instruction.

It is time to realise that we are tinkering at the margins. We are literally rearranging the deckchairs on the Titanic, when we should be grasping the need for change and actually re-envisioning higher education. This re-envisioning demands rethinking our approach to teaching and learning.

ARE THERE OPTIONS TO CONSIDER?

In their book *Taking Stock: Research on Teaching and Learning in Higher Education*, Christensen Hughes and Mighty (2010) brought a number of people worldwide together to reimagine higher education. The international forum affirmed the need for a radical shift in pedagogy at universities in order to instil the belief in students that they have the ability, and indeed the responsibility, to participate in processes of inquiry and debate, and should take an active part in helping to resolve the complex issues facing the world today. To this end, *Taking Stock* recommends that university students should be encouraged to become independent learners who are critical of the information available: individuals who are able work in collaboration with others and who will be able to make informed judgements on subjects when they find and evaluate the available information. The significant challenge, however, is that universities have to bring about this transformation in students who have largely been trained to accept information presented to them in a passive and uncritical manner. In order to understand

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how to bring about this transformation, it is important for university teachers to engage with the literature on self-efficacy (Bandura 1977; 1986) and empowerment (see, for example, Conger & Kanungo 1988).

There is a strong parallel between the situation currently presenting itself in higher education and the shift that has occurred in business and management. According to management literature, in situations where employees experience hierarchical and authoritarian control and where they are constantly being told what to do, there is a sense of powerlessness and a lack of self-efficacy belief (Conger & Kanungo 1988). Removing the conditions that foster a sense of powerlessness and introducing empowerment-inducing strategies (for example, participation, collaborative goal setting, effective feedback, interesting work, and the provision of meaningful rewards) make a significant difference to employees. In order to be effective, these empowerment-inducing strategies must include self-efficacy confirming information, involving four areas: 'enactive attainment' (the experience of mastering a task); 'vicarious experience' (the experience of observing peers successfully mastering a task); 'verbal persuasion' (verbal encouragement and positive feedback); and a positive 'emotional arousal state' (a supportive and positive environment). These same concepts are relevant to higher education, because they are at the heart of deep learning (Marton & Säljö 1976a; 1976b). Pintrich and Schunk paraphrased this when they wrote, "It has been a major finding from the earliest models of achievement motivation and behavior that when people expect to do well, they tend to try hard, persist, and perform better" (2002:620). Moreover, empowerment – meaningful participation, collaborative goal setting, giving and receiving effective feedback, engagement in work, and the provision of meaningful rewards – is also at the heart of diversity and tolerance (Włodkowski & Ginsberg 1995). With greater participation in higher education, there is also a growing need to recognise and embrace diversity, which again underlines how essential it is that universities adopt such empowerment-inducing strategies.

There are other motivational constructs that are critical for learning (Pintrich 2003). These include beliefs about control: "[...] students who believe they have more personal control of their own learning and behavior are more likely to do well and achieve at higher levels than students who do not"; intrinsic motivation: "[r]esearch on both personal and situational interest has shown that higher levels of both are associated with more cognitive engagement, more learning, and higher levels of achievement"; value: "[...] whether students care about or think the task is important in some way"; and goals: "[...] serve to motivate and direct behavior in classroom contexts" (*ibid*:673-675).

Based on these fundamental constructs, Pintrich (2003) identifies a number of principles that should be included in renewed pedagogical design:

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- Clear and accurate feedback regarding competence and self-efficacy, with the focus on the development of competence, expertise, mastery of process, and reasoning skills;
- Tasks that offer opportunities to be successful, but also challenge the learner;
- Opportunities to exercise some choice and control;
- Stimulating and interesting tasks that are personally meaningful (relevant and interesting to the learner);
- Cooperative and collaborative group work; and
- Evaluation structures that focus on process and not necessarily on the examination of content – in fact, the evaluation procedure can be used to enhance content while observing the ability to reproduce process.

These elements are precisely the design components inherent in problem-based or enquiry-based learning (Murray & Summerlee 2007). Before continuing though, it is essential to emphasise that there is considerable inexactitude in the pedagogical literature regarding the term ‘problem-based learning’. Many researchers use it loosely, applying the term to any strategy that introduces problems – from using them to simply illustrate a point during a didactic lecture, to examining cases used in law and business schools. However, problem-based learning refers specifically to the use of problems as vehicles to teach *process* – the process of learning. This specific definition and approach was at the heart of the revolution in medical education that emanated from McMaster University in Canada in the 1960s (see Pallie & Carr 1987). In fact, McMaster used a very particular form of problem-based learning known as ‘closed-loop reiterative problem-based learning’ (Barrows 1986). Students were asked to work cooperatively and collaboratively in a group. They were given a challenge or a ‘problem’ that was intriguing and relevant to them as learners. It was not a problem to solve *per se*, but rather a challenge to pique their interest and to offer them choice and the opportunity to develop their own systematised approach to discovery, research, understanding and communication. Students were encouraged to focus on process and skills development, and, on this journey, they learned content and generated confidence in their abilities. They were required to create a list of what they needed to learn; identify for themselves where they could find that information; carry out independent research; and then report back to the group. They were encouraged to be critical of information and the sources of information they used, and were schooled in the process of giving and receiving feedback from their peers and facilitators about their own and their fellow students’ performance. They were supported (not taught) throughout by trained facilitators who guided them through the learning process. At no point did the facilitators teach or share content information with the students. This approach, and the tasks and skills involved, are closely allied to Pintrich’s (2003) principles and are essentially the same as the ideas enunciated by Chickering and Gamson (1987). And the results are very powerful. As I was finishing this chapter, the university semester ended and I received an e-mail from a first-year student, which

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I decided to include here verbatim, because I think that it captures the essence of what we are trying to do at the University of Guelph:

After just leaving my last first-year seminar class, I have been overwhelmed with emotions. The friendships that were built between facilitators and students were very important, but the one thing I will value the most, is my reignited passion for education. I find that entering university is a daunting challenge. Large class sizes, professors who do not know your name, you begin to feel like a number more than a student. After partaking in the first-year seminar class I have truly experienced what it is to learn. Walking away from class today, I realized that in that class, I was valued, that in that class I was safe, and most importantly in that class I could truly collaborate my thoughts with others to solve a sometimes seemingly unsolvable case. Although this class is over, I know that what I have learnt over the duration of 12 weeks will stay with me for a lifetime. I hope all first year students have the opportunity to experience what true collaborative education is all about.

(First-year BSc student 2012)

Using the principles and concepts discussed above as the theoretical basis for a new approach to first-year teaching at university, the University of Guelph in Canada has been using closed-loop reiterative problem-based learning in first-year seminars for more than five years. Working with first-year students from diverse backgrounds, with different levels of preparation and varying average grade entry points, and studying a range of subjects (from business to science, and from the humanities to engineering and social science), we have been able to show that just one course presented in this problem-based format has profound qualitative and quantitative impacts on the future learning potential of students (Murray & Summerlee 2007; Summerlee & Murray 2010). Our observations have been confirmed at another university, where a similar strategy for first-year engagement has subsequently been implemented (P Farrugia, Wilfrid Laurier University, Canada: personal observation 2012). Students in these problem-based first-year seminars learn *how to learn*, and in doing so change their approach to learning. They gain tremendous confidence and show commitment to independent research and deep learning, as well as incredible commitment to being engaged in some of the most challenging social and cultural issues in the world (Summerlee & Murray 2010).

Learning *outside* the classroom is also a vital and reinforcing component of a quality learning experience (Astin 1993; Kuh 2001; Pascarella & Terenzini 2005). There is compelling evidence that the amount of time and energy that students devote to external activities that are linked to an overall educational purpose is directly related to their ultimate success and performance in the classroom (Kuh 2001). In addition to their efforts in the classroom, students in problem-based learning classes also demonstrate enhanced participation in activities *outside* the classroom (Summerlee & Murray 2010). This cycle is self-reinforcing: students who take problem-based classes participate more *outside* the classroom, and participation *outside* the classroom

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improves their overall success *inside* the classroom. The fundamental point I am trying to stress here is that neither of these activities form part of a traditional lecture or lecture-based course. The implications are clear: institutions that engage their students more fully in the life of the university and its community will be able to claim to be of a higher quality than those that do not.

These observations emphasise that university education should be about process, not content; it should be about teaching students how to learn, rather than memorising facts; it should be centred on problems, not disciplines, so as to create a context in which to learn more; it should marry theoretical and applied knowledge to help the learner appreciate why it is necessary to understand the material; it should be involved in, and not isolated from, the communities where students and faculty live and work; it should be about working together in teams and real-life situations; and it should be relevant to international issues, not limited to the local or national context. Such an education cannot be delivered by lectures.

CAN WE REALLY CHANGE?

Considering the substantial weight of evidence against achieving effective learning through lectures, it is pertinent to ask why the lecture has persisted for so long. Perhaps it has to do with history. Perhaps it has to do with a sense of disenfranchisement experienced by faculty members in light of the relentless drive to massification: if they had more control, perhaps they would take greater charge of the pedagogical approaches they use. Perhaps it has to do with control by lecturers – there is no doubt that there is a sense of comfort in ‘controlling learning’ by pontificating in front of a class. Whatever the reason, we have to change. We have to move away from lecture-based instruction. But change will not be easy. In fact, it will require us to reflect deeply on our purpose; recommit to understanding the difference between teaching and learning; and truly challenge the cherished myths and assumptions about the lecture as well as the suppositions associated with faculty roles and institutional resources. We need to begin by ensuring that the process of encouraging students to learn is fully valued at our institutions (note: not that teaching is valued, but that the outcomes of teaching are valued). We need to ensure that this emphasis is not seen as secondary to research, but is at the core of what society expects from us and needs us to do. We need to invest time, energy and resources in supporting the development of academic staff as facilitators of efficacious learning (and celebrate and reward them for doing so). We need to address the issue of class size by reconstructing learning as the student’s responsibility, not the lecturer’s, and find time for small-group learning where students are encouraged to drive their own learning. All of this will require a fundamental shift in resource allocation.

Resources, or rather the lack of them, are always cited as a challenge when considering pedagogical change. Ewell (2008) reports that there is a very deeply ingrained belief among faculty members that cutting costs leads to a reduction in the

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quality of the educational experience, particularly if direct contact time with students is reduced. However, Ewell presents evidence to the contrary, citing a study by Carol Twigg, which was carried out under the auspices of the National Centre for Academic Transformation (NCAT) and involved the redesign of large first-year courses at several US institutions. These curriculum redesigns involved replacing lecturers' contact time with a combination of technology, peer learning, and applied learning. Twigg found that these resulted in better learning outcomes, increased retention, and reduced costs. However, her findings were contrary to conventional wisdom and were met with scepticism and downright disbelief: the article of faith that cost-cutting invariably yields diminished quality was too firmly entrenched to be overturned, even when the evidence proved it wrong.

So how do we break this deadlock? Paradoxically, the current fiscal climate and mounting pressure on universities from students, government and employers to train students more effectively in the use of current technologies and to produce graduates who are able to work in groups and collaborate effectively may be the driving forces for faculty members to re-examine our entrenched views.

ARE LECTURES USEFUL AT ALL?

The damning indictment of lectures presented here leads to a completely different question. Rather than seeking ways to improve the lecture for large or small classes, we should be asking ourselves whether there is a place at all for lectures in a new pedagogical paradigm. Perhaps surprisingly, I believe that the answer is a resounding 'yes', but the concept of the lecture needs to be radically different for our current practice. The lecture should be seen as an adjunct to learning and not the principal vehicle for learning. A new approach to lectures should be constructed on the principles put forward by Pintrich (2003). These 'new' lectures should be engaging, intriguing, challenging, and focused, forcing students to investigate further. They should be rooted in process, not content, and should drive the learner to take responsibility (preferably collectively) for finding out more – to become involved in research to answer a question or challenge an idea, a concept, or a dogma.

This is precisely the value of TEDTalks. Concentrated into a shorter time span (as Cowan (1998) suggests a lecture should be), TEDTalks offers a spectacular array of challenging ideas that may be woven into the framework for learning. Take two examples by Robinson (2006; 2010). In these two very different examples, he tackles education and educational reform (including at the post-secondary level). In one, he simply talks, engaging the audience (and the electronic viewer) through a mixture of humour, pathos and cynicism (Robinson 2006); in the other, his words (or 'lecture') are accompanied by a series of animations that illustrate the subject matter, but also provide a different, intriguing interpretation of his commentary (Robinson 2010). In both cases, he delivers a succinct, powerful rationale for rethinking education. There is content that could be used (memorised) by the learner, but the critical issue in both

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examples is that Robinson is addressing process. He is trying to drive the learner to take responsibility for learning – learning about the way we have been teaching and the reasons for thinking about change.

Integrated into a framework of collaborative discussion by students (learners), these examples – and other talks that might speak eloquently for the other side of the argument – could be used to construct a meaningful learning experience through dialogue. The beauty of this approach is that access to these resources is free and that they are constantly changing and improving, continually providing learners access to the insights of some of the most profound thinkers worldwide on any given issue.

CONCLUSION

With the weight of evidence against effective learning through lectures so significant, universities need to change their approach to teaching and learning. The challenge, however, is that this damning evidence has been available since the late 1980s, yet we are still talking about improving, not dismantling, the prevailing concept of the lecture. There are at present incredible additional pressures on universities to change our approaches to pedagogy. These pressures come from students, future employers and governments, and include fostering student self-efficacy and motivation; providing enriching learning activities outside of the formal curriculum; recommitting to our teaching and learning mandate; and challenging the myths and assumptions associated with traditional faculty roles and the allocation of scarce resources. These approaches fall outside the scope of the current concept of a lecture, but there are pedagogical techniques that do focus on them, and these techniques have been shown to enhance learning and the learning experience. The question we should ask ourselves is: why have we not availed ourselves of these ideas? Why is it that we, like Nero, continue to fiddle while Rome burns? Why is it that we continue to think about how to improve lecturing – and lecturing to large classes in particular – when we know that evidence suggests that only a radical shift in the pedagogical paradigm can really influence learning outcomes?

This paper is a call to action. Lecturers need to reimagine, rethink and re-engineer university teaching and learning, and move the standard lecture into the closet. We need to replace the reliance on lectures with a new approach that will significantly enhance learning – and we have the power and the opportunity to do so.