

Imagine you are a lecturer for a day. How would you teach your students?

If I were a Physical Sciences lecturer, how would I teach my students?

Bear with me, if you will, while I tell you a story.

A young man went to study a scientific course at a University. On his first day there, he was talking with one of his fellow students. She had attended a good school and obtained respectable A-level results. The subject of discussion turned to motivation; why did you come to university? His answer was clear – to enter the profession he desired to, a degree was necessary. Not only that, the subject excited and inspired him. Her response was less clear. She was mainly there to avoid having to look for a job for another few years, to have some fun. The subject interested her, but she lacked passion. She was not nearly as deeply engaged in the course as he was. It was for her, something to do, but little more.

He sparkled and achieved a first class degree. She did not. She held on and completed the course, but never seriously contemplated a job in the field of her study. She was still not excited by it.

During my time as a Chemistry undergraduate I have met people like him and people like her, from all sorts of backgrounds. For me it is sad that I have met more of the latter.

Why am I telling this story? I tell it because it highlights the major problem facing a lecturer in the Physical Sciences, that of student disengagement. If students are engaged, they learn, they study, they are enthusiastic and passionate, and most importantly, they succeed. If students are disengaged, they struggle, they avoid lectures and they do not realise their full potential.

So, if student disengagement is the problem, how would I as a lecturer address it?

It's difficult to give a single answer to that question. There is, as far as I can tell, no magic cure for apathy. Different approaches will engage different students. There are, however, some overriding principles that I would apply.

Firstly, I would be interested. Not just in the student, but as importantly, in my subject. I would demonstrate through my body language, my words and my teaching materials that I found what I was sharing to be absolutely fascinating. I would tell them how useful it was, how it had invaluable applications in a variety of settings, how it was truly important and of real worth to society.

On occasion I have heard lecturers making statements such as 'this isn't very exciting but we have to cover it.' More often I have seen lecturers betraying by their demeanour that there and then frankly the last place they wanted to be was giving a lecture to undergraduates. This negativity is noted by the students, and gives many of them a similar feeling.

Happily, I have also been in many a lecture where the academic clearly feels that what they are about to share is exciting and useful, and such contagious enthusiasm is caught by the listeners. These become the lectures where attendance is high and people want to be there out of engagement and this is how I would aim to teach.

Next, I would demand scholarship. This would doubtless be painful for many students, habituated as they have become to the 'spoon feeding' of A-level teaching, where they do not have to learn the art of scholarship in order to succeed. Thus undergraduates come with the expectation that all they need to know will be supplied by the lecturer. Too often current teaching practices reinforce this assumption, as tutorials and examinations can indeed frequently be passed with high percentages largely by memorisation and repetition of lecture notes.

How to counter this? A paper discussing lectures in Physics states that "lectures can be incredibly passive experiences for students, particularly dangerous for those who believe that if they follow the professor, they've mastered the material¹". Thus I would endeavour to make my lecturers interactive. Technology which allows audience members to vote using a keypad has already been successfully used in lecture theatres. I would make this a regular occurrence in mine, to help the students to think about the topic of the lecture, and, as they inevitably get some questions wrong, to realise their need of scholarship to gain a true comprehension of the subject matter.

To develop scholarship outside of lectures I would hold assessed problem sessions where the answers could not be found simply by looking at my lecture notes or by a cursory glance at a textbook. The students would have to develop with their own answers through thinking and studying. I would also incorporate this to a point in my examination papers. This would make students far better equipped to succeed in the world of work.

Finally, I would tap into the power of my students by empowering them to help each other. The University of Manchester currently has 18 Peer Assisted Study Session programmes across 4 faculties², where higher year undergraduates voluntarily act as learning facilitators for their fellow students. The beauty of the scheme is that, by shifting some of the tutoring burden from themselves onto engaged and enthused PASS leaders, lecturers can simultaneously help their students to learn and have more time to focus on their own research, which is of such importance to the respective department and university. Student leaders are developed all whilst developing and inspiring their fellows to a greater commitment to and understanding of their discipline of study. Other universities have already begun to follow this model³, and if I were a lecturer, I would endeavour to establish it as soon as possible in my department, as it's ability to aid achievement is immense.

To summarise, the main challenge facing a lecturer of the Physical Sciences is that of student disengagement. If I were a lecturer, I would counter this by demonstrating clearly my passion for the subject, by helping students to develop the skill of scholarship, and by empowering my students to facilitate one another's learning. These three approaches are interlinked and aim at the root of the problem. They would motivate and inspire students to excellence and deliver to the job market trained and competent scientists, filled with passion for their discipline and ready to make the breakthroughs our world so desperately needs.

¹ Van Heuvelen, Am J Phys 59(10),1991,891-897

² <http://www.campus.manchester.ac.uk/tlso/studentsaspartners/peersupport/pass/schemes/>

³For example, Loughborough University ran a pilot scheme in the Department of Chemistry in 2009