

Is the lecture dead?

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Abstract

Today, technology such as the Internet and automated digital video cameras offers the possibility of using new methods for teaching. We see that massive online open courses (MOOCs) and the idea of a “flipped classroom” are promising to replace the traditional lecture. The idea is to use technology to reduce costs and improve learning. However, in the quest for new teaching methods we have perhaps not understood why the lecture format is so widely used. In this paper, we shall try to explore the advantages of the traditional lecture.

Keywords: education, lecture, new IT technologies, MOOCs, flipped classroom

Introduction

Lectures have been a way of teaching for thousands of years. In the beginning, attending a lecture was one of few ways to access information. Later on, when textbooks and other form of course material were available, the lecture became a way of aiding students to understand the material, offering help, the possibility of asking questions and also presenting the lecturers personal interpretation of the material. Today, course material may also be available as “lectures” in video format on the Internet, often prepared by top scientist. The question is then; can the traditional lecture be replaced by these online variants?

My first introduction to online courses was in 1980. I had a sabbatical at SRI International and had the opportunity to follow Donald Knuth’s lectures on algorithms. There were two options: either to bike to Stanford University and attend the class, or to go to a room at SRI, where Knuth appeared on a large TV, with a microphone if one wanted to ask a question. I found that viewing the lecture on TV was extremely dull. The microphone was never used as none of the participants could muster the courage needed to interrupt the lecturer. Ultimately, I took the bike trip and attended the class at Stanford, where it was possible to ask questions and mingle with other students after class.

Since then, we have seen a dramatic technological improvement, perhaps to a level where one can automate the lecture. But history tells us that for every new technology, one has prophesied a revolution in education: Vinyl records, film, TV, tape recorders, the CD, personal computers, and the Internet have all been offered as breakthroughs. Some institutions, such as the UK’s Open University, which started with course-based television broadcasts from the BBC in 1971, have clearly succeeded in distance learning. Still, in most universities, the lecture format is the norm. It has been able to withstand all attacks—until now.

What faces us today is improved technology in many areas for production and dissemination of course material. Modern video cameras offer high resolution, good sound recording, and can also operate automatically. There are many excellent editing programs available. Perhaps as important, there are standardized data formats for compacting, storing, and presenting videos. With the Internet, one can disseminate the course material, from custom sites or from well-known sites such as YouTube. And, of

course, the Internet also provides two-way communication, handling exercises, chat groups for students, exams, etc.

Based on this improvement in technology the traditional lecture is attacked from two sides: MOOCs and flipped classroom. The first threatens to “automate” teaching and the second is replacing lectures with videos and individual coaching.

This attack on lectures is nothing new. Through all times the virtue of the lecture has been discussed. In the nineteen thirties, for example, the discussion was not if lectures could be replaced by video, but if improved access to written material, books and papers, would make lectures outdated. Corey, 1934, writes that “the lecture method of teaching may be considered as an anachronism”, very similar to arguments given by supporters of MOOCs and the flipped classroom. Still, the lecture format has been able to withstand all attacks – at least until now.

MOOCs

A MOOC is much more than just a taped lecture (Liyanagunawardena et al, 2015). An artificial intelligence course offered both in the traditional lecture format and as a MOOC by Sebastian Thrun and Peter Norvig at Stanford showed that many students preferred to follow the MOOC version (Hill, 2012). Martin says that, “the carefully crafted online lectures, peppered with probing questions that are autograded for correctness and then explained further are indeed an improvement over a conventional lecture” (Martin, 2012). They may be, but campus students that follow an online course are still local, and have all the advantages of a physical network. Martin also reports that when he had his own students following the online course the, “weaker students struggled and a few students were bored”.

The initial idea of a MOOC was courses with no fees, no prerequisites, and no formal accreditation (nytimes.com). They are offered by universities, non-profit organizations, and private companies. While there is an initial cost of producing the material, the dissemination costs are next to nothing. That is, a new student can be added without cost, provided that all communication with the student is handled automatically. For the courses that offer personal help and grade exercises and exams manually, the cost of adding a new student may be significant. Then, the “Massive” part of the MOOC may not be easy to implement. In theory, MOOCs may be a good solution for students living far from a university, part-time students, and those that cannot afford ordinary universities’ often very high tuition fees. In many ways, these advantages are what the Open University and its previous TV broadcasted teaching offered.

A few years ago, MOOCs were in all the headlines. The New York Times declared 2012 as “The year of the MOOC” (nytimes.com). In an interview with Wired, Stanford professor Sebastian Thrun and now the founder of one of the first MOOC companies, Udacity, prophesied that in 50 years there would be only 10 institutions in the world delivering higher education (wired.com). Since then everything has cooled down. Sure, the MOOCs had a large enrollment, but only a small fraction of the students managed to pass the exams (Cusumano, 2014). Thrun is no longer as enthusiastic (pando.com) and a new version of Udacity offers more personal service, but at a higher cost.

Interestingly, had the founders of MOOCs looked to the Open University, which has nearly 50 years’ experience with distance learning, they would have seen that personal tutoring is a significant part of their business model. There is some evidence that the MOOC format also constrains good teaching practices, for example limiting

participation between students, not being able to differentiate between students with different learning needs or build on their previous knowledge (Margaryan et al, 2015).

In many ways, technology still cannot replace the teacher. If the MOOC is the only alternative, then yes; however, if one is able, economically and otherwise, to attend a physical university, this will most often be the better alternative. Clearly, the social interaction between teachers and students, and among students themselves, is important in acquiring motivation and building networks. Interesting enough, the students that pass MOOC exams are not from third world countries, but mainly students that use MOOCs to complement their college degrees (Lewin, 2013).

Some college and universities have employed new technology to offer video presentations of all lectures, often offered through the institutions web page or YouTube. However, the effects are not singular positive. Experience from Molde College shows that while the student body advocate taped lectures in all courses, there is significant lower physical attendance in lectures that are taped. That is, some students may see the taped lecture as an excuse for not participating: “I can always view the video later”. Then many of the advantages of attending a physical university disappear.

Flipped classroom

“Flipped classroom”, another concept based on the idea that that technology will change on-campus teaching, is perhaps replacing MOOCs as the new educational hype. A good definition is provided by Lage et al.: “Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa” (Lage, 2000). The idea is that students, prior to class, will follow lectures and perhaps also collaborate online. But this is not easy to achieve, even in excellent universities (Pienta, 2016). The advantage of having prepared students is that classroom time can be more personalized.

There are many examples of successful “flipped classroom” experiments within compulsory education. There are also some supporting research from higher education (Little, 2015), but many of the case studies have been performed on small cohorts. Abeysekera et al, 2015, writes that “Despite popular enthusiasm and a somewhat reasonable rationale, flipped classroom approaches could not yet be considered an evidence-based ... approach; there is little research on the flipped classroom approach and none of it relies on particularly rigorous designs.” A problem with these types of studies is that, as always, one finds that a highly dedicated and motivated teacher with a new method of teaching will always succeed, regardless of whether the technology employed is virtual reality, 3D graphics, a learning environment system, online experiments, a blackboard or flipped classroom.

Another problem that one faces when evaluating studies around flipped classroom is that the method requires students to come prepared for class. Thus, if one demand that students watch the videos in advance the control group that are given lectures should also have a similar requirement, for example that they have read the relevant material in advance.

Clearly, individual tutoring or teaching small groups will nearly always be a better alternative than lecturing large classes. The drawback is that the university will need more teaching resources. For example, in my teaching, there may be approximately 40 students in class. If I flipped the classroom and used the lecture time, two times 45 minutes, for more personal instruction, there would be only two minutes for each

student. Teaching small groups would be more effective, but I would have to spend much more time than 90 minutes per week to offer a satisfactory service.

The lecture

The lecture format is probably not the *best* form of teaching, but is widely used since it is a *cost-effective* method, especially with large classes. A critique is that it is often one-way and passive for the students. However, one should note that lectures are only a part of a student's education, most of the time they are required to work alone or in groups.

The lecture format offers several pedagogical advantages – many of which are underestimated in the quest for applying new technology. The format is flexible. It can include theory, cases, laboratory experiments, problem solving, etc. Each professor may have a personal style, with some using the blackboard, and others presenting short videos or interesting stuff from the net as a part of the lecture. Also, perhaps most important, is that the free format enables adjusting each lecture, even the complete course, based on feedback. To some degree, this flexibility is challenged by technology: for example, the use of Powerpoint has made my lectures less flexible than before. When using only the blackboard, a question from a student could change the course of the lecture; this does not happen very often today - it is too easy to fall back to the premade slides.

Lectures are also flexible with regard to what one demand of participants. One student may come prepared with a list of questions for the teacher; another may have a hangover from the evening before. The lecture format welcomes both. Clearly the prepared student will have a better learning experience than the one with the hangover, but even the latter may benefit by being present. Hopefully, one does not have a hangover in every lecture.

The lecture offers a meeting point for students. One can use the break to ask the teacher questions or have discussions with fellow students. Then one can meet in the cafeteria afterwards. The flipped classroom will have the same effect, requiring students to be physically present. However, it will require that students have followed the online material in advance. If many don't prepare, this may reduce participation even more. A requirement to come prepared for every lecture may also be a drawback for highly motivated students, as it controls their time. As I see it, university education should offer students the possibility to concentrate on own ideas, even if this implies less time for preparing for classes (pardon me for using Mark Zuckerberg and Facebook as an example).

Conclusion

The traditional lecture has been challenged by the idea of MOOCS and the flipped classroom. Neither seems to offer a replacement. The standard MOOC does not offer the social interactions that are so important for teaching. The flipped classroom does. In theory, it may offer more interaction than the lecture, but will require much more teacher time to succeed. Due to many universities' tough economic situation; it is not realistic to expect more teaching resources and we already see many lecturers complaining that teaching takes too much of their time.

The main threat today is that technology may change the lecture from a flexible to a more "canned" format, less dynamic and less influenced by input from the students. Video capture can reduce participation in class, with serious consequences. If students don't meet physically for lectures and other learning activities, one may end up with the

worst solution – taped lectures. That is, even if lectures worked previously, even if they work today they may not work in the future.

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