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On the Use and Misuse of Lectures in Higher Education

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Abstract

Background: The purpose of this article was to review the literature on lecture effectiveness and to suggest avenues for improvements.
Methods: Selective literature review with an emphasis on active learning in the classroom setting.
Results: Conventional lectures are effective only to a limited extent in attaining important curriculum objectives. They do not promote critical thinking; student attendance tends to be low and so is cognitive engagement; furthermore, the idea that lectures should and can cover all essential subject matter is false. Moreover, empirical literature on what students actually learn from lectures is lacking. A most fundamental problem of lectures is that they are based on the information transmission fallacy, the idea that students learn just by being told. The paper proposes an alternative approach to lecturing based on studies in teaching the natural sciences: active learning in the classroom. This approach has four key elements: (a) an initial individual learning attempt by students to master important concepts or ideas, (b) the presentation of a relevant problem by the teacher in the classroom setting, (c) elaborative activities of individual students or small groups of peers to come up with solutions to the problem, and (d) feedback of the teacher.
Conclusion: The available evidence suggests that active learning in the classroom setting supports and fosters learning to a much larger extent than conventional large-group teaching.

Keywords: Lectures; Active learning; Peer discussion; Constructivism

1. Introduction

Lecturing is the most employed tool for information transmission in higher education. A cursory look at Dutch medical education demonstrates that around 70% of the teaching activities in which instructors engage consists of lecturing to students.[1] A teacher resides in front of a class, talks, and shows slides while students listen and take notes. Lecturing is part of a long tradition, probably even dating from the dawn of mankind. In the early days, information was shared through verbal transmission exclusively. Anthropologists argue that story telling used to be the most employed and most successful instrument for cultural transmission. It is based on the assumption that when you tell somebody something, and that person shows interest in what you are telling him, he will eventually

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remember it, use it, and convey it to a next generation. In early era education, before books became cheap and widely available, the teacher had no other means than simply *telling* students what he knew. He would literally read from his own notes, enabling students to write down everything he dictated, thereby more or less creating their own books. In the English university system a teacher is still called a "reader," or a "lecturer" ("legere," passivum: "lectus" is Latin for reading). Lectures help when student wrestle with particular difficult topics. A teacher who has the ability to explain concepts in a simple yet effective way can be a big help. Lectures can also be quite engaging if delivered by a charismatic teacher. Most of us still remember that one teacher who changed our perspective of the world. Finally, lectures have survived as a cost-effective way to instruct large numbers of students.

2. Shortcomings of lectures

2.1. Lack of student engagement

Lecturing is not without its critics however. Bligh,[2] for instance suggests that lectures are generally poor if one wishes to promote critical thinking in students. Kelly and colleagues,[3] observing student engagement in three types of classrooms, found engagement to be the lowest in the lecture theater. Attendance of lectures tends to be low.[4] Typically less than half of the students show up, even if those who attend score higher on examinations than those absent.[5] In surveys, students indicate that an important reason to attend is to get an impression of what will be asked during the examination; acquiring knowledge is usually rated as less important. Some teachers seem to reinforce such attitudes by focusing during tests exclusively on information shared with students through PowerPoint slides. The result is that students do not consult textbooks in their area. Their knowledge of the domain necessarily must become superficial and abbreviated; stuff for examinations rather than for life.

Then there is the issue of attention span. Some say that students are unable to attend to lectures for more than 15 min at a time. Although others challenge this point of view, there is a broadly shared opinion among teachers that students are less and less able to stay engaged with a lecture for longer periods of time. This expresses itself in off-task behaviors such as chatting with each other, being engaged in answering emails, consulting Facebook, twittering, etc. The teacher is forced more and more to act as a police officer restoring order than as an inspiring sage on the stage. Charisma, an antidote to noisy lecture theaters, is usually in short supply among university teachers. Finally, lecture time is limited. A teacher cannot, in sufficient detail, discuss all subject matter to be learned. He has to summarize topics, focus on what he sees as essential, describe in approximate fashion, or select topics at the expense of others. Therefore, teachers often feel that they have insufficiently covered the material taught.

2.2. Lack of learning from lectures

But the really important question is: do students learn from lectures? And if so: what do they learn? The question of how effective lectures are in transmitting knowledge has found surprisingly few answers. This is somewhat unexpected given their ubiquitous presence in higher education and the importance attached to the quality of that kind of education. What information is available is old and suggests that lectures are about as effective in transmitting knowledge as other forms of teaching.[2,6] However, most of the studies summarized by these authors involved comparisons between combinations of methods, for instance, lectures plus independent reading versus discussion plus reading. In addition, these studies employed natural classrooms rather than randomly assigned groups, leaving room for all kinds of confounds. A more relevant test of the effectiveness of lectures would be to have exactly the same information presented to students in two different teaching formats for exactly the same amount of time. From the literature only one such study could be retrieved, and a fairly old one at that. Corey [7] compared the learning of two groups of students who either attended a 25-minute lecture or studied for the same amount of time the text as delivered by the teacher. The latter group remembered significantly more information on a subsequent immediate test. In a yet unpublished experiment involving two randomly assigned groups, Arshad and colleagues [8] reached a similar conclusion. The authors suggest that there are at least four reasons why studying from text is superior to listening to a lecturer. The first is that students can read the text at their own pace, whereas during a lecture the teacher determines the pace with which the material is presented and has to be processed. Second, a text enables the rereading of materials too difficult or too complex to understand immediately. Third, while studying a text, the student can rehearse some of the materials or elaborate on them to improve memory. And fourth, while engaging in elaborative activities, there is no risk