

for your consideration...

SUGGESTIONS AND REFLECTIONS ON TEACHING AND LEARNING

March 2012

Effective Lecturing

"Good teachers do not merely 'deliver content' to students, but wake them up, throw them on their feet, and pull the chair away."

(Brown, 2010)

Lecturing is often criticized as being an outmoded and relatively ineffective method of instruction. More than 200 years ago, Samuel Johnson reportedly told a colleague, "Lectures were once useful, but now when all can read, and books are so numerous, lectures are unnecessary" (Boswell, 1904/1791, p. 401). More recently, Heppner (2007) similarly concluded "a lecture is a lousy way of transmitting facts to people—reading or the web are much more efficient at that job" (p. 36). However, the idea that students can learn just as well, or perhaps better, from instructional media (e.g., books, websites, or video-recorded lectures) as they can from a live lecture does not stand up to scrutiny. It may well be that students can learn more from instructional media than they can from a bad lecture, but a good lecture, one that is well crafted and expertly delivered, can surpass instructional media not only in cultivating so-called higher levels of learning, such as critical thinking, analysis and problem-solving skills, but also in the transmission of factual information (Figlio, Ruish & Lin, 2010). Here we consider some of the factors that give live instruction a pedagogical advantage over instructional media, and show how to use these factors to guide the design and presentation of instructionally effective lectures.

One reason live instruction can be pedagogically superior to instructional media is that, from the earliest ages, learning is greatly facilitated by personal interaction between students and teachers. Indeed, laboratory research has shown that, in some instances, learning simply does not occur in the absence of social interaction (Kuhl, Tsao, & Liu, 2003). For example, in a study of second language learning among 9-month-old children, the researchers found that the infants learned a substantial amount when they were exposed to a

new language in a live social interaction, but they learned nothing when the exact same language material was presented via a videorecording. The greater pedagogical efficacy of live instruction for infant language acquisition can be attributed to certain characteristics of social interaction that are known to facilitate learning, including heightened attention and arousal on the part of the learner and the opportunity for the teacher to monitor the learner's comprehension in real time and adapt his or her presentation of the material accordingly. These factors facilitate learning in the college classroom just as they do in the infant language laboratory. Therefore, your challenge as a lecturer is to find ways to sustain your students' arousal and attention and to tailor the presentation of material based on an assessment of your students' understanding.

Sustaining Student Attention and Alertness

In order for learning to occur, the learner must be reasonably alert and attentive. Arousal and attention depend on a variety of physiological and environmental factors, including some you have no influence over, such as whether students have received adequate sleep or nutrition prior to the class meeting. However, the content, organization, and delivery of the lecture also affect student arousal and attention, and these are things you can control. Specifically, students are better able to maintain alertness and attention when they perceive the subject matter of the lecture as relevant to their interests and related to what they already know, when they experience varied types and levels of stimulation, and when the lecture is structured in a way that respects the typical limits on how long

listeners can sustain focused attention. Therefore, to help students maintain the level of arousal and attention necessary to support learning, you should:

1. Explain the relevance of each new topic you introduce.

For example, explain how the topic or concept is relevant to some larger instructional goal of the course, mastering some new skill, understanding some current event, or solving a particular problem. If nothing else, you can explain how learning the information you are about to present is relevant to doing well in the course (e.g., that an upcoming exam or paper assignment will assess their mastery of the new material).

2. Provide links between new ideas and previous learning or experiences.

New terminology and ideas should be linked to previous experiences or subject matter (Wittwer & Renkl, 2008). This exercise can be as simple as showing students a mnemonic device to help them remember the elements of a chemical process or as complex as finding elegant metaphors for the most difficult concepts in your field. One researcher has suggested that one trait effective teachers seem to share is the ability to construct metaphors that immediately connect with the minds of their students. Examples of how UNC professors provide these links in their lectures include a history professor who explains eighteenth century imperialism in terms of pancake sales and a literature professor who uses television soap opera characters to draw parallels with characters in novels and short stories. It is also helpful to explain how the new concept or subject matter is related to information encountered previously in the course.

3. Vary the form and content of the lecture as well as more basic visual and auditory aspects of delivery.

To vary the form and content of a lecture you can alternate between formal exposition of the subject matter and more conversational presentation of anecdotes or stories. In addition, you can intersperse the lecture with presentation of visual materials such as images or video segments (if you are using a projection system) or by drawing graphs or diagrams on the chalkboard. Effective ways to vary the visual and auditory aspects of delivery include moving around the room as you speak; varying the pitch, volume, and intonation of your voice; varying the rate at which you talk; employing pauses; and conveying a variety of facial expressions and emotions. One way to do this without having to consciously think about it is to simply make an effort to convey enthusiasm for the subject matter of the lecture; when speakers express enthusiasm, they spontaneously vary these visual and auditory aspects of delivery.

4. Speak uninterrupted for no more than 20 minutes.

There are wide individual differences in how long one can sustain focused attention before mental fatigue sets in (Wilson & Korn, 2007). Few individuals, however, can sustain the level of concentration needed to absorb and understand new information for a full 50 minutes without a break. Over time, attention wanes, the mind wanders, and learning ceases. On the other hand, most students are capable of sustaining focused attention for 15-20 minutes, especially if you adopt some of the delivery strategies described above. Therefore, it is a good rule of thumb to organize a lecture in 20-minute blocks with five-minute breaks in between blocks. During the breaks you can pose questions to the students and invite the students themselves to ask questions. You can also use the breaks to provide students time to work alone or in small groups on some assigned task related to the information just presented (see discussion of buzz groups below).

By contrast, an effective way to minimize what students learn from a lecture, and perhaps even put them to sleep, is to remain stationary at the front of the room reading the lecture from notes in a monotone voice for the entire class period while avoiding any and all eye contact or interaction with the students.

Dynamically tailoring the presentation of material to students' degree of understanding.

In order to adapt your presentation to students' degree of understanding, you first need some way of assessing, in real time, what the students are learning from the lecture and when they are having difficulties. To monitor student understanding during a lecture you can:

1. Use eye contact and questions to verify periodically that students accurately understand the information in the lecture.

Most teachers pay attention to the facial expressions of their students in order to gauge roughly whether they are puzzled, amused, alert, or bored. But in order to verify (with any degree of precision) that they are getting the point, the teacher needs to establish two-way communication—to ask them questions, to test their perceptions in a dialogue of some sort. This kind of verification requires directing questions about the subject matter to individual students (Zakrajsek, 1998). Periodically posing questions to the entire class does not usually work because those who respond may not be representative of the class

as a whole. Indeed, those students who are struggling the most to understand the lecture may be the ones least likely to respond to such a question, either because they simply do not know the answer or out of fear of appearing stupid in front of their peers. Nor is it sufficient to ask general questions such as, “Are there any questions about these points?” both because this type of question does not require students to test their perceptions against yours, and because a lack of a response does not necessarily indicate that all students accurately understand the material. Rather, the question should require the respondent to, for example, summarize in his or her own words the main points you have made in the lecture, or demonstrate understanding by applying the concepts to a new situation or problem.

- 2. *In large classes, use buzz groups or electronic Student Response Systems (SRS) to assess comprehension and identify misunderstandings.***
A buzz group is “a team of four to five students that form extemporaneously to respond to one or more questions” (Davis, 2009, p. 208). You assign the groups a question to answer, allow them a few minutes for discussion, and then ask the groups to identify the areas of confusion or disagreement. An SRS is a wireless electronic response system that allows students to respond to your question by using a “clicker,” or hand-held response pad, to send their information to a receiver connected to a computer. The computer then calculates and displays the distribution of responses, showing, for example, the percentage of respondents who answered the question correctly. Kaleta and Joosten (2007) studied the use of clickers at four University of Wisconsin campuses and reported that faculty members found the tool useful for quickly gauging student understanding during a lecture.¹ Explicitly testing students’ understanding during the lecture not only provides feedback to the instructors about how effectively they are conveying the subject matter, but also helps the students remember the material (Karpicke & Blunt, 2011).

In addition to sustaining student attention and monitoring student comprehension, use the following techniques to enhance students’ ability to learn from lectures:

¹According to one of their faculty respondents, “By getting immediate feedback, I could judge whether students understood the basic concepts. If a vast majority answered the multiple-choice questions correctly, then I could confidently proceed to the next topic of lecture. If a large number of students did not get the correct answer then I could lecture some more and re-poll, or I could get the students to discuss amongst themselves what the correct answer should be.”

- 1. *Provide outlines to help students discriminate between more important and less important material.***

It is difficult for students to discriminate between the central and peripheral material in a lecture unless they are given appropriate cues. Although instructors often give spoken signals during a lecture (e.g., “Now, this is important”), students learn better when they understand the overall structure and organization of the lecture because they can focus their attention on the more important concepts and the way these elements fit together (Davis, 2009). Therefore, it is helpful to provide an outline of the lecture in a handout, on the board, or on a projected slide. The outline should reveal the organization of the lecture and give students clues to its most significant elements, and perhaps flag those elements that students are likely to find most difficult. Some teachers include a unit-by-unit outline of their lectures in the syllabus for the course. The basic principle is that students will be better able to filter out nonessential information if they are told, in various ways, what is essential.

- 2. *Use multiple concrete examples to illustrate new concepts.***

Just as students have difficulty discriminating the more important from the less important information presented to them in a lecture, they also can have difficulty identifying which features of a particular illustration exemplify the abstract concept being presented and which are incidental (Murphy, 2002). Therefore, it is helpful when introducing new concepts in a lecture to provide multiple varying examples and to explain how each example illustrates the concept. Although examples can be given orally, they might also take the form of pictures, diagrams, illustrations, or even exercises that the students perform. For example, a UNC professor of business law illustrates case studies in the course with a series of slides that show, in cartoon format, the figures and the issues involved in each case. A UNC psychology professor illustrates the Freudian concepts of superego, ego, and id through conceptual diagrams, thereby creating concrete examples of the theoretical constructs that students have difficulty grasping.

- 3. *Provide “blank time” to allow students opportunities to consolidate the new information.***

Consolidation of new information in memory is aided by repetition, rehearsal, and organization, all of which require time (Bligh, 2000). Therefore, you should resist the temptation to try to cram as much new information as possible into a lecture. Instead, include periods when no new information is presented, so that students can catch up in

their note-taking, ask you to repeat something they may have missed, and organize their notes in a way that will help them review the material later on. Some professors pattern their lectures so that, after introducing a series of new ideas, they always provide subordinate, illustrative, or anecdotal material that is not new, but is related to the new information in some way. Frequent internal summaries in a lecture also provide blank time for rehearsing and organizing the new information

Conclusion

The lecture format is remarkably durable. Despite centuries of technological innovation that might have been expected to make oral transmission of knowledge obsolete, the lecture remains the most frequently used instructional method in higher education (Zakrajsek, 1998). Habit and professional conservatism may account in part for the continued prevalence of the “sage on the stage,” but it may also be that innovations in information technology have not changed the fundamentally social nature of teaching and learning. By recognizing and exploiting the pedagogical advantages live instruction has over the use of disembodied instructional media, lecturers can both facilitate student learning and ensure that flesh-and-blood teachers remain central to the process of knowledge transmission for a long time to come.

Bibliography

Bligh, D. A. (2000). *What's the use of lectures?* New York: Jossey-Bass.

Boswell, J. (1904/1791). *Life of Samuel Johnson*. London: Henry Frowde.

Brown, W. (2010). Presented at the UC Graduate Student Association Forum on the Cyber Campus, October 11, 2010. Retrieved from <http://ucbfa.org/2010/10/wendy-brown-on-online-education/>

Davis, B. G. (2009). *Tools for teaching* (2nd ed.). San Francisco, CA: John Wiley & Sons.

Figlio, D. N., Rush, M. and Yin, L. (2010). Is it live or is it internet? Experimental estimates of the effects of online instruction on student learning. NBER Working Paper 16089.

Heppner, F. (2007). *Teaching the large college class: A guidebook for instructors with multitudes*. San Francisco, CA: John Wiley & Sons.

Kaleta, R., & Joosten, T. (2007). Student response systems: A University of Wisconsin system study of clickers. *Educause Center for Applied Research: Research Bulletin*, 10, 1-12.

Karpicke, J.D., & Blunt, J.R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, 331(6018), 772-775.

Kuhl, P. K., Tsao, F., & Liu, H. (2003). Foreign-language experience in infancy: Effects of short-term exposure and social interaction on phonetic learning. *Proceedings of the National Academy of Sciences*, 100, 9096-9101.

Murphy, G. L. (2002). *The big book of concepts*. Boston, MA: MIT Press.

Wilson, K., & Korn, J. H. (2007). Attention during lectures: Beyond ten minutes. *Teaching of Psychology*, 34(2), 85-89.

Wittwer, J., & Renkl, A. (2008). Why instructional explanations often do not work: A framework for understanding the effectiveness of instructional explanations. *Educational Psychologist*, 43(1), 49-64.

Zakrajsek, T. (1998). Developing effective lectures. *APS Observer*, 11(2).