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First Steps Toward Increasing Student Engagement During Lecture

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First Steps Toward Increasing Student Engagement During Lecture,

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Have you tried to repurpose materials you've gotten from another lecturer or publisher that you thought could express a concept exceptionally well, only to find when you used the same materials, they did not have the dramatic effect on your students you desired? It would be easy to conclude that student apathy is to blame. But, if students listening to your lecture take on the same bored appearance and passive disposition often observed when you are showing a video, consider whether your instructional approach is designed to intellectually engage students. An information-download lecture has often been described as…*the process by which the teacher's notes get transferred into students' notebooks without passing through the brains of either*. That brilliant set of lecture materials that you thought would be perfect might need to be adjusted to meet the learning styles of your students to actively engage them in developing conceptual understanding.

The first step toward refocusing the teacher-centered lecture to a learner-centered classroom is to accept that much of the responsibility for learning resides squarely on the **listener**—not on the lecturer. Lecturers can motivate, inspire, and build a series of experiences that make the discipline more accessible; but teachers cannot do the learning for the students. This notion has encouraged me to promote the perspective, "It's not what the teacher does that matters; rather, *it is what the students do*." In a learner-centered teaching environment, the role of lecture is radically shifted to a focus on guiding students through meaningful learning experiences. The pathway to giving great lectures is to say less and *change listener behavior from passive to active!* Teachers who have navigated the road to student engagement rarely go back to teaching mostly by telling.

Lecturing about science and technology has a distinct advantage over other disciplines in that demonstrations can be provocative, provide illustrative clarification, and excite the learner with unexpected phenomena. Research on the actual effectiveness of demonstrations shows the most important part of the demonstration is *asking students to predict (in writing) what they expect to see* and predict the effect of changing particular variables. It is the act of predicting and rationalizing these predictions where most of the learning occurs. So, stop and take the time to ask, "What do you think you'll see?"

Students in the most basic of learner-centered learning environments do more than mindlessly recopy notes projected by the lecturer; they add notations and fill in missing pieces to partially completed forms or diagrams distributed to audiences at the beginning of a lecture. Rather than providing students with complete copies of lecture notes, give them fragmented notes to be completed during a lecture to give them an expert-like skeletal structure on which to build their understanding.

The central part of a learner-centered approach is to *ask questions.* The questions posed should be nonrhetorical questions and should be at a cognitive level requiring more thought than just relying on preexisting declarative knowledge. Classrooms of students responding quickly, and in unison, can be mistaken for meaningful dialogue. Questions should be intellectually challenging and be carefully crafted to lead the students to deeper levels of understanding. Questions such as "does everyone understand?" and "do you have any questions?" provide the lecturer little insight into whether or not the audience actually comprehends the ideas being presented.

An easy-to-understand yet difficult-to-implement teaching skill is to *ask meaningful questions and then patiently WAIT*. Researchers that carefully track classroom dynamics have found that an instructor who too quickly provides clarifying information or responds to the first person who answers a question completely squashes further discussion and divergent thinking. The common advice is to wait at least 10 seconds before

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"To Do" List for Creating Engaging Classroom Lectures	
To Do List	***How To Do It Better***
1. Do find out what they know and use it as a bridge to what you are trying to teach them.	Start a lecture by asking the audience to write, then share, responses to "what would you do if" questions before getting far into your lecture.
2. Do periodically stop and find out if they understand and give listeners feedback.	Periodically stop and give listeners Think-Pair-Share questions.
3. Do give listeners a structure for how to follow your lecture.	Provide PowerPoint handouts with ONLY the slide titles and images/graphs to which listeners can add notes.
4. Do have them work in teams on mini-case studies with ill-defined variables.	Ask groups to consider seemingly easy mini-case studies and elect a spokesperson to summarize analysis.

saying anything after posing a question. If everyone in the audience can answer your question in less than 10 seconds, then the question isn't conceptually challenging enough. One useful strategy to help fidgety lecturers be certain that 10 seconds elapses before accepting responses is to turn away from the class, taking a sip of coffee, or flip through lecture notes without looking at the students. It is equally important to ask responders to explain the reasoning behind their answers and to avoid affirming the correctness of a response before accepting several other answers.

A lecturer must avoid holding a discussion with only the students in the first few front rows. After just a few sessions the students farther back in the classroom realize that questions without accountability systems don't actually need to be contemplated because only the first few rows are required to respond. To be effective, a *system that holds all the students accountable needs to be implemented*. Some lecturers draw names at random from a hat to ask specific students questions. Others write students' names on ice cream sticks using a color code that distinguishes male names from female names to easily alternate between males and females.

To capitalize on the innate social nature of students, pose a multiple-choice question to students in a *think-pair-share* format. Students are asked to THINK about the question and individually commit to and vote on an answer. It is crucial that people actually commit to an initial idea so that they can actively compare their initial thinking with any new understandings that might result after discussion with a peer. The second step is to PAIR with another student and to SHARE their answer, articulate the reasoning, and convince their neighbor "why their answer is correct." After a short collaborative discussion, they are asked to respond to the question a second time. We ask the audience to vote anonymously perhaps by holding one, two, three, or four fingers close to their chest to indicate their answers, using colored or lettered index cards to indicate a choice, or even use electronic peer-response systems. The outcome of the voting allows the lecturer to monitor the audience's conceptual growth. The underlying hope is that through social conversations with peers, the audience will develop a more complete understanding.

Breaking the students into small, collaborative learning groups to solve a meaningful task is one of the most successful and fully evaluated teaching techniques implemented over the last century. Our experience is that the students will readily talk to one another and stay on task for several minutes at a time if the questions are posed at the right conceptual level. Engage collaborative learning groups in meaningful conversations by providing students with dilemmas to be solved through case studies. Case study tasks ask audience members to synthesize several ideas or evaluate scenarios that have not been explicitly presented to them in the lecture. The best case studies have an initial appearance of being simplistic and ask students to work at the highest cognitive levels by challenging them to use their knowledge to create and justify decisions as well as evaluate scenarios.

The bottom line here is that the most valuable role of an expert is not to simply tell students what they know; rather, it is to use their unique expertise to build rich scenarios for students to analyze using novel ideas. Adding these pedagogical tools will dramatically improve the intellectual engagement of your students if they can see how these aspects improve their learning and course grades.