

Active Learning & Learner-Centered Instruction

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Is it possible to teach and yet the students not learn? I suppose someone could debate the issue philosophically, but one thing I know for sure is that I've done it. I could say "it has happened to me," but I think that way of phrasing it runs the risk of letting me off the hook. There have been too many times that I felt confident that I was doing a great job teaching. I just *knew* I was explaining things clearly and including great examples and applications that would be meaningful and memorable to the students. Everything was going great as the audience members maintained eye contact and even nodded along in agreement.

Then came the exam and my optimism was dashed. Sure, some students did well and seemed to "get it" with regard to a particular concept. Unfortunately, many students who were exposed to my great teaching apparently did not "get it," or what they "got" was way off base. What happened (or didn't happen)?

Of course there are multiple reasons why any given student may not have learned a particular concept, and it's easy to focus on reasons having to do with the student. Perhaps the poorly performing students are not intelligent, not diligent, or not studying. However, even if true, those are factors over which I have no control. I do have much more control over what occurs during class, so perhaps the relevant question is why the material in question was not learned during the class meeting that I orchestrated? What should I have done with class time to help ensure learning?

Once upon a time class meetings were viewed as an efficient means of exposing students to a body of knowledge shared orally or visually by an instructor. This model made good sense when students did not have access to materials as a means of exposure to the relevant information. With the advent of books (and subsequently other media), access to information was no longer a barrier to learning. However, information is not synonymous with knowledge, so the key is a deeper understanding that allows for application, critical thinking, and problem solving. Perhaps the nodding heads in my classes signaled that students felt as though they understood the material as I explained it, but that apparently did not mean that they were then knowledgeable when they left class. Why the discrepancy?

When we reflect on how we ourselves learn, we realize that learning (in a lasting sense) is an active process requiring cognitive effort. Learning is not a spectator sport. That explains why students frequently talk about first learning course material when they get around to studying it for an exam rather than when they first read the material or take notes on it in class. Herein is the turning point from a teacher-centered approach to a learner-centered approach to classroom instruction. Rather than focus on how well the instructor is presenting material the focus is on how cognitively active the students are in class (and therefore how much responsibility they are taking in the learning process).

Certainly, many people would argue with my particular definition of "active learning" or "learner-centered teaching," but here it is: *Any method that facilitates active (cognitive) engagement of students with the material to be learned.* I chose such a general or broad definition to purposely avoid classifying any particular techniques as inherently learner-centered or inherently not learner-centered. Lectures are frequently pointed to as the antithesis of learner-centered instruction, but they do not have to be as long as there are components that ensure student engagement and cognitive effort.

If active learning is based on what is going on inside students' heads, what is the role of the instructor in a learner-centered course? First, the instructor is vital in providing appropriate materials for students to use outside of class. These materials are extremely important as they provide the initial exposure to, and context for, the information or skills to be gained from the course. Although such exposure and context may not be enough to ensure learning, it's a vital first step that takes great care and consideration to result in learning.

Next, the instructor is vital for planning and conducting the classroom activities that prompt engagement and cognitive effort on the part of learners. We cannot assume that learners want to, or will, engage in this effortful behavior on their own. This important step not only involves selecting effective activities but ensuring incentives so that students are likely to participate fully and appropriately. These incentives do not necessarily have to be grades; instead they may be based on prior expectation setting, or peer pressure and the desire to fit in. Building in student-engagement activities consistently and presenting them with the expectation that this is what is valuable about class sets the tone for a high rate of participation.

So far, the instructor's role in the learner-centered classroom has involved work "behind the scenes." However, one major advantage of learner-centered classroom activities is that they generate student questions and reveal areas of ignorance and misunderstanding. This is where the instructor has opportunities to rely on his or her expertise to provide pointed instruction that might be labeled "lecture." The difference from a portion of a traditional lecture that may have covered the very same material is that now the students are primed and motivated to receive the information and integrate it within a cognitive context that provides meaning and purpose. The material shared in this type of lecture is much more likely to be remembered and to have meaning that allows for application and generalization.

Last, the effective instructor closes the learning loop by providing reinforcement for the effort (and thereby learning) experienced by the students. An effective educational activity will be at least somewhat self-reinforcing by nature of providing a sense of accomplishment and learning. However, additional and powerful reinforcement may come from the instructor's demeanor, apparent excitement, and verbal praise (the relationship between the instructor and the students). Such reinforcement closes the loop by prompting a desire for further learning and cognitive engagement, creating a classroom environment characterized by high rates of learner participation and energy.

The reasons given for evolving toward a more learner-centered classroom typically focus on the benefits for students. However, there are benefits for instructor as well. Yes, lecturing feels safe, but it can also grow routine and stale. With traditional lecture all of the energy needs to come from the lecturer, who is often left unsure just what effect (if any) he or she is having on the audience. As with my experience as an instructor, heads may nod in apparent agreement, but such attention does not ensure learning. With learner-centered instruction, there is more energy in the room and no two classes covering the same material are ever the same in process. In addition to greater learning by students, instructors tend to learn more, both in terms of what their students really know as well as the occasional question or comment that sparks an intellectual fire.

Despite providing a definition of active learning or learner-centered instruction that precludes any particular methods or techniques, there are several activities that are considered classic examples. Of course any effective technique can be employed poorly, without care provided to the important aspects and steps that support a learner-centered educational environment, thereby all but ensuring a poor outcome. Conversely, a less-than-great activity can produce powerful learning when conducted well and in a setting that has been cultivated for such learning. As is true with most things, employing learner-centered activities takes practice and revision to maximum results.

Below are brief descriptions of several classic activities used by learner-centered instructors. Additional explanation and examples should be easy to find with an internet search on any particular method. For all techniques, it can be useful to explain to learners *why* you choose non-traditional methods, and that it is not simply to create busy work or fill class time. Similarly, some instructors ask students to reflect on an activity immediately upon completion, asking about the apparent purposes and benefits of the activity (which not only promotes buy-in but also develops important metacognitive skills).

Popular Active Learning and Learner-Centered In-Class Educational Activities

Think-Pair-Share – Pose a question, scenario, or cognitive task and ask students to think about and jot down their answers. After sufficient time for most students to complete the first step, ask students to join one or two others sitting nearby and quickly share answers. After sufficient time, call on one or more students to share their answers. When using an audience response technology such as clickers, ask all students to submit an answer. Based on responses, clarify, elaborate, or answer questions before moving on to a new topic.

Not all three steps must be included, yet there is a solid rationale for each. First, students vary in how quickly they think of a suitable answer. When simply posing a question to the class generally, and calling on someone who raises his or her hand, the remaining students are robbed of the opportunity to engage in the necessary cognitive effort to promote learning. Second, research has demonstrated educational benefit to verbally sharing answers with a pair partner, and those benefits have been shown to extend to new questions and applications covering the same material. Calling on one or more students to share answers with the entire class exposes students to a wider range of perspectives and allows you to gauge the level of understanding of the class as a whole.

This technique is best used with tasks that do not result in a yes/no or multiple-choice answer, unless there is the additional requirement that the student explain the reasons for his or her choice, why the other response options are incorrect, etc. Fortunately, it is easy to create effective prompts starting with “explain,” “why,” or “how.” Also, any two concepts in the course can be used for meaningful learning by simply asking students compare or contrast the two (“How is ____ and ____ alike? Different?”). The important thing is not that there is a correct answer, that the two concepts share any logical connection, or that students come to a consensus, but rather simply that the activity prompts students to think about the material.

Roundtables – Present a case, scenario, or other problem that does not necessarily have one correct or clear answer. Ask students in small groups to each take a piece of paper and write down an answer. As soon as they are done they are to pass the sheet to the group member to the left with no discussion. Each student is to quickly add to the sheet he or she receives, continuing to pass sheets to the left. The required addition might be a “new” answer or a reason why an existing answer on the sheet is strong or weak. When the activity has slowed, students can be directed to briefly discuss within the group the strongest answer to then share with the class, or students can be directed toward a general classroom discussion.

Jigsaw Groups – Despite variations, the core technique is to structure learning tasks so that each student in a small group is responsible for his or her own portion, which is then shared with the others in the group. Each student is responsible for one piece in the larger puzzle, and each takes turns teaching the others his or her piece so that each student serves as both teacher and learner. The assigned task may involve divvying up portions of a complex reading, tackling different aspects of a single case, or becoming the group expert on a particular condition or disease state. Because students are ultimately responsible for the material being taught by their group mates, they are highly invested in both a good teacher and student to each other.

Quizzes – Rather than strictly for assessment, quizzing has been shown to have powerful effects on learning. Asking students to explain something, or describe their knowledge or understanding of specified material, quickly reveals intellectual gaps and misunderstanding (and making such assessment is an important meta-cognitive skill). Presentation of accurate material immediately following self-assessment of knowledge is particularly prone to student retention and integration. In other words, there is something powerful about being quizzed, or trying to come up with an answer, that prompts retention of relevant material encountered immediately after unsuccessfully generating an answer.

Concept Maps – In their simplest form, concept maps involve learners creating visual representations of interconnections among concepts related to a particular topic or problem. Asking students to graphically represent their knowledge not only provides an assessment of that knowledge but facilitates learning, particularly with regard to how concepts relate to one another and the larger context into which particular facts and concepts fit. After allowing time for students to create their own concept maps, you may ask students to share or explain with a neighbor, and you may call on students to contribute as he or she constructs a concept map in front of the class. The sharing portion of the activity allows students to clarify and solidify their knowledge, as well as see how others think about the very same concepts and connections.

Group Quizzes – Administer formative quizzes first individually, then in small groups. The need to come to a consensus prompts discussion of the material and thinking through why a particular answer is correct (or better) and other answers are incorrect (or not as good). Explaining to, or persuading, a group mate is a powerful learning process.

Predictions – Before presentation of material, students are asked to each make a prediction regarding the outcome of a case or the answer to a problem, and articulate their rationale for their predictions. Similar to quizzing, this task prompts motivation and subsequent learning of the material that applies to the prediction and determining its accuracy.

Cases and Problems – Provided scenarios become powerful methods of teaching when students are required to work on them independently and/or in groups rather than simply being presented with the cases/problems and their solutions as illustrations or examples.

Posed Questions – Instructors frequently pose questions to the class and select from raised hands the individual student to provide an answer. This is an efficient and comfortable approach, but most students in the class are likely to wait passively for the payoff: the instructor repeats, clarifies, or provides the correct answer. Small adjustments to this scenario can result in powerful learning for the majority of the class. First, set a policy of waiting several seconds before calling on someone allows all students to think about their answers to the posed questions. This change is even more powerful when combined with a policy of calling on students at random, rather than on someone who raises a hand, thereby prompting all students to give some thought to an answer should they be found suddenly in the spotlight.

Student Follow-Up on Other Students' Comments – The norm is for student to raise their hands to ask a question, answer one, or offer a comment. The instructor then responds before moving on. Often, other students do not hear the student comments or do not listen, figuring that the instructor will provide what the class needs through the instructor's follow up to the student's comments. However, some instructors respond to student comments by calling on another student, asking him/her to summarize or restate what the first student said, and then to agree/disagree, or add anything that is missing, etc. Doing this at least sporadically increases the rate at which students listen to other students' comments and think about them critically.

The Fish Bowl – Students drop slips of paper into a bowl upon entering the classroom, each containing a question or request for clarification based on the material presented outside of class. Address those questions and requests in class, ideally asking or calling on students to address each after you read it to the class.

Test Questions – Ask students to generate possible exam questions, either individually or with other students, regardless of whether the questions are used for actual exams. Then discuss those questions as a class, determining both the correct answer as well as the extent to which it is a viable exam question (and why). This process not only fosters learning of the content the questions cover, but trains students to better anticipate actual exam items.

Note Checks – When presentations result in substantial note taking, periodically students are asked to compare notes to those of a person sitting nearby. After allowing a few minutes to do so, ask for student questions or requests for clarification. Not only does this result in better notes, but students must think about what they have in their notes, whether it is understandable, and possibly explain portions to the classmate— all active forms of learning.