How Can I Utilize Active Learning in My Classes?
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I.   What is Active Learning?

Active learning refers to activities done to help students process and interact with material. It consists of anything besides listening to a lecture or reading material. Technically, this can include homework and other out-of-class work, but most scholars choose to focus on in-class activities designed to help students work with the material presented in class/readings. Active learning is often contrasted with passive learning (listening to a lecture, reading a textbook, etc.). Active learning is borne out by research, and this paper will address justifications for active learning, strategies for active learning in classes of various sizes, as well as considerations in making a transition from a more lecture-dominant classroom to a learning environment that calls on students to participate more regularly.

II.   Why should I integrate active learning strategies?

Some professors (and students) may wonder why active learning is necessary, or even helpful. We're used to lectures, complemented by occasional discussion (or regular, but separate, class sections for discussion/recitation). First and foremost: "some of the criticism and hesitation seems to originate in the idea that techniques of active and cooperative learning are genuine <u>alternatives</u> to, rather than enhancements of, professors' lectures" (Paulson and Faust, n.d., p. 1).

In making the case for active learning, many authors utilize a form of the proverb attributed to Lao-Tzu: If you tell me, I will listen. If you show me, I will see. But if you let me experience, I will learn. In their guide to active learning, Hiler and Paul (2005) offer a pithy spin on this idea: "When you're the one doing most of the talking, you are the one doing most of the thinking" (p. 7) While this language is inspiring, it is still worth asking a couple of questions:

- **What's wrong with a lecture?** There is mounting evidence that lectures may be traditional, but they are not necessarily effective. In *Make it Stick* (Brown, Roediger, & McDaniel, 2015), the authors cite research dating back to 1885 that suggests we may forget as much as 70 percent of what we have just read, heard, or seen. Similar research done specifically on lectures has shown disparate retention rates between the first 10-minutes of class (70%) and the final 10-minutes (20%) (Prince, 2004, p. 4).

- **Is there evidence to support using active learning?** In one study, Ruhl et al. (1987) a control group of a traditional lecture performed worse on a test of recall than an experimental group involving three breaks, every 15 minutes, when students would compare notes. The results were just as strong in a physics class, with an 'experimental' lecture dramatically improving students' under-standing of basic concepts in comparison to a traditional lecture (Laws et al., 1999). Hake et al. (1998), also cited by Prince (n.d.) includes a sample size of

over 6,000 physics students who outperformed their control group peers when giving active engagement techniques (Prince, n.d., p. 4). Though the effect size varies, there *is* an effect.

Regardless of the specific mechanisms, recent research in cognitive science bears out the principles of active learning. Brown et al. (2014) advocate an approach to learning that utilizes regular retrieval practice (i.e., quizzes) and urge against mere review and/or rereading of material: "Testing helps calibrate our judgments of what we've learned" (pp. 4-5). Active learning offers students many opportunities to test themselves. Moreover, teachers and students need not wait until after material has been presented: "Trying to solve a problem *before being taught the solution* leads to better learning, even when errors are made in the attempt)" (p.4).

III.   How do I use active learning in my class?

Whether as a warm-up or a follow-up, active learning strategies can help students practice articulating their answers, either through writing or speaking. Any written activities can be taken up for attendance or simply just to get feedback as to what your students do/don't understand. This element of formative assessment (assessment as you go) is one element that can be missing from a lecture class where students demonstrate understanding only on exams and major assignments. **Here is a list of various active learning strategies that can be used with individuals, pairs, groups, or entire classes:**

Individual Activities

These activities can be an elegant solution to a couple of problems: How do I assess my students on a regular basis in a low-stakes atmosphere? How do I help them engage in class? These can be done at the beginning of a class/unit, or they can serve as a review/conclusion for the day. Finally, any of these strategies can be writing activities or discussion-based activities, and they don't need to take more than a few minutes of your class time.

Concept/Content-Based

- **Specific Question** – In its simplest form, you would ask your students to respond to a particular question: Explain this theorem, define this concept, etc. These can be used as quizzes, but they also provide clear feedback to teachers as to whether students have understood a particular idea.

- **Muddiest/Clearest Point** – The teacher asks students to spend a minute or two writing down the idea/point that is most unclear (or clearest) from today's lecture/class. This casts a wider net than asking a specific question, but it also allows students to provide you with feedback on an individual basis. The instructor can peruse these and see if any themes emerge, and they can act accordingly with review/clarification.

- **Background Knowledge Probe** – While the first two options take place after or during the learning of an idea, a knowledge probe can serve as a warm-up activity. Prompts like "Tell

me what you know about…" offer students a chance to a.) get started thinking about a topic, b.) provide you with a clear starting point, and even c.) offer up points for discussion (be it from misconceptions or different points of view on the same topic).

Reflective/Affective

- **Affective Response** (what is your reaction to x/y/z?) – While there is some overlap here with a knowledge probe, asking students to provide their emotional response to certain material provide a useful way to personalize student learning. With courses involving the arts or social issues, being transparent about our feelings towards events, people, and ideas can offer good material for discussion and making the material more relevant to the students.

- **Learning Audit –** Stephen Brookfield (2015) offers an idea that asks students to articulate what they've learned since last week/class. He started this to address "students' complaints that they are learning nothing, making no progress, getting nowhere." This kind of an audit can even be included on a mid-semester of end-of-semester class evaluation.

- **Journaling** – Journaling can serve many functions, and it can be done in class or at home. Students can keep a record of observations, questions, and ideas that occur to them as they complete readings, activities, and projects. These materials can be used for discussion, or turned in to serve as informal assessment.

Working in Pairs

Many active learning strategies utilize some collaboration. One of our 'go-to' strategies here at the TLPDC is what is called a Think/Pair/Share (T/P/S). It is as simple as it sounds. Given a prompt, individuals first **Think** about their own answers, and then they **Pair** up with someone else to discuss their answers, finally getting a chance to **Share** them with the group as a whole. This activity can be used for a variety of situations:

- **Giving students time to compare notes can provide benefits in and of itself.** This method has actually been tested (Prince, 2005, p.3) and been shown to increase recall of information. This can also filter out some questions, as students can answer each other's.
- **In larger classes, T/P/S can make discussion possible** by breaking the class into smaller units. You need not necessarily stick with 'pairs,' but keep in mind that part of what makes T/P/S work is its use of pairs to facilitate more direct discussion.
- **T/P/S can be expanded to include peer review of work.** For instance, students can review each other's homework and discuss how they got their answers (and where possible misconceptions/ mistakes might have happened). Getting students to evaluate others' work can help them see their own work through the same light.

Think/Pair/Share is especially effective as it allows for both individual work and group discussion, all in one activity. For example, say you have a slightly more introverted student: he/she gets to think on their

own, followed by a chance to discuss their thoughts before they speak up in front of their peers. Getting a chance to plan and rehearse can take some of the fear out of speaking up: many times those who speak up in large groups simply feel more comfortable doing so, while shyer students (with valuable contributions) appear not to participate and simply keep to themselves.

Group Activities

- **Jigsaw** – This is a more structured activity, but its potential payoffs are similar to Think/Pair/Share in that it involves multiple levels of participation and interaction. A jigsaw is easiest to diagram:
    - As one example, take a class of 16 students: You have 4 groups of 4, with 4 different topics to cover. One member from each group studies topics A, B, C, and D (so, different groups of 4). Then, once each Topic Group reaches a consensus about some key points, members return to their original groups to explain the information to their group members. This activity gets students out interacting with about half of the class in a single activity! Also, students get a chance to take ownership for the material, and they take a responsibility for the learning as a whole. The instructor is there to facilitate.
        - Note: Some sources (Michaelson et al., 1997) recommend a final task that involves the group working together, utilizing each member's contribution to maximize learning from the jigsaw.

- **Fishbowl** - A discussion method that requires some planning but offers unique benefits. Namely, it emphasizes participation and deep listening/reflection. Students on the inside of the fish-bowl are actively discussing a topic, while an outer circle of students listens, reflects comments, and offers their own take on the discussion (from an outsiders' perspective). Be careful with numbers on this one, or else you end up with another crowd where people can 'hide' in the background of the outer circle. Also, roles need to be define clearly enough that everyone has something to do, especially in the outer circle!

- **Write-Pass** – Like some of the other methods offered here, this strategy utilizes student participation without some of the social pressure of speaking up in class. To execute it, you simply have students Write their responses to a prompt and Pass it down the row a certain number of seats.

- **Clickers (or show of hands)** – Short and sweet, this strategy is a way to take 'polls' on various topics/questions with immediate feedback. Clickers, or response devices/apps like Socrative, allow for literally immediate response, with results funneled to a computer screen for everyone to see. If students disagree in the initial results, the instructor can give them time to discuss, and a follow-up poll can be taken.

- **Focused listing** - This can be both a review activity as well as a brainstorming activity. Before an activity, lecture, or presentation, students (with some guidance from the teacher) can brainstorm as many ideas around a topic as they can in a limited amount of time. Instructors need to be mindful of how many different people are contributing.

IV. What else should I consider?

Even with an overview of potential benefits and a healthy amount of basic active learning ideas, it is worth mentioning a few things. First and foremost, some people may wonder, 'How am I going to cover the syllabus while integrating active learning strategies?' (Felder & Brent, 1999) As we have mentioned, these strategies do not need to use a lot of class time, as little as 2-3 minutes each. One way to conceive of this is trade a small portion of your class for a large return on student engagement, retention, and comprehension. This may require a small change in mindset, being willing to consider "what the students learn as opposed to what you present" (Felder & Brent, 1999, p. 1) as the measure of success for your lecture.

Even so, a few specific concerns may still come to mind:
- **What if not everyone participates?** If a few students sit out of an activity, they can choose to deal with the consequences. Yet, how many students ARE engaged and enjoying it? If you were to compare this to a normal day of class, is there overall more or less engagement and participation?
- **Is it really worth the preparation time?** While active learning strategies may require more planning time than recycling lectures, it does not follow that active learning strategies require more time than a well-planned, thoughtful lecture.
- **Doesn't it require more classroom technology?** While clickers are popular and provide a certain level of immediacy (and easy attendance taking), they are not necessary for active learning strategies. Sometimes it's as simple as pencil and paper, or even a show of hands.

While active learning strategies don't necessarily require technology or more time, they do require some planning. Particularly with large classes, logistics require foresight so as to minimize 'wasted' class time getting in and out of an activity. Also, active learning strategies benefit from some intentionality on the part of the teacher: "the activities must be designed around important learning out-comes and promote thoughtful engagement on the part of the student" (Prince, 2005, p. 4).

In addition to all of the above considerations, one element in play for both teachers and for students is simply resistance to change. Students may be used to not having to participate in class, and teachers may need to adjust as well. Moreover, both students and teachers will be learning new skills: "Modifying one's teaching is not as easy as picking and choosing among elements" (Grasha, 1996, p. 4), as it requires the development of new skills by teachers and students in order to utilize these methods. Students need to be willing to try, and teachers need to be willing to try, reflect, and try again.

V. Final Thoughts

While active learning may involve making changes in how we structure our classes and plan our lessons, these changes need not be time-consuming. It can be helpful to conceive of active learning as a spectrum, a ratio of content to activity. There is a lot of room on this spectrum, and even a few activities on a regular basis can be effective. When well-designed and well-explained, active learning strategies offer an opportunity to try something new: "The payoff is that we move away from blindly *teaching as we were taught* or simply repeating *how we taught the course the last time"* (Grasha, 1996, p. 4).

Sources

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Prince, M. (2004). Does active learning work? A review of the research. *JOURNAL OF ENGINEERING EDUCATION-WASHINGTON-*, *93*, 223-232.

Online Resources

Official Website for Jigsaw Classroom - Aronson, E. (n.d.). The Jigsaw Classroom. Retrieved July 7, 2015. https://www.jigsaw.org/

USC Center for Excellence in Teaching – Online resources for Active Learning http://cet.usc.edu/resources/teaching_learning/docs/Active_Learning_Florida.pdf

Purdue University – Resources for Active Learning https://www.ydae.purdue.edu/lct/HBCU/documents/Active_Learning_Creating_Excitement_in_the_Classroom.pdf

Stanford – Teaching Commons – Promoting Active Learning
https://teachingcommons.stanford.edu/resources/learning-resources/promoting-active-learning