Peer Instruction

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As an instructor, you likely take a leading role when taking your class through content and discussion. In traditional class discussions, we typically get a few students participating. This leaves productive discussion up to a few highly motivated students or those sitting toward the front and leaves out most of the others. Splitting up content amongst students through readings or pre-class assignments, then challenging them to teach their peers in their own words is a great alternative known as Jigsaw (see additional resources). Peer instruction (PI), an evidence-based, student-centered pedagogy, was originally introduced by Eric Mazur, professor of physics at Harvard University. PI can ensure everyone in the class engages with your material through polling and peer discussion.

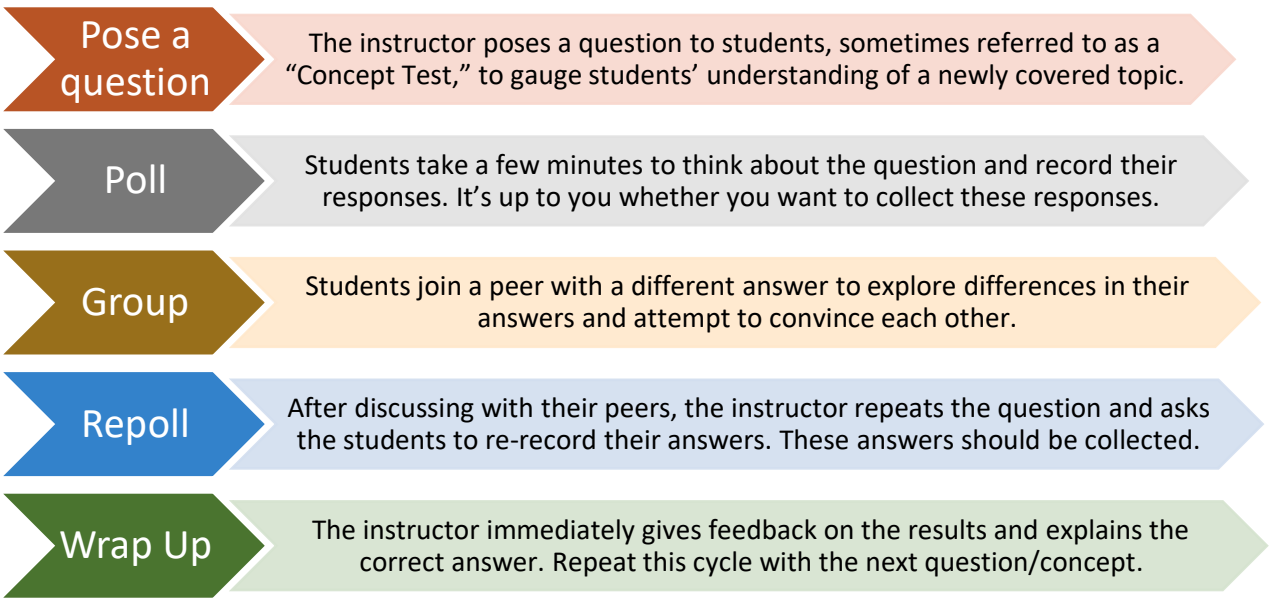
Why Should You Try PI?

PI allows students to apply the knowledge they have just learned and get immediate feedback. When there is a combination of PI and instructor explanation, polling scores are significantly higher than with PI alone, so the feedback portion is equally important! (Zingaro, 2014). Students improve their conceptual understanding and problem-solving skills with concepts they often misunderstand.

When using PI, you allow for positive group interaction where students help each other succeed and achieve goals. Students also get the opportunity to reason and have productive arguments, which helps alter their current mental models. Students encouraged to argue tend to construct deeper knowledge (Osborne, 2010). PI also allows students to be metacognitive. They can reflect on the process used to get to an answer: did they guess, connect other concepts, or need peer explanation? (McDonnell & Mullally, 2016).

Finally, as an instructor, you've mastered complex concepts related to your content. It can be difficult to see the content from the original perspective of someone new to the field. Students who have just grasped a topic are likely able to articulate where concepts are most confusing or difficult. See the graphic below for guidance on implementing PI into your class.

PI typically incorporates the following steps:



Vary how you, the instructor, get involved during group discussion:

- Walking around the classroom may help gauge when fruitful group discussions have come to an end.
- Staying nearby, but not engaging with students, may promote autonomy in their problem-solving.
- You could interact with pairs/groups to answer questions they have or discuss other considerations.
- When going over the final answer, you could explain the solution, or have one of your student groups explain the solution to the rest of the class. If you notice a large portion of the class struggling to identify the correct answer, consider another round of peer discussion and re-polling before revealing the correct answer.
- Engaging with students with lower self-efficacy during small discussions may help boost their confidence and get them more involved in discussion.

Considerations for Inclusivity:

Group or partner discussion can be nerve-wracking for some students. It's important to be proactive in alleviating some of this stress. The following tips can help create inclusive groups in your classroom:

- Before starting group work, create a list of expectations as a class. For example, all voices should be heard, we disagree with ideas not people, etc.
- Have students count off (1, 2, 3, etc.) to the number of groups you need. All like-numbered students work together.
- Ask students to form groups or partner with students they do not already know.
- Randomly assign students so no one is chosen last, and partners don't over-socialize.
- Have students take on roles within the group (note-taker, timekeeper, spokesperson, etc.)
- Rotate groups/partners throughout the semester.

Keep in mind that your classroom structure may not allow for student movement and some students may have disabilities limiting their mobility.

Technology Considerations:

PI works well in both low-tech and high-tech contexts. Mazur reminds us: "It's not the technology, it's the pedagogy."

- A few low-tech opinions include having students:
  - raise a number of fingers representing an answer choice.
  - raise colored or lettered index cards.
  - turn in their responses on a sheet of paper.
- High-tech options may help you analyze student responses more quickly. You could use clickers or other web-based polling tools (Google Forms, Kahoot!, Mentimeter, etc.)

Additional Resources:

- For additional information and evidence regarding Peer Instruction, check out CBE Life Sciences Education guide. Here you can find summaries of key research articles regarding Peer Instruction.
- The K. Patricia Cross Academy has many teaching technique videos. Try searching for "Think, Pair, Share", "Jigsaw", "Fishbowl" or "TAPPS" for methods that involve peer learning.
- Check out this video of Mazur himself using peer instruction in the classroom: Eric Mazur shows interactive teaching
- For updates from the Mazur group on Peer Instruction: Mazur Group-Peer Instruction

References:

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