What the flip is peer instruction?

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In this week's micro-CPD Monday, Sean Morrissey and Patrick Thomson explore Peer Instruction, an approach to teaching that has great promise as we 'pivot back' to digitally enhanced on-campus learning.

Peer Instruction (PI) is an instructional tool that complements and enhances on-campus teaching. It was popularised by Eric Mazur, a Harvard Professor of physics, in the early 1990s, who delivered PI largely within a flipped-learning model

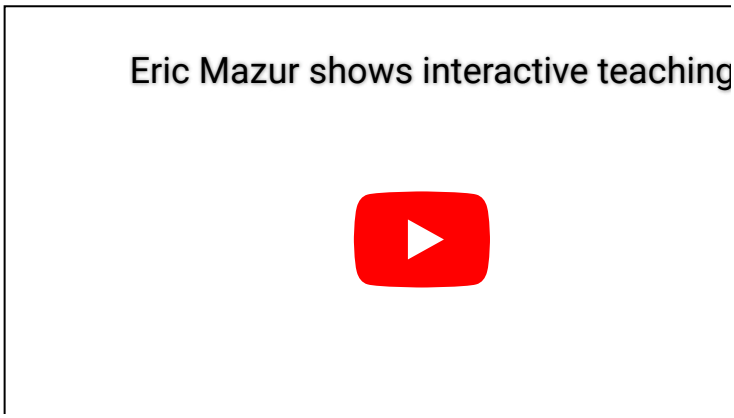
The early 1990s, you say?

Yes, peer instruction has been around for decades. But it is still relevant today. Now more so than ever!

Unlike online learning and many approaches to blended learning, PI **does not** seek to reduce contact time with students. Rather, this learning model implies that digital tools such as electronic voting systems and out-of-class activities delivered via the virtual learning environment both **enhance** and **prepare students to engage more fully with** in-class activities.

PI therefore has great potential in a post-pandemic context, as many of us seek to make the most of our on-campus teaching opportunities, while still retaining some of the best practices and innovations from the past few years.

Students learning about science together



Eric Mazur demonstrates Peer Instruction

There is a strong body of pedagogical evidence to support the notion that, when done well, Peer Instruction significantly improves student learning and leads to higher student engagement. While typically associated with STEM teaching, Peer Instruction can be used equally effectively in humanities and social sciences at all levels.

How does Peer Instruction work, then?

In Peer Instruction, students first engage with taught material relating to a single difficult (or "threshold" concept. This material can be delivered before the class, or within a class itself. Then, the instructor leads students through the Peer Instruction process.

Eric Mazur has outlined the in-class approach as follows:

- The instructor poses a single conceptual question, covering a single difficult concept
- Students reflect on the question and secretly provide an answer, using a voting app or clicker system, but without becoming aware of the whole-class response
- The instructor cuts the process short if too many or too few students were correct
- Students are asked to 'turn to their neighbours' and defend their answer in debate with any peer who chose differently.
- Students then commit again to an individual answer
- The instructor reviews responses – most of the time, a short debate will double the number of correct answers.
- The instructor more explanation is needed before moving on to the next concept. This step may be accompanied by a whole class discussion

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Why is PI so effective?

In many traditional models of teaching in higher education, the teacher dedicates most of the time they spend with students to conveying information and/or demonstrating processes. This leaves the students to do many of the more complex tasks related to analysing information, thinking critically about concepts, and creating new forms of knowledge alone – as homework.

In Peer Instruction, students are asked to engage with tasks from lower cognitive domains like watching videos and reading information about a topic on their own, perhaps (but not necessarily) before they even come to class.

Students are then better prepared to their knowledge and understanding through higher-order tasks such as problem solving, analysis, discussion and creation of

new knowledge. And crucially they undertake these tasks in the presence of their peers and with the support of one or more teachers.

Peer Instruction can therefore turbocharge learning by providing a framework where conceptual understandings can rapidly spread from peer to peer under the guidance of a subject expert.

Getting PI right

While there are clear pedagogical reasons why Peer Instruction is worthy of consideration, there are potential challenges to getting it right. One of the biggest challenges is **designing good concept test questions**. In the video of Eric Mazur's physics class above, you may have noticed his question had a definite answer and was challenging enough to elicit meaningful discussion amongst his students.

Eric Mazur suggests that the multiple-choice questions should:

- Focus on a single important concept, ideally corresponding to ideas or concepts that students find difficult.
- Require genuine thought, not just plugging numbers into equations. As much as possible, avoid numerical questions entirely.
- Have a single correct option, with the incorrect options reflecting common misconceptions
- Be worded in a clear and direct manner.
- Challenge the students without being too difficult.

While not all equally successful, a number of cross-disciplinary examples of concept test questions can be found here: https://www.slideshare.net/peternewbury/sample-peer-instruction-questions

Further Resources

https://peerinstruction.wordpress.com/

https://rtalbert.org/

Are you interested in Peer Instruction? Have you had any experiences (positive or negative) of employing this approach? Please use the comments section below to join the conversation