DESIGNING PEER INSTRUCTION QUESTIONS FOR STATISTICAL CONCEPTS

Karol P. Binkowski
Macquarie University, Australia
karol.binkowski@mq.edu.au

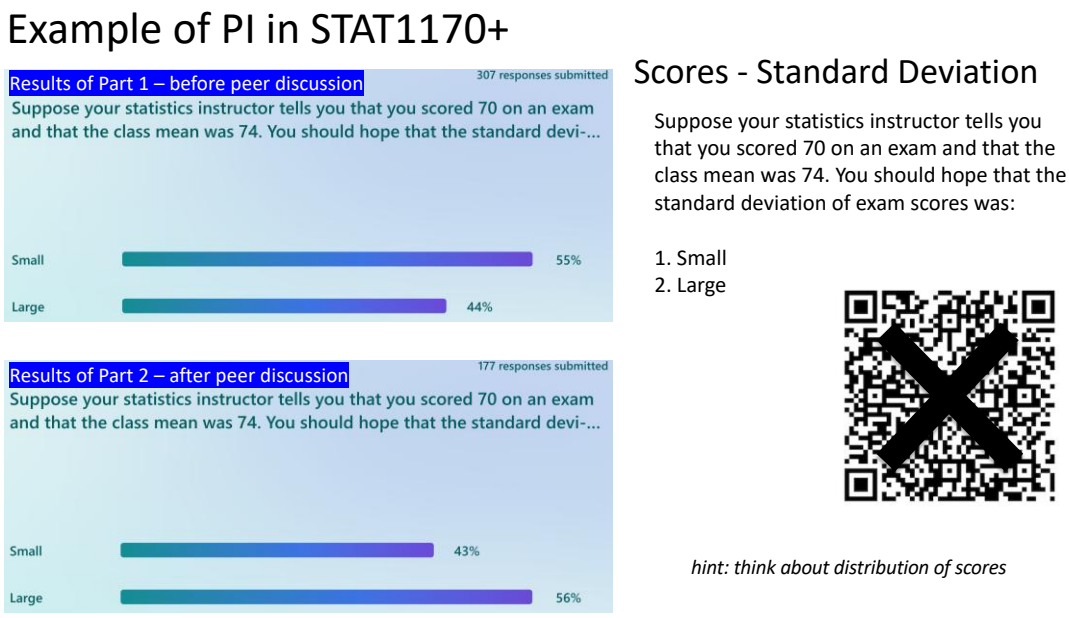
The workshop aimed to provide an immersive experience from a student and a teacher's perspective of Peer Instruction (PI). In this student-centred teaching method, students discuss and refine their understanding of concepts through interactive questioning. We shared our experience adapting this method for a first-year introductory statistics unit during one-hour lectures inside a 500-seater theatre, including a showcase of technology tools that assist it. We intended to have participants who have tried a similar approach share their experiences. The primary learning objective was to prepare participants to create Peer Instruction implementations for their lecture classes. The participants used one of the technology tools (e.g., MS-Forms) to facilitate PI voting. The workshop provided a platform for further discussion, formalising concepts, and exchanging ideas between practitioners. We considered creative ways to support learners within under-resourced contexts and inform the design of digital tools, resources, tasks, and modern learning environments.

PLANNED AGENDA

1. Introduction to a modified Peer Instructions method (Mazur 1997), the theoretical framework and the examples of questions used in Introductory Statistics (Binkowski 2024).
2. Demonstrating a voting mechanism using an online app that will host the PI questions,
3. Initial paired peer discussions, followed by working in groups,
4. Designing questions for teaching concepts,
5. Implementing questions into an online app,
6. Presentation of the results of one of the groups.

OUTCOME

Around 30 participants present on 3rd July at the conference attended the 90-minute workshop session. The participants were divided into ten teams, each designed Peer Instruction question sequences and coded into various online polling tools of their choice. Each group's questions were peer-reviewed by another team member with the provided rubric, followed by presentations where each group pitched the importance of their questions in a teaching context. We then selected one question by a show of hands and field-tested it in the last ten minutes of the workshop.



In: Kaplan, J. & Luebke, K. (Ed.) (2024). *Connecting data and people for inclusive statistics and data science education. Proceedings of the Roundtable conference of the International Association for Statistics Education (IASE), July 2024, Auckland, New Zealand.*

A typical Peer Instruction question sequence:

Concept introduction	Introduce the concept or topic you'll explore.
Pre-assessment (Part 1)	Pose a question related to the topic to gauge students' initial understanding. This could be done using QR code technology.
Peer discussion	Students are then given time to discuss the question with their peers. Encourage lively debate and the exchange of ideas.
Re-assessment (Part 2)	After the discussion, ask the same question again to see if students' understanding has evolved.
Teacher explanation	Finally, the teacher provides clarification, addresses misconceptions, and reinforces key concepts based on the discussion and responses.

FEEDBACK

The feedback was overwhelmingly positive through MS Forms (14 responses) and verbal comments afterwards. Participants appreciated the session structure, and the immediate field test of the chosen question designed during the workshop. They highlighted key takeaways, expressing that they liked the "ideas about questions to use", "different ways to implement activities", "active learning is great for engaging the audience", "discussion among peers was helpful," and found it "very cognitive stimulation". Most found it "highly relevant" to their teaching, "very helpful" in learning about the Peer Instruction method and felt "very confident" in applying it after the workshop. Feedback included a suggestion to "allow for feedback from groups at the end so people share how they discussed the question and arrived at their responses".

A commemorative post was shared on the LinkedIn platform with a summary of the event and key takeaways (http://bit.ly/3CamzOm).

REFERENCES

Binkowski, K.P. (2024). Revolutionise your classroom with Peer Instruction: engage students one-on-one and all-at once!, *TECHE Macquarie University's learning and teaching community blog:* https://teche.mq.edu.au/2024/04/revolutionise-your-classroom-with-peer-instruction-engage-students-one-on-one-and-all-at-once/

Mazur, E. "Peer Instruction: A User's Manual." *Prentice Hall, Upper Saddle River, NJ*, 1997.