**Discussion Paper** **1**

# Title: Peer-Instruction Unveiled: Measuring Self-Assessment Skills and Learning Gains

**Presenter:** **Fabio Aricò, Duncan Watson**
University of East Anglia

## Session Learning Outcomes

By the end of this session, delegates will be able to:

- Appreciate teaching practice that embeds self-assessment and Peer-instruction in Flipped Classroom formative assessment environment.
- Use Student Response Systems (e.g. clickers) to encourage self-assessment and to facilitate Peer-instruction debate.
- Identify the variables and the techniques that can be used to conduct an evidence-based evaluation of flipped classroom pedagogies.

## Session Outline

This paper evaluates the impact of a teaching methodology aimed at enhancing student learning and self-assessment skills in a large-class flipped learning environment (Bishop & Verleger, 2013) involving a cohort of First Year students in Economics at the University of East Anglia. We are particularly interested in assessing the role of Peer-instruction (Mazur, 1997) as one of the dominant flipped pedagogies. Our teaching methodology is based on an algorithm that alternates formative assessment questions, self-assessment questions, and Peer-instruction moments, in a sequence of learning cycles iterated over the duration of each Flipped Classroom session. Using data collected in multiple sessions, we investigate four distinct features of the learning process, comprising: (i) students' ability to self-assess their performance, (ii) the association between learning gains generated by Peer-instruction and student self-assessment statements, (iii) the correlation between learning gains and student attainment, and (iv) students' perceptions of their learning experience. Blending self-assessment practices (Boud, 1995, McMillan & Hearn, 2008, Henderson & Harper, 2009) with the activities performed during Peer-instruction constitutes the most innovative contribution of our pedagogical design, which, in turn, offers novel insights to educational research on active learning teaching techniques. Our investigation also addresses the role of Peer-instruction in 'levelling the playfield' in the classroom. By comparing the proportion of correct responses to formative assessment questions before and after Peer-instruction, we find that learning gains are significantly higher (after Peer-instruction) when student initial attainment is lower (before Peer-instruction). Finally, our analysis also considers student perceptions of Peer-instruction sessions. We demonstrate that while students are initially resistant to the idea of learning from their peers, they change their opinion as they are exposed to Peer-instruction.

**Session Activities and Approximate Timings**

The outline of the workshop is a follows;

- This session will involve:
  - a presentation of concepts and evidence through PowerPoint (15mins);
  - a demonstration of the Peer-instruction pedagogy using Student Response Systems –in the middle of the presentation (10mins);
  - time budgeted for clarification questions along the presentation (10mins)
  - conclusion of the session with final questions and answers (10mins).

- Topic questions:
  - How can we facilitate self-assessment and Peer-instruction dialogue in a large class learning environment?
  - How can we evaluate the effectiveness of pedagogies aimed at developing self-assessment skills?
  - How can we evaluate the effectiveness of Peer-instruction pedagogies?
  - What can be done more, and what can be done differently?

**References**


- Bishop, J. L., and Verleger, M. A., (2013), "The Flipped Classroom: A survey of the research", Paper presented at the American Society for Engineering Education, Atlanta, GA.
- Boud, D., (1995), "Enhancing Learning through Self-Assessment", London: Routledge.
- Henderson, C., Harper, K. A., (2009), "Quiz Corrections: Improving Learning by Encouraging Students to Reflect on their Mistakes", *The Physics Teacher*, 47, 9, 581-586.
- Mazur, E., (1997), "Peer Instruction: A User's Manual", Prentice Hall, Englewood Cliffs.
- McMillan, J., and Hearn, J., (2008), "Student Self-Assessment: The Key to Stronger Student Motivation and Higher Achievement", *Educational Horizons*, 87, 1, 40-49.