Chapter 14
The Peer Instruction Flipped Learning Model

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ABSTRACT

Peer instruction flipped learning blends the concepts of flipped classroom and peer instruction in order to maximize the strengths of both techniques. Peer Instruction, a student-centered learning approach developed by Eric Mazur of Harvard University, engages students in the learning process through small group discussions. Flipped classroom, credited largely to Jon Bergmann and Aaron Sams, reverses the roles of traditional lecture and "homework" in order to maximize student learning. This chapter discusses the research on peer instruction and flipped learning, the details of implementing the peer instruction flipped learning model, and the benefits of using a peer instruction flipped learning model. This chapter also details one high school's experiences with these strategies.

INTRODUCTION

While peer instruction and flipped classroom are separate educational strategies, the growing body of research is beginning to combine and blur the distinctions between them, recognizing the complimentary aspects. As Mazur (1997) noted, humanities disciplines have always required students to come to class having prepared by reading; science disciplines had not fully embraced this idea at the start of his research. In his article "Peer Instruction: Getting Students to Think," he makes the analogy that to teach Shakespeare, no teacher would spend the entire class reading the play out loud. The students would come having read the play, and class time would be spent deepening student understanding through discussion. He felt this was the equivalent of lecturing out of the textbook and set out to find a way to engage his students with content in meaningful ways (p. 981). Bergmann and Sams' flipped classroom ideas promote engagement and ownership over learning by shifting how time is spent in and out of class.

If instructors want to create more engaged classrooms with increased conceptual discussions and understanding, peer instruction strategies can provide that active learning environment. If instructors need to make more time in class for active learning, flipped classroom strategies provide a solid option for delivering content outside of the regular instructional time which opens up class time for other options. No one educational strategy will meet the needs of all learners or solve all of education's problems; an instructor must have a solid content foundation, clear objectives, and a variety of instructional tools to achieve success for students.

By combining Mazur's Peer Instruction and Bergman and Sams' flipped learning ideas, the student-centered, active learning model of peer instruction flipped learning maximizes the strengths of each technique in order to engage students in a student-centered, active learning environment.

In this chapter the reader will be given background on the separate strategies of Peer Instruction and flipped classroom techniques, a discussion of implementing the peer instruction flipped learning model, an overview of Byron High School mathematics department, and Byron's implementation of the peer instruction flipped learning classroom. Data will be provided to support how the peer instruction flipped learning model improves student learning, and details will be given on the additional benefits of peer instruction flipped learning.

BACKGROUND

Eric Mazur, Harvard physics professor, began using Peer Instruction in 1991, and Aaron Sams and Jonathan Bergmann, credited for pioneering the flipped classroom in Colorado, began their work in 2007. Technically separate entities, peer instruction and flipped learning have the same goals: increase student engagement and learning. According to current research, both are powerful, flexible tools for educators to consider implementing. Separately, each strategy has been shown to impact learning and student perceptions. Each strategy presents unique advantages to instruction, but this chapter will argue the real strength comes when they are used in combination.

Literature Review of Peer Instruction Research

While a very flexible model, the basic model of Peer Instruction (PI) set forth by Mazur (1996) asks students to learn the basic material before class (typically via a video, reading, or possibly doing some independent research) then to use class time actively engaging in the learning process with their peers. A typical peer response experience starts with a concept question(s) posed to students; Mazur (1996) defines conceptual questions as brief conceptual questions related to content material. These concept questions are used to gauge students' understanding of content. The students first answer the question independently, guessing if necessary. A key element is recording and collecting individual student responses at this first stage; this ensures a student commits to an answer and has an investment in the subsequent peer discussion. The answers and reasoning are shared with the teacher and class. Students then discuss their initial answers and reasoning in small groups, defending and debating the differences in answers and thinking. Students may change their answers during this process. Without teacher intervention, students with incorrect answers and/or thinking are corrected and taught by their peers.

As outlined in *Peer Instruction: A User's Guide* (1996), Eric Mazur's Peer Instruction approach boils down to the following processes:

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