macmillan learning

COURSE:	Intermediate Algebra, delivered face-to-face to 45 students
PRODUCT USED:	iClicker Cloud
STUDY DESIGN:	Mixed methods with descriptive and correlational analyses

How iClicker Cloud supports student academic performance in a moderate-sized Intermediate Algebra classroom

Institutional and Course Context

Merced College is a community college offering associate degrees and certificates both in person and online. The institution serves over 14,500 students with one main campus in Merced and one regional campus. This Intermediate Algebra course was taught face-to-face to 45 students. Students met two times a week and were expected to keep up with their reading and assignments throughout the week. The instructor has been teaching for 11 years and has been teaching in this specific department for six-and-a-half years. The instructor has used digital learning tools in the past and has been extremely comfortable implementing them.

Instructor Implementation

The instructor used iClicker to track student performance. The instructor used a flipped classroom teaching technique, and iClicker questions guided classroom instruction. Students were expected to read material from their texts prior to class and to be prepared to discuss that content in class. iClicker questions were presented to students throughout the class, and students were required to answer the questions correctly to receive a

point. All iClicker points were totaled over the course of the semester and used as a quiz grade. The instructor also used iClicker responses to track attendance. but a point value was not associated with attendance. The instructor simply tracked students with a large number of absences to inquire about whether they dropped the class without providing notification. The instructor presented iClicker questions in 88% (29 out of 33) of classes, with a total of 272 iClicker questions presented over the course of the semester. Forty-six percent of the questions were multiple-choice, 14% were short answer, 4% were target, and 36% were numerical items.

"I believe students like the fact that their phones are no longer considered a distraction but a vital part of their academic experience. Many students mentioned to me that they appreciated all of the extra practice they were able to do while in class. This was only possible because iClicker Cloud effectively allowed me to facilitate the class in that manner." —Instructor

Course Goals and Challenges

This particular instructor used a flipped classroom teaching technique. The instructor assigned text for the students to read prior to class. During class, the instructor presented iClicker questions that were related to the text to students, and as a group, they solved and discussed the questions. The instructor used all questions types available in iClicker Cloud (multiple-choice, numerical item, short answer, and target). The instructor used iClicker in the lectures and in labs. The instructor believed the learning tool provided a measure of

student understanding, helped engage students, and allowed for better management of the pacing of the class.

Study Design

The study examined whether use of iClicker Cloud was related to student outcomes, including learning, course completion, engagement, and satisfaction. In addition, information about instructor and student perceptions of iClicker Cloud was gathered. iClicker usage was documented through platform data along with midsemester observations of classroom implementation and instructor interviews. Student learning data were collected at the end of the semester via course records shared by the instructor. End-of-semester surveys were used to gather data on instructor and student perceptions of the product along with student engagement. Data were matched across sources, and descriptive and correlational analyses were conducted.

Results

Use of iClicker Cloud supported student academic performance. There was a significant positive relationship (.807) between the amount of iClicker questions students answered correctly and their performance in the course. Students who answered more iClicker questions correctly tended to have a higher overall course grade. Conversely, students who answered less questions correctly tended to have lower course performance. There was also a significant positive relationship (.803) between the mean percentage of iClicker questions answered correctly over the course of the semester and student performance.

Relationship Between Course Grade and iClicker Questions Answered
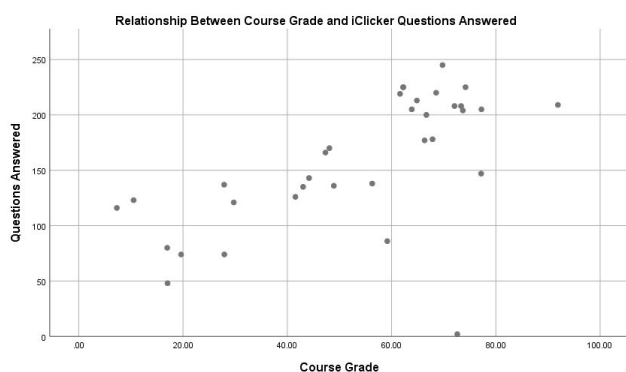
Sixty percent of students reported that they were more engaged in class material because they used iClicker Cloud. Students rated their overall engagement levels as higher than average (3.13 on a scale of 1–5). Students were asked to share their favorite iClicker Cloud feature in an open-ended question, and several students said they enjoyed being able to use iClicker to ask and answer questions. Students also reported

that use of iClicker helped keep their attention focused on lectures and that they enjoyed being able to see if their iClicker responses were correct. The instructor also reported that iClicker increased student engagement in the class.

"Besides the obvious—asking content-based questions—I believe that the most effective use of iClicker Cloud was not for assessing content mastery in students but rather as a means of communication between the instructor and students. My favorite use of iClicker Cloud was to collect questions from students at the start [of] and during the class sessions."—Instructor

Both the instructor and students reported that iClicker Cloud increased student participation in class. Seventy-three percent of students said they were more likely to participate in a class that uses iClicker Cloud than a class where they have to raise their hand to participate. Eighty-seven percent of students said they enjoyed the anonymity iClicker provides. The instructor also said that use of iClicker increased student participation in the class.

Both the instructor and students reported that iClicker Cloud was easy to use and that it increased their understanding of the subject matter. Eighty-seven percent of students said iClicker was easy to use. The instructor also reported that iClicker Cloud was easy to use and that the various features integrated well with the class—the instructor was comfortable integrating the learning tool in the classroom.

Insights for Optimization

The instructor has provided insightful feedback on several features to integrate into iClicker Cloud. The instructor wants to be able to take snapshots of correct answers when presenting iClicker questions. The results of this study have generated recommendations for the iClicker Cloud product team.

Insights for Instructors

One of the most critical findings from this educator study is the strong positive relationship between the amount of iClicker questions answered and student course performance. As students participate more in the lecture by answering the instructor's iClicker questions—regardless of whether their responses are correct—student course performance tends to increase. Students believe that use of iClicker increases their active participation during lessons. Therefore, instructors in similar educational contexts might consider increasing the number of iClicker questions presented in class to increase overall student performance.

Note: These results are part of a larger iClicker Cloud implementation study across multiple institutions. To access the full report and results, please visit http://www.macmillanlearning.com/catalog/page/learningscience