iClicker Educator Study 2019 - 08

Using iClicker to fill skills gaps is related to higher final grades in a Microeconomics course

Macmillan Learning partnered with a Microeconomics instructor at Santa Monica College to explore iClicker use and evaluate how it is related to instructor and student outcomes

About iClicker

iClicker is built on the science of active learning. A synthesis of educational research in the areas of effective active learning, formative assessment, and interactive learning guided the development of iClicker. With its simple, reliable technology and focus on pedagogical content, iClicker makes it possible for instructors to take attendance, engage students in all sized classrooms and lecture halls, and use the students' responses to decide which topics to emphasize.

iClicker is a flexible solution that can adapt to an instructor's pedagogical approach. A 2017 implementation study identified the "engagement model" as one of the most often implemented approaches. In this model instructors write their own iClicker questions, pose the question to the class and ask them to respond. Responses are used to gauge understanding and spark classroom discussion. Students receive credit for participating in the iClicker activity and in some cases the responses are marked as correct or incorrect. The goal of this model is to increase comprehension and understanding through engagement.

Institution and course context

Santa Monica College is a public two-year community college offering certifications, associate degrees, and bachelor's degrees. The institution serves over 30,000 students with one main campus in Santa Monica, California, and five satellite campuses. Most of the students are part-time. This Principles of Microeconomics course was taught face-to-face to 37 students. Students met twice a week and were expected to keep up with their reading and assignments throughout the week. The instructor has been teaching for seven years and has been teaching in this specific department for two years. The instructor has used digital learning tools in the past and has been extremely comfortable implementing them.

iClicker use case

The instructor used a combination of the participation and performance iClicker implementation models. iClicker questions were presented in each class (except for those with exams). Students earned one point for each iClicker question they responded to, whether or not their answer was correct. If the students did answer the question correctly, they earned an additional 40% of a point. At the end of the semester, 70% of a student's iClicker grade was based on whether they answered the questions and 30% was based on the accuracy of their answers.

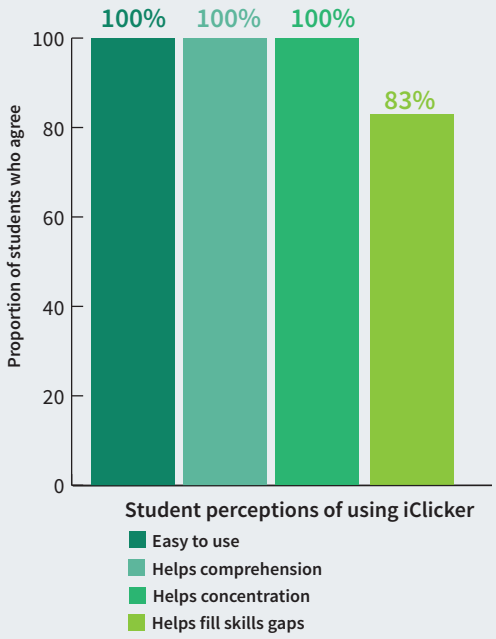
This instructor presented iClicker questions in 100% (11 out of 11) of the classes, with a total of 78 questions asked over the course of the semester.

"I use iClicker to work toward higher achievement by those students who normally don't participate during class and therefore don't always get the highest grades. Interactive clickers get them to participate"

- Instructor

All questions were multiple-choice. This instructor had used iClicker in multiple classes before this semester. The instructor allowed students to use the mobile app but also had a classroom set of iClickers so many students chose not to pay for the app. The instructor found that students believe iClickers are effective in the classroom.

Figure 1. Student perceptions of using iClicker



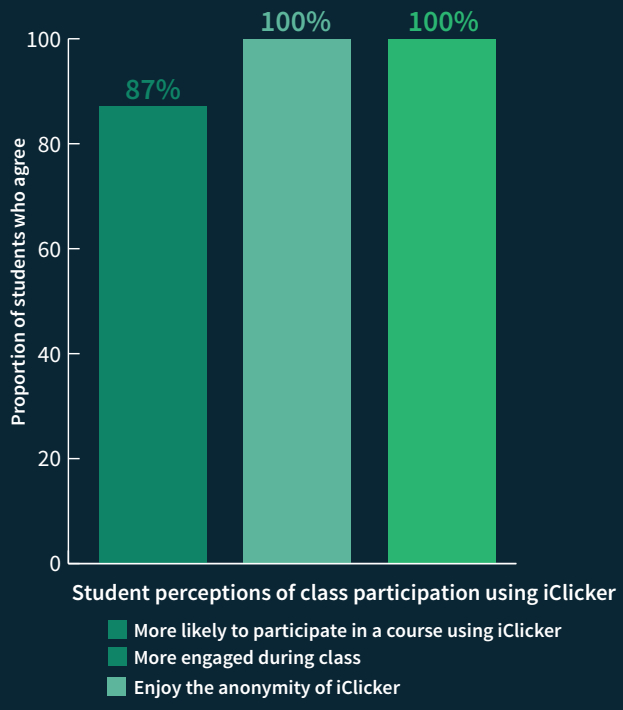
100% of students in the study reported that iClicker is easy to use, 100% said that the immediate feedback they receive helps them better comprehend the coures material. 87% of students say that using iClicker helped them concentrate in class and 73% say that using iClicker in class helps them fill their skills gaps

iClicker Reef supports student participation and engagement.

Both the instructor and students reported that iClicker Reef increased student participation in class. Eighty-seven percent of students said they were more likely to participate in a class that uses iClicker than a class where they must raise their hand to participate. One-hundred percent of students said they enjoyed the anonymity iClicker provides. In addition to the students, the instructor felt that the use of iClicker within the classroom increased student participation.

One-hundred percent of students reported that they were more engaged in class material because they used iClicker Reef. Students rated their overall engagement levels as higher than average (4.2 on a 5-point scale). Students were asked to share their favorite iClicker feature in an open-ended question, and several students said they enjoyed answering questions and taking quizzes with iClicker. Students appreciated how answering iClicker questions ensured their understanding of the lesson. Students felt that use of iClicker is a great way to keep engaged in the classroom.

Figure 2. Student perceptions of class participation using iClicker



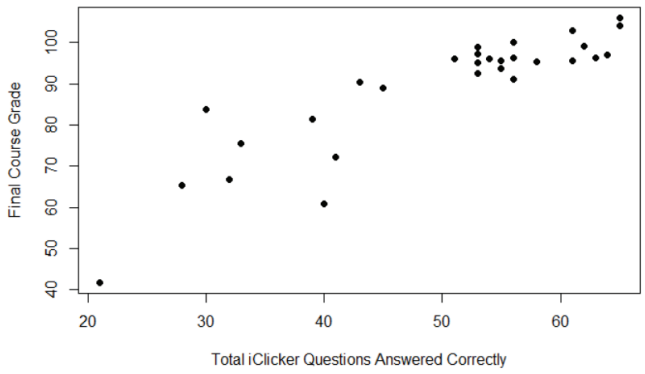
macmillan learning

> "I believe it is a good source of engaging students [and] teachers and can help classes flow mroe smoothly. In a sense, it's like a game, where it also still goes across the topics needed to be discussed."
>
> *-Student*

iClicker Reef is related to increased student academic performance.

There was a very strong, significant positive relationship (.840) between the number 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 fewer questions correctly tended to have lower course performance. There was also a significant positive relationship (.830) between the mean percentage of iClicker questions answered correctly over the course of the semester and student performance.

Figure 3. Relationship between number of iClicker questions answered and final course grades



Insights for Optimization

The instructor has provided insightful feedback on several features to integrate into iClicker Reef. The instructor wishes the clickers provided more capability for critical thinking rather than just multiple-choice questions. The results of this study have generated recommendations for the iClicker Reef product team. The instructor raves about iClicker to colleagues but feels that many of them are hesitant to bringing technology into the classroom.

Insights for Instructors

One of the most critical findings from this educator study is the significant 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, student course performance tends to increase. Students believe that use of iClicker increases their participation within the classroom as well as their concentration during lessons. Students feel that iClicker helped them better understand the material. Therefore, instructors in similar educational contexts might consider increasing the number of iClicker questions presented in class to increase overall student performance.

Study design

The study examined whether use of iClicker Reef was related to student outcomes, including learning, course completion, engagement, and satisfaction. In addition, information about instructor and student perceptions of iClicker Reef was gathered. iClicker usage was documented through platform data along with mid-semester 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.

Study limitations

Although the data are rich and the findings important for product optimization and insights for instructors, they are specific to this course and cannot be generalized to all instructors who use iClicker Reef. The results are also descriptive and correlational and should not be used to infer causation.

Amplifying the IMPACT

Research on iClicker suggests that trying these strategies may increase the positive impact of iClicker

1. Ask more in-class iClicker questions
this is related to higher final course grades

2. Mark responses as correct or incorrect and incorporate scores into student grades
this drives engagement

3. Share the distribution of results and discuss trends that stand out
this helps to fill skills gaps and correct any misconceptions

4. Explore peer-to-peer discussion of results
this drives engagement and comprehension

Ethics and Data Privacy

Prior to data collection, this study and the associated consent forms and instruments were reviewed and approved (found exempt) by the Human Resources Research Organization (HumRRO). HumRRO is an accredited third-party Institutional Review Board organization with no affiliation with Macmillan Learning. Macmillan Learning seeks third-party review to eliminate any bias in decision of exemption. The data in this study, which are provided by the instructor and consenting students, are initially identifiable. However, once a random identifier is generated identifiable data are destroyed. Data are provided in secure storage locations, and access is permitted only to the primary investigator in the study.

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