Instructor sees an increase in academic performance when using iClicker in his small Accounting class

Macmillan Learning partnered with an Accounting instructor at Bendictine University to examine how using iClicker in their course is related to student academic performance

iClicker

Achieve more. | www.macmillanlearning.com/learningscience

macmillan learning

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

Benedictine University is a private Roman Catholic university offering bachelor's, master's, and doctoral degrees. The institution serves over 5,000 students with one main campus in Lisle, Illinois. This Accounting I course was taught face-to-face to 31 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 28 years and has been teaching in this specific department for 11 years. The instructor has used digital learning tools in the past and has been extremely comfortable implementing them.

Course challenges and goals

By using iClicker, the instructor's goal was to increase student engagement and therefore student success in the course. This instructor had used iClicker the previous semester and anecdotally found that the learning tool achieved this goal. The instructor reported that it is easy to get started with iClicker and that there are a lot of resources online for both instructors and students. Students seemed to like the engagement, especially for reviewing study materials. Students also seemed to enjoy the immediate feedback iClicker provides.

"I love iClicker REEF because it so clearly provides more involvement by the students and engagement in the class."

- Instructor

iClicker use case

The instructor used iClicker Reef to track student participation. The instructor primarily took attendance with iClicker using the geolocation feature but also presented review questions before exams. The students received points whether or not their responses were correct. The instructor presented iClicker questions in 9% (3 out of 32) of the classes, with a total of 52 questions asked over the course of the semester. Only multiple-choice questions were used.

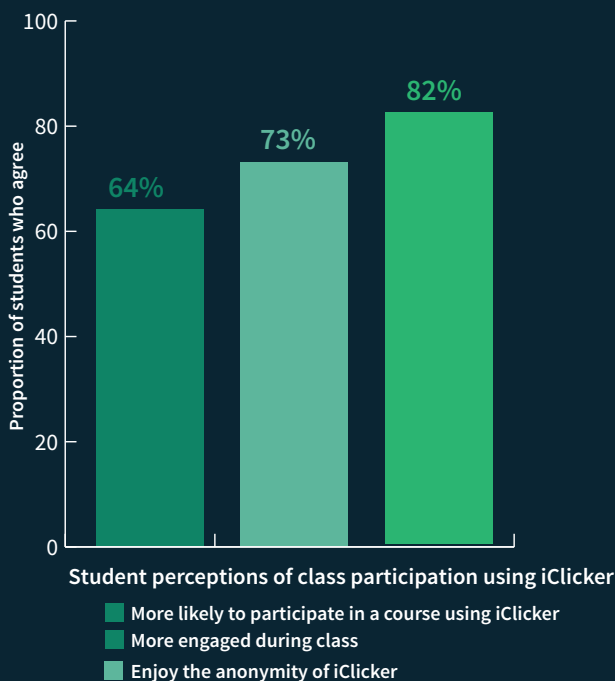## Figure 1. Student perceptions of using iClicker
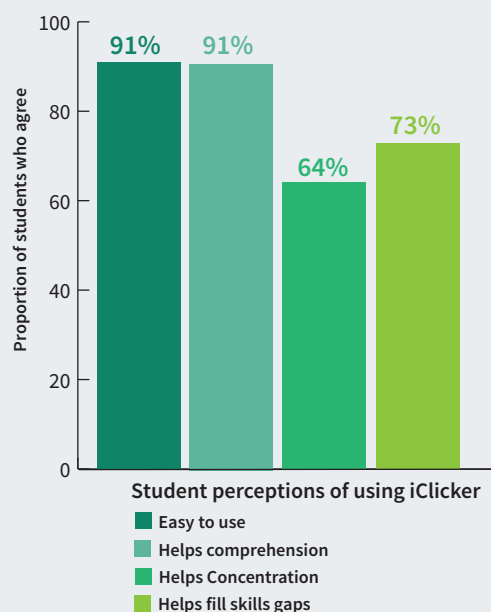
91% of students in the study reported that iClicker is easy to use, 91% said that the immediate feedback they receive helps them better comprehend the coures material. 64% of students say that using iClicker helped them concentrate in class and 73% say that using iClicker in class helps them fill their skills gaps

iClicker Reef supports student participation and engagement.

Both the instructor and students reported that iClicker Reef increased student participation in class. Sixty-four 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. Eighty-two 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.

Seventy-three 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 (3.54 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 reviewing for exams and taking attendance with iClicker. Students found iClicker to be useful within their classroom. Some mentioned that they liked seeing the percent of students who answered questions and checking their own understanding of the material.

Figure 2. Student-reported level of engagement

Student perceptions of class participation using iClicker

- ■ More likely to participate in a course using iClicker
- ■ More engaged during class
- ■ Enjoy the anonymity of iClicker

" Students like the ability to review the material non-verbally and see how others in the class are doing. This helps them feel more confident to participate."
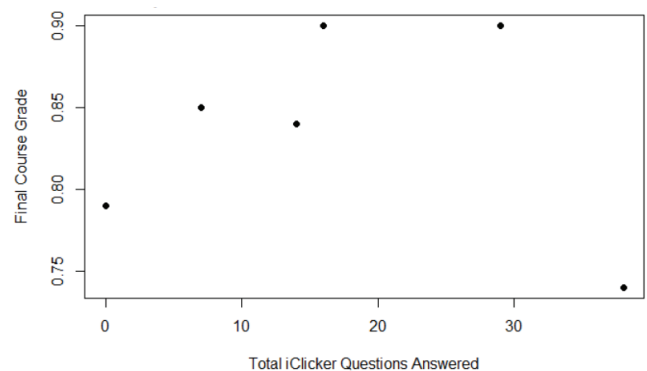
- Instructor

iClicker Reef is related to student academic performance.

Increased engagement in iClicker Reef sessions was positively related to student academic achievement. There was a positive relationship (.579) between the average proportion of iClicker questions a student answered throughout the semester and their final course grade.

That is, the more a student engaged in the iClicker sessions the better they performed academically. These results, taken with the qualitative findings that participation in iClicker supports engagement, suggest that increased engagement may influence positive academic 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 suggests that more research might be done to increase the reliability of the geolocation feature. The results of this study have generated recommendations for the iClicker Reef product team.

Insights for Instructors

One of the most important insights is how students report that use of iClicker Reef increases their participation within the classroom as well as their concentration during lessons. Students also report that iClicker helps them better understand class material. Both students and instructor feel that iClicker is easy to use and that they are more engaged in the classroom when using the learning tool. 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.