

Google Forms as an Enhanced Classroom Response System

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ABSTRACT

Classroom response systems (CRSs) are devices and associated software that allow instructors to pose questions that students can answer during class, and instantly present the instructor with a listing or summary of student responses. CRSs can improve student learning and improve student engagement. The instructor receives feedback with a listing or summary of student responses. Most CRSs use *clickers*, handheld devices with small keypads that can be used to choose answers to multiple-choice questions. An increasing number of systems allow students to use other devices, like cell phones, laptops, and tablets, for input (i.e., PollEverywhere¹, MessageGrid², ClassQue³, and ChimeIn⁴). As standalone systems, they face a major barrier to adoption: they are not integrated with tools students use regularly to do their classwork.

Many universities, ours included, have adopted Google Apps for Education. Google forms can serve as an enhanced CRS, providing a wide range of response formats that extends beyond many clicker options. Students' answers can be tracked and students can be given credit for the number of questions they answer, or the number of correct answers they submit over the course of the semester. Previous work by the second author assessed the benefit of holding students responsible for their answers when using Google forms as a CRS. Giving credit for answers was shown to raise the response rate on in-class exercises from 29.3% to 42.4%. This paper describes how two computer science instructors use Google forms as a classroom response system. By providing a CRS that records and retains student responses, we can track students' learning over time and hold them accountable for class preparation and participation.

Both instructors teach large lecture sections that may range from 30-120 students, which increases the difficulty in assessing student learning during lecture. Google forms promote active learning and gauge student understanding of the materials during lecture. The instructor creates a Google form containing questions for students to answer, usually related to materials just covered in class. The instructor provides a link to the form on the course website, and reveals the link at the appropriate time in class. Students have several minutes to answer the forms, optionally working in pairs or small groups. As forms are submitted, the students' answers are entered into a Google spreadsheet associated with the form. The instructor can watch the responses as they are submitted and from observed student answers, the instructor can clarify lecture materials specific to student difficulties.

Students in classes ranging from introductory undergraduate to graduate level courses, were surveyed about their perceptions of Google forms as an enhanced classroom response system to student learning and engagement. We had 160 responses with a response rate of 33% across eight course sections over two semesters. We found that 70% of students answering the survey agreed or strongly agreed that Google forms helped them learn course materials. Seventy-four percent of students agreed or strongly agreed that Google forms as a classroom response system increased their engagement in the classroom.

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1. REFERENCES

- [1] D. Bruff, *Teaching with classroom response systems: Creating active learning environments*, Jossey-Bass, 2009.
- [2] K. Siau, H. Sheng, F. Nah, "Use of a Classroom Response System to Enhance Classroom Interactivity," *IEEE Transactions on Education*, vol. 49, no. 3, August 2006, pp. 398-403.

¹PollEverywhere is available at: <http://www.polleverywhere.com>.

²MessageGrid is available at <http://www.cs.clemson.edu/~pargas/messagegrid/>.

³ClassQue is available at <http://vip.cs.utsa.edu/classque/>.

⁴ChimeIn is available at: <http://chimein.cla.umn.edu/>.

