Classroom Response Systems at UW: Findings from the 2015-2016 Needs Assessment and Poll Everywhere Pilot

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Overview

In an effort to identify a classroom response system that best meets the needs of instructors and students at the University of Washington, UW Information Technology (UW-IT) undertook two projects in Winter and Spring Quarters 2016. We first conducted an assessment of existing instructor needs, goals and challenges when using a classroom response system. We then piloted a polling software, Poll Everywhere, that best met the specific use cases and needs identified in the assessment.

The Poll Everywhere pilot concluded Spring Quarter 2016. Findings indicate that Poll Everywhere meets student and instructor needs, provides a satisfactory user experience, and positively impacts the teaching and learning environment. However, concerns do exist about the accessibility of the software and integration with Canvas. In addition, instructors and students are concerned about student access to devices required to participate in in-class polling. Once a plan has been finalized to resolve these issues, UW-IT will recommend Poll Everywhere as the enterprise solution for classroom response systems.

Assessment and Pilot

Needs Assessment

In order to understand the needs regarding classroom response systems (CRS), researchers from UW-IT spoke with seven instructors and staff representing a variety of teaching and learning contexts and departments from the three UW campuses.

This study identified requirements for a CRS that would effectively address the following needs:
- Improve in-class student engagement
- Facilitate assessment of student performance and understanding of course material
- Enable students to respond to in-class polls using numeric or write-in data
- Allow instructors to transfer student responses and scores into an LMS, or use for discussion purposes
- Provide students with an affordable option for participating in in-class polls
- Enable students and instructors to respond to, or run, a poll from any device or presentation system
- Provide a seamless integration with the LMS and presentation software

Results of the needs assessment were used to target specific use cases for the Spring Quarter 2016 pilot, and inform the design of the pilot survey instrument.

Poll Everywhere Pilot

In Winter Quarter 2016, instructors were recruited to participant in the Poll Everywhere (PE) pilot. Among those recruited, 14 instructors agreed to participate, representing a wide range of teaching and learning contexts and departments. All participants in the spring pilot, as well as students from their classes, were invited to complete an end-of-quarter survey about their use of and experience with PE. For the survey, we received responses from 10 instructors and 53 students from six courses. Among the responding students, 22 of them reported having used a CRS in a previous course, 15 of whom reported having used clickers, while the rest indicated they had used PE, Top Hat, or another CRS.

Accompanying Research

UW-IT also analyzed data from two surveys initiated by the Biology Department at the UW. The goals of these surveys were to assess student perceptions of a bring-your-own-device polling system and gauge student device ownership. One of these surveys (N=48) described two hypothetical polling systems—one a clicker-based CRS and the other a bring-your-own-device CRS like PE—and asked students which they preferred. In a second survey, (N=1355) biology students were asked about the types of mobile devices to which they had consistent access for participating in in-class polls.

Finally, UW-IT reflected on data collected from 2013-2015 via the Educause Center for Analysis and Research (ECAR) survey. The ECAR survey explores student and faculty opinions and use of educational technologies, including CRSs. This survey provides useful information about device access and ownership among UW students, a critical factor when evaluating tools like PE, which require ready, regular access to devices in order to participate in in-class polling.

Findings

Student Engagement and Contribution to Learning

One concern about students using their own devices to respond to in-class polls is that they will become distracted and engage in off-task behavior. About a quarter of the students (22.5%) who took the spring 2016 biology student survey voiced concerns that a bring-your-own-device CRSs like PE might invite in-class distractions. Over half of students who participated in the PE pilot said that their peers were not more likely to engage in off-task behavior when using their mobile devices for in-class polls, while 18.4% agreed their peers would be more likely to engage in off-task behavior; 26.5% had no opinion. Of those students who participated in the PE pilot, 91.8% reported that PE did not have a negative impact on student engagement during class, and 71.4% reported that PE did not adversely affect in-class discussion. Students reported that PE assisted in facilitating discussion, with one student reporting that PE was a "fun way to get a discussion started."

Overall, instructors felt that PE positively impacted student engagement in the classroom. When asked if they felt PE increased off-task behavior among students, most instructors indicated that it did not have an impact. Instead, the majority of instructors (87.5%) reported that they were satisfied with PE's ability

to encourage active participation among students, and all of the instructors surveyed said they were satisfied with PE's ability to engage students after a period of passive listening.

In reflecting on how PE impacted their learning experience, 81.6% of students agreed that in-class polls helped them gauge their understanding of course material, and just over half of students indicated that PE contributed to their academic success. Most students, 79.6%, reported that PE made them feel more connected with the course material, and one student added that PE "helped me learn the course material and helped open up classroom discussion about the material we were learning." Students also spoke about the ability to respond anonymously, citing this as having a positive impact on facilitating engagement, with one student explaining that this feature allowed "students to respond to questions [even when] they didn't feel comfortable answering."

While PE appeared to positively impact student engagement in class, the use of PE was not strongly linked to a student's choice to attend class. When students were asked if they were more likely to attend class when their instructor used a CRS like PE, 44.9% of students agreed this was the case, 18.4% of students disagreed, and 36.7% had no opinion about how PE would impact their attendance.

Instructor Goals

During the needs assessment, we identified the major goals instructors had when using CRSs. In the survey, instructors were asked to reflect on how well PE helped them achieve these goals. Overall, instructors reported high rates of satisfaction and felt that PE made a positive pedagogical contribution. Of the nine goals listed, instructors felt that PE was effective in helping them achieve their teaching and learning goals (Table 1).

Table 1. Instructors were asked how satisfied they were with PE's ability to help them accomplish their teaching and learning goals.

I used Poll Everywhere to...	Instructors who indicated using PE for this purpose (N=9)	% of respondents satisfied with Poll Everywhere's ability to meet need (including satisfied and very satisfied)
Gauge student understanding	4	100%
Give students an opportunity to self assess their own work	3	100%
Facilitate student connection with the material	9	75%
Generate data for in-class discussion	8	100%

Give students an opportunity to self assess	3	100%
Provide students with feedback about their performance	1	100%
Modify course material based on student feedback	2	100%
Facilitate discussion	6	80%
Quiz students	1	100%

Ease of Use

Most students reported that they were able to set up their PE accounts and use it when they needed to, although several encountered problems. When asked if they had difficulty setting up their PE account, 73.5% of students said they did not run into any trouble, while 10.2% reported issues with the process.

When asked to reflect on any challenges they encountered when using PE, one student said that the process of setting up a PE account left room for improvement, but did not specify what the exact challenges were. Among those polled, 75.5% of students agreed that PE always worked when they needed to use it, however 12.2% disagreed, and 12.2% indicated that they did not agree or disagree with this statement.

In terms of learning how to use PE, about 30% of the participating instructors indicated that the learning curve for PE was steep. However, all of the instructors who participated in the pilot said they felt comfortable integrating PE in the classroom setting and in their teaching by the end of the quarter.

Polling Options

In the pilot survey, students reported that multiple choice, free or open response polls, and true/false polls were the most common polls used in class. The following summarizes the percentage of students who indicated it was easy to respond to the following types of polls over PE: Multiple choice poll: 80.5% (N=41); free or open response (text response): 80.5% (N=41); true or false poll: 84.6% (N=26); question and answer poll: 84.6% (N=13); brainstorm poll: 84.6% (N=13); image response poll: 100% (N=2).

The vast majority of responding instructors indicated that multiple choice polls, free or open response polls, true or false polls, Q&A or brainstorm polls, and word cloud polls where all easy to use, with multiple choice polls the most popular option among participating instructors. When asked to reflect on options for polling, 77.8% of instructors indicated they were satisfied with the available polling choices (N=9). Instructors seemed particularly excited about the opportunity to collect open response questions

from students through PE's open response polls, noting PE's superiority with this function over alternative CRSs. One instructor noted open response questions as a specific advantage over clickers based CRSs, saying "if I was just asking multiple-choice questions I would stick with Turning Point. For this class, I used a lot of open ended questions which you can't do with turning point." This was a consistent theme during winter quarter instructor interviews as well.

Cost of Service

Currently, one of the most used CRSs on the UW campus is Turning Technologies. The "clicker" required for this service costs students $40.

"Dear god. Please please please let me use my phone for stupid responseware things.
Those stupid clickers can go to hell." –UW Student, 2015

Among students represented in the Biology Department survey (N=48), reduced cost to students was one of the most common explanations for why they would choose a bring-your-own-device CRS over a traditional clicker-based CRS. This sentiment was echoed in the end-of-quarter PE survey, where one student wrote that "I am just glad it is free! I think students should use free technologies like PE, not expensive ones like clickers."

The cost associated with clicker-based CRSs has also been addressed in the ECAR survey. From 2013 to 2015, students responding to the annual ECAR survey frequently commented about the cost associated with clickers, urging for an alternative polling system that utilizes personal devices for in-class polls. One student encouraged the UW to "use technologies like PE, rather than make students buy a clicker" and another student added that s/he had used a CRS like PE and "it was much better than having to remember to pay for a clicker."

Satisfaction

Overall, both students and instructors were satisfied with their experience using PE; further, they noted that any issues they did run into had little impact on their teaching and learning. When asked to reflect on their overall satisfaction, 93.6% of students indicated they were satisfied with PE (N=47). Similarly, the majority of instructors were satisfied with PE, with 87.5% indicating they were satisfied with ease of use (N=8) and 88.9% who were satisfied with overall reliability of PE (N=9).

Of the students who indicated they had used another CRS in a previous class, 61.1% said that PE was better, and the remaining 38.9% said that PE was pretty much the same (N=18). Likewise, most instructors (3 of 5) who had used another CRS in previous teaching indicated that PE was better, when compared to these alternatives; one instructor said they were similar and another said they didn't know.

Over half (57.5%) of students who participated in the biology survey exploring hypothetical classroom polling scenarios (N=48), said they would prefer a bring-your-own-device system. Students noted that they always have their smartphone or other mobile device on hand, but often forgot their clickers. The cost and inconvenience of clickers were the major factors for those who preferred the bring-your-own-device option.

Challenges and Limitations

Accessibility

UW-IT's accessibility review of PE surfaced a number of concerns, namely the inability to perform basic actions using a keyboard. Other noteworthy concerns include views with improper color contrast, lack of focus indicator, and inaccessible navigation. Most of these concerns are currently being addressed by PE for the student view and UW-IT is currently in the process of verifying those improvements.

Integration

When asked about any challenges they encountered when using PE, instructors indicated that PE polls did not always integrate well with the various presentation software and devices; only 55.6% of respondents indicated they were satisfied with PE's ability to integrate (N=9).

During our interviews with instructors it became clear that the ability for a CRS to integrate well with Canvas, UW's enterprise LMS, is critical. Our PE pilot, unfortunately, could not assess instructor opinion regarding Canvas integration because so few in our pilot used PE for grading or as an attendance tracker. However, a technical review by UW-IT indicates PE's Canvas integration to be lacking in a number of areas. Some integration issues are slated to be addressed in an upcoming update from PE, including improper export of graded poll scores into Canvas, random authorization token expiration, and the inability to import Canvas user roles. Other integration issues may not be addressed soon but would need to be negotiated with the vendor, such as the intermittent denial of access to new UW Domain participants and the Group List/Course List feature becoming unsustainable once the scope of the account expands.

Registration

Students logging in directly to Poll Everywhere must ensure that they have registered with their default Canvas email address (usually their UW NetID email) in order to access course specific polls and receive credit. Single Sign-On using Canvas roles and permissions will streamline both the registration and the log in processes and will ensure the proper student information is captured.

Device access

Overall, 91.8% of students indicated they were able to easily access and respond to PE polls from their devices, and were satisfied with their ability to respond to polls from most mobile devices. A breakdown of device usage can be found in Table 2.

Table 2. Percent of students who responded to a poll using various devices and their satisfaction with the experience.

Device[A]	iPhone	Android Smartphone	Mac laptop	PC laptop
Students responding from device	46.7% (35)	17.3% (13)	12% (9)	12% (9)
% Satisfied with ability to respond from device	80%	69.2%	90.9%	55.6

A. *Students also reported using PC desktops, Mac desktops, and tablets; however this accounted for less than 6.7%, 2.7%, and 1.3%, respectively, of responding students*

While 97.9% of students responding to the pilot survey said they were able to access a reliable device to use for in-class polls, the spring quarter Biology Department survey revealed that 7.5% of students had concerns about accessing a device for in-class use (N=48). In another survey in the same quarter, biology students were asked specifically about device access. Of those students who took the survey, 5.1% indicated they had irregular access to one or more devices (Touch screen smartphone, laptop, text messaging enabled cell phone, tablet, or iPod), while just under 1% of students lacked access to these devices altogether (N=1355).

Instructors also brought up concerns about student device access in the end-of-quarter PE pilot survey. When asked if they had any students who didn't have access to a device to respond to polls, three out of the nine responding instructors said yes. Instructors faced with this hurdle added that they resolved the issue by making participation in polls optional or by having students write in their responses on paper, but provided no other resolution for participation. Data collected during instructor interviews earlier in the PE pilot also speaks to this issue, with multiple instructors expressing concerns about student's having access to the devices they would need to participate in a "bring your own device" CRS. During these interviews, one instructor indicated that they have personally provided extra devices during class, so students can continue to fully participate in classroom-based activities.

Summary

The CRS needs assessment conducted in Winter Quarter 2016 identified use cases and related needs. Other CRSs currently in use at the UW (Turning Technologies, Top Hat) meet some of these needs, but PE meets a wider range of these needs by providing greater versatility in collecting and visualizing qualitative responses, flexible options for how students respond to polls, and the ability to stratify responses and visualize differences in responses.

Results from the Spring Quarter 2016 PE Pilot indicate that the majority of faculty and student participants were satisfied with their experience with PE, appreciating the simplicity and flexibility of the tool. Most importantly, PE was effective at enabling instructors to accomplish their teaching and learning goals for classroom polling. Comments from both students and instructors indicated that PE serves as a preferred replacement over other CRSs.

However, concerns do exist about the accessibility of the software and integration with Canvas. In addition, instructors and students are concerned about student access to devices required to participate in in-class polling. Once a plan has been finalized to resolve these issues, UW-IT will recommend Poll Everywhere as the enterprise solution for classroom response systems.