CRS [Classroom Response Systems] REVIEW PROJECT

2016 FINAL REPORT
The University of Texas at Austin Faculty Innovation Center
An Introduction

CRS—the acronym for classroom response system—is a type of technology that allows students to respond to in-class questions and remain anonymous to their fellow students. This anonymity facilitates student engagement, especially among students who would otherwise not participate. Anonymity also encourages students who, in the presence of a large course, would be too intimidated to answer a question or offer an opinion for fear of appearing foolish.

Two Platforms of CRS

Classroom Response Systems come in two varieties. The first is a system that features its own physical remote device, commonly referred to as a "clicker."

The second is a web-based system, which can either run in a web browser or a dedicated mobile application. Either of these options will work on a laptop, tablet device, or mobile phone.

There are advantages and disadvantages to each of these platforms. Let us take a closer look at the considerations facing instructors who are looking at both.

<table>
<thead>
<tr>
<th>Physical Remote</th>
<th>Web-based</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classroom Use</strong></td>
<td>Wide variety of uses, but students are limited to multiple choice or short text answers.</td>
</tr>
<tr>
<td><strong>Student Data</strong></td>
<td>Stored on computer hard drive or thumb drive. Not shared with vendor.</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>FM frequency. Not dependent on WIFI or cellular reception.</td>
</tr>
<tr>
<td><strong>Distraction</strong></td>
<td>Very low. Can't use clicker for anything else.</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>Good. Students do need to check their batteries and remember to bring their clicker to class.</td>
</tr>
<tr>
<td><strong>Dishonesty</strong></td>
<td>High. Students loan clickers to peers to click in for them.</td>
</tr>
<tr>
<td><strong>I.P. Protection</strong></td>
<td>Unless students take a photo of your projected images with their phone, they have no record of your slides.</td>
</tr>
</tbody>
</table>
Why Classroom Response Systems are Important

In-class questions create student engagement. Here are a few examples:

- Solicit student opinions
- Gauge comprehension
- Spark class discussion
- Quiz students' knowledge
- Collect anonymous feedback

In fact, the nature and type of questions presented to students is limited only by an instructor's imagination.

In qualitative data from a poll conducted with nearly 4300 student respondents in April 2016, many students reported that when their instructors used a CRS for more than just taking attendance, they felt more connected to their peers, the instructor, and course content.

As departments move toward increased class sizes, the challenge to engage and connect students—perhaps even plant the seeds of curiosity—will become greater. Strategic use of a classroom response system can go a long way toward creating lasting learning experiences.

There are other benefits to consider as well. Efficient use of class time and student confidence. The latter of which can have profound implications for students' perceptions of the instructor, department, degree plan, and conceivably, the university as a whole.

"Responding in class is engaging and interactive and anonymity eliminates reservations about being publicly wrong."

—Student Response from Spring Survey
Identifying the Problem

The Classroom Response System Review at UT was initiated in December of 2015 in response to a growing number of inquiries from faculty about recommending a mobile-based classroom response system. These inquiries were being received by instructional technology support units located in all quarters of campus.

Some faculty were getting frustrated with the iClicker system. They either felt its physical clicker was too expensive, out-dated, or they’d grown weary of iClicker’s inconsistent integration with Canvas. Other faculty members just wanted to push the limits of what was possible with mobile-based products, as they offer a multitude of response types and features that simply aren’t possible with a physical clicker.

Some faculty also mentioned that their students were upset with having to purchase subscriptions to multiple classroom response system in a given semester or year.

So the Faculty Innovation Center launched the CRS Review Project with the following research questions:

1. What does the technological landscape look like for classroom response systems? What products are being used by instructors?
2. How are instructors using these products?
3. Is one of these products superior to the others? Could we make a recommendation that UT purchase an enterprise license for one of these products in order that instructors and students might be able to use a CRS product for free?

Project Time Line

AUG–DEC 2016
Fall Pilot with three finalist products: Poll Everywhere, Squarecap, and Top Hat.
Participating faculty surveys and student survey.

MAY–JUL 2016
Data processing, field of eight products narrowed to four

APR 2016
Instructor Spring Survey [n=72]
Student Spring Survey [n=4300]

FEB–MAR 2016
CRS Vendor Demonstrations

JAN 2016
CRS Review Project Team assembled

DEC 2015
CRS Review Project Charter Approved
Spring 2016 Instructor Survey

We needed direct input from faculty and students, so in April of 2016, we polled both groups. The resulting data helped us narrow our mobile-based field from seven to three.

How satisfied were you with the classroom response system you have used?

<table>
<thead>
<tr>
<th>System</th>
<th>Not Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>iClicker</td>
<td>10</td>
<td>5</td>
<td>13</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>TurningPoint</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Learning Catalytics</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Top Hat</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>REEF</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>SquareCap</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Poll Everywhere</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

What do you consider important when selecting a CRS?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Very Important</th>
<th>Crucial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to instructor</td>
<td>20</td>
<td>30</td>
<td>3</td>
<td>3</td>
<td>69</td>
</tr>
<tr>
<td>Cost to students</td>
<td>1</td>
<td>34</td>
<td>14</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>Ease of use for instructor</td>
<td>7</td>
<td>39</td>
<td>50</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>Ease of use for students</td>
<td>3</td>
<td>15</td>
<td>52</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>Reliability of System</td>
<td>1</td>
<td>11</td>
<td>57</td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>Canvas Integration</td>
<td>10</td>
<td>13</td>
<td>14</td>
<td>38</td>
<td>70</td>
</tr>
<tr>
<td>PowerPoint integration</td>
<td>13</td>
<td>21</td>
<td>13</td>
<td>12</td>
<td>68</td>
</tr>
<tr>
<td>Keynote integration</td>
<td>42</td>
<td>8</td>
<td>12</td>
<td>3</td>
<td>67</td>
</tr>
</tbody>
</table>
We posted a link to the student survey in Canvas. It was available to all UT undergraduate and graduate students for ten days.

**Which classroom response systems have you used this (Spring 2016) semester?**

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>iClicker</td>
<td>1,397</td>
</tr>
<tr>
<td>SquareCap</td>
<td>945</td>
</tr>
<tr>
<td>Top Hat</td>
<td>428</td>
</tr>
<tr>
<td>Learning Catalytics</td>
<td>59</td>
</tr>
<tr>
<td>Turning Point</td>
<td>15</td>
</tr>
<tr>
<td>Poll Everywhere</td>
<td>64</td>
</tr>
<tr>
<td>REEF</td>
<td>192</td>
</tr>
<tr>
<td>Tower</td>
<td>46</td>
</tr>
</tbody>
</table>

**Which classroom response systems have you used while attending UT?**

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>iClicker</td>
<td>3,049</td>
</tr>
<tr>
<td>SquareCap</td>
<td>1,479</td>
</tr>
<tr>
<td>Top Hat</td>
<td>989</td>
</tr>
<tr>
<td>REEF</td>
<td>796</td>
</tr>
<tr>
<td>Learning Catalytics</td>
<td>172</td>
</tr>
<tr>
<td>Poll Everywhere</td>
<td>111</td>
</tr>
<tr>
<td>Tower</td>
<td>86</td>
</tr>
<tr>
<td>Turning Point</td>
<td>42</td>
</tr>
</tbody>
</table>
"My least favorite thing about using these kinds of response systems is that you have to pay for them and some students may be unable to do that and that limits their classroom interactions."

—Student Response from Spring Survey

How important to you is it that all your instructors use the same classroom response system?

22% Extremely important
22% Very important
28% Moderately important
12% Slightly important
16% Not at all important

"The iClicker was used to make sure we were all in attendance. However we were asked questions, and our answers were used to alter the lesson plan, to cover the topics we were weak on, and to basically leave out the topics we were strong on. The feedback gained from using them in class was terrific."

—Student Response from Spring Survey
**SPRING DATA SUMMARY**

<table>
<thead>
<tr>
<th>On the Instructor Side</th>
<th>On the Student Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>At one of our first team meetings, we compiled a list of critical requirements for faculty based on our discussions with them about different CRS products.</td>
<td>Classroom Response Systems are important because of their ability to connect students to each other, their instructor, and course content. They are especially important in larger classes where the anonymity that accompanies being one in a sea of students runs counter to so many of the tenants of an ideal learning environment.</td>
</tr>
</tbody>
</table>

The data we received from the spring survey confirmed our memories of those conversations.

**CRITICAL REQUIREMENTS**

1. Reliability of the product
2. Ease of Use [for instructor & students]
3. Integration with Canvas

This data also helped us narrow the field of mobile-based products for a final recommendation down to three products.

![Icons](image1.png)  
![Icons](image2.png)  
![Icons](image3.png)

You will note that iClicker was not included in the list above. Remember that iClicker is not a mobile-based product, it has a physical response device.

Also, our team determined that given the continued widespread use of this product, we would continue training and support for faculty using this system as we have for the past decade.
Fall Pilot & Surveys

12th Day Instructor Survey

We needed targeted data on our three finalist products. To accomplish this, we enlisted three groups of ten faculty members for each product.

We created two surveys for faculty, one to be distributed after the 12th class day, and the other at the end of the semester. We only surveyed the students once, at the end of the semester.

Please rate your satisfaction so far with the CRS you are using.

**Poll Everywhere [n=10]**
- 100% Satisfaction (6)

**Squarecap [n=10]**
- 30% Extremely satisfied (3)
- 30% Satisfied (3)
- 10% Neutral (1)
- 30% Unsatisfied (3)

**Top Hat [n=10]**
- 50% Extremely Satisfied (7)
- 40% Satisfied (2)
- 10% Unsatisfied (1)

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End of Semester Instructor Survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask ungraded questions to gauge student comprehension and misconceptions</td>
<td>14</td>
</tr>
<tr>
<td>Ask ungraded questions to stimulate class discussion</td>
<td>22</td>
</tr>
<tr>
<td>Participation score: Does not matter if students answer correctly, score is based on being present and answering</td>
<td>19</td>
</tr>
<tr>
<td>Ask graded quiz questions</td>
<td>6</td>
</tr>
<tr>
<td>Anonymous course feedback/survey</td>
<td>12</td>
</tr>
<tr>
<td>Facilitate a way for students to ask questions during class</td>
<td>3</td>
</tr>
<tr>
<td>Attendance</td>
<td>16</td>
</tr>
</tbody>
</table>

How did you use the CRS in your class this (Fall 2016) semester?
We surveyed each of the finalist product instructor pilot groups at the end of the Fall 2016 semester.

Poll Everywhere INSTRUCTOR data

How likely would you be to recommend this product to a colleague?

Definitely (55.56 %)  
Average: 55.56 %

Likely (44.44 %)  
Average: 44.44 %

Please rate your level of satisfaction with each of following applicable CRS uses for this product.
Poll Everywhere STUDENT data

Please rate your overall user experience with this product.

Did you experience any of the following issues when using this product?

How valuable was this technology to your learning experience?
How likely would you be to recommend this product to a colleague?

Definitely not (10 %)
Average %: 10%

Unlikely (20 %)
Average %: 20%

Definitely (50 %)
Average %: 50%

Likely (20 %)
Average %: 20%

Please rate your level of satisfaction with each of the following applicable CRS uses for this product.

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial account setup</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning to use the system</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting up questions before a class</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementing questions during a class</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration with presentation tools e.g. PowerPoint, Keynote, etc.</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing data within the system</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of use importing data into Canvas</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of use for students</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost to students</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall level of satisfaction</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Black: Sum of Extremely Unsatisfied
- Pink: Sum of Unsatisfied
- Green: Sum of Neutral
- Red: Sum of Satisfied
- Blue: Sum of Extremely Satisfied
Fall Pilot & Surveys

Squarecap STUDENT data

n=532

Please rate your overall user experience with this product.

Did you experience any of the following issues when using this product?

How valuable was this technology to your learning experience?
Fall Pilot & Surveys

Top Hat INSTRUCTOR data

How likely would you be to recommend this product to a colleague?

- Definitely (37.5 %) Average %: 37.5%
- Likely (50 %) Average %: 50%
- Uncertain (12.5 %) Average %: 12.5%

Please rate your level of satisfaction with each of following applicable CRS uses for this product.
Fall Pilot & Surveys

Top Hat STUDENT data

Please rate your overall user experience with this product.

Did you experience any of the following issues when using this product?

How valuable was this technology to your learning experience?
<table>
<thead>
<tr>
<th>Products</th>
<th>Cost</th>
<th>Integrations</th>
<th>Features</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poll Everywhere</td>
<td>Free up to 40 students&lt;br&gt;Over 40 students: Student pays $14 per year&lt;br&gt;OR&lt;br&gt;Instructor pays $349 per semester for up to 400 students</td>
<td>Canvas: Yes (API)&lt;br&gt;Powerpoint: Yes&lt;br&gt;Keynote: Yes&lt;br&gt;Student Access Polls: Web browser: Yes&lt;br&gt;App: Yes</td>
<td>• 12 Question Types including clickable image and ranking order&lt;br&gt;• Poll participants do not need an EID to access poll&lt;br&gt;• SMS accessible for students with flip phones&lt;br&gt;• Self paced polling</td>
<td>PROS: High marks in set-up and use by instructors and students. System can be used by persons without EID makes PE flexible.&lt;br&gt;CONS: Canvas Integration is not intuitive to set up and use.</td>
</tr>
<tr>
<td>SquareCap</td>
<td>Free to Instructors&lt;br&gt;Student Subscriptions:&lt;br&gt;$10 per semester&lt;br&gt;$15 per year&lt;br&gt;$40 for 4 years</td>
<td>Canvas: Yes (LTI)&lt;br&gt;Powerpoint: No&lt;br&gt;Keynote: No&lt;br&gt;Student Access Polls: Web browser: Yes&lt;br&gt;App: No</td>
<td>• Multiple choice, numeric, and open text question types.&lt;br&gt;• Instructor can create auto-feedback for students&lt;br&gt;• SMS accessible for students with flip phones</td>
<td>PROS: Affordable, great Canvas integration, extremely easy set up and ease of use for instructors and students. Customer support is on campus and highly rated.&lt;br&gt;CONS: No integrations with presentation software yet. Limited feature set. No app for students.</td>
</tr>
<tr>
<td>Top Hat</td>
<td>Free to Instructors&lt;br&gt;Student Subscriptions:&lt;br&gt;$24 per semester&lt;br&gt;$36 per year&lt;br&gt;$72 lifetime</td>
<td>Canvas: Yes (LTI)&lt;br&gt;Powerpoint: Yes&lt;br&gt;Keynote: Yes&lt;br&gt;Student Access Polls: Web browser: Yes&lt;br&gt;App: Yes</td>
<td>• Many question types&lt;br&gt;• Question analytics inside Top Hat gradebook&lt;br&gt;• Students can revisit polls to use as study guides&lt;br&gt;• Self paced polling</td>
<td>PROS: The most robust feature set of all the products on this list, great integration with presentation tools.&lt;br&gt;CONS: Expensive, needs robust classroom WIFI, and some instructors report integration with Canvas is not intuitive.</td>
</tr>
<tr>
<td>iClicker</td>
<td>Free to Instructors&lt;br&gt;New iClicker 2 from UT&lt;br&gt;CO-OP: $56&lt;br&gt;Students can buy used iClicker 2 &amp; iClicker + devices for as low as $10</td>
<td>Canvas: Yes (LTI)&lt;br&gt;Powerpoint: Yes (Manual)&lt;br&gt;Keynote: Yes (Manual)&lt;br&gt;Student Access Polls: Physical clicker</td>
<td>• Multiple choice &amp; short answer question types&lt;br&gt;• Runs on radio frequency only, not WIFI&lt;br&gt;• Students do not have poll questions on devices</td>
<td>PROS: Student data is stored locally, still widely used on campus so students may already own a device.&lt;br&gt;CONS: Students forget device or loan them to peers to click in for them.</td>
</tr>
</tbody>
</table>
Recommendations

1. Due to instructor demand for a CRS offering a physical remote device and the continued popularity of iClicker, the Faculty Innovation Center will continue to endorse iClicker as a physical remote based classroom response system.
   - Technical support for iClicker and its associated mobile based product, REEF, will be provided by iClicker.
   - The Faculty Innovation Center will continue to offer pedagogical support and facilitate pedagogical training events when the demand arises.

2. The data we collected of our three web-based classroom response system finalists—Poll Everywhere, Squarecap, and Top Hat—was inconclusive in identifying a singular recommended product at this time. The CRS Review Team is therefore recommending any of the three finalist products and **only** the three finalist products.
   - The vendors of each of these products will be expected to provide technical support for their products. It is also expected that each of these vendors will provide technical training for instructors choosing their product.
   - The Faculty Innovation Center will continue to offer pedagogical support, consultations addressing specific technical issues, and facilitate pedagogical training events when the demand arises.
Proposed Next Steps

Given the current fiscal realities present at this time, it appears unlikely that the University of Texas at Austin will be willing and/or able to subsidize an enterprise license for a mobile-based CRS product.

While this is disappointing, there are some extremely positive developments to consider when formulating what we should do next.

1. Since announcing our list of finalist mobile-based products in August 2016, we have noticed increased use of these three products.
2. We have been receiving reports of groups of faculty members teaching in the same department banding together to negotiate lower subscription prices for their students for a given CRS product.

Here is what we propose for next steps:

**OPTION 1**
The University of Texas negotiates a lower price for students directly with the vendors of the identified three finalist products: Poll Everywhere, Squarecap, and Top Hat.

**Option 2**
The University of Texas put out an RFP to the three finalist vendors named above. Whichever vendor can offer the best pricing to students will be officially endorsed by UT.

Faculty will still be able to use any CRS product they desire, as these products have been classified as course materials per the accepted changes to UT Policy regarding classroom response systems as proposed by the C-14 Technology-Enhanced Education Oversight Committee during the 2015-2016 academic year.
The CRS Review Team

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College of Pharmacy

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Director I
Cockrell School of Engineering

Noah Stroehle
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