

Clicker Pilot Team Report

Cleveland State University

December 18, 2006

Overview

This report outlines information regarding the semester long pilot study on the use of Student Response Systems in the classroom and the adoption of a single standard campus-wide solution.

A Student Response System (SRS), more commonly referred to as “clicker”, is a wireless system that allows instructors to ask questions of the class and receive responses via hand-held remote devices. Student responses are recorded through a receiver attached to the instructor’s workstation. Responses can be graded, summarized and shown to the class in real-time or saved for later viewing.

Executive Summary

In January, 2006, a preliminary study was completed to assess the use of clicker technology in higher education. A survey was conducted in March, 2006 to determine clicker usage at CSU and to gauge interest in participating in a Pilot program to assess products with the intent of recommending a standard solution for the university.

What we found out from this survey is that clickers have been used at CSU for quite some time. Although usage has increased year after year, there hasn’t been any concerted effort to standardize this technology campus wide. A proposal to conduct a pilot for clicker standardization was presented to the Dean’s IT Council meeting. The council agreed that this was a good idea and gave approval to proceed with the pilot. At this time, there were at least three different products used on campus.

A number of vendors were contacted to submit information for analysis. Price, functional capabilities, technical requirements, etc. were all considered. The pilot pool was narrowed down to two products: eInstruction’s CPS and TurningTechnologies’ TurningPoint.

This project team held a formal kick-off meeting in May, 2006, participated in training sessions during the summer and conducted the pilot during the Fall semester, 2006. Monthly status meetings were held for faculty to share their experiences – problems, solutions, best practices, etc. At the end of December, a survey was conducted to get each faculty participant’s input. The results were tabulated and presented at the status meeting held on December 18, 2006. After careful deliberation, thorough analysis and discussions, the pilot team decided to recommend TurningPoint Response systems as the standard clicker solution for Cleveland State University.

Goal of Pilot

The goal of this pilot study is to make a recommendation for one standard university-wide SRS solution by the end of Fall Semester 2006 for rollout in the Spring Semester 2007.

Objectives:

- Test products from more than one vendor
- Conduct testing in both small and large classrooms
- Conduct side-by-side product comparison
- Have both experienced and un-experienced clicker users in the pilot team

Benefits of Standardization

Standardizing on one clicker solution on campus

- Greatly simplifies the process for any faculty member who wants to use this technology in the classroom.
- Provides for easier technical support from the vendor and IS&T.
- Enables students to purchase clickers at lower discounted prices.
- Ensures that students will only need to purchase one clicker and will be able to use it for multiple classes, and have the option to give/sell it to another student or sell it back to the bookstore.

Hardware Requirements and Considerations

Clicker Unit

- Minimal Cost
 - To the student
 - To the University / Departments
- Response confirmation
 - Visual confirmation of transmission and receipt
- Ease of use
- Battery
 - Type
 - Life
- Accessibility considerations

Receiver

- Accommodate large audience (up to 1000)
- Minimal Cost to University / Departments
- Work in large classrooms
- WiFi interference free
- No interference between adjacent classrooms

Faculty Requirements

- Ability to load software on all computers in the classrooms and those used by instructors
- Easy to use software
 - Creating questions
 - Polling
 - Tabulating results
 - Grading
- Used with multiple applications
 - Microsoft PowerPoint
 - Other applications
- Clicker registration process
 - Via Web
 - Via Course Management Systems (e.g. Blackboard / WebCT)
 - Import from Excel
- Roster creation
 - Via Web
 - Import from Excel
- Interface with Blackboard / WebCT
 - Roster creation
 - Grading

Other Considerations

- Virtual Clicker using handheld or mobile devices
- Mac Version
- LCD version of clickers

Identified Vendors

Two vendors were identified for the pilot: eInstruction and TurningTechnologies. Other vendors were considered, but were eliminated from the list due to not meeting requirements stated above.

- eInstruction (www.einstruction.com) – Product: CPS RF
- Turning Technologies (www.turningtechnologies.com) – Product: TurningPoint (Radio Frequency)

Analysis

Given the advanced features of radio frequency (RF) clickers over infrared (IR) versions, only this type of model was considered and used for this pilot. Neither vendor provided an LCD version.

A formal project kick-off meeting was held in May, 2006, with both vendors demonstrating their products. The plan was to have formal and informal (i.e., one-on-one and web-based) training sessions during the summer when faculty will have more time to learn how to use the products.

TurningPoint offered bi-weekly scheduled web classes (beginners and advanced). The vendor was also available for one-on-one onsite consultation when requested. CPS offered one-on-one consultation via phone or web.

The initial proposal was to have each faculty member or members from the same department use both the CPS and TurningPoint products during the pilot. Unfortunately, CPS was not able to provide enough clickers for all classes. Since the Biology department has previously used CPS, they were asked to use TurningPoint exclusively through the semester. Their prior experience with CPS will still provide information for a valid product comparison.

Both CPS and TurningPoint have similar simple keypads. Students liked the smaller size of the TurningPoint clicker units. Both have LED confirmations to let students know their answers were received.

The bookstore cost of the CPS clicker unit is \$15 and requires the student to purchase a license or registration fee (\$15 each semester capped at \$39 or \$35 lifetime license). A TurningPoint clicker unit costs \$49 for Higher Ed institutions, but is discounted to \$34 for Ohio Learning Network members. A perpetual license is included in this bookstore price.

The TurningPoint clicker unit uses 2 coin batteries (CR2032 3V), similar to a watch battery, while the CPS clicker unit uses 2 AA batteries. Both batteries are widely available in retail stores and are expected to last a year on average use. A screwdriver is required to change the batteries on a TurningPoint clicker.

Both systems work very well in large classrooms and can accommodate up to 1000 units within a 150' to 200' range. Both have passed WiFi interference testing. They can run on different channels so as not to cause mixed signals between adjacent classrooms.

The application for both clicker products can be loaded on any computer. Both have MAC versions, but the pilot team was not able to sufficiently test either one during the pilot.

Both clicker units need to be registered in order for the instructor / receiver to identify which students are using them. Rosters can either be created manually by importing a comma delimited file or extracted directly from Course Management Systems (e.g., Blackboard, WebCT). CPS's registration process is done on the web.

Receivers plug in easily to the USB port of a computer. The TurningPoint receiver is similar in size to a thumb drive, while the CPS receiver is a 4" x 2 1/2" x 1 1/4" box with a cable that connects to the USB port. The channel settings for both receivers can be changed to prevent any interference between adjacent classrooms.

The TurningPoint application is integrated in Microsoft PowerPoint, while the CPS application runs as a separate program.

Midway through the semester, a couple of faculty conducted a student survey on clicker usage in classrooms. The results came out very positive. Over 90% of students think that clickers helped them understand the concepts discussed in class. A strong majority indicated that it made the class more interesting and enjoyable (Appendix C and D).

Overall, faculty members found the TurningPoint application easier to learn and more intuitive to use. Authoring questions was a breeze. The CPS application presented a steeper learning curve to use. Some faculty were able to author questions in TurningPoint almost immediately after the demo. Faculty like the fact the TurningPoint application was inherent in PowerPoint. It provided for a much better visual presentation, not only for presenting questions, but for the displaying answers and results.

Faculty indicated that although TurningPoint has numerous reporting capabilities, they found it difficult to extract the session data into one single file for the whole semester. They also indicated that this may be due to lack of understanding how it can or should be done. According to a faculty member who is experienced in CPS, session data comes out summarized in this application.

Through the pilot, all participants were directed to contact the vendor and each company's technical support staff directly for assistance. Faculty pointed out that they had a very good experience from the TurningPoint vendor and technical support team. Response was immediate and resolutions were easy and quick. On the other hand, faculty experienced below average service from the vendor for CPS. There were delays in callbacks and problem resolution. Closer to the end of the pilot period, the CPS vendor did indicate that they invariably did not send us a CD that would have made the registration process go smoother.

Recommendation

After careful deliberation, thorough analysis and discussions, the Clicker Pilot Team recommends TurningPoint as the standard Clicker solution for Cleveland State University.

In order to receive the best pricing for both clicker units and receivers, CSU will enter into a formal agreement with TurningTechnologies, LLC which states that TurningPoint is the recognized standard for response system technology on campus. TurningTechnologies has also partnered with the Ohio Learning Network which allows for additional discounted pricing.

Students will continue to purchase their clickers from the bookstore. During the initial implementation, students can turn in their non-TurningPoint clicker for a credit towards the purchase a TurningPont clicker.

Appendix A: Clicker Pilot Team Participants

| Faculty Member | Department | Class Size | Used Clickers before |
|--------------------------------|--|-------------------|-----------------------------|
| Paul Doerder / Ralph Gibson | Biological, Geological and Environmental Sciences | 200; 70 | Y |
| Brian Harper | Curriculum & Foundations | 22 | N |
| Robert Mensforth | Anthropology | 32 | N |
| Ann Price | Teacher Education | 24 | N |
| Jerry Reed-Mundell | Chemistry | 90 | Y |
| John Schupp | Chemistry | 100 | N |

Appendix B: Project Timeline

| Date (2006) | Event |
|--------------------|-------------------------------------|
| May | Kick-off Meeting |
| May / June | Product demo / Training |
| Summer | Product Familiarization and Testing |
| Fall Semester | Pilot |
| Late December | Recommendation |

Appendix C: Student Survey – General Chemistry

Cleveland State Gen Chem

Fall 2006

39 responses

28-Nov-2006

Clickers

Do you agree or disagree with the following statements about clickers?

| | <i>Agree + Strongly Agree</i> | <i>Strongly Agree</i> | <i>Agree</i> | <i>Neither Agree Nor Disagree</i> | <i>Disagree</i> | <i>Strongly Disagree</i> |
|---|-------------------------------|-----------------------|--------------|-----------------------------------|-----------------|--------------------------|
| The clicker questions my professor asks help me determine if I understand the concepts we are covering. | 92% | 49% | 44% | 0% | 8% | 0% |
| The clicker questions my professor asks help me determine if I understand the <i>applications</i> of the concepts we are covering. | 87% | 39% | 49% | 5% | 5% | 3% |
| The clicker Quiz questions my professor asks at the beginning of each class help me to identify the concepts I need to review from the prior class. | 85% | 46% | 39% | 5% | 5% | 5% |

What is the best thing about using clickers? (Click for details)

| |
|---|
| This is new for me so it is different. But I like the fact you can see if you are keeping up with the class or not. |
| Gives the professor instant feedback on how well the class understands a concept. |
| It helps me to see where I am at in the class and certain questions I need to look at more closely. |
| they are easy to use and fast to find if you got an answer right or wrong. |
| I 'm not very fond of them. |
| you get a good review of the materials being covered |
| That they are easy and help me to review the previous lecture |
| They are a quick and easy way to not only survey the class, but chart the performance of the class for each question given. |
| Easy to use |
| It helps me to realize what I already know, and what I need to study the most. |
| It adds something new to just ordinary question/answer sessions. |
| shows attendance and Prof gets a good idea of the whole classes understanding so he can explain subject a little more. Can give a record of how well i know the matterial over the semester. If my grade is able to swing this should help Prof decide. |
| it keeps the class on their toes on what i being taught in class. |
| its fast |
| its a quick method to see where the class as a whole stands |
| Instant feed back. It allows you to adjust before you make a habit of doing it wrong. |

| |
|--|
| less time than pen and paper |
| What I like about the clicker is that it's convenient, it records the latest answer, and it saves time. |
| it is anonymous |
| I really like how it makes the students involved in the class besides just sitting back and listening. It lets me pay attention so that I can try to get a right answer on the clicker questions. |
| They're a reliable way of determining attendance, and it helps me make sure I am understanding what we do in class and that I am staying on task. |
| It's an easy way to see if the class understands the lecture. |
| having a quiz and being able to just plop the question in, and then immediately see how you did |
| It is a quick, easy way to test where the class is at. |
| it really tests if I can recall the stuff I have learned. plus there is chance for bonus points. |
| It lets me know right away whether I know what I'm doing or not. I get the results instantly. |
| Clickers are useful in helping to prepare for an exam. They are a good way in testing ones comprehension on the material discussed in class. |
| They do help determine your level of understanding about the material. |
| Fast results |
| I get a better idea of how I'm absorbing the material and what I'm doing right or wrong |
| Understanding what was important from the prior lecture. |
| Makes me come to class. |
| You don't waste paper on a single question. |
| I like the quizzes because it gives me a chance to test what I have learned. Using the clickers lets me know immediately if I understand the material and if I do not I can address it right away by asking my professor about it. |
| From the perspective of the professor, I can see many advantages to using the clickers. They present an easy way to take attendance and administer (and record) pop-quizzes without having to take the time to hand out or collect any additional paperwork. |

What, if anything, do you dislike about using clickers? (Click for details)

| |
|--|
| Nothing |
| I do not really have any complaints about the clicker questions. |
| nothing |
| Some of the questions are tough |
| i dislike the graded ones |
| they are ok there is nothing bad about them |
| Sometimes I feel that there is not enough time to finish the problems which involve a lot of work. |
| At some times I feel like we did not go over the style/application of the problems we are solving. Even though I may understand how to do a problem, the question may be worded a way I have not been taught how to solve. So at many times I feel like we do not learn the problem in the form in which we are tested enough. |
| Nothing especially bad about them. |

| |
|--|
| technical difficulties |
| Nothing so far. |
| Sometimes, I don't understand the material right after the explanation. I prefer to look over the material once more, and then take the clicker quiz. |
| the only thing i dislike are the clicker quiz questions at the beginning of class. I just have problems recalling last lectures at such early stage of the day and I don't like the stress that builds up from them. |
| Nothing really. Only that if you skip class, you'll get points taken off your grade. |
| The receiver program isn't klutz-proof. |
| nothing really, no problems so far. It just doesn't work sometimes |
| You cannot show your work, therefore there is no partial credit. Thus, to the professor it looks like either you know the question or you don't. |
| if I am not getting the material, I will get points knocked off my class score. |
| If I get a question wrong but a lot of the class gets it right, we won't go over it. I think we should go over ALL clicker questions. |
| If you miss a clicker quiz you can't make it up. |
| I like the clicker exams at the beginning of class so that it makes you motivated to be on time and show up for every lecture because every point counts. |
| The confusion of multiple classes...some prof's do not get the correct clicker info to identify me. |
| The fact that the Professor took awhile to understand everything that goes into using the clickers with his laptop. |
| I like them and I think they are a great idea. |
| If I forget it, I'm marked absent and cannot answer the question(s) whether or not I know the material. |

Would you like other courses to use clickers?

| | |
|---------|----|
| 85% Yes | 33 |
| 15% No | 6 |

Please explain:

| | |
|-----|---|
| No | I don't think it would be very practical to carry around one clicker for each of my classes. One class that uses a clicker is good enough. |
| No | I take an abundant amount of time on questions.. clickers are timed and I feel pressured when other students finish before me. |
| Yes | Any class they would be helpful in. Not every day, but they can be helpful. |
| Yes | Because this is a good way to provoke participation in the lecture not just the usual boring lecture. |
| Yes | every class should have clicker quizzes instead of fill in the blanks kind of thing |
| Yes | I believe that it is a great way of testing the students knowledge of the subject and should be used in other classes. |
| Yes | I feel it helps you "place" yourself with others and you can determine if you need to work more/less. |
| Yes | I like the instant feedback for the professor, but I also like the instant feedback to me. I know instantly if I am lacking in any area, and I can answer without the feeling insecure about being wrong. |
| Yes | I think it helps you too see where everyone in the class is and if I get a question wrong that everyone gets right I may need to get some extra help with that topic. |

| | |
|-----|---|
| Yes | I would rather have one clicker question every day over the previous days lecture than one five or ten question quiz every week. |
| Yes | It helps me to realize what I already know, and what I need to study the most. |
| Yes | It makes class more interactive and helps to show you how well you are understanding the material. |
| Yes | It's a great way to do quick quizzes to see if you know the material or not. |
| Yes | less time on tests and quizzes, immediate response for the professor to see how the class is doing, and understanding certain concepts |
| Yes | like i said earlier it is a way to keep the student learning because if they were not being used some of the students would probably be failing because of not studying the notes or reading the chapter. |
| Yes | One of my other classes is also using the clickers. |
| Yes | Only for concrete courses (non-subjective)...such as math and sciences. Clickers do not seem appropriate for english, humanities, etc. |
| Yes | other classes have used clickers, and it had about the same effect. |
| Yes | The clickers give me a good idea of how well I understand the material and it gives me a good idea of what to expect on tests |
| Yes | They are easy to use and help me see what I need to focus on studying. |
| Yes | they are easy to use. |
| Yes | They would allow the class to be more involved. |
| Yes | Yes, I think they are a good learning tool. |
| Yes | Again, it is a quick way to test your knowledge and see what you should be studying. |
| Yes | In another large lecture class, it would be helpful for checking understanding as well as easy points. |
| Yes | It helps in Biology to make sure I can identify the key points of the lectures and know what to study on the tests. |
| Yes | It would be useful in other course that are more technical and require a lot of practice. |
| Yes | only if there is a chance of giving exampl problems for the Prof to evaluate how the class is varying. |
| Yes | The use of clickers in different subjects is convenient and useful. |
| Yes | They are so easy to use. But only if it was all the same clickers, so you only had to buy one for all your courses and not a different one for every course |

Appendix D: Student Survey – Psychology

Data from a Student Clicker Survey Administered to Students in Behavioral Science Statistics (PSY 311 - Section 3) on November 12, 2006.

Student Clicker Survey

1. How would you rate the clicker in terms of overall ease of use?

| | | | |
|--------------------------|-----------|-------|-----|
| <input type="checkbox"/> | Excellent | 17/27 | 63% |
| <input type="checkbox"/> | Very good | 07/27 | 26% |
| <input type="checkbox"/> | Good | 01/27 | 03% |
| <input type="checkbox"/> | Fair | 02/27 | 07% |
| <input type="checkbox"/> | Poor | 00/27 | 00% |

2. How would you rate the overall usefulness of the clicker as a resource for this class?

| | | | |
|--------------------------|-----------|-------|-----|
| <input type="checkbox"/> | Excellent | 14/27 | 52% |
| <input type="checkbox"/> | Very good | 09/27 | 33% |
| <input type="checkbox"/> | Good | 03/27 | 11% |
| <input type="checkbox"/> | Fair | 01/27 | 03% |
| <input type="checkbox"/> | Poor | 00/27 | 0% |

3. Overall, has the clicker made the class more interesting or less interesting?

| | | | |
|--------------------------|---------------------------|-------|-----|
| <input type="checkbox"/> | Much more interesting | 13/27 | 48% |
| <input type="checkbox"/> | Somewhat more interesting | 12/27 | 44% |
| <input type="checkbox"/> | Made no difference | 02/27 | 07% |
| <input type="checkbox"/> | Somewhat less interesting | 00/27 | 0% |
| <input type="checkbox"/> | Much less interesting | 00/27 | 0% |

4. You are more likely to attend class as a result of the instructor using the clickers.

| | | | |
|--------------------------|----------------------------|-------|-----|
| <input type="checkbox"/> | Strongly Agree | 10/27 | 37% |
| <input type="checkbox"/> | Somewhat Agree | 10/27 | 37% |
| <input type="checkbox"/> | Neither Agree nor Disagree | 05/27 | 19% |
| <input type="checkbox"/> | Somewhat Disagree | 01/27 | 03% |
| <input type="checkbox"/> | Strongly Disagree | 01/27 | 03% |

5. Overall, has the clicker made the class more or less enjoyable?

| | | | |
|--------------------------|-------------------------|-------|-----|
| <input type="checkbox"/> | Much more enjoyable | 10/27 | 37% |
| <input type="checkbox"/> | Somewhat more enjoyable | 13/27 | 48% |
| <input type="checkbox"/> | Made no difference | 04/27 | 15% |
| <input type="checkbox"/> | Somewhat less enjoyable | 00/27 | 0% |
| <input type="checkbox"/> | Much less enjoyable | 00/27 | 0% |

6. How much do you agree or disagree with each of the following statements? **Please check one response for each item**

| | STRONGLY AGREE | SOMEWHAT AGREE | NEITHER AGREE NOR DISAGREE | SOMEWHAT DISAGREE | STRONGLY DISAGREE |
|---|-----------------------|-----------------------|-----------------------------------|--------------------------|--------------------------|
| a.) Using the clickers enables me to stay more focused during lectures | 21/27 78% | 4/27 15% | 2/27 7% | 0/27 0% | 0/27 0% |
| b.) Using material from the textbook in the clicker slides makes me more likely to read my textbook. | 5/27 19% | 11/27 41% | 6/27 22% | 4/27 15% | 1/27 3% |
| c.) Using the clickers to answer sample questions helps me do better on exams | 15/27 56% | 10/27 37% | 2/27 7% | 0/27 0% | 0/27 0% |
| d.) Overall, I found that the clicker helped me learn in this course | 15/27 56% | 8/27 30% | 3/27 11% | 1/27 3% | 0/27 0% |
| e.) Because the clicker response slides let me know whether or not I understand a topic, it helps me focus my studying more efficiently | 12/27 44% | 13/27 48% | 1/27 4% | 1/27 4% | 0/27 0% |
| f.) Using clickers helps the instructor understand when additional explanation is needed to help the class understand a topic | 17/27 63% | 10/27 37% | 0/27 0% | 0/27 0% | 0/27 0% |
| g.) The use of the clicker makes it easier to indicate when I don't understand something in class | 19/27 70% | 7/27 26% | 1/27 3% | 0/27 0% | 0/27 0% |
| h.) Given how the clicker has been used in this course, its cost represents good value to me | 9/27 33% | 12/27 44% | 2/27 7% | 4/27 15% | 0/27 0% |
| i.) In the future, I would be more likely to sign up for classes that use clickers than for classes that do not use clickers | 6/27 22% | 13/27 48% | 5/27 19% | 3/27 11% | 0/27 0% |