Transcripts for Faculty Engagement Meet-up on Classroom Response Systems

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Indistinct background noise

Welcome everyone -uh, that's loud. A little too loud for this space- My name is Josh (unsure), director for the Center of Teaching Excellence here at Rice and welcome to our faculty engagement session on using classroom response systems. Before I introduce our panelists today, Id just like to thank Jane for organizing this, and our sponsors: Fondren Library, OIT, the CWOVC, and the Center for Teaching Excellence. "Classroom Response systems" that's kind of an umbrella term that encompasses everything from colored notecards to clickers of all kinds, to new websites that offer the ability to turn students' cellphones into clicker-like devices. So, these have become very popular over the last decade or so, and we have a number of faculty here at Rice who are experimenting with their use in the classroom, and have invited six -(unsure, maybe: "NAME will hopefully come by the end of it") -have invited six to talk to you a little bit today about their use of classroom response systems in their particular courses. So, we asked them five guiding questions: in what class did you use the system? how many students did you have in that class? in what kinds of situations of contexts did you use it? how did it work for your teaching? was it helpful, effective, engaging, etc? How did your students respond to it? Would you use it again (or differently)? With that, I'm going to introduce our speakers; first we have John Greiner, who's a lecturer in Computer Science, and then we'll move to Robin Sickles, who's the Reginald Henry Hargrove Professor of Economics, and also Professor of Statistics, then we'll move to Fay Yarbrough, who's Associate Professor of History, then to Gary Woods, who is Professor in the Practice of Electrical Engineering, and finally, Rocio Doherty, who is a Research Scientist and Chemical and Biomolecular Engineer. So, please welcome our guests.

clapping

So, as he said, I'm John Greiner. So, I've used the little clickers, that the office provides, in two classes so far, COMP382, the sophomore and junior-level course of about 120 students, and in a databases class of about 60 students, and I'll continue to use that when I teach the class next semester as well, that's a senior-level and grad-level class. As I said, so far I've just used the clickers, in particular I use it in anonymous mode, where I'm not keeping track of who is clicking them, I just hand out the clickers at the beginning of class, and take them again at the end of class. So, how have I used them, in particular? So, in class, I use them to check and reinforce whatever the contents are. So I'll have anywhere from one to half a dozen little times to vote, times to respond to questions, and I try to make the questions so that they're interesting, not trivial, so that it often leads to class discussion, because students might get it wrong, and I'll follow up on that. Frequently it will be a variety of difficulty, anywhere from just sort of checking whether they understood definitions to applying algorithms we covered, as well as how to solve a problem if the answer to these problems are short and they can give a few different answers.

How has it worked for me?So, it's been very good. It helps keep the students engaged, which is really the primary purpose that I've been using it for. To make sure that they're actually paying attention and able to apply the knowledge that hopefully they're gaining during class. It's been helpful, it provides me a way to make sure that people are paying attention, and actually getting the material, and it helps students understand the material, especially when they're answering questions wrong, right? I mean, it makes them say 'Oh, okay, maybe I didn't understand this after all, let's talk about that.' And I get that feedback from the students not only, the immediate feedback of seeing what their answers are but I also get in class surveys midway through the class to ask how/what students thought about various parts of the course. And the various types of active learning I was using, including the clickers, were highly rated; they were among the best things of the course, according to students. So, the downside of it, though, is that it takes time. It takes time to stop, and pause, you know, explain the question, wait for them to actually respond, because there's going to be about half that are going to respond very quickly, and half that kinda drag their feet, and I want a reasonable majority to respond and participate, I don't want to move on too quickly and encourage students to not participate. So I want to wait for them and get them to actually participate. So that slows things down, sometimes, but I want to make sure the questions I'm asking are actually worth that time. One other disadvantage of the system that I've found; so I'm embedding these questions inside of PowerPoint, and just the software that come with, the PowerPoint plugin, for Turning Point, it's not the best add-in, it's kinda a little kludgy on the interface. So as I said, students responded to it very favorably overall, as long as the questions were worthwhile. Another thing that I found is that I want to have at least several questions in any class that I'm going to use it in, it's kind of too much trouble if I only have one question in the class, to get the clickers out and get them back. So, I'm definitely going to use it again next semester, when I repeat my database class, I'm reviewing all the questions, trying to make sure that all of the questions are worthwhile, and that, like I said, I have a least a few questions any time I'm actually using them. So, I guess that's the count(?).

What he said. *laughter* I had some slides, but I'm not sure it's practical to go through those. I teach a course in energy econometrics, energy modeling for our master in energy economics, at least, that's the one that I use the clickers in. and we have 25 students in that class, they're between 25-30 and they're highly motivated, it's a professional master's arrangement, so they are motivated, not only because they're older, and looking for a job, and of course the energy market is not as good as has been, so they're pretty anxious to do well, but they're also paving the way. So having a class like this, and a constituency like that, is a little different than having undergraduates that are very different. And I've found that, that kind of technology that engages them in a variety of ways is beneficial, it has, I think, been very useful. I've got several situations that I use the clickers in. You know, there's a lot in econometrics that, visually, is pretty close to pattern recognition. We try to establish patterns in data. And some of the easiest ways to do that, of course, is to just look at data, and see, you know, what sort of lines fit it, certain cognitive perceptions are consistent with patterns in the data. Where I have found the clickers to be helpful is in getting the students to respond to questions that are framed in such a way that they would see patterns in data but I've fixed it this way, which in fact, are incorrect. Just to get them to recognize that in order to be able to actually understand relationships you have to think

slow as well as fast, and that's one of the first things I talk about, you know, the difference between thinking fast and thinking slow. In some of these settings I ask them to very quickly respond to a question, you remember the picture of the I don't know how it's framed to be politically correct, but there is a witch, and there is a beautiful woman, and the question is, how, what do you perceive in that picture? How do you perceive it to look? And of course, I want them to give me a quick answer, so they give me a quick answer, an equal distribution, it's 50/50/. And I point out what the pictures really are, and everybody's like 'yeah, I see that now'. Again, that sort of speaks to, recognizing in a deeper way, maybe some underlying patterns and irregularities in the data that they might not have seen, at first blush. And I found that to be very useful, a very useful way to motivate that idea. Data analysis and understanding the theoretical underpittings of inference is largely a mental exercise, and so, having them actually give the data by essentially responding to a certain question and clicking an answer to that question, and then taking that data and using it in a physical exercise; they gave me the data, I enter it, and utilise it in some sort of analysis, you know, gives them a bridge, between the actual physical part of getting data together and the inferential tools that we develop. So, you know, those are somewhat the situations we use them in, it is, I think, very effective. It does engage them, but again, these are highly motivated, highly engaged students to begin with. So it's not clear that the margin of what it's doing is as large as it could be in other settings, but in the end it has been helpful. The students do respond to it well, there is the downside, of course, that it does take time. And I have found myself during this year using it less, because of the set-up cost, and the set-up time, which is unfortunate, but that's what I've found to be the case. I will continue to use it. I think I will use it differently in the sense that, oh, you know, motivating histograms, which of course, is one of the outcomes of this software, you get, essentially distributions of responses, and if you've got a finite number of responses, you essentially get what is a histogram of the data. What I would like to be able to do; I know it's feasible, but I just haven't done it yet, is to actually get the information in the form of data, not in the form of just summaries and distributions, but in the form of the data itself, and link that to an excel spreadsheet and use it in a simple regression setting, so that they are essentially giving me survey data that we're analysing formally in the econometrics part of the course. That's something I have not done, and in a sense that answers question 5, 'would you use it again/how would you use it differently?' I would use it in that way. So that, that's it.

I'm going to set a little timer, so I make sure I keep it to 3-5 minutes. Okay, so, I used the Turning Technology's clickers, the little calculator looking things, when I teach the first half of the US history survey. I've used them here, and I've used them at my previous institution, the University of Oklahoma. There I used it with 75 students, here I used it with 35 students. I used it every class. I used it to do daily reading quizzes. In the larger class I did it because I wanted to keep the students engaged, I wanted to try to encourage them to do the readings, because the discussions you have in class are obviously going to be better if they've actually read. And the way that I thought to, I prefer to think of it as 'incentivizing it' was by doing these daily reading quizzes. They varied between four and ten questions, and we did it every class at the beginning of class, they had assigned clickers, it takes a little bit of time to set it up the first day, but once you've set them up once, you can do it all semester long. We had a system, they all

knew to get them out, they all knew to start the class with these clickers. So, I used it for that, I used it also because I am a person who likes to take attendance, and it can take attendance for you, by virtue of did they answer any of the questions on the quiz. I also used it for opinion polling. So sometimes I would set the students up to debate an issue, for instance, Indian removal. And then, they would be in teams, they would present their arguments, and then their classmates would vote on who had presented the best argument. That I found to be a really useful way to engage them in a different kind of activity. I also used the polling sometimes to test if they knew about a topic before we talked about it, or what their misconceptions might be, so we could address them directly. The other way that I used the quizzes is that I built the lecture around the quiz. So sometimes I would have quiz questions which many answers were right, or none of the answers were right, and then we would stop, and talk about each of the answers on the quiz, and so that was the structure, the bones, for the lecture that day. I found them to be really useful. The biggest thing that I found useful about the quizzes, for me, in terms of pedagogy, was that if there was a problem, I could fix it right then. You can do reading quizzes on paper, right? You can then check them after class and then you know that there was some kind of problem. I had my polling set up so the results would show up automatically. I also timed the quizzes, so there was a little clock at the bottom, so people who wanted to drag their feet couldn't. So, you know, 45 seconds or a minute or thirty seconds depending on the kind of question. And then, if I saw if 75% of the class got a question wrong, we could stop and say, 'Okay, what happened?' And what was really interesting is that sometimes the students would answer the question for themselves. So sometimes the students would say 'Oh, I see what they did, they didn't read this part of the chapter.' Or, 'I think you misunderstood why'. So I thought that was super useful because it got the students engaging with each other. Sometimes, many students would get an answer wrong, and I would let them argue for why they thought my answer was wrong, or why I should accept their answer. If they could come up with a good reason, good logic for why I should accept their answer, I would add that to the roster of correct answers that day. And because it was all computerized, I could just go back in after class to change a response or add a correct response if I wanted to do that, or I could throw out a question entirely. So I thought it was very useful because I could engage them with this information quickly, and because sometimes they were educating each other. For the most part, students responded pretty positively to it. I think it probably works better in a larger class, there can be some resentment about the quizzes, as one student said to me this semester, 'it's like you expect us to read everything and know the material really well' *laughter* And I said, 'yes, in fact, that is what I want you to do!' But that can cause some tension for some students. For other students I also found it really useful because you always have some students that are really quiet, and you don't really know what they're thinking or imagining or doing. And I would discover some really quiet students who were just killing it on these quizzes, who had clearly done all the reading and were thinking very carefully and all that. And so, this was a way to reward these kids who didn't want to talk in class, because I give participation points, but they could still earn points for having done the reading. I have had colleagues who used this system at the University of Houston, and they reported that when they looked at the numbers, classes that used clickers have lower rates of Ds, Fs, and withdrawals, and had higher student evaluations. I've only done it with one class here so I can't speak to that, but this is something they found when they did it across the US history surveys at UH. Finally, I would use these

again, I think I might need to rethink the frequency of my quizzes, just because I did get some pushback from the students who said, 'It's like a test every class!' Yes. It is like a test every class! So I think I would rethink that, but thus far I've found them to be really useful in a variety of ways and that you can be creative about how you want them to be useful for you.

So I had some slides, but it was mostly just bullet points, so I'll just give the highlights here. I used clickers in my device physics class, it is a sophomore/junior level class in electrical engineering. There's about 40 students in the class, it's a required class, and most of the students don't like it. The material is basically the physics of how transistors work inside integrated circuits. And even among people who have chosen electrical engineering, this is not why they went into electrical engineering. They don't want to understand how the ICs work, they want to just use them and build amazing things with them. But nobody wants -I mean, there's a subset, but- 10-20% of students really are interested in the devices. We gotta make them take it, but for many people it's just kinda a chore. So anyway, one comment that I pulled off the evals, this is pretty typical of what I get every semester, every year, quote 'I hate the material but Woods makes it a good course. Happy to be done with physical electronics.' So that's kinda what I'm up against. I'm tasked with teaching a course where most of the students, that's kind of the way they feel. I'm always trying to make it interesting, trying to do something to make them see why I find it interesting, why I've chosen to do this for my career, and hopefully they can appreciate it. So anyway, I do some things, I do a video project, that Jane has been helping my students with every year. I'll give you a url, you should check it out, there were some amazing videos last year. There was a really great rap battle one that somebody made. Not safe for work and everything, it was perfect. But anyway, for the first time, last year, I used classroom clickers. And I would say I think I used it the way I think John was saying, I just used it in anonymous polling mode, the receiver was installed on a mac in the classroom, and the way they say to set it up is to install the widget onto your own laptop computer, embed the questions within your PowerPoint, and present from your PowerPoint and so on. But what I found instead, because I don't use the projector in my classroom, I actually just print out my slides on paper and hand them out so students can take notes on them, but I don't actually use the screen. So what I did instead, I just gave them hard copy slides, and then I basically ask snap questions that they can use the clickers to respond to, and the mac on the podium tabulates the answers, but I don't bother projecting them up on the screen. I just kind of tell them the results as they come in So that worked pretty well, that was a good compromise for me, given how I like to present to the classroom. So what I used to do, the situations in which I used the clickers, I used the approach of what I call small group questions. I''l post, I'll pause the lecture, pose a question, and I'll have the students, instead just asking them individually, I'll say, 'Okay, turn to your neighbors and discuss among yourselves what the answer is to this question.' And then I'll call on a group randomly. With clickers, I do it a little bit differently but almost the same. I basically build in a question to the notes, sometimes into the hard-copy notes I give out, but sometimes I'll ask a snap question, so as I'm lecturing, and I see a lot of blank stares or anything like that, I'll pause and I'll say 'Okay, what do you think about this?' and I'll make up some question, some multiple-choice answers for it, write the answers on the board, and ask them to respond to the poll, and I'll wait until 80% of the students have responded or something like that. And sometimes it's surprising; I'm asking what I think is a simple question, but fewer than half the students get it

right. So it's been good feedback for me, to help make sure that they are learning the material. Overall, I would say it was effective, often the way I like to teach material makes it hard to generate multiple-choice questions, like I would like to ask them to calculate and answer something, and so how far off do I make the answers? do I make the answers 20% off from each other, or do I make them orders of magnitude? So there's a bit of ambiguity there on how to use it; And I didn't use it every lecture, maybe twice a week I would incorporate it to my lectures. So I would say they were used somewhat effectively. I went through the course evals, and only one student mentioned anything about the clickers, and I'll read what he said, 'I personally think the clickers are not the way to go, I actually suggest we do more practice problems in class.' He's the only one who provided feedback on that. Nonetheless, my plan is to try them out, my main issue is I want to get the students more involved, and engaging with the material. So one of the things I wanted to do was try to use the clickers again, and use them better next time. One of the reasons I came here was to find out what people have for suggestions in that regard. I also want to try some other things, like trying more live demos in the classroom, and try more of these small-group questions like I mentioned before. I'm open to other ideas in that department. That's been my experience with the clickers.

Hello everyone, I'm Rocio Doherty, I'm in the Chemical and Biomolecular department, and I specifically teach chemical engineering fundamentals. I am not a main professor, I just jump when a professor needs help, so, last year he was on paternity leave, so I jump and I taught the full semester. I tried the clickers, the system, a lot, in two ways: The first way was like my colleagues to test if the students are really getting the concepts, my class is the first chemical engineering class the students have in their lives and at this point I think they start the semester with still a high school mentality, whether they saw organic chemistry or physics, they're in a very different state of mind. And my class, this is the breaking point where they have to change their speed of thinking, change their state of mind. And also, they have to learn a lot of new concepts very quickly, very quickly because it's a class packed with material. So one of the uses I had for the clickers was just to test if the guys were getting the concepts in the way I wanted. So I explained something, I ask a question, about the concepts involved, and just check if everybody got it or not -quick-. If the majority failed the question, I explain again, maybe in a different way. If the majority was right, I just move forward, because once again, it's a class full of new concepts, and the material is really packed. This was one of the used, but the one that I liked the most was a little contest I did before the midterm exams -we had three midterm exams- because this is a contest, and it's where we test the speed and the exactitude with which the students think. I truly believe that we, as professors, we gotta teach concepts, we gotta teach science, or whatever our area is, but we also gotta teach skills, we gotta teach aptitudes, etc. When they complain about how fast they have to respond to these contests, I tell them, 'well sometimes when you are in the industry you have to think that fast, and make a good decision that fast.' It's a matter of seconds for something bad to happen. There were a lot of complaints of, 'Oh, I'm so stressed, I pushed the wrong button.' well yeah, I agree, but if you are outside, and you have a bomb, or you have something and you push the wrong buttons, something bad is going to happen. So, you really have to learn how to manage that stress, and how to be fast and how to be confident with your answer. There was no punishment or bad points for people who didn't answer or didn't answer on time, but there were rewards for the people that did. I

just, I assigned the clickers also at the beginning of the year, so I knew who was the winner, or who was answering incorrectly, and I gave something like 10 points over the exam to the five first people, or something like that. I know that there were some resistent people. I asked them, 'What do you think about the clickers?' in person, and some of them were like, 'Eh, okay' and some of them said, 'They are so stressing' and some of them said, 'It's stressing!!' *laughter*

STOPPED HERE-30:06 ON SATURDAY, OCTOBER 29

The good thing was the last time I did it, most of them were really exciting, especially because they knew that those points were really valuable in their grade. I also liked to get the ideas, especially around the midterm time, you can see some more empty seats. At the end of the year when they say I got my A, I want my A+, if you didn't come, you know. And I forgot I had around 85 students divided into groups, but taking attendance for example would take me 10 minutes to do it and I don't have that time. So it's a way to manage the groups in a very efficient way just to know if all of them are there and some other things.

We have some time for QA now. I'll kick it off with two tiny questions. One for you Fay. Do you use the reading quizzes only for attendance or do you grade them in their own right?

Oh no they get points. So this is another thing to think about. I did daily reading quizzes, and part of the push back from students was there was no makeup for the reading quizzzes. Because I tell you the answer after each questsions. So if you have a large number of students who are going to miss class for whatever reason, then they're going to complain about the inability to maekup those quizzes. It's funny since the quizzes didn't count for much in their grade, but for some reason their perception was that it was outsized. They had the perception that it counted for a lot of their grade when in actuality I laid it all out in the syllabus and it counted for a small part of the grade and they took them quite seriously. And then to account for the fact that I didn't offer a chance to make them up, it's pretty easy to go in and adjust. So I jsut went in and basically threw out 4 quizzes over the course of the semester. And the students who were there all the time and had earned more points possible than after I readjusted I just gave them those points. So you benefitted from having come all the time and performing well on all the quizzes. I like that they took the quiz really seriously.

Did all of you use turin point or another clicker?

All: turning point

First, a comment on what you've said. I used a quiz at the beginning of my lecture, and yeah people take them really seriously even though it's just like 2 points. And I've had everyone show up every day which wouldn't have happened in the past. I have 28 students and they're always there. They'll email me if they can't make it. The question I have for john and rob is, I guess you're doing all multiple choice questions, so it is possible to do anything other than mc?

so there are other options but i've only used multiple choice. And sometimes i just can't come up with a question on some material because i can't think of how to present it as a mc question. Other times i come up with plausible alternatives that if they misunderstand this way, then here's the answer. If they misunderstand it this way then here's the answer. It hasn't been too much with simple calculation errors. It's more misunderstandings of different options.

There is something with the licesne here that only mc and true false are working. But the way i used to do it is the right answer, and just do the mistakes that they could have done during the process. For instance multiply instead of divide something. And the answer that i got by doing that, that's one of the answers. And something i've noticed is that if you only have four choices, it's 25% chacne to get the right answer. So i did 10 and they really really have to push the right button to get the right answer.

So just to respond to your question. It does require some effort to frame questions in a way that can be responded to by clicking a-g. So i was just going through some of the slides i put together. So one of the questions i asked students just to get a sense of their sense of income levels, i could ask questions about what are their aspirations in terms of income or are they comfortable with the income they're making. And so one of the questions i asked in terms of just survey information you've got the linker skill but you've also also got other questions. I'm comfortble with the income i'm currently making strongly agree agree somewhat neutral somewhat disagree strongly disagree. I could put income groups as well. A lot of times i ask questions that spoke to gender differences or spoke to choices in a treatment model. So i could show them the fallacy of, just looking at simple outcomes, 2 different groups and ignoring the potential of selectivity in the treatment model. I can do that simply because of categorical outcomes. So i have to focus the question really on income groups or price groups or *indistinguishable* or demographic characteristics. But to be frank, it was not that difficult to do measurement kind of course like this is. You pose certain questions and the way you frame them is one's right and one's wrong. Or you make a statement and is this a reasonable thing to say. And immediately you ask their response and they'll give it to you and of course you get a sense of whether they're in the game or not. Often times they don't and you think they do and it's an immediate feedback very important.

Actually one thing i found useful in some situations is to have multiple correct answers as well and that often throws students off. They think oh there's only one way to do anything and there must be only one answer correct. And if you see in their responses most people are saying these two answers it's a good chance to ask well is there something wrong going on here. Do you believe these other guys do you believe this other answer and you can have a discussion even though they're all right. You need to realize the other answer was also correct.

Another pull everywhere iclicker tophat and soccertootle offerfreeresponse are their others?

Well so turning point cloud, you can use your own device or laptop and that allows free response.
Thanks

Directed to fay, when the students take a quiz and it's automatically graded is that already integrated into canvas?

Oh gosh i could not tell you. So turning point is allegedly working with some of the course management systems. So again because i'm frightened by technology i don't trust it to do it. So in fact i after class every time will resave the data over and over again because i could have waited until the end of the semester to do it but i was quite frightened something would happen. So i'm also not someone who migrates on owlspace or anything else. I've never done that because i'm too anxious. But they recognize that that's what faculty want. I can't tell you if they do it with canvas or not.

Can you kind of walk us through how you would start a class that has a quiz. Are the questions on the screen is there a certain amount of time that you're giving?

So i would embed it into the powerpoints. and so we would come to class and in both of these classes i had a ta. At rice we've very fortunate that rice provides the clickers. At ou the students had to pay for them themselves. So there was an added element of and they have to pay for their own clicker device. Here i had a box and i had little stickers on the back of all of them to label them by number so students knew what their number was after we set them up the first week of class. At the beginning of class i would put the box on the table and the students would come get their clickers and sit down and they would turn them in by row so that we could keep them segregated by row. I don't think anybody else was using them because they stay in the same order. It's useful for me because i can say at the beginning of class alright everybody are you ready with your clickers. I would have a slide just for the day. Each question is its own slide. I would put the slide up and then initially i didn't have a timer and they would take forever to answer these questions i think to delay getting to lecture. I then put a timer at the bottom that would start and i set it so it wouldn't show how the students were responding until i closed the polling but you can have it track them if you want. I would close the polling and then the answers would show up and then it was really interesting how competitive they were. You said d and i'm sure that's wrong and why does that say that d is right? And they would ooh yay when they say what the answers were. I would have the polling show up and then i would actually have a separate thing show them which one was right. Because sometimes the majority of the class did not pick the right thing. So that's what we would do. Sometimes we would take maybe, depending on how many questions, i would give them for true false questions i would give them 30 seconds to answer for longer questions 45 at the most a minute. And 10 questions is too much and i need to stay around 8 but some classes i just had 4 or 5.

Any questions?

I have one question about the physicality of the clicker. I was wondering your feel on how important that was as opposed to something else like going through your phone or your laptop or something like that.

I mentioned this when i was answering these questions. I thought that the physicality of the clicker and the fact that they were engaged in the physical act of registering the information and used in a virtual computational algorithm was very important intellectual link that really connected them to this sort of theoreetical treatment. That they realized and understood that the empirical study is about the physical entity or physical phenomenon. The physicality that i was talking about was more in terms of just learning and understanding the linkages that go into their findings. Just in terms of literally the feel of it, it's a completely mindless simple thing to push buttons on. It's small it's compact it's fairly easy to see whether it's abcdefg.

There's also this anonymous mode right and the anonymity to it as well. I wondered if there is a psychological difference to using it on your phone and logged in with canvas or something like that. Versus this physical thing.

I always used it in anonymous mode. **very quiet**

I'm going to answer the question a little bit differently. I have them using clickers and not their cellphones or anything for 2 reasons. 1 is i didn't want to give them an excuse to have their cellphones out. And secondly i didn't want to go through the hassle of everybody needing to setup their cellphone and make sure they work appropriately. Handing out the clickers was easy.

But then you're restricted to a room that has the clickers.

Right. But you just arrange with them to have the box of clickers there.

And the software on the machine.

I personally don't like the students to have their cellphones in front of them during the class because it just makes me mad to see the students on them. The other thing is it's just amazing because just the fact that they are not exposed to the noting right there changes everything. They know you know who they are but it's a different attitude to answer right there in front of everyone. They are not participating.

I have a question. So i can see that most of you are using the clicker to test their knowledge and survey course and i'm wondering if you think that there are any possibilities to flip the assignment and ask students to design questions for the poll. That means engaging their knowledge in a particular subject or if they were running a class for example a group was running class for a day. Could they design a poll that you could then evaluate as a measure of their knowledge of that subject?

Hahahahah

Are you asking whether it would be easier to do that with turning point clickers than it would be in any other setting?

No. i'm asking if it would be possible that would be an assignment that could be given to them to design a series of questions for their classmates to answer.

Sure you could do anything.

That's not something unique to the clickers that's what i'm saying. That's a generic question about how you might engage the students and developing questions in general.

It sounds as though the kinds of questions you have to develop for the clicker have to be carefully thought out. What is a good question what kinds of responses might be reasonable what kinds of interpretations might people have that lend themselves to this kind of modality.

They're essentially multiple choice questions so to the extent that you design multiple choice questions or you want to use it for an exam setting then it would be no different to putting multiple choice questions in the other setting that's what i'm trying to say.

I was thinking more of what fay was talking about when you get to questions are more interpretive where there could be more than 1 right answer or there could be a debate about the uh.

Is the turning point software easier to use say in the middle of class you've got a bunch of people arguing about something you could put together a question right then and there during class as alright let's take a vote how many people want to go this way or that way. Could you do that i've not seen this software.

That would be easy to do.

I'm a graduate student and one of our professors uses a different software but does similar things. One of our homework assignments was always to turn in questions that he would then use the ones that he liked so he uses those questions and throws in questions that he also wanted. But additionally the one that he uses was one that he actually made but has a stop slow down and speed up function too that at any point in time you can log in and give a stop i have no idea what's going on anymore and if he saw enough of those reds pop up then something has gone drastically wrong and lord knows what's happened any more. But if everything continued to be at the green then it was okay we understand the content. And both of those things were helpful. Coming up with the questions and also answering questions you know your classmates had made as well as yourself was kind of fun and the function of being able to slow down class or be like i'm good i understand this concept is helpful for making sure we didn't go a long ways without actually understanding the content. So i think that kind of answers your question.

Yes thank you.

Okay one last question before we finish. Most of the responses focused a lot on what the students are doing what are the answers how do those answers lead to subsequenet answers and things like that. And they all have this moment where they say and then the teacher explains something. But to me that glosses over the most important part and one of the most effective uses of classroom response systems. So my question is, when you put the question up on screen and a misconception is revealed or a significant percentage of students get it wrong, what do you do next? How do you address that wrong answer or that misconception at that moment in the classroom?

I use it as a way to anticipate the material. I have a particular set of questions to ask about a particular phenomena analysis and i'll have well is it this problem this problem this problem this problem this problem or all of them. And the answers are all over the place and of course i say well you're all right but you're all wrong. And that's what we're going to talk about next class. It gives them a sense that they're right but it's not complete. So that's one way.

I would say somewhat depends on there's questions i anticipate to mostly get right and it's mostly a check and if they're getting it wrong, then it says oh ok i need to stop reexplain the concept some other way. And then there's other problems where i'm anticipating them to get it wrong. It's setup as i'm taking you down the garden path here and i have baked into the lecture a story of whatever it is i think they're going to get wrong. And that's just part of the lecture.

I sometimes would discover that they didn't understand something and my first question was always ok what did you think just happened. Why did somebody who answered a, why did you answer a. And then they would give their spiel. And then somebody who answered b, why did you answer b and then they would give their spiel. And there's the moment i mentioned before where sometimes students would say oh i know why they got that wrong, they did thing x or they didn't read thing y. Or sometimes the students would call the other students out well that was really in the first paragraph of the article so i don't know how you missed that. It's very different when it comes from your classmate vs when it comes from your professor. We had moments like that where i would turn it around on them. Well what did you think happened why did you choose that answer. And sometimes the students would do things like get the textbook out and say well i highlighted this thing and this is why i thought this was the answer. And those were also funny because and then the classmate would say but did you read to the end of the paragraph where they said this other thing. So i generally turn the question to the students and say what happened why do you think that answer what did we not understand and try to make it so that they're a little more responsible for it. And again sometimes i would let them make a case, well 40% of you thought it was d. Prove to me why i should accept that as a correct answer. And i felt like i had a couple of budding attorneys in class last time who were okay, what about this what about this and sometimes other classmates would chime in well i think if we interpret the word in this way instead of that way and sometimes i would give it to them not because they were right but because they were willing to make the argument even though from my perspective no, you clearly misunderstood that. But usually i wouldn't tell them in class. Okay i'm going to think about what you said and then i'll let you know next class if i'll take your response or not. And sometimes i would come back and tell them they could have the point and

it made them feel good about me and there's nothing wrong with the students being a little happier with the professor so it was a really cheap way in terms of it didn't cost me anything it was just a point of a tiny percentage of their class but it also fostered some good will because they felt like i took their point seriously and that i was willing to be swayed by them and that i respected what they had to say so i think that those are all positives from addressing the wrong answer and asking them to figure out what was wrong about it.

In the case when i use them for the contests at the end i just publish the solution. But when i use them to test their understanding of a concept i usually prepare in advance ways to explain the concept and i say if 5% of the students got the answer wrong i reexplain the concept which is pretty much all the time. 3 4 5 students got the answer wrong so i explain it again.

Alright let's thank our guests.

clapping.