Please stand by for realtime captions. While you're waiting, you can download a copy of the mobile earnings report or participate in the poll. >> This session is entitled researching mobile learning at ACU. Conclusions questions and future directions. Hopefully all of you are in the right room. I don't know about you guys, I was actually -- I'm actually a vendor. I wanted to make sure I got to this session so I got to convenient after the session to make sure -- so they wouldn't stick me in the booth. So I really wanted to be here. Let me introduce these men here and let them go on with what they're doing. I want to listen to it as much as you guys do. First, we have -- who is starting? George is? We have George Salzman. He's the executive director for the atoms center at Abilene Christian University. Which follows almost a decade of service as ACU's director for educational technology. As one of the leaders of ACU's connected mobile earning initiative, he works closely with faculty administrators who are deploying and researching mobile learning within education. And also we have here Dr. Scott Perkins. Over the last three years, Dr. Perkins research focused has focused on issues and outcomes related to the ACU's mobile learning initiatives. And including student engagement, learning outcomes, and utilization patterns. Related to the integration of mobile learning devices and higher education. Perkins is a professor of psychology and has played a leadership role in conducting and is encouraging faculty research on this huge campus. I don't know what you guys, but I've been aware of what they've been doing at ACU for a long time so I really want to hear what they have to say. I will turn the time over to you, George.

Thank you very much. It's always good to be here at Educause. Let me fiddle with the technology one second..

All right. Okay. If you didn't get a chance to the poll at RWpoll.com, you can enter session ID Philly, and I'm interested in what you think, what is the percent of technology that needs to be in place before all right, we're going to start using this? At some point throughout our lives we said, everybody's got a cochlear. I expect somebody to bring a calculator to class. I think everybody's got a pen and paper and we're expecting that people are going to be bring a pen and paper to class. As you think about technology, what is the percentage of students who need to have access to that technology before you say, we're ready to go? I'm really curious to see where this group stands. Okay?

As I mentioned before, or it in the introduction, I'm George Salzman. I'm the director of educational technology here, director of the atoms center for teaching and learning at ACU and Dr. Scott Perkins, and we are at ACU, we are -- tell us a little bit about who we are.

As you can see from what appear, where from a relatively small liberal arts comment -- college, represented of students around the nation and several other countries as well. Highly ranked in U.S. News & World Report and so on. Got a lot of attention over the last several years for being the first undergraduate campus to saturate with iPhones and iPod touches and we have been talking the last couple years at Educause about our research findings and we are anxious to share new conclusions and findings with you today.

So we're going to be talking back and forth during this, sort of beauty and brains conversation. I'm supposed to be the beauty, Scott is supposed to be the brains. I do know how well that worked out for either of us.

There's a vote on that later.

I wanted to start by just saying, where are we right now today with mobility? Mobility today looks a lot different than when we started three years ago. Now in our fourth year of mobility, we saw this coming a bit and we said it would be interesting to kind of think about where this would lead us. But 250 million iOS devices, and 4 million more of those were sold this weekend. Android is just on fire. 190 million. This is just the last few years. The number of apps that are in the app store, the number of downloads is staggering. And number of educational apps and the way that we use those apps, it really transforming our lives. It's hard as a user of the connected mobile device to imagine how I get by without one now. And just having had that a few years, it's become a transformative -- it's been a disruptive innovation. Like us at three, four years ago, five years ago, we were looking at, what is mobile going to do? We weren't the only ones. The people who were participate on the horizon report were looking at that. It's been on the horizon -- the one-year horizon for a number of years, we're looking at the kinds of things that the students were doing with technology. We decided this is interesting enough that we wanted to force the issue, so we gave our students devices so that we could help understand this before we would see this sort of natural selection take place in the classrooms.

I want to talk a little bit about what this has actually meant for the students. I had for example one of my sons was a freshman back in our 2000 and class, so beginning with the fall 2008 entering freshmen, choose an iPhone or iPod touch. Obviously if they pick a phone they were response before the plan. And then beginning just this last year, students could have a credit towards purchase of an iPad instead. Over the course of those four. Now, we seem -- when we were first the devices at two years in roles. Juniors got new devices entering that time as well. So we've had a saturated undergraduate campus with devices for the last two years and student selection ratio of about two thirds or more picking iPhones, and now with iPad, that split would be about 65 to 67% phones and the remaining for iPod touch.

So I'm going to come back to the question we started with. What's the percentage of ownership of device before we can say, all right, we're ready to use it? Well, here's what you said. Slide this over -- looking at the live data, most of you have said it doesn't really matter as long as it easy to get and it's inexpensive. You know, there might be another set of questions, what's expensive, what's not expensive? Many of you have said that if at least half of the students in the class have a device, then it's worth adopting that. So where are we with technology, mobile technology, today? Well, if we look at the latest data coming out of -- look at the latest data, 87% of students own a laptop. I think that ranks in their about the 80th, 90th percentile of where you were saying we should adopt the technology if it should exist but how many of our faculty are saying okay, everybody take out your laptops in the class let's do something with them? I don't know that there's that many. I think we see a lot of students doing things on their own but I don't know if we see a lot of coordinate activities with that. What about -- what about with mobile phones? Internet connected handhelds? This is actually two years ago come looking at data that's three years old, 2010, which is looking at the 2009 data, 62% of students owned an Internet connected handhelds and that was growing at 71% a year. What we see is 55% of students today, this is the data that just came out in the 2011 ECAR report, 55% of students own a smart phone. That's a lot. I'm wondering when we as institutions are going to say, okay, everybody has got a smart phone, let's try to make that happen. How about this? 99% of students, 99.5% of students own a cell phone. How many of those can do texting? I don't know? Every one of them? So if 100% or 99.5% of the students have a cell phone with texting, could we think about using that as a technology that we would use in the classroom? What about cameras? How many of cell phones have cameras? And how are we using those cameras on those devices educationally? Are we just not thinking about that? At ACU, we -- we began thinking about that. We said really, we see these technologies kind of emerging and we think that the teacher in the classroom has three choices to make. I don't think ignoring them becomes a choice. I think you're going to be forced at some point to say, okay, I want everybody to drop their mobile phone in the box when you walk in the classroom. I don't want to see anything that looks like you texting. You could do that.

One of the things you could say is hey, you know what? We're going to use a lot of things that are going to make use of mobile technologies. You are encouraged to use these devices. The other option would be to say, we're going to things and you are required to have these devices. You know what? A campus could say, I want everyone on campus to have an iPod touch. It's $200. I don't know if it fits in your realm of readily available and inexpensive but I think it fits in mind. So at what point were we going to say, everybody needs to have one of these devices is we're going to have these devices in the classroom for educational purposes? So this was the big question that we had at the beginning when we were starting to roll out devices. Is you between essential? -- Is you between essential -- ubiquity?

Primarily we saw at the initiative, faculty very concerned about the students who were the have-nots and couldn't play. For sample we did a survey and a required freshman class in the fall of 2008, had 300 students in the class and had a 92% saturation rate given that our policy was full-time entering freshmen under so many hours given the device. And deny class we left about 8% of the students about 24, 25 students out of the cold, no device. And the from the professors are saying, if ever but is not on the same platform, I can't rely on it, it's not fair. I don't need to go on. What we find when we look down the road even within about a year into one of our chemistry classroom studies we'll tell you about it a little bit, we found that this professor had students divided into teams of three or four working on independent research and independent lab conduction. And over the course of the semester she found that most of the teams had only one or two of the devices in the room for labs. Out through the semester. But every team already had had a device to use to check on, so working in teams, working in pairs has been highly productive, may be just as successful for a number of kinds of activities and ubiquity hasn't mattered as much as we maybe have thought. So the deployment of programs into places where -- between laptops, smart cell phones, et cetera, we've got a significant coverage of the room to get everybody in pairs or groups online would have been adequate but we didn't know that in the fall of 2008. We had a faculty that was stuck on if everybody can play, I'm not going to try.

So the need for students to have access is what's most important. They have access through laptops, access through smart phones, Internet connected devices of all types. And we really see this changing the way that we think about how the Internet works. How the Internet works in our classrooms. So with online learning, we kind of had the phrase, anytime, anywhere. And with mobile learning, we really think that this is coming into something different. We think that it's all the time, everywhere, because the student carries that device with them all the time everywhere they go. They have this access. Any really transforms the way that they participate in class and out of class and with a variety of things. Here's the research that's going on. We've done a variety of different things with our faculty and our students. Do you want to talk about the numbers?

Sure. If you were to follow the web like that at the bottom, you would find the site where we have the positive findings and summaries of research projects. I want last night, 41 things that I would qualify as empirical formal evaluations that have been done or are currently underway. But if you look at all the faculty members to whom we've given some money or some devices to try something, we've got over 70 additional experiments. And if you look at the folks across our campus that are trying things, it's literally a significant number of faculty. It's not everybody, but most of our faculty have a device and many of them are trying something in at least one class. That was the challenge George put out to our faculty at the session a year ago, those of you who haven't played yet, find somewhere, one class try one of these tools or apps and get in the sandbox and try things for the future.

Well, our students love it. And it's interesting to see that each class of students who comes in loves it more. The fact that the blue line doesn't change much, the redline doesn't change, the yellow line doesn't change much, is interesting. The fact that each of those classes success is higher each year they come in a --

One of the things we've clearly done is to create an expectation among entering freshmen because they've heard about what we're doing, they've been giving a device and they walk into those freshman devices -- classes , so it's been a nice way to turn demand back on the faculty number to get busy and play. At three weeks, these freshmen are saying that I expect this and this and this to be happening. Collaboration, active learning, et cetera.

When we started looking at all the so that was coming in, here's three years worth of data. Looking at how these things are coming in chunks of, how do we group them, how do we put them in piles? And we really saw that learning was being transformed in a variety of different ways. First, formal learning -- we're seeing a lot of things that were restructuring the way formal learning happens. The kinds of things that you think about when you think about a college class. We also saw that it was impacting may be more what's happening informally, what's happening outside of the class, how are students engaging with content, how are they engaging content outside of the formal class process? It's changing the way we think about literacy is. -- Literacy. The students are using the media capability of these devices to do things that we might not necessarily have anticipated beforehand. The cameras, I mean, everybody now has access to a 1080 P. camera in their pocket. Video camera. Community -- these are social devices, and they are reconnecting and communities are forming around capabilities in these devices, and finally the last category we're seeing is how it's restructuring what we would see as authority in the classroom process. Students and teachers becoming more engaged and a peer level in the classroom. We're going to go through each of these little by little, provide some examples of how that has happened at some results of some of the studies that were conducted that we kind of put into those piles.

So if we look at the first one, restructuring formal learning, there's been a lot of stuff that's been going on .

This is a slight I first put together about a year and half ago when I was headed off to talk somewhere and I thought, I think we're at a critical place where for many of the departments on campus, I can now find that faculty member whose kind of gotten on the ball, tried things, and if not a champion, at least is an expert residentially for that particular department that somebody could go to and they don't have to come across campus to us to find out what to do, et cetera. So here's a list. At that point about 18 months ago where we have representation and I was really surprised that this covers more than half the departments on our campus as appointed time. -- At that point in time. Next one. >> So one of the things I've done is to survey faculty at the midpoint of each year, so we've now got three years of faculty data, we talked with this before, but these are numbers that we didn't get until December or January of 10-11. So you can see at this point, faculty responsiveness and we've got more than 60% of faculty responding to voluntary online survey, those are response rates, and I don't know other than giving people devices, I don't know what you can do to get them to respond to surveys like that. We have faculty that are excited and trying things, taking their devices with them regularly to class. And I always can't out on the last point on this slide, 182% say, I'm -- when 82% say, I'm using it for required activity -- in the middle, 90%, comparable with required class activities, from a technology deployment perspective, that's a good definition of success that's maybe a homerun. Live Internet searches is a place that's really been relevant for me. -- We haven't given them devices yet but I'm doing things differently in class because of our initiative that I wasn't thinking about doing years ago. People are in groups, looking stuff up live, educating the classroom. That's because of what happened other places on campus and in my other classes. The same thing happens when we look at students. Formally positive, these are freshmen data from last fall, and the freshmen are very excited about what's going on, bringing devices to class, we continue to see that iPhone, iPod touch different where the iPhones are there even more often. But those are things we talked about before anyway, a little bit of a snapshot of students say, this is having a positive academic impact on me. Both students and faculty will not tell you that students are working harder or making better grades but on all the other dimensions of engagement, active learning, collaboration, et cetera, the numbers are significantly improved as a result of having devices according to faculty and students.

Just going back to the idea of ubiquity, the ability to do live Internet searches in class and ask your students, so what does the Internet have to say about this, what is the source, the Journal article have to say about this? These are kinds of things that can happen even if not everybody in the classroom has a device. The teacher needs to be able to know that many of the students do have a device and that is enough to be able to have a class discussion on a they can pair off, some and next to them they can --

And if the students don't mind. They don't mind having to slide next to somebody, it's more engaged, more active, more interesting. >> This is an acronym that we have created that we call mobile enhanced equity-based learning. So you may have heard about equity-based learning. This is a mobile enhanced way. What it does is it allows the written documents that would be a part of a laboratory instrument, the India safety sheets, -- the MDA safety sheets, they are provided in a mobile fashion and most importantly, the teacher makes the lab assignment in the form of a podcast. Rather than doing a regular lecture, the teacher puts that out in the form of a podcast and allows the students to be able to consume that information at their own speed. If they want to or wind and played again, they can. If they want to fast forward, they can. On average, a student will view a podcast about 2.3 times, which is more than the 1.0 times you would get if you showed up to the lecture. If you're interested in that, there's and assessing deeper learning session tomorrow, Thursday, at 2:30 back in the room that's right in there. You can get more information about that. Here's the results that we found out that study.

So Dr. Powell, from our biochemistry department has divided intro to chemistry lab sections into those that were also equipped with devices and those that weren't, this came about initially because of our deployment strategy, freshmen, sophomores, et cetera. So as you see here, she's looking at the traditional course outcome academic performance type grades. Looking across those that had no lecture and did podcasts an independent team Lab conduction and those that had a traditional lecture taught kind of lab. And what you see is essentially no significant difference across the academic outcomes. We had a lot of discussion about this when we first began to see these results, and I think he successfully argued that this is a win for us, this was a highly successful programs in -- sent students to medical schools at two or three times the national rate. It wasn't broken, I think is my point. We've taken lecture out, put students in independent teams and let them create their own labs and to those experiments and academic mastery of content is where was before. We move from a teaching platform where the ceiling is right on our heads, lecturing, 21 we have the almost limitless possibilities with no loss of student mastery of content and competence in the discipline. And then we do see -- from one of her iterations of statistical analyses the last time around, the more highly motivated students actually performed better. As you might guess, the better students, the more disciplined, more engaged, more active students are also those who seem to get an academic up from the addition of new technology and new tools. If they are going to study, having another tool helps more. We have seen that a number of different places where we're talking about clickers or flash card use, we're talking about online resources, the more motivated, the more disciplined, the more active students seem to get a bump.

If you have wondered if your a courses were holding back your best students, maybe this is evidence. So Dr. Mark Phillips is a professor, tedious intro business course and he has an idea, he's going to completely build his course around the idea of having mobility, completely restructure that course.

That was a big task for Mark to buy off. He redesigned the whole course, and I think has worked through that a couple semesters to work out all the kinks, but even from the very first semester, you can see his students were about as positive about what they were doing. Other than liking to have a paper copy of this oldest -- that it would be quite that high now, that 18 months ago, -- I don't mind things crash now and then. In fact I would summarize to say this is one of the greatest changes that's taken place on our campus among the faculty and students. We expect things not to work overtime, we're willing to have that happen and people go in the next day trigon. That wasn't happening in 2008.

Okay. A lot of people have been asking, what's the difference between an iPod and a laptop? This is a study, and in an economics class in which some students had access to the course management system blackboard through laptop, some students had access through the iPad. The iPad section is the third one over there that's got the yellow header. And the results?

You're looking at a heat map. Green colors are lighter activity, red is darkest activity. We can see some interesting patterns throughout the data and so on, but generally you are tracking more yellow, more red showing up on the iPad group. That's also an afternoon section so you could have some other interesting questions about time of day. We even have an enrollment issues, if you're smart and disciplined you get up early and you enroll on the daily get your classes and you don't have to go to class at eight. The really interesting thing to me though about this project is that we've had people asking about real data as opposed to student and faculty perceptions of use. And so we have these two business professors use ocean drilling down this year into log onto, log off, and to some extent connection to app use. And this is a guess the most expensive actual use study that we've had -- we had conducted at this point in time.

So iPad access content more, and access more of it. Interesting study. Okay. Now, thinking about how blogs shape the way that our classrooms work, in a number of classes, at the ACU, they have set up mobile blogs, so these are based off of WordPress mu, you have the ability to have a plug-in that allows these to be Mobley accessible. How to students access the blogs, how to bring outside information into the classroom, so this is an interesting study with a large cornerstone class, cornerstone is our intro to that kind of intro college class . It meets on Mondays where you've got 600 people or so in a classroom at one point in time and then it they break out into small groups on Wednesdays and Fridays. The results are also interesting in that our teachers perceptions of how the students use that material.

I think this is probably from the students perspective the most innovative thing about technology used in a large lecture kind of setting. They are being challenged to go find bits of information, find additional alternative perspectives and bring those in to a current ongoing discussion in the classroom, so Mondays are the big position in the lecture hall and they vote in polls and do word clouds and so on but then they get class and Wednesday and Friday and we in our groups or as a whole cost are going to find information, bring it in, so on the fly externally informing a class conversation is a really different model for teaching and for learning them both our teachers and students were used to.

So poor that allows students to participate all the time everywhere because they have the device with them all the time everywhere has been a really great tool. So let's talk about what's happening in the informal learning space. This is outside of the formal classes. These are teachers who are working in that area. Augmented reality, what would be like if you could experience art using augmented reality? That was a question that one of our art and design faculty had. Created a -- using layer which is an application created a set of augmented reality tools for experiencing a cult -- this culture on our campus and found some really interesting results. -- A sculpture.

This is Kenny Jones and he is looking at the comparison section traditional versus they focused a our section. And you are seeing significant mean differences in the direction of greater mastery of two-dimensional, three dimensional concept and use of the right terms and so on. Really incredible results, very exciting to us. Number, this is a real-world classroom and this was a first-generation experiment. Here's the problem. I mentioned sections and times a day a minute ago. Guess what time the AR section was. Early afternoon. It'll -- the eight o'clock session was traditionally on time. When you think of research and methodology with no place rule out alternatives or threats to the internal flow to the study, what I mean? When you then look at pre-test versus post test scores, all of this difference disappears. In fact it's about 70% of the fact that we see that gets us so excited with their pre-test or the beginning of the course. Now, he knows who's in which class, he knows what he's teaching, he's excited about what he's doing and students who are better and in fact we had more upper-level students and students with higher GPAs in the afternoon section. This semester, Kenny is researching the same question but now using a crossover design were students in the -- in each section of course get some with augmented reality and some without. We are controlling for those very most, the instructor where does and the student demographic offenses maybe get a cleaner result. It was really exciting and some of the effect seems not to be purely due to the manipulation but at least part of it is really exciting.

Thinking about student teachers, teacher candidates, there in the classrooms, they are doing student teaching, and they are having their performance evaluated in the way that most teacher candidates would. Rather than just teacher coming in and providing the evaluation, a mentor coming in and providing the evaluation the mentor would use the camera capabilities of mobile device to video that and then allow those students to see themselves on video before the reflective comments were provided.

So Sheila borrowed I think five or six iPads from -- in the spring semester and conducted a pilot. This was near the end of the spring semester and that iteration of teaching and critiquing their own teaching she found to be substantially deeper and more in line with her own comments for the teacher candidates than had been true earlier in the semester and the only thing different obviously the semester going along, they were getting better but the real change was to say they now have videos of some -- of themselves as they watch to form those reflective statements. She said, I found this interesting thing, what should we do? She's one of our mobile learning Fellows. Using a crossover model where teachers do traditional reflection based on memory and comment, and then the next time around will do video enabled reflection on their teaching. And so she systematically is studying in a way that would disentangle some of that but she was really excited and the whole project came about by the tremendous difference in the depth and conference of this of crude -- students critique of their own teaching that video provided. Video on a mobile device than essentially is a technology manipulation that could be taken anywhere. Anytime I want to look in, I could do that.

It works with the golf swing, it is with your teaching. This is Dr. Scott Hamm. He was working with students in online courses, graduate students in online courses, we gave them iPads to see how they would use 3G enabled iPads in their online courses, and the results came back extremely favorable.

I think you know where the thing about this slide is the only thing we've slope -- shown you so far from the online audience that we are still seeing the same kinds of patterns that we are seeing in our on-campus broad surveys or focus class assessments, does it make me get a better grade, does it make me a better student, not necessarily. Doesn't engage me? Yes. If you talk about online expert being short -- experience, overall it's great of a course, utility is improved, those get rated highly by students as a result of using mobile devices to it -- to assist their learning.

The mobile aspect of the eye that really plays into the online study. We're also Rick -- also interested into how that plays into how teachers use these devices. So this is a study from Ken Pamplin who is the chair of our chemistry department, not thinking of how it's using chemistry, but what our state -- teachers doing with iPads when there different situations and activities?

These are middle school and high school science teachers it enrolled in a three-week training program on our campus towards Texas teacher excellence kind of model and students can purchase pay for the next year in some session and a -- ongoing activity filled trips and so on. What we see here is Dr. Pamplin wrote in an iPads -- 3G iPad with data plans included, yet all that richness the grant, so they literally had all the time anywhere access to information. What's exciting to me is that this is the first real deep look we've had at patterns of use. I think this is similar to my experience and I expect most of yours. If you initially asked the question that says, what is a tablet device going to replace my life? Is a laptop, that -- desktop, smartphone? The answer is it doesn't replace anything. It's in addition now. It has a note -- it has its own niche. Teachers tell us about after four months of use, when they are traveling, it's on iPad. When they're on their office and punching numbers on a spreadsheet and statistical analysis, they are still on their computer. But the iPad clearly is bleeding over. If you look at reviewing and editing documents, you see -- and recreational reading you see iPad playing -- professional reading, that's where I'm headed, the second one. IPad has made a significant dent in that middle category of at home.

One of the things in the heat map, this interesting, recreational reading, professional reading, even in the office, teacher is more likely to pick up an iPads to do professional reading than any of the other technology that exists in their office. I thought that was interesting to see how that plays out. Okay. So let's think about how this is restructuring community. How are these communication devices helping restructure the way we think about communities? This is Dr. Steven Baldridge. Is a professor of so -- of social work. What does it mean to teach remotely? How can I teach my class about -- without me being in the class? How can I get them in the real world? Social work has a lot of things that happen in the real world, so let's take this class and let's ask them to go into different communities, the disabled community, Hispanic, African American, and experiencing that community, talk about while they're actually in that community. So this is some blog stuff he's got going on, these are photos that are being brought into the blog by students, they're putting audio comments on. He's asking them to tweet what it's like to be a part of the community. He says, let's put you in a community where you feel that you are not comfortable. I want you to go to a school lunchroom and tell me what it's like to be there. This is a tweet that a student came back and said. While I'm sitting here right now with all these students looking at me, this is really uncomfortable. And that may be what it's like to be a part of a community when you are an outsider. Having that experience is such -- so much more powerful than when a student is just reading about that experience in a case study in a book somewhere or trying to imagine that. So Steven Baldridge is a big believer in get the classroom out of the class , get the class of the classroom, so they can experience the real world and what we are trying to study. This is a study from Jamie Goff, who is working with a graduate class thinking about how the graduate students are using mobile devices to create a community.

The main purpose of showing you this slide is to remind you that this was a faculty member with a group of students that we had given no devices to. These are graduate students, they have not come under our deployment plan yet but she looked at logging, blog use, social activity among graduates, found them excited, anxious, here to purchase pay on our project and will and to make use of any project we create even when not giving them devices.

So the next is user interface design class thinking about digital media and usability, so what are the ways that we can use mobile devices to be able to have the students be a part of real world communities? How can they work with real-world colleagues across the planet? Being able to use these skills with real projects. The ability to have face time conversations, the ability to have the interactivity that this has, the way that we keep connected at the office, also works in the classroom because students can keep connected with their work teams that are working in real-life situations that are in the class environment. Thinking about literacy, how is this redefining literacy? You know, this kind of brings up this interesting observation that we're seeing happen across our education is that we know what a textbook is. And we know what a course management system is. But when you bring the iPad into the equation, mobile learning into the equation, it seems like these things are merging together and now we're looking at the sort of interactive content. So is a course management system or is it my book? I mean, how does it work when students are making comments and having discussions in the margins of the pages of the textbook in which they are reading? How does it work on these journal articles become socially connected to a larger community of people? We were thinking about that saying okay, what are the things that we can learn about this? So what did we learn?

One of the first things we did was to ask students about their perception of willingness to fund iPad purchase. We're managing a day in which the iPad essentially or some other tablet comes a digital backpack and her books are there and are assignment and reading notes and annotations and so on . At least among those early groups of students that we asked, 75% of students respond positively to the question, it over the course of career your text books were available on a mobile device, would you be willing to fund the perfect -- purchase? Maybe mom and dad paid, and not me, but still there saying yes. Tell me that I can have have my books on this platform over the next four years. Add that to my bill and I will pay for it.

You know that half of us I don't know that half of the books are available now but I do believe they are coming on quickly. If you go to the exhibit floor, a number of vendors are moving textbook in this individual world. It's something that's moving fast. Before that happened, we started saying what can we use an app with two approximate the interactivity of a connected book before these things exist? So we worked with a company called Gailo to build a supplement for a statistics course.

Three semesters worth of this project data were summarized in an article in Educause review sometime last spring. Anyway, the reference is there at the bottom when the a were asking -- my co-authors on the paper, and generally what we found is that students are significantly more engaged, excited, really like the tools that are available, flashcards and review, strategies, quizzes, the instructor was excited as well. We did find some difference for more motivated or highly performing students to get a bump even in academic performance from devices. This was essentially a supplement to the textbook, so the course was redesigned around the textbook plus app use for assignments and reading components of the class.

One of the things I saw coming out of the studies that I thought was interesting is students are here with a multi-hundred page very expensive statistics book and a $4.99 app. Minimal -- really condensed content. The main thing that students are saying, why do I need the textbook that I've got all the things I need here.

The use of the app at places where they would normally have been studying, winning in line for the movies to review and to flashcards. -- Waiting in line. >> This was interesting. In the chemistry lab where students have mobile devices, doing lab reports like we've all done, except with the little like book with gridlines on it, they're doing it digitally. Without any prompting, they all began to start submitting multimedia lab reports. As a student that sees these tools as they are there, they think they should immediately be used in a traditional lab environment. Thinking about that, we began a large conversation across campus about how do we instill faculty and students with the understanding, the skills, and the pedagogy to begin to think about media as an alternative literacy to traditional printed paper? What does it mean when we take maybe what used to be an essay and turn it into a media assignment? How do we think about things like to chill storytelling? How do we begin to incorporate the students -- to tell storytelling. What are the skills they need to be effective communicators using these new literacies, new techniques? We created the learning studio to help that, both to help our students and to help our faculty with not just the facilities to be able to integrate these media, but the expertise to have someone guide them through that process.

And I wanted to take you -- take a minute to talk about a Masters thesis from one of our psychology grad student. We know that digital texts were coming. We've seen states go -- claiming to be digital only at some point in the future. Clearly there are challenges. One is looking at those early Kendall studies or the PDF file on the computer studies, students and like those in learning was great on those kind of platforms. We know that we need media rich and cost effective digital textbooks or it just doesn't make sense. If it's the same words with no enrichment and if it's the same price, then why? Secondly, from a research standpoint we really need to know what happens to reading comp ranch in and transfer of information when we move from the known printed platform to a digital platform? That's what Ryan studies. He looked at -- Ryan looked at reading comp ranch and transfer learning with students on his psychology, social psychology chapter out of an intro book. They took since tests over mastery of content, and you see literally no difference here for reading comp ranch and but a significant effect for transfer learning. Now, this was randomized, this was experimentally controlled and this is a pretty clean result. Need some repetition and an extension to other settings may be maintenance of learning across time and so on. When they looked, maybe marker after would be more discernible. -- Maybe the bargraph. Transfer of learning content, reading on a digital platform as opposed to paper text. It's probably the first clean result we have in this direction and it's pretty encouraging.

Okay. Thinking about how this changes authority. How does this change the way things happen in the classroom dynamic between who's in front of the class and who was sitting in the Rose that are in front of the teacher? Thinking about back in a clump -- in a chemistry class, in the future?

I want you to notice the means in the first column here that the students in the lecture group traditionally taught lab are going to the instructor more often during the lab as they conduct the lab to ask those clarifying questions. And the students in the iPod group to have the pre-class podcasts and are going back to those podcasts on their devices to review that one instruction the camera member or not hitting the teacher as often for those small remind me what I was supposed to do next kind of instructions. I would hope and this part of what the MEEBL project is looking at his career, that we're having deeper level more scaffolding type interactions because we don't have to have the rudimentary what to do next kind of contact.

Okay. A math class, where this is -- she is working with math instructions, it's the old mass elementary instruction teachers. How to use technology?

I will let you read to the slide to see what she's doing but she's essentially got two different classes, one is special ed and one elementary math teachers. And they put a significant chunk of the class on iPad format. We've got I've had loaned out this semester and she's having the students do all kinds of things, essentially looking to build more student reading and more preparation for class time and more independent in learning.

Okay. Bob Maccabean working with a team of researchers from Cambridge University in France, thinking about how do social invitations work in class books? As I annotate and share that with my social community, how does that function?

The main quote point would be the first bullet again, although that developers had 10, 15, 20 different annotation tools in mind, the students want two or three or four, teach me how to use those on the go with those.

So the next thing which is very similar, Dr. Ian Shepherd, working with an economics class, they all have a copy of the inkling textbook which allows the social and efficient. How to use those within the classroom? To gain understanding from each other?

And one of these places where we first saw the role of students -- our students being folded into the app developers design and update releases that came about. For example, there was an iteration of this particular app or stroll -- scrolling went up and down rather than sideways and the student didn't like that. They wanted to turn pages when the reading. Similarly, they lost their annotations one a new update of the software would come out. Those were critical pieces that the developers needed and were incorporated in the next design. Students are involved in the development of software is pretty exciting for us.

We've asked if they would like to see these teachers notes that the teacher to and textbook. We get a big yes. That's the big groupings that we've seen, how these things are changing. To say that it's changing a lot of things and that these things are intermingled, I think the barriers between formal and informal learning are quickly closing. We tried to group them that way but in so many of these studies, you would see the idea of out of class and in class getting confused with each other, the idea that students are creating community and that provides a secondary authority in the classroom, teachers are finding ways in which those wishing to the work together and they're all doing this under a new literacy with new skills, especially media skills being brought in on the conversation. So when you ask us about mobility because we do believe it's the few -- the vehicle for the future of education that there's so much ability with these devices that the time on task that goes up because students have access to each other, to their learning groups come learning content, anytime, all the time, everywhere, that sort of stuff is really amazing. We've got a copy of our mobile learning report. We do this every year, this is something that sort of summarizes all the activities that are taking place on campus, provides a little bit more depth and then point you to other online resources that have even much more depth, there are a number of those books that are on the back table back there, or you can download a digital copy from the QR code that is here. There's our e-mail addresses, and information that you can get on the web if you've got more follow up that you would like to do. Do we have time for questions?

I think we're almost out of time.

If you have to ask a question, you have to come to the mic since we're streaming.

Again, thank you so much for being here. It's a great honor. And I hope that we can continue to have conversations about how to change the future of education.

Thank you.

[Applause]

[event concluded]