# "Heck, yea. Technology is the Bomb, yo": Student Perspectives on a Mobile Tablet Pilot Project and Implications for Educator Preparation

**Heather K. Olson Beal, Ph.D.**
Stephen F. Austin State University

**Mark S. Montgomery, Ph.D.**
Stephen F. Austin State University

**Mary Smith, M.Ed.**
Stephen F. Austin State University

## Abstract

*This exploratory case study of a mobile device pilot project at a regional comprehensive university highlights the experiences of students who participated in the project. Data, which included focus group interviews with student-participants and a post- survey of student-participants, were broken down into units of meaning (Lincoln & Guba, 1985) and then organized into discrete categories via open and then axial coding (Strauss & Corbin, 1998). Findings highlight student perspectives regarding how tablet usage changed the learning process for them (though in many cases, they struggled to articulate exactly how) and discussion of benefits and challenges of tablet usage in university classrooms. Findings have important implications for educator preparation programs and faculty which are training future teachers to work in classrooms with students and mobile devices.*

Keywords: mLearning, mobile tablets, student voice

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As use of internet technologies and mobile devices in PK-20 learning environments has exploded in the last decade, more research is needed that explores the impact of these technological shifts on students' academic engagement and learning outcomes, as well as the impact on pedagogical strategies and styles. This growing body of research is of particular importance to faculty in educator preparation programs who are training future teachers to use mobile technologies that may not yet even exist. Teacher educators are preparing teacher candidates who come to college campuses with a wide range of classroom technology experience ranging from none to teacher candidates who attended schools with significant access to and use of technology. Furthermore, teacher educators are training teacher candidates to teach in schools with a similar range in terms of access to and effective integration of technology.

In the rural area in which this case study was conducted, some teachers in area schools are using mobile technologies increasingly in their PK-12 classrooms to ask questions, deepen existing content knowledge, and co-create new knowledge with their students. As teacher educators, we began to wonder how college students perceived technology and how they feel about using technology to enhance learning. What do today's college students know about technology? How do they feel about it? Do they perceive it as an overall good? Do they use their devices as learning tools, or primarily as

communication devices? Are they inclined to embrace technology as a learning tool or to eschew it? These questions, which are key to designing teacher education coursework, creating meaningful and authentic assessments, and framing conversations about technology, are the impetus behind this exploratory case study.

While there is no one agreed-upon definition of mobile learning (or "mLearning"), it includes—in broad strokes— the pedagogical use of mobile computing devices such as phones, tablets, and netbooks (Brand & Kinash, 2010; Crompton, 2013; Manuguerra, 2011). Nearly a decade ago, Cobcroft and Towers (2006) identified three ways in which mobile devices would change the teaching and learning landscape: 1) changes among the learners, whom Prensky (2001) earlier identified as "digital natives" while older adults were called "digital immigrants"; 2) substantive changes with regard to the types, availability, and access to technology; 3) changes within institutions as administrators and faculty grapple with how to respond to these technological shifts. The following brief literature review focuses primarily on the ways in which technology use impacts the university student, which is the level of analysis of this study.

## Theoretical Framework

According to Crompton (2013), students today both expect and are expected by their professors to be active in their own learning—shifts which reflect the move away from behaviorism and towards cognitive-constructivist theories of learning (Bruner, 1966; Vygotsky, 1978) and problem-based learning (Wilson, 1996). The result of these pedagogical shifts is an increasing focus amongst scholars and practitioners alike on creating learner-centered environments (Freeman et al., 2014; Roehl, Reddy, & Shannon, 2013).

Research on mLearning, which seeks to connect the advent of mobile technologies with research on teaching and learning, is mixed. For example, numerous studies (Al Zahrani & Laxman, 2015; Chen, Lambert, & Guidry, 2010; Hargis, Cavanaugh, Kamali, & Soto, 2014) identified positive relationships between Web-based learning technology and student engagement and achievement. While Enriquez (2010) identified an overwhelmingly positive response from students towards the use of tablet PCs for learning, students in Rossing et al.'s (2012) and Miller's (2012) studies reported both positive and negative perceptions of mobile technology usage. Henderson, Gibson, and Gibb (2013), on the other hand, identified advantages (e.g., size, weight, portability) of iPads for students with disabilities as well as disadvantages (e.g., lack of specialized software, difficulty writing lengthy writing pieces, social media distractions).

While Brand and Kinash (2010) call for more "empirical research that tests educational efficacy, not only interface acceptance or popularity" (p. 148), others lament the absence of student voice from educational research in general and urge researchers to highlight it (Bahou, 2011; Cook-Sather, 2006). Flutter and Rudduck (2004) posit that "The most important argument for listening to the pupil voice lies in its potential for providing schools with directions for constructing a better future" (pp. 131-132).

The primary objective of this exploratory case study of a mobile device pilot project at a regional comprehensive university in a rural part of Texas was to highlight the experiences and perspectives of college students who participated in the project. Because we wanted the college students' voices and experiences to emerge with minimal influence from us, we began with three broad research questions that guided the study. First, what benefits (if any) did students experience during the mobile tablet pilot project? Second, in what ways did tablet usage change the learning process for the students? Third, what challenges did students experience with mobile device usage? This paper concludes with some implications for educator preparation programs which are grappling with how to best prepare teacher candidates to appropriately and effectively use technology in their future classrooms.

## Research Design

In the fall semester of 2014, the Vice President of Academic Affairs at the case study site (a regional comprehensive university of approximately 13,000 students) asked a team of university faculty and staff to investigate the feasibility of implementing a one-to-one mobile device initiative. A committee was convened that included faculty members representing

a range of disciplines and staff members from various university offices (e.g., student affairs, the Information Technology department, the business office) to gather information from other institutions and to explore existing research. Over the course of this process, it became clear that more time was needed before a university-wide initiative could be launched. Thus, it was decided that a smaller pilot project would begin immediately while discussions continued about a university-wide initiative.

Once the decision had been made to proceed with a smaller pilot project, five faculty members from the following disciplines were selected to participate in the pilot: mathematics, engineering, education, political science, and German. There was no formal application process; rather, faculty participants were chosen based on their interest in participating and recommendation from their department chairs. Student participants in the pilot project came from a range of classifications (with the majority being juniors and seniors) and disciplines. The Assistant Director of the university's Center for Teaching and Learning ordered two different tablet devices (iPads and Microsoft Surface tablets) for the predicted enrollment (n=145) for the five selected courses. Contracts were quickly drafted and vetted by legal counsel as students would be held responsible in case of damage or loss.

A case study (Stake, 2000) employing both qualitative and quantitative data collection and analyses methods was conducted over the course of one academic year, which included one semester of planning and the first semester of project implementation. The three authors had different roles. One occupied dual roles: first, as a committee member on the initial committee tasked with exploring the possibility of implementing a university-wide mobile tablet pilot project and then, as a researcher. One author worked directly with the students and faculty participating in the pilot project, so she was familiar to them and was present during the focus group interviews. The third author participated in data analysis, peer debriefing (Lincoln & Guba, 1985) and writing.

When the semester began, students in each participating class learned that their class was part of a mobile tablet pilot project. If students did not wish to participate, they were allowed to enroll in a different section. No students opted out of the mobile tablet pilot project sections. While initial projections were that those five courses would contain approximately 145 students, each of the five courses ended up with enrollment lower than expected, which resulted in a total of 91 students who participated in the mobile tablet pilot project. Students in all five participating courses (mathematics, engineering, secondary education, political science, and German) were invited to volunteer to participate in the research study. Participation was not required or assessed in any way. The study was reviewed and approved by the Institutional Review Board at the university where the study took place.

Data were collected from two primary sources. First, we conducted three focus group interviews with student-participants. The focus group interviews had between two and five participants each and lasted approximately one hour each. Students were given free pizza to eat during the focus group. Second, we distributed a post-survey to all 91 participating students that included a quantitative component with Likert scale questions and a qualitative component wherein participants were asked to provide written responses to open-ended questions. Eighty-eight students completed the survey.

In terms of data analysis, the survey data was first carefully examined and tabulated to see how the students answered the Likert scale items. Second, the open-ended post-survey responses were broken down into units of meaning (Lincoln & Guba, 1985) and organized into categories that represented events, ideas, or themes that emerged from the data via an open coding process. Third, the focus group interview data was similarly broken down into units of meaning (Lincoln & Guba, 1985) (Strauss & Corbin, 1998). Finally, all the categories were compared with one another via the constant comparative method (Glaser & Strauss, 1967). The next section shares the primary findings, followed by a discussion of the findings and implications for educator preparation programs and faculty.

**Findings**

The first task was to assess how participating students said they were using the tablets.  This depended largely on the professor of record for the course.  Some professors used the mobile devices largely as expensive copying machines, disseminating electronic documents to students and allowing students to share documents from their tablets with the whole class via wePresent.  Others used the devices to experiment with content-specific learning applications or games such as Kahoot and polling apps like Poll Everywhere.

Survey participants were asked to identify ways in which they and their classmates used the mobile tablets during class.  During data analysis, their open-ended responses were coded and grouped into the following categories illustrated in Table 1.

Table 1
*Uses of the Mobile Device*

| Tablet Use | Percentage of Respondents |
| --- | --- |
| Completing in-class activities | 33 |
| Completing homework | 28 |
| Taking notes | 26 |
| Accessing websites/fact checking | 20 |
| Taking quizzes/polls | 19 |
| Discipline-specific usage (e.g., Arduino) | 11 |
| Sharing articles | 10 |
| Accessing professor's lecture notes or slides | 10 |
| Communicating with classmates | 8 |
| Communicating with professor | 5 |
| Accessing course ebook | 4 |
| Accessing online course delivery system (e.g. Desire2Learn) | 4 |

The second task was to assess the extent to which students agreed or disagreed with the items listed, which focused on student use of, comfort with, and attitudes towards the tablets.  Table 2 shows the extent to which students agreed/disagreed with the survey questions, where 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, and 5 = strongly agree.

Table 2

*Students' Uses and Attitudes Toward Technology*

| Question | N = 88 | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|---|
| Prior to taking this class I was familiar with using a tablet as a learning tool. | 88 | 14 | 17 | 15 | 23 | 19 | 3.18 |
| I feel that the activities in this class have helped me become more comfortable using a tablet as a learning tool. | 88 | 7 | 1 | 4 | 34 | 42 | 4.17 |
| I am able to use the tablet for work in other classes. | 88 | 8 | 3 | 6 | 28 | 43 | 4.08 |
| I feel the tablet I have is very easy to use. | 88 | 5 | 5 | 4 | 29 | 45 | 4.18 |
| I used the tablet in class for non-class activities (for example: social media, texting) | 87 | 21 | 19 | 9 | 20 | 18 | 2.94 |
| I feel I take more notes because I have the tablet. | 88 | 12 | 15 | 18 | 18 | 25 | 3.33 |
| I feel I communicate with the instructor more because of the tablet. | 87 | 5 | 13 | 16 | 19 | 34 | 3.43 |
| I read a majority of the course material on the tablet. | 87 | 5 | 13 | 16 | 19 | 34 | 3.74 |
| I use my tablet to access additional materials to help me in this course. | 87 | 6 | 2 | 4 | 30 | 45 | 4.22 |
| I believe having a tablet has helped me learn. | 87 | 8 | 2 | 5 | 37 | 35 | 3.93 |
| I feel like the tablet negatively affected my ability to pay attention in class. | 88 | 42 | 26 | 9 | 4 | 7 | 1.95 |

Student participants in this study were overwhelmingly (though not entirely) positive regarding the experience of using a mobile device in the classroom. In open-ended responses to the post-survey and in focus group interviews, students identified numerous benefits of the devices, including convenience, ready access to the internet, and ease of use. As one student explained, "The tablet was incredible . . . I was able to take it anywhere and it was compatible with everything I needed to do." Students also noted that the device was lightweight and compact and that they benefited from learning how to use a new device with which the majority of them had not had previous experience. Out of 88 responses on the post-survey, only two noted that they had experienced "no benefits" from having participated in the mobile device pilot project.

Four-fifths (82%) of students in the post-survey agreed or strongly agreed that the tablet had helped them learn. In focus group interviews, the researchers asked students to describe whether and how the tablets had changed the learning process for them. Students responded similarly on the survey questions, noting that they participated, paid attention, read more of the course materials (51%), and communicated more frequently with their professor (81%) in the tablet-enhanced course than in their non-tablet-enhanced courses. For example, one student said, "My attention was heightened while using the tablet in class" and another said, "I was able to communicate more with my professors, mainly because my email was linked to my tablet." Nearly half (n=43) of the respondents on the post-survey said that they took more notes in their tablet-enhanced class because of the tablet. Other students said the tablet helped them be more organized and efficient with their reading and studying. For example, one student explained, "I have become more streamlined in how I work, study, and present material in class." Another noted that she had "become exponentially more organized and engaged in my classes" due to the tablet usage.

When asked to compare their tablet-enhanced course to their non-tablet-enhanced courses, students said that the tablet-enhanced course was much more engaging. In one focus group, a student explained that in most of their courses, "They all follow the same basic format. You just walk in, sit down, and write notes while the professor talks." Students said that their fellow classmates do the following things during lectures: texting friends, sleeping, not attending, and "just basically blank stares." One student noted that in a non-tablet enhanced course during which he estimated that the professor lectured 90% of the class time, a fellow student sits in the back of the room and watches Netflix with no sound on. Students

explained that they were more engaged in the tablet-enhanced courses and benefited from being able to actively participate in class and follow along with what the professor was doing on their own device.

Finally, students identified a wide range of challenges they experienced in their tablet-enhanced course, including compatibility issues, learning to use a different platform (Apple or PC), battery or other hardware issues (i.e. protective cases), weak connectivity, devices updating in the middle of class, and fear of breaking or losing the device and thus being held financially accountable to the university. While some students (42%) said the tablet negatively affected their ability to pay attention in class, others explained how they reserved the tablet only for use as a learning tool, using their phone for entertainment and social media. One student explained, "I was actually surprised by the amount of people that weren't sitting there just on Facebook or whatever. I thought that was gonna be a problem, but people were actually engaged on the tablets."

We close this section with a brief mention of one additional consideration which we believe represents fertile ground for future research (though it did not reach the level of research findings). More than one student attributed their willingness and comfort with participating more vocally in the tablet-enhanced course to the anonymity provided by certain apps. As one student explained, "I think the best part was that it is all anonymous. So, if you get it wrong, you can't single out that person." Another student noted that he "was more comfortable contributing to class discussion when we were able to type out our answers first."

## Implication for Educator Preparation Programs

These primary findings suggest four implications for educator preparation programs. First, student participants in the study were almost unanimously in agreement that using the mobile tablet was a positive experience for them. However, when examining the multiple sources of data, different data sources revealed different answers, in some cases. For instance, while students responded in the survey and in the focus groups that the devices helped them, 42% of the survey respondents said that the tablet distracted them from paying attention in class. Furthermore, while the mean was 2.94 on the Likert scale item that asked "I used the tablet in class for non-class activities (for example: social media, texting), focus group participants reported that their *classmates* texted friends and watched Netflix. Students may have been reluctant to admit—either on the survey or in the small focus group settings—that they used the devices for non-learning-related purposes. The devices did, after all, belong to the university in which they were enrolled and the interviewer was someone who could potentially be their professor of record in a course. Thus, these findings reveal either a lack of honesty or a lack of awareness about their own technology use, coupled with very positive attitudes and dispositions towards technology use. If, as students, they are predisposed to feel favorably towards technology, it may be difficult for them, as teachers, to think critically about effective technology use in their future classrooms.

Second, students' perceptions regarding changes to the learning process and/or to their study habits were unclear. Students responded that the devices were helpful. However, when pressed, they were not able to articulate *how* the device helped them learn or how it changed how they study. Their responses focused primarily on things like convenience, portability, weight and a gut sense that they did *more* than they do in their non-tablet courses. This finding is important to teacher educators because it suggests a limitation in students' ability to self-assess their own learning or critically self-evaluate their use of the tablets as learning tools.

Third, this exploratory study suggests that there may be differences between the way students use their personal devices versus the way they use school- or university-loaned devices. Several students in the focus groups said that they had decided at the beginning of the semester to only use the university-loaned device for their classes. Therefore, they had not downloaded social media apps like Facebook, Snapchat, or Netflix so that they could maintain focus during class and only use the device to support their learning. This raises interesting questions about the advantages and disadvantages of BYOD (bring your own device) initiatives versus using school- or university-owned devices. These questions apply to higher education in general as well as to educator preparation programs which are seeking to train their teacher candidates to use technology for instruction. More research needs to be done to examine this potential distinction.

Lastly, findings from this study raise questions about the ways in which we, as educational researchers and particularly as teacher educators, measure "student engagement." Students in this study reported feeling more engaged. They felt like the devices helped them learn. They reported communicating with their professors more frequently and accessing the content more regularly. Are these good measures of student engagement? Is it important whether students report *enjoying* a learning experience more? Why or why not? Is this evidence of the affective domain influencing learning outcomes? Though findings from this study do not extend to this, we believe they raise the question and hope that more research will be done to further understanding of the relationship between the affective domain, technology use, and student learning outcomes.

## Scholarly Significance of the Study

Despite the growing body of literature that focuses on mLearning, it is still a relatively immature field which will undoubtedly continue to expand. Findings from this exploratory study, which adds to the literature by highlighting the voices and experiences of students who primarily felt that the mobile tablets enhanced the learning experience for them, may be valuable to other universities who are considering similar mobile tablet initiatives and to educator preparation programs which are training future teachers. Findings also have implications for pedagogical professional development for faculty. As we plan for higher education reforms that we hope will increase student learning outcomes, better prepare students for further education and/or the workforce, and train future teachers, it is important to consider student attitudes and perceptions in addition to quantitative measurements of student achievement, such as test scores and GPAs, as well as other issues such as cost and wireless infrastructure, etc.

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