Evaluation of a First-Year "Bring-Your-Own-Device" Initiative

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Applied Quantitative and Qualitative Research—EDRS 8000

November 23, 2013

Introduction

Orientation to the Topic

A quick glance around a shopping mall during the Christmas season or a restaurant at dinnertime is bound to reveal not only numerous people, but likewise numerous people accessing electronic devices. From tablets to smartphones to mp3 players, individuals, it seems, are never without some sort of electronic, often internet-enabled, device. Perhaps most alarming is Hill's (2011) research that suggests at schools where cell phone usage is specifically prohibited, 65% of students still bring and access mobile devices in class each day, doing so in a stealthy manner that breaks the rules.

Accordingly, in the face of teacher furloughs, reductions-in-force, and all-around budget cuts, as well as a desire to elevate learning standards and adopt twenty-first century learning styles, school systems have decided to be finished fighting the futile battle of the cell phone and have begun to capitalize on the abundance of technology students already bring with them to school each day (Hill, 2011; Ng, 2013; Sangani, 2013). Rather than investing large sums of money into new devices that must remain in the school building, schools instead have developed wireless infrastructures and adopted more lenient electronic policies to encourage students to use personal internet-enabled devices to complete tasks during the school day (Caldwell, Zeltmann, and Griffin, 2012). Leveraging the technology students already possess and implementing Bring Your Own Device (BYOD) policies has, in many instances, fostered greater technology integration in the classroom. Bring Your Own Device (BYOD) or Bring Your Own Technology (BYOT) policies outline acceptable use guidelines for student access to personal mobile and electronic devices during the day and encourage teachers to implement greater amounts of technology in classroom lessons and assignments by reducing the burden of not having enough

computers for students to access. Ideally, students should use applications, search engines, and Web 2.0 tools on their personal mobile devices for the purposes of engagement and enhanced student learning.

However, this push for 1:1 technology, in which each student has access to a personal electronic device, while it can produce positive outcomes (Kiger, Herro, and Prunty, 2012; Kothaneth, Robinson, and Amelink, 2012; Lei and Zhao, 2008) does come with potential problems which must be addressed in order to ensure that devices are used appropriately and that teachers feel comfortable enhancing or transforming learning using technology. Hardware and network issues, equitable access for students without personal devices, possible student misbehavior, and teacher comfort levels regarding technology all stand as potential impediments to effective implementation of BYOD policies, especially when BYOD is quickly implemented with relatively little guidance or instruction for educators (Donovan; Green, ad Hartley, 2010; Donovan, Hartley, and Strudler, 2007; Dunleavy, Dextert, and Heinecke, 2007; Martin, et al, 2010; Pan and Franklin, 2011). Woodland High School, a suburban high school in Stockbridge, GA, of approximately 100 teachers and 1500 students, represents one such school who has implemented a BYOD policy and encouraged its teachers to allow students to use mobile devices in the classroom for specific educational purposes.

Purpose Statement

The purpose of this research project is to evaluate the first-year implementation of a BYOD initiative at Woodland High School by identifying how the policy has altered instructional practices and student learning and relating use of mobile devices in the classroom to

potential barriers, including network malfunctions, student access to devices, student behavior, and professional development for educators.

Research Questions

1. Have teachers integrated technology more often into lessons and student assignments with a BYOD policy in place?
2. How has BYOD changed teachers' lessons or students' assignments?
3. How do hardware and network issues influence the implementation of BYOD?
4. How does student access to personal devices influence the implementation of BYOD?
5. How has student use of personal devices influenced classroom management and off-task behaviors?
6. How has professional development influenced the implementation of BYOD?

Importance of the Study

The final results of this study can be used to create an action proposal of suggestions for improving the BYOD experience during the second and subsequent years of implementation at Woodland High School and other schools of similar size, socioeconomic status, and demographic composition. While current educational literature is just beginning to speak about the effect of 1:1 computer or tablet access in the classroom, definite gaps in educational literature about the integration of students' personal mobile devices currently exist. This study, therefore, works to close these gaps by providing an illustration of a school that has implemented policies that permit students to bring personal mobile devices to school and encourage teachers to allow students to utilize these devices in the classroom. A listing of potential barriers to technology implementation is included, thus providing educational researchers with opportunities for further

investigation about best practices for integrating students' personal mobile devices into the classroom learning environment.

Definition of Terms

1. "BYOD" will be used in this paper as an acronym for Bring-Your-Own-Device. BYOD describes a general policy adopted by a school that allows students to bring personal electronic devices to school and use them in the classroom when the teacher allows. BYOD is interchangeable with BYOT, an acronym for Bring-Your-Own-Technology.
2. "Electronic device" includes all personal electronic devices students may use as learning aids, including laptop computers, smartphones, tablets, e-readers, and mp3 players. These devices may or may not have Internet access capabilities, but the individual student, not the school, supplies each.
3. 1:1 (One-to-one) is a ratio that suggests each student in the classroom has personal access to an electronic device, rather than having to access an electronic device in a small group or with a partner. For 1:1 to be achieved, a classroom of 30 students should have access to 30 devices so that all students can individually access the Internet or other electronically enabled activities.

Literature Review

The Benefits of 1:1 Computing in the Classroom

1:1 computing is a growing trend in educational settings so data is beginning to surface to suggest that such technology richness can promote positive outcomes in the classroom. Lei and Zhao (2008) credited 1:1 computing with increased student technology proficiency and increased

parental involvement. Increased access in the form of 1:1 computing has also led to greater focus on student-centered learning (Mouza, 2008) and more emphasis on teacher's facilitating student learning, a constructivist philosophy, rather than imparting knowledge. Furthermore, Dunleavy, Dextert and Heinecke (2007) suggest 1:1 technology has the potential to add value to the learning environment by increasing a teacher's ability to formatively assess her students and individualize instruction as well as increasing a student's ability to self-pace instruction, access online resources, and communicate and collaborate with peers in and out of the classroom. When iPads or other tablet devices are used in a 1:1 classroom, students and teachers have access to a wide variety of engaging apps, especially designed for educational purposes, which allows for differentiation in the learning environment, and permits teachers to address different learning styles of students (Hutchison, Beschorner, and Schmidt-Crawford, 2012; Kothaneth, Robinson, and Amelink, 2012). For learners with disabilities, 1:1 devices have facilitated great improvements, including helping students with Attention Deficit Hyperactivity Disorder to focus attention on a single task and to increase metacognition while reading (McClanahan, Williams, Kennedy, and Tate, 2012).

Still, the current focus on data-driven instruction suggests that for technology integration to continue, it must lead to real increases in student achievement. Kiger, Herro, and Prunty (2012) conducted a study in which experimental groups of third grade students were allowed 10 minutes a day of classroom time to perform multiplication practice through various iPad applications, while non-experimental groups practiced multiplication facts 10 minutes a day using "business as usual" techniques, such as flashcards and other forms of drill practice. Initial instruction involved responsible use of mobile devices, as well as how to use each application implemented in the study and its educational purpose. On some days, students were assigned

specific multiplication facts to practice or specific applications to use, while on other occasions students were given choice in deciding how to use the iPads to practice their multiplication facts. Pre-test scores measured students' mathematic abilities before experimentation, and on average, those students engaged in the mobile learning initiative using the iPads, scored higher on the post-test than did students using more traditional methods of practice (Kiger, Herro, and Prunty, 2012).

Similarly, Looi, et al. (2011) considered the effect of a mobile learning environment and a learning management system in a 1:1 environment. One mixed ability third grade science class was taught using mobile devices, while another 5 classes implemented traditional forms of instruction. Students in the experimental group accessed information via mobile devices in class and through at home assignments. The lessons, Looi, et al. found, were student-centered, took advantage of resources accessible on the student's mobile devices, archived information for formative assessment, and facilitated collaboration among students and between students and teachers. Final course scores were higher for student participating in the mobile learning experience than those who were not.

The Benefits of Mobile Learning and BYOD

Yet, large amounts of capital are needed for schools to purchase enough devices to provide for students a 1:1 computer-based learning environment. Therefore, following the trends of many businesses, schools have begun to adopt Bring Your Own Device (BYOD) policies that encourage students to bring their own mobile, handheld, or laptop devices to school for use in the classroom.

Caldwell, Zeltmann, and Griffin (2012) reported that outside the schoolhouse, businesses are adopting BYOD policies for the purposes of improving the productivity of their employees, who find it easier to access a device with which they are familiar and have access to at any time. Furthermore, Ng's (2013) survey respondents, who participated in BYOD work policies, identified flexibility in working hours, creativity, speed, innovation, and collaboration as key benefits to a BYOD policy. Each of these qualities is also recognized as a possible benefit of technology integration in the classroom, and educators are beginning to adopt business' "Bring Your Own Device" trend to capitalize on the range of benefits it purports both academically and financially. While companies benefit from reduced costs and reduced liability, since maintenance and care for devices is relegated to the employee, school systems reap the same benefits in terms of lower initial capital, a move important in today's cash-strapped school buildings. Information communication technologies vendors have recognized this growing trend in education by developing agnostic software platforms that can function on the multiple operating systems students possess (Sangani, 2013), and schools have responded with BYOD policies outlining acceptable terms of use of school-level wireless networks and classroom-based instruction that incorporates technology.

Still it should be noted that in both the study by Looi, et al (2011) and Kiger, Herro, and Prunty (2012), student devices were provided in a 1:1 ratio by the school, not by the individual students or their parents. Further, in these studies, all students used the same type of device, even though each student had his or her own device to use. Accordingly, there is a dearth of research about the effectiveness of mobile learning environments in which students use personal devices supplied by their parents and where students may be accessing multiple device types.

Therefore, additional research should be conducted as related to the effect of a BYOD policy and students' use of personal mobile devices in the classroom.

Potential Barriers to the Effectiveness of BYOD

Technology integration is not simply about access to or the presence of new devices, but rather about implementation—how those devices are actually used by teachers and students and how parents and administrators perceive their uses. Crichton, Pegler and White (2012) suggested that while students are generally enthusiastic about the incorporation of handheld devices in the classroom, it is teachers who are more critical of their implementation.

While technology has the potential to increase student engagement and broaden the scope of learning, it also introduces a host of other issues regarding classroom management (Dunleavy, Dextert, and Heinecke, 2007). Donovan, Green, and Hartley (2010) found that when teachers do not receive the proper technology and pedagogical training, off-task behavior could result. Further, teachers continue to suggest that a BYOD policy may alienate some students who do not have access to personal devices. The research, here, however, is not in favor of teacher concerns. In fact, the digital divide is closing and analysts estimate that by 2015 all students will have a smart phone; in fact, families are finding internet-enabled mobile devices to be more cost efficient than at-home computers (Hill, 2011). As smart phones continue to be produced, prices will continue to drop, which will likely lead to a reduction in the number of students without personal devices.

Perhaps teachers' greatest barrier, however, in technology implementation is confidence in their own abilities to use technology. Teachers have real concerns about their own abilities to operate technology as well as their abilities to blend traditional teacher education and teaching

styles with technology to form a new pedagogy, one for which many of them were not prepared at the post-secondary level (Donovan, Hartley, and Strudler, 2007). For example, Pan and Franklin's (2011) study suggested that teachers cite their own unfamiliarity with specific Web 2.0 tools as the primary reason for not implementing technology in the classroom. Without the requisite self-efficacy, what Pan and Franklin (2011) posit is the "primary predictor of Web 2.0 tools integration in school classrooms," teachers simply did not demonstrate the desire to implement a new tool which they themselves did not utilize confidently (p. 35).

Still, even when teachers are comfortable with the technology, its implementation does not always result in transformative changed to the learning environment. After all, research suggests that the teacher's role in a mobile device-enhanced classroom should change from a dispenser of knowledge to one who helps students to synthesize and evaluate findings, an approach that is more congruent with constructivist, student-centered learning theories; indeed, teachers may have less control of student learning, which means that student learning can deepen and broaden itself beyond the limitations of the teacher. Walls & Palak (2011) conducted a study to determine if technology implementation in the classroom was also accompanied by a shift toward a student-centered approach to learning, or if technology continued to reinforce possibly less effective, teacher-centered modes of instruction. Despite examining technology-rich schools in which technology integration was considered an integral component of a teacher's performance evaluation and teachers were well versed in how to operate various instructional technologies, Walls & Palak (2011) found that access to technology did not necessarily "mediate changes in the way [teachers] taught in the classroom" (p. 435). Even though teachers may have exhibited positive attitudes toward technology, this did not necessarily translate to the implementation of student-centered instructional strategies; instead, technology was merely a

support to the teaching approach already being employed by the teacher and a clear illustration of technology for technology's sake. Walls & Palak (2011) did suggest possible reasons for this failure to use technology within a student-centered paradigm for learning which included (1) the lack of models of technology being used to support student-centered instructional strategies, and (2) teacher beliefs about class sizes and student ability levels.

Moreover, Storz & Hoffman (2013) examined the early results of a one-to-one computing initiative in a middle school. The altered teaching format did present new demands on the teachers in terms of delivery of information for previous teacher-centered approaches reliant on lecture, book reading, and worksheets. However, student and teacher-reported results indicated that some teachers adopted a more student-centered model involving collaboration, individualized and small-group instruction, and interactive demonstrations, while others simply used the computers to teach the same way they had always taught, simply requiring students to type papers, rather than handwrite them, and make KeyNote presentation as opposed to hand-drawn graphic organizers (Storz & Hoffman, 2013). Similarly, some students felt the one-to-one initiative increased their overall learning, while others did not and felt they were learning the same things in the same ways, just using a computer (Storz & Hoffman, 2013). As expected, professional development was cited as a factor in both the successful and unsuccessful implementation of technology in a student-centered paradigm.

It should be noted that research related to the implications for specific professional development regarding BYOD policies seems to be nonexistent. Yet, studies focused on professional development related to implementing instructional technologies in the classroom continue to suggest the need for sustained, collaborative, content-specific, student-centered

professional development that extends beyond merely demonstrating for teachers how to operate specific technologies.

Alternative Approaches to Technology-Related Professional Development

Several educational researchers have offered evidence-based suggestions for alternatives to the traditional one-day training sessions typically used for professional development. The general consensus in research related to technology-based professional development correlates professional development fidelity, defined simply as professional development that aligns with teachers' actual instructional practices, and increased teacher and student outcomes (Martin, et al., 2010). For example, Potter and Rockinson-Szapkiw (2012) noted that behaviorist practices do not support adult learning and instead recognized the need for collaborative practice to replace traditional forms of professional development, which have succeeded in increasing use of technology for classroom administrative purposes, like email, test creation, and grade books, but not significantly altered instructional practices (Potter & Rockinson-Szapkiw (2012). These professional learning sessions lack fidelity because they do not directly connect with teachers' instructional practices. Accordingly, Potter and Rockinson-Szapkiw (2012) offered a three-fold model of effective technology-related professional development: technology operation, technology application, and technology integration and mentoring, noting that current models of technology-related professional development typically stop at technology operation.

Allan, et al's (2010) proposition for a collaborative curriculum approach to technology-related professional development, seems to be congruent with Potter and Robinson-Szapkiw's (2012) suggestions. Rather than teach the elements of TPACK (technological, pedagogical, and content knowledge) separately, selected Maine science teachers immersed themselves in project

creation; reflecting on their experience, teachers deepened their TPACK through learner-centered professional development practices (Allan, et. al, 2010). Their TPACK deepened as an "outgrowth of teachers becoming involved in the project's tasks" (Allan, et. al, 2010, p. 37). Yet, many professional development models still rely on behaviorist, teacher-centered approaches concerned with delivering information to passive students when teachers themselves are acting as the students. In addition to improving their TPACK, teachers who participated in the content-specific professional development also transitioned their classrooms to technology-enhanced student-centered learning environments. Additionally, Harris & Hofer's interpretivist study emphasized the importance of content-specific technology professional development, rather than broad topical sessions attended by large groups of teachers from different levels and content areas. Harris & Hofer (2011) concluded "a content-based, activity-types approach to technologically inclusive instructional planning is compatible with existing approaches to teaching" (p. 226).

Simply put, teachers cannot teach what they themselves do not know; therefore, professional development of instructional technology must examine the entirety of the TPACK model, ensuring that teachers not only develop and continue growing their technological knowledge of how to operate specific technologies, and their technological pedagogical knowledge of how to use technologies for instructional purposes, but also their technological pedagogical content knowledge, which ensures they use technology in such a manner as to assist student in achieving content-related aims. Without a strong foundation in each domain of TPACK, teachers typically lack the confidence to implement technology in the classroom, or do so in a manner that is ineffective and continues to reinforce teacher-centered paradigms of instruction.

Implications

The proposed research study will examine Woodland High School's first year-implementation of BYOD with regards to teacher's perceptions of its effectiveness. This study fills a void in the current literature concerning a school's implementation of BYOD with an emphasis on students' personal mobile devices. Previous studies of 1:1 computing have focused on schools where personal devices were purchased by schools and provided to students, rather than purchased by students' themselves. The research study will emphasize how a BYOD initiative has affected technology usage in the classroom, altered teacher/student activities, and been influenced by commonly-known barriers, such as network issues, student access, misbehavior, and professional development.

Methodology

Overview of Research Design

The research design consisted of a cross-sectional survey administered to teachers near the end of the 2013-2014 school year (estimated April 2014). The survey was available in both an electronic and paper form and was completed as a component of a professional learning session in order to ensure greater teacher participation. Each month, Woodland High School teachers participate in a mandatory professional learning session during their planning periods. At regular intervals, the school's technology focus team assumes responsibility for these professional learning sessions in order to introduce or demonstrate specific technologies for the classroom. A technology-led professional learning session was scheduled for April 2014. The electronic survey was created as a Google Form and linked to a spreadsheet for data analysis. Later, the Google Form was downloaded as an Excel spreadsheet for further data analysis.

Participants accessed the form using a QR reader or a shortened URL. Alternately, a paper copy of the survey was provided for those teachers without a personal electronic device. All results from paper-based surveys were entered by hand into the Google spreadsheet for data analysis by the researcher. Although the survey was administered on a single day during a professional learning session which teachers were required to attend, completing the survey was optional and anonymous; teachers were not penalized for failure to complete the survey. Consent was stated in the instructions of the online survey; an implied consent cover letter was included with all paper-based surveys.

Participants

The sample included all regular education and special education teachers at Woodland High School, approximately 100 in total. 65 teachers completed the survey. Those completing the survey represented a range of experience (9% had 0-4 years experience, 31% had 5-8 years experience, 15% had 9-14 years experience, 14% had 15-20 years experience, and 31% had over 20 years experience) and a range of school academic departments (20% taught English, 15% taught Career and Technology classes, 8% taught science, 17% taught social studies, 8% taught world languages, 5% taught health and physical education, 6% taught fine arts, and 22% taught math). Additionally, 88% taught regular education and 12% taught special education.

Data Sources/Instrumentation/Procedures

A survey with supplemental optional open-ended questions was used to collect data. The researcher, in conjunction with the school's technology focus team, developed the survey. Survey results were anonymous, but teachers were asked to identify their subject area, regular or

special education, and their years of experience. The survey consisted of 11 questions and asked teachers to consider how often they use BYOD, in what ways they use BYOD, how hardware or network issues have influenced their ability to implement BYOD, how student access to devices has influenced their ability to implement BYOD, how student behavior has been affected by BYOD, how professional development has influenced their ability to implement BYOD, and any other factors that have influenced their ability to implement BYOD. All survey questions were closed-ended, multiple choice, with spaces for optional open-ended clarification on specific questions. Some questions were measured using a 5-level Likert scale: 1 Strongly disagree, 2 Disagree; 3 Neither agree nor disagree, 4 Agree, 5 Strongly agree. Other questions had specific choices that delineated time periods such as daily, 1-2 times per week, 1-2 times a month, 1-2 times during the school year, never.

Reliability/Validity or Credibility

School level officials examined the survey for its appropriateness and clarity. The survey was field-tested with teachers on the school-wide technology focus team to ensure that the questions were clear and that the options provided were adequate.

Results

Technology Integration with a BYOD policy

The first research questions asked if teachers have integrated technology more often into lessons and student assignments with a BYOD policy in place. To determine the answer to this question, the survey asked teachers, “Approximately how often do you teach a lesson for which students are allowed to use personal mobile devices?”

Table 1: Approximately how often do you teach a lesson for which students are allowed to use personal mobile devices? (End of Year Survey)

Response Type	Count	Percentage
1. Each day	9	13.84%
2. 1-2 times each week	29	44.62%
3. 1-2 times each month	21	32.31%
4. 1-2 times each year	4	6.15%
5. Never	2	3.08%

Each of these answer choices was coded on a Likert scale where 1=each day, 2=1-2 times each week, 3=1-2 times each month, 4=1-2 times each year, and 5=never. The mean answer was 2.40 (SD=0.92). The median and mode answers were both 2, or 1-2 times each week.

This survey result was compared with another survey administered by the technology focus team at the beginning of the school year. On the pre-school year survey, which was also completed by 65 teachers (though demographic data was not determined), teachers were asked, "How often do you teach a lesson that requires students to use technology while in your classroom?" The answer choices were each period, every day, 1-2 times each week, 3-4 times each week, several times per month, rarely, and never. Because the answer options were not the same as in the year-end survey, the answers were recoded to be on the same Likert scale: each day and each period were both recoded to be 1=each day; 1-2 times each week and 3-4 times each week were both recoded to be 2=1-2 times each week; several times per month was recoded to be 3=1-2 times each month; rarely was recoded to be 4=1-2 times each year; never remained 5=never.

Table 2: How often do you teach a lesson that requires students to use technology while in your classroom? (Beginning of Year Survey with recoded answers)

Response	Count	Percentage
1. Each day	14	21.54%
2. 1-2 times each week	17	26.15%
3. 1-2 times each month	20	30.77%
4. 1-2 times each year	12	18.46%
5. Never	2	7.69%

The mean answer was 2.55 (SD=1.12), and the median and mode responses were both 3. An independent sample T-test was conducted to determine if there was a significant statistical difference between the two responses. Even though the mean seemed to decrease from the beginning of the school year to the end of the school year, this statistical testing suggested there was no significant statistical difference in the two data sets ($t=0.86$, $df=128$, $p>.05$, two tailed). The p value was 0.39, two tailed. Additionally, the t critical value=1.98, two tailed, is greater than the t stat (t stat=0.86), which further suggests there is no significant statistical difference between the two data sets.

It should be noted, however, that the results are limited for several reasons. The exact same question was not asked on both surveys and instead, data from the first survey had to be recoded to match the year-end survey. Similarly, the first survey was conducted informally for general school technology purposes only, so demographic data was not gathered and the data responses from the second survey could not be paired with data responses from the first survey. The wording of the questions is also important since in the year-end survey the wording included *required* but also broadened the definition of *technology* to all types of electronic devices. In the second survey, the focus was on when students had been *allowed*, rather than required, specifically to use personal *mobile* electronic devices. It does seem significant that from the beginning of the school year to the end of the school year the mean, median, and mode responses all decreased. Since a 1 on the Likert scale means the teacher incorporates student technology each day and a 5 means the teacher never incorporates student technology in the classroom, a decreasing mean, median, and mode do seem to suggest that teachers are incorporating student technology, perhaps even personal mobile devices, to a greater extent after a BYOD policy has been implemented. Of course, these two events are only correlated and no causation is proven.

Furthermore, if this research project were re-created under ideal conditions, the survey given at the beginning and end of the school year should be identical.

The survey also asked teachers to identify the types of tasks students complete while using technology in the classroom.

Table 3: Types of Tasks for which Students Use Technology

Task	Count	Percentage
Calculators, Dictionaries, Thesauri, Clocks for Time	44	67.69%
Searching the Internet for Information; Using QR codes	48	73.85%
Drill-Type Practice or Test-Prep Software	14	21.54%
Taking Pictures, Filming Video	15	23.08%
Viewing Content-Related videos	24	36.92%
Submitting Reponses (polls/surveys)	11	16.92%
Creating Products (using documents, spreadsheets, presentations, websites, etc.)	30	46.15%
Collaborating with Peers	14	21.54%

Teachers were given the option of including written answers to an "other" option. The following responses were collected:

- "Virtual Labs"
- "Musical Tuner"
- "Remind 101"

Barriers to Technology Integration

Another facet of the survey was the extent to which common barriers to effective technology implementation in the classroom have or have not effected each teacher's incorporation of BYOD. Teachers were given a statement related to how network issues, hardware issues, student access to personal mobile devices, and student off-task behaviors have prevented them from using technology in the classroom. They were asked to choose their level of agreement with the statement; responses were recorded using a Likert scale where 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

Table 4: Network issues regularly prevented me from using technology in the classroom.

Response	Count	Percentage
1. Strongly disagree	3	4.62%
2. Disagree	25	38.46%
3. Neither agree nor disagree	13	20.00%
4. Agree	19	29.23%
5. Strongly agree	5	7.69%

The mean response was 2.96 (SD=1.09); the median response was a 3 while the mode response was a 2. Some optional explanations included:

- "All laptops in the cart never connect at the same time; I can only get about ½ connected at any one time."
- "It can take up to 25 minutes for all students to log into our system if they are using laptops. That's half a period.
- "We very seldom have network issues."
- "Network issues are never a problem but as my day went on, I became frustrated with the failing of computer access."
- "Network issues with the number of computers running at one time; blocked sites, especially for individual galleries and art sites."
- "Laptops are not reliable and have a hard time connecting to the wireless sometimes and even struggle to login to the actual computer."
- "We have new computers and laptops, but after an update or whatever they go through, they can take an entire class period to connect. How can this be remedied? Also, do we need to consider more bandwidth to cut down on the long wait times for computers to connect. Finally, YouTube has great educational videos. Can we look at a third party program that will allow teachers to unblock specific videos for a specific amount of time (a day, a class period), etc.)?"

Table 5: Hardware issues regularly prevented me from using technology in the classroom.

Response	Count	Percentage
1. Strongly disagree	8	12.31%
2. Disagree	27	41.54%
3. Neither agree nor disagree	11	16.92%
4. Agree	14	21.54%
5. Strongly agree	5	7.69%

The mean response was 2.71 (SD=1.17); the median and mode responses were both 2.

Some optional explanations included:

- "Technology is good around here. When I have issues, they have a quick turn around time in terms of getting the equipment back in operation."
- "I just don't have much to use."
- "There is something wrong with how my projector is talking to my pen and it is essentially useless at this point."

Table 6: Students without their own personal devices regularly prevented me from using technology in the classroom.

Response	Count	Percentage
1. Strongly disagree	6	9.23%
2. Disagree	25	38.46%
3. Neither agree nor disagree	13	20.00%
4. Agree	17	26.15%
5. Strongly agree	4	6.15%

The mean response was 2.82 (SD=1.17); the median response was a 3 and the mode response was a 2. Some optional explanations included:

- "Students who do not have access to personal devices must use school owned devices and this causes problems when trying to check out a couple of computers for each class."

Table 7: Student misbehavior (off-task) while using personal mobile devices regularly prevented me from using technology in the classroom.

Response	Count	Percentage
1. Strongly disagree	7	10.77%
2. Disagree	14	21.54%
3. Neither agree nor disagree	11	16.92%
4. Agree	27	41.54%
5. Strongly agree	6	9.23%

The mean response was 3.17 (SD=1.19); the median and mode responses were both 4. Some optional explanations included:

- "If students are off task or misbehave, I redirect them immediately."
- "Students getting off task is a consideration when planning."
- "I would rather focus on teaching. If I catch them, I stop them."
- "When I give them an assignment where they can use their phones often they do not do it and I catch them watching something or playing games."
- "Most of my students feel being able to use electronic devices is play time."
- "Students are easily off task with phones and texting, tweeting and what not. In their opinions, their phones and technology is for personal use."
- "Student devices often cause distractions."
- "Hard to monitor all students at the same time to ensure that they are using technology appropriately"

Professional Learning for Technology Integration

A significant portion of the survey focused on professional development and preparation for BYOD. Teachers were asked to determine how prepared they felt at both the beginning and end of the school year to integrate technology into the classroom. The answer choices were extremely prepared, adequately prepared, somewhat prepared, or not prepared.

Table 8: How prepared did you feel at the beginning of the school year and currently to integrate technology in your classroom.

Response	Beginning of the School Year Count	Beginning of the School Year Percentage	Currently Count	Currently Percentage
1. Extremely prepared	4	6.15%	8	12.31%
2. Adequately prepared	21	32.31%	24	36.92%
3. Somewhat prepared	35	53.85%	31	47.69%
4. Not prepared	5	7.69%	2	3.08%

Each response was given a number so that 1=extremely prepared, 2=adequately prepared, 3=somewhat prepared, and 4=not prepared. The mean response at the beginning of the school year was 2.63 (SD=0.72); the median and mode responses were both 3. The mean response at the end of the school year was 2.42 (SD=0.75); the median and mode responses were both 3. Additionally, a paired t-test was conducted to determine if there was a significant statistical difference between the responses from the beginning of the year and those at the end of the year. This test suggested that the results were statistically significant ($t=3.59$, $df=64$, $p<0.05$, one tailed). Additionally, the t stat=3.59 is larger than the t critical value=1.67, one tailed, which further suggests statistical significance.

Some optional explanations on these two questions included:

- "How can I prepare if I have no idea what technology is available or how well it functions or sometimes how to use it?"
- "I need ideas on how to use technology. I understand how to use it, but just need ideas."
- "First year. And what I thought would work great would not be as successful as I imagined."
- "I would say extremely prepared, but more and more uses are coming into use, which always makes me feel I am not prepared to do everything I could do with technology."

- "I don't have the tools and am still learning ways to incorporate. This is a new mindset."
- "Prepared, but my laptop, mirroring, and printing did not work starting day 1 and I continue to have laptop issues."
- "Through trial and error, I hope to incorporate more of what I have learned."
- "When I prepare myself, however the training I have receive so far is not adequate for implementation."
- "I am learning quite a bit through professional learning outside of school, but I still need to get the products/tools to move forward."
- "Technology is always changing so keeping up is a struggle."
- "I'm not entirely sure if I will be able to devote time to embed the lesson."

Teachers were also asked to determine the helpfulness of the technology related professional development conducted by the technology focus team. Answer choices were 1=not helpful at all because I do not care to use technology in the classroom, 2=not helpful because they did not provide me with tools I can use in the classroom, 3=helpful, but I did not get to use many of the tools in the classroom this year; 4=helpful and I got to use some of the tools this year.

Table 9: In terms of helpfulness, how would you rate professional development sessions related to technology that you have attended this year?

Response	Count	Percentage
1. Not helpful at all because I do not care to use technology in the classroom.	0	0%
2. Not helpful because they did not provide me with tools I can use in the classroom.	7	10.77%
3. Helpful, but I did not get to use many of the tools in the classroom this year.	33	50.77%
4. Helpful, and I got to use some of the tools this year.	25	38.46%

The mean response was 3.28 (SD=0.65); the median and mode responses were both 3. Some optional explanations included:

- "QR codes were very helpful."
- "It hasn't been applicable so far."
- "Sessions are helpful; however in-depth training is required to use in class."
- "I am just not sold on how effective technology is in student learning."
- "Some tools we could take back and use immediately."
- "I would love to use some of them but there is no time to implement them."
- "Not capable of using in a music classroom."
- "The QR stands out. I like the simple things."
- "Lack of time to implement."
- "May I suggest a PL for behaviors that demonstrate good Digital Citizenship and how to communicate those behaviors to students."
- "I have a short list of things I am trying to use in the classroom this year. A couple of the items I picked up at different workshops, not necessarily in-school professional development. I am, though, trying things I was not using this time last year."

Teachers were then given a list of possible learning designs for professional learning and asked to rank how they thought each change might impact the effectiveness of professional learning. A score of 1=This would definitely negatively affect my professional learning experience, 2=This may negatively affect my professional learning experience, 3=This would not affect my professional learning experience either positively or negatively, 4=This may positively affect my professional learning experience, and 5=This did or would definitely positively affect my professional learning experience.

Table 10: For each of the following options, choose to what extent it improved or you think it would improve your technology-related professional learning.

	1-This would definitely negatively affect my professional learning experience.	2-This may negatively affect my professional learning experience.	3-This would not affect my professional learning experience either positively or negatively.	4-This may positively affect my professional learning experience.	5-This did or would definitely positively affect my professional learning experience.	Mean Standard Deviation
Whole group sessions attended by the entire staff simultaneously.	23.07%	21.54%	36.92%	16.92%	1.54%	2.52 SD=1.08
Sessions designed for teachers in specific departments.	3.08%	4.62%	12.31%	50.77%	29.23%	3.98 SD=0.94
Differentiated sessions for beginner, intermediate, and advanced users.	1.54%	3.08%	15.38%	38.46%	41.53%	4.15 SD=0.90
Multiple options (different topics) for sessions on a specific day.	1.54%	3.08%	18.46%	60%	16.92%	3.88 SD=0.78
Sessions offered at times other than planning periods	7.69%	10.77%	38.46%	27.69%	15.38%	3.32 SD=1.11
Specific times for follow-up after professional learning.	3.08%	3.08%	30.77%	53.85%	9.23%	3.63 SD=0.82
Observing teachers using different types of technology.	4.62%	3.08%	18.46%	47.69%	24.62%	3.85 SD=0.99
Online tutorials or videos of teachers demonstrating how to use certain types of technology.	6.15%	6.15%	20%	41.53%	24.62%	3.72 SD=1.10
Specific examples of how other teachers use using technology in the classroom.	4.62%	1.54%	10.77%	55.38%	26.15%	3.95 SD=0.99

Some optional explanations included:

- “I think we need to have more individual content related technology sessions with examples of how it can be used for the courses we teach.”
- “I need ideas. Seeing how other teachers, in my subject area, utilize technology would be very helpful.”
- “PL's designed specifically for my courses will be helpful.”
- “Special education is always the last department to receive technology and yet many of the students could benefit the most from technology.”
- “I think department-wide training is more beneficial than school-wide training. I like to see the concepts/software in action so the idea of watching another teaching using it in practice appeals to me a great deal because I have learned this year that no matter how great a product is, I need to execute it successfully in the classroom.”
- “We are not doing enough.”
- “No videos, please.”
- “I don't want to be in training with people who have no idea about how to turn on a computer or device.”
- “It is so frustrating to be in a class where the entire time is spent teaching someone how to open a program. It is such a waste of time when I know about something but have to spend my entire planning period being told stuff I already know.”
- “Whole group would slow me down a lot. I would more so benefit from level specific or content specific training.”
- “Differentiated learning would be helpful!”
- Content specific examples of teachers using technology in the classroom.”

Qualitative Results

The final question of the survey asked teachers: "What do you need in order to integrate technology to a greater extent in your classroom next year?" The result was 62 qualitative responses. Upon first reading of the responses, initial codes were created; these codes were then grouped into categories so that emerging themes could be identified.

Table 11: "What do you need to integrate technology to a greater extent?" Codebook

Code	Abbreviation	Frequency
Training	Tr	17
Differentiated Training	DT	3
Instructional Coach	IC	4
Time	Ti	9
Ideas	I	2
Better Function of Existing Technology	BF	6
More student resources	SR	10
More teacher resources	TR	4
More resources in general	GR	4

The first theme that emerged was that greater amounts of effective professional learning is needed in order to provide teachers with the knowledge, skills, and ideas necessary to integrate technology in the classroom.

Table 12: Theme 1 Training

Training	17
Differentiated Training	3
Instructional Coach	4
Ideas	2

The second theme that emerged was that greater attention and money must be directed toward attaining technology resources and ensuring the function of those resources (hardware, software, and network).

Table 13: Theme 2 Resources

Better Function of Existing Technology	6
Student Resources	10
Teacher Resources	4
Resources in General	4

The final theme that emerged was additional time needed to integrate technology in the classroom. Teachers noted that they not only needed time for training, but for follow-up and processing. This needed to be time during the school day, not simply during the summer. The time needed to have no other specified purpose.

Table 14: Theme 3 Time

Time	9

Discussion/Findings

The purpose of this study was to evaluate the first year implementation of a Bring Your Own Device initiative at a suburban high school for two reasons: to determine if the policy increased technology integration and to aid in the creation of an action plan to be followed by the school's technology focus team to spur technology integration in the coming school years. The data collected helps to address each of the six research questions.

Question 1: Have teachers integrated technology more often into lessons and student assignments with a BYOD policy in place? Though the design of this study could not, with certainty, prove that the BYOD policy had increased technology integration, results did seem to suggest that teachers were using technology more often in their classrooms. More than half of the faculty used student technology at least on a weekly basis and 90% used student technology at a minimum on a monthly basis. The amount of technology being used by teachers to deliver information and guide instruction is most likely greater than these numbers.

Question 2: How has BYOD changed teachers' lessons or students' assignments? Results of the survey suggest even further that students use technology for multiple types of assignments. Over 73% of teachers noted that their students used technology to search for information and over 46% described students using technology to create student-generated

products, such as reports, spreadsheets, websites, and presentations. The technology team may choose to focus future professional learning experiences on implementing technology to promote learner-centered activities and foster higher-order skills, such as synthesizing, evaluating, and creating. For example, a large population of teachers noted students use personal mobile devices as calculators, dictionaries, thesauri, or clocks for time. These tasks do not involve a transformation of the learning experience in any significant way due to the integration of technology. However, only a small portion of teachers (21%) used technology to help students collaborate with their peers, a skill that is recognized as paramount in twenty-first century classrooms. Rather than simply using technology, the next focus for Woodland High School should be on promoting research-based uses of technology that help to promote twenty-first century learning skills.

Interestingly, one of the themes that emerged from qualitative responses was the need for more resources for both students and teachers. Perhaps the acquisition of additional resources, namely electronic devices for each student, and additional technologies to facilitate instruction for each teacher, may increase the number of and difficulty of tasks students use technology to complete. If more technology is available, teachers may be more likely to allow students to use this technology to complete assignments, and with proper training, teachers can learn how to transform learning to be more learner-centered and applicable to twenty-first century skills using technology.

Question 3: How do hardware and network issues influence the implementation of BYOD? As part of Woodland High School's adoption of BYOD, a wireless network was added to the school to ensure that students without data plans on their mobile devices could still use these devices to access Internet sites and use applications as long as their devices were Internet-

enabled. Additionally, the school was provided with ten laptop carts containing at least 30 computers each that teachers could use as mobile computer labs, on top of the already five stationary computer labs in the building. This research question, therefore, was designed to determine whether network or hardware issues presented significant barriers to technology integration. For network issues, the mean response was a 2.96, between strongly disagree and neither agree nor disagree that network issues presented barriers to technology integration. However, a sizeable number of teachers, almost 30% did agree that network issues regularly prevented them from using technology in the classroom. It is impossible to discern whether these teachers were referring predominantly to network issues experienced and then resolved at the beginning of the school year, or rather to current issues with the network. Likewise, because all teachers have different access to technology—some have classroom sets of desktop computers, while others rely on laptop carts—it is difficult to determine whether the network issues are pervasive or isolated. Still, some qualitative answers warrant examination, including several that note teachers experience difficulties with laptops. Numerous explanations to this survey question revealed that teachers struggle when large numbers of students try to access the Internet at once, specifically with the laptop computers. It may be worthwhile, therefore, to investigate the school's bandwidth and determine possible solutions for increasing Internet access when large numbers of students need to access the network at a single time. Since high-stakes testing may eventually become electronically administered, the need to promote easy access to the Internet on any device becomes even more paramount.

Furthermore, a large majority, close to 70% of teachers, disagree or neither agree nor disagree that hardware issues prevented them from using technology in the classroom. Approximately 30% either agreed or strongly agreed that hardware issues did prevent them from

using technology in the classroom, but very few of these teachers provided further explanation about this answer. With an increase in technology usage, there will undoubtedly be an increase in technology-related problems for which many teachers cannot provide their own solutions. Woodland High School, therefore, may consider whether the current technical support staff is sufficient to address the technology-related issues that may arise in the building. While it may not be feasible to hire another support specialist, one of the suggestions that arose from the final survey question—What do you need to integrate technology to a greater extent next year? —Was an instructional technology coach, a position eliminated several years ago in light of the economic downturn and reduced school budgets. Although an instructional technology coach is not trained to address all types of hardware, software, and network issues, and instead is an expert in the application of technology for instructional purposes, these individuals still often possess a great deal of technical expertise that may prove beneficial in reducing the amount of time teachers must wait to have hardware or technology equipment repaired. If a full-time instructional technology coach cannot be hired, the school may consider allowing a teacher the opportunity to teach for half the school day and fill the role of technology coach for the other half of the day.

Question 4: How does student access to personal devices influence the implementation of BYOD? The majority of teachers (approximately 67%) disagree or neither disagree nor agree that student access to personal devices prevented teachers from integrating technology in the classroom. Still, 32%, a significant amount, answered that student access did regularly prevent them from integrating technology in the classroom, yet very few responses were gathered to explain this issue. One teacher did note that students who do not have personal electronic devices can use school-owned devices but that they have experienced difficulties when needing

to check out a few computers for each class. Currently, the school reserves at least one laptop cart (approximately 30 computers) for teachers to check out individual computers for students to use. It is unclear whether those teachers who agreed with the statement are aware of this policy or have had difficulty actually checking out a few computers for students. The issue may also be one of timing since it is often not until the actual class period that a teacher would be aware how many computers he or she needs or one of embarrassment since students may not be willing to admit that they do not have personal devices if the majority of their classmates do.

Question 5: How has student use of personal devices influenced classroom management and off-task behaviors? Like other questions about potential barriers, this research question seems to be inconclusively answered. Approximately 50% of teachers answered that they agree or strongly agree that use of personal devices may increase student misbehavior and thus discourage the teacher from regularly integrating technology in the classroom. Close to 30% of teacher disagreed with this statement and 17% neither agreed nor disagreed. Several teachers, however, chose to explain this answer choice with responses that seemed to indicate many students have a difficult time differentiating personal use of their mobile devices from appropriate classroom use of the devices. Teachers noted difficulty in monitoring whether students are off-task or on-task since it is often not readily clear what students are doing on their mobile devices. Still, a significant portion of teachers noted that student misbehavior does not prevent them from integrating technology in the classroom, which certainly warrants further investigation. Perhaps these teachers have different classroom management philosophies or are more tolerant of outside uses of technology in the classroom. However, it may be worthwhile to isolate the teachers who regularly implement technology without misbehavior problems to

provide mentoring or form professional learning communities with those teachers who are less technologically proficient or struggle with classroom management and student technology.

Question 6: How has professional development influenced the implementation of BYOD? This research question yielded a large amount of data because of the numerous related questions. The survey does indicate that teachers feel more prepared than they did at the beginning of the school year to implement technology in the classroom. The percentages of teachers who felt "extremely prepared" and "adequately prepared" both increased, while those teachers who felt "somewhat prepared" and "not prepared" both decreased. Teacher explanations, however, did prove revealing, with several teachers noting that the ability to feel prepared to implement technology is difficult since technology is always changing. The school's technology focus team did implement several professional learning workshops on topics such as QR codes, Google Drive, applications for BYOD, and POINT, the school's learning management system, and some teachers attended outside professional learning workshops related to technology. Teachers overwhelmingly found these professional learning sessions to be helpful, with only 11% of teachers finding them not helpful, but the majority of survey respondents (51%) acknowledged that they did not get to incorporate the tools in the classroom this year. Likewise, one resounding theme seen in all open-ended responses was the need for more time. Teachers echoed in numerous questions the need for more time to learn tools and decide how to implement them into their curriculum. Many teachers felt overwhelmed with the sheer volume of technology tools available and so struggled to determine which may be effective with their current classroom management philosophy and curriculum needs.

The most predominant theme, however, to derive from survey results was the need for more training. The survey explanations and one open-ended question continued to reveal

teachers' desire for additional training in terms of new products and tools, as well as practical, real suggestions for how to incorporate the tools into the classroom. Several teachers suggested specific forms of training, including differentiated instruction tiered toward technology proficiency levels, while others expressed a need for an instructional technology coach who could deliver one-to-one instruction. Teachers felt that the following changes to professional learning would all have a positive influence on their professional learning experience: professional learning designed for each academic department, differentiated sessions for beginner, intermediate, and advanced users, multiple options or topics for professional learning sessions, specific time for follow-up after professional learning, observing teachers using different types of technology in the classroom, online tutorials or video of teachers demonstrating how to use certain types of technology, and specific examples of how teachers are using technology in the classroom at this specific school. These are suggestions that echo many of the technology initiatives put forth by the current technology focus team, including differentiated instruction and content-specific professional learning. However, other suggestions should form the basis for the technology focus team's action plan for the upcoming school year. Specifically, teachers seem to desire practical, simple training that is accessible and allows for follow-up. The most desirable suggestion would be for the school to hire a technology coach who could assume the responsibility for much of the school's technology-related professional learning, rather than allowing this need to be delegated to teachers who are already overburdened. Still, if hiring additional personnel is not feasible, the technology team should ensure that all professional learning delivered in the future adhere to the wishes expressed in this survey, so that teachers find the professional learning relevant and responsive to their needs.

One final suggestion only presented itself on a single teacher's survey, but it corresponds with the National Educational Technology Standards set forth by the International Society for Technology in Education: the need for student instruction related to digital citizenship. Currently, teachers must engage in a brief digital citizenship training at the beginning of the school year, which amounts to no more than signing an understanding of copyright laws. Yet, more extensive training on digital citizenship for both teachers and students could ensure that the technology integration that occurs in the classroom is fair and equitable from the beginning.

Conclusion

To imagine the future of education is to imagine a schoolhouse with even more technology than is currently offered; therefore, teachers who plan to continue their professional careers in education must recognize this trend rather than choose to ignore technology. Implementing a BYOD policy is one method schools can use to increase technology integration without expending the money necessary to ensure all students have an electronic device to use. Still, with this ease come additional burdens in terms of infrastructure and teacher preparedness to integrate technology. The results of this research project suggest that Woodland High School made a strong initial attempt at BYOD, but that additional training and resources are needed to fully recognize its possible influence. Furthermore, the school needs to reevaluate its wireless network and how it handles large numbers of users at a single time, as well as address teacher concerns about student misbehavior while using technology. Continued professional development that is effective and responsive to teacher wishes will ensure that the second and subsequent years of BYOD implementation are more productive than the first.

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Appendix A—Online Survey with Consent Form

Title: Evaluating Our First Year "Bring-Your-Own-Device" Initiative at Woodland High School

Researcher: Please contact Sarah Barnett (sarah.barnett@henry.k12.ga.us) should you have any questions about this survey.

Description:
You are being asked to complete a survey evaluating Woodland High School's first year implementation of BYOD. This survey is also part of a research study conducted by Sarah Barnett at Kennesaw State University. Before you complete the survey, please read the instructions and ask any questions needed. The purpose of the survey is to evaluate Woodland's first-year implementation of BYOD and to create an action plan for next year's technology focus team. You will complete the online survey at the link provided. The survey should take you approximately 10 minutes to complete. Some questions do have space for further explanation. These responses are optional but appreciated for explaining, clarifying, or providing more information. When you finish the survey, please click "Submit" and log out of your browser. You may stop the survey at any time without penalty; data from surveys in which "Submit" is not clicked will not be collected.

All participants should be current certified classroom (regular or special education) teachers at Woodland High School; all participants should be at least 18 years of age. Anonymity will be guaranteed since no names or IP addresses will be collected; therefore, there should be no risks in taking the survey. Although you may experience no direct benefits from taking the survey, you will provide the technology focus team with valuable data to create an action plan for future technology implementation. No names of teachers, schools, or the school systems will be mentioned in the final report.

Statement of Understanding:
The purpose of this research has been explained and my participation is voluntary. I have the right to stop participation at any time without penalty. I understand that the research has no known risks, and I will not be identified. By completing this survey, I am agreeing to participate in this research project.

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #0112, Kennesaw, GA 30144-5591, (678) 797-2268.

PLEASE PRINT A COPY OF THIS CONSENT DOCUMENT FOR YOUR RECORDS, OR IF YOU DO NOT HAVE PRINT CAPABILITIES, YOU MAY CONTACT THE RESEARCHER TO OBTAIN A COPY

□ I agree and give my consent to participate in this research project. I understand that participation is voluntary and that I may withdraw my consent at any time without penalty.
□ I do not agree to participate and will be excluded from the remainder of the questions.

Evaluation of Technology Initiative at Woodland High School

Choose one answer from the choices provided.

1. For how long have you been teaching?
    a. 0-4 years
    b. 5-8 years
    c. 9-14 years
    d. 15-20 years
    e. 20+ years

2. In what department do you spend most of your teaching day?
    a. CTAE
    b. English
    c. Fine Arts
    d. Health/PE
    e. Math
    f. Science
    g. Social Studies
    h. World Languages

3. Are you a regular education or special education teacher?
    a. Regular Education
    b. Special Education

4. How often do you teach a lesson for which students should use personal mobile devices?
    a. Each day
    b. 1-2 times each week
    c. 1-2 times each month
    d. 1-2 times each year
    e. Never

5. What types of activities do you have students complete using their personal mobile devices? Please select all that apply.
    a. Using calculators, dictionaries, thesauri, clocks for time, etc.
    b. Searching the Internet for information, QR codes
    c. Completing drill-type practice activities
    d. Taking pictures, filming video
    e. Viewing content related videos
    f. Submitting responses for formative assessment (polls/surveys)
    g. Creating products (documents, presentations, videos, etc.)
    h. Collaborating with peers inside or outside the classroom
    i. Other: _____

6. For each of the following statements, choose your level of agreement using the following scale:
1—Strongly disagree
2—Disagree
3—Neither agree nor disagree
4—Agree
5—Strongly agree

Please provide explanations of your answers, especially if you choose "5--strongly agree."

a. Network issues prevented me from regularly using technology in the classroom.

1 2 3 4 5

b. Hardware issues (computer/device malfunctions) regularly prevented me from using technology in the classroom.

1 2 3 4 5

c. Students without their own personal devices regularly prevented me from using technology in the classroom.

1 2 3 4 5

d. Student misbehavior (off-task) using personal mobile devices regularly prevented me from using technology in the classroom.

1 2 3 4 5

(Optional) Explain any of your answers, especially those for which you chose "strongly agree" or "strongly disagree."

7. In terms of helpfulness, how would you rate professional development sessions related to technology that you have attended this year?

a. Not helpful at all because I do not care to use technology in the classroom
b. Not helpful because they did not provide me with tools I could use in the classroom
c. Helpful but I did not get to use many of the tools this year in the classroom
d. Helpful and I used some of the tools this year in the classroom
e. Other (Please explain your answer.)

(Optional) Explain your answer.

8. How prepared did you feel at the beginning of the year to integrate technology in your classroom?
   a. Not prepared
   b. Somewhat prepared
   c. Adequately prepared
   d. Extremely prepared

   (Optional) Explain your answer.

9. How prepared do you currently feel to integrate technology in your classroom next year?
   a. Not prepared
   b. Somewhat prepared
   c. Adequately prepared
   d. Extremely prepared

   (Optional) Explain your answer.

10. For each of the following options, choose to what extent you think it improved or you think it would improve your technology-related professional learning.
1—This would definitely negatively affect my professional learning experience.
2—This may negatively affect my professional learning experience.
3—This would not affect my professional learning experience either negatively or positively.
4—This may positively affect my professional learning experience.
5—This did or would definitely positively affect my professional learning experience.

a. whole group sessions attended simultaneously by the entire staff

   1 2 3 4 5

b. sessions designed for teachers in specific departments

   1 2 3 4 5

c. differentiated sessions for beginner, intermediate, and advanced users

   1 2 3 4 5

d. multiple options (different topics) for sessions on a specific day

   1 2 3 4 5

e. sessions offered at times other than planning periods

   1 2 3 4 5

f. specific times for follow-up after professional learning

1 2 3 4 5

g. observing teachers using different types of technology

1 2 3 4 5

h. online tutorials or videos of teachers of teachers demonstrating how to use certain types of technology

1 2 3 4 5

i. specific examples of how others teachers are using technology in the classroom

1 2 3 4 5

11. What do you need in order to integrate technology to a greater extent in your classroom next year? Please consider all questions from the survey in providing your answer.

Appendix B—Paper Survey with Consent Form

Title: Evaluating Our First Year "Bring-Your-Own-Device" Initiative at Woodland High School

Researcher: Please contact Sarah Barnett (sarah.barnett@henry.k12.ga.us) should you have any questions about this survey.

Description:
You are being asked to complete a survey evaluating Woodland High School's first year implementation of BYOD. This survey is also part of a research study conducted by Sarah Barnett at Kennesaw State University. Before you complete the survey, please read the instructions and ask any questions needed. The purpose of the survey is to evaluate Woodland's first-year implementation of BYOD and to create an action plan for next year's technology focus team. You will complete the online survey at the link provided. The survey should take you approximately 10 minutes to complete. Some questions do have space for further explanation. These responses are optional but appreciated for explaining, clarifying, or providing more information. When you finish the survey, please place the completed survey in the envelope at the front of the room before leaving. You may stop the survey at any time without penalty; incomplete surveys should be marked "Incomplete" and submitted; data from incomplete surveys will not be included in final results. Please do not remove the survey from the room.

All participants should be current certified classroom (regular or special education) teachers at Woodland High School; all participants should be at least 18 years of age. Anonymity will be guaranteed since no names will be collected; therefore, there should be no risks in taking the survey. Although you may experience no direct benefits from taking the survey, you will provide the technology focus team with valuable data to create an action plan for future technology implementation. No names of teachers, schools, or the school systems will be mentioned in the final report.

Statement of Understanding:

The purpose of this research has been explained and my participation is voluntary. I have the right to stop participation at any time without penalty. I understand that the research has no known risks, and I will not be identified. By completing this survey, I am agreeing to participate in this research project.

THIS PAGE MAY BE REMOVED AND KEPT BY EACH PARTICIPANT

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #0112, Kennesaw, GA 30144-5591, (678) 797-2268.

Evaluation of Technology Initiative at Woodland High School

Choose one answer from the choices provided.

6. For how long have you been teaching?
    a. 0-4 years
    b. 5-8 years
    c. 9-14 years
    d. 15-20 years
    e. 20+ years

7. In what department do you spend most of your teaching day?
    a. CTAE
    b. English
    c. Fine Arts
    d. Health/PE
    e. Math
    f. Science
    g. Social Studies
    h. World Languages

8. Are you a regular education or special education teacher?
    a. Regular Education
    b. Special Education

9. How often do you teach a lesson for which students should use personal mobile devices?
    a. Each day
    b. 1-2 times each week
    c. 1-2 times each month
    d. 1-2 times each year
    e. Never

10. What types of activities do you have students complete using their personal mobile devices? Please select all that apply.
    a. Using calculators, dictionaries, thesauri, clocks for time, etc.
    b. Searching the Internet for information, QR codes
    c. Completing drill-type practice activities
    d. Taking pictures, filming video
    e. Viewing content related videos
    f. Submitting responses for formative assessment (polls/surveys)
    g. Creating products (documents, presentations, videos, etc.)
    h. Collaborating with peers inside or outside the classroom
    i. Other: _____

6. For each of the following statements, choose your level of agreement using the following scale:
1—Strongly disagree
2—Disagree
3—Neither agree nor disagree
4—Agree
5—Strongly agree

Please provide explanations of your answers, especially if you choose "5--strongly agree."

a. Network issues prevented me from regularly using technology in the classroom.

1 2 3 4 5

b. Hardware issues (computer/device malfunctions) regularly prevented me from using technology in the classroom.

1 2 3 4 5

c. Students without their own personal devices regularly prevented me from using technology in the classroom.

1 2 3 4 5

d. Student misbehavior (off-task) using personal mobile devices regularly prevented me from using technology in the classroom.

1 2 3 4 5

(Optional) Explain any of your answers, especially those for which you chose "strongly agree" or "strongly disagree."

7. In terms of helpfulness, how would you rate professional development sessions related to technology that you have attended this year?

f. Not helpful at all because I do not care to use technology in the classroom
g. Not helpful because they did not provide me with tools I could use in the classroom
h. Helpful but I did not get to use many of the tools this year in the classroom
i. Helpful and I used some of the tools this year in the classroom
j. Other (Please explain your answer.)

(Optional) Explain your answer.

8. How prepared did you feel at the beginning of the year to integrate technology in your classroom?
   a. Not prepared
   b. Somewhat prepared
   c. Adequately prepared
   d. Extremely prepared

   (Optional) Explain your answer.

9. How prepared do you currently feel to integrate technology in your classroom next year?
   a. Not prepared
   b. Somewhat prepared
   c. Adequately prepared
   d. Extremely prepared

   (Optional) Explain your answer.

10. For each of the following options, choose to what extent you think it improved or you think it would improve your technology-related professional learning.
1—This would definitely negatively affect my professional learning experience.
2—This may negatively affect my professional learning experience.
3—This would not affect my professional learning experience either negatively or positively.
4—This may positively affect my professional learning experience.
5—This did or would definitely positively affect my professional learning experience.

j. whole group sessions attended simultaneously by the entire staff

1 2 3 4 5

k. sessions designed for teachers in specific departments

1 2 3 4 5

l. differentiated sessions for beginner, intermediate, and advanced users

1 2 3 4 5

m. multiple options (different topics) for sessions on a specific day

1 2 3 4 5

n. sessions offered at times other than planning periods

1 2 3 4 5

o. specific times for follow-up after professional learning

1 2 3 4 5

p. observing teachers using different types of technology

1 2 3 4 5

q. online tutorials or videos of teachers of teachers demonstrating how to use certain types of technology

1 2 3 4 5

r. specific examples of how others teachers are using technology in the classroom

1 2 3 4 5

11. What do you need in order to integrate technology to a greater extent in your classroom next year? Please consider all questions from the survey in providing your answer.