TECHNOLOGY PROFESSIONAL DEVELOPMENT:

INVESTIGATING THE EFFECTIVENESS OF TECHNOLOGY INTEGRATION IN MIDDLE SCHOOL CLASSROOMS

by

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An executive position aper submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Education in Educational Leadership.

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INTEGRATION IN MIDDLE SCHOOL CLASSROOMS

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GLOSSARY OF TERMS AND ACRONYMS USED THROUGHOUT THE PAPER

1:1: A term used to reference a building or district that has a 1:1 ratio of internet-ready devices to students. The device may vary between tablet, laptop, or chromebook or other mobile device.

Amplification device: A microphone and speaker system set up in classrooms to project the teacher's voice

App Slam: A fast-paced presentation that shares web-based applications for use in the classroom.

Augmented Reality: A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

Blended Learning: A blend of a traditional face-to-face learning environment and an online learning environment.

BrainPop: A website that contains over 1,000 short animated movies with quizzes and related lesson materials.

CAEP: Council for the Accreditation of Educator Preparation

Class Dojo: A behavior management tool for the classroom where each student has their own profile and teachers can award positive or negative points for student actions.

CCSS: Common Core State Standards

DiscoveryEd: A subscription-based digital streaming service developed and maintained by Discovery Education. Teachers can access videos and other lesson materials if they have a paid subscription.

Dropbox: A file hosting service that offers cloud storage, file synchronization, and the ability for users to share files with others.

EduCanon: A free platform that is designed to help educators flip their classrooms by adding interactive questions to videos from YouTube and other multimedia sources.

Elmo (aka document camera and visual presenters): real-time image capture devices for displaying an object to a large audience. Like an opaque projector, a document camera is able to magnify and project the images of actual, three-dimensional objects, as well as transparencies.

Embedded media: When media, such as a video or image, is embedded, or placed within another source, such as a website. For example, a teacher might embed a video from YouTube into his or her LMS page for student use.

F2F: Face-to-face: Indicates an interaction is taking place in person.

FaceTime: An Apple product that allows users to communicate with audio and video. A method of telecommunication.

Gamification: The application of typical elements of game playing (e.g., point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service.

GAFE: Google Apps for Education; A free suite of productivity applications that include, but are not limited to drive, calendar, sites, and other Google products.

Google Hangouts: A communication platform developed by Google that allows users to communicate via audio, direct message, and video chat. Users have the ability to share their computer displays with other users as well.

Graphing calculator: A handheld calculator that is capable of plotting graphs, solving simultaneous equations, and performing other tasks with variables.

Kahoot: A web-based game that allows teachers to develop their own questions about content or select them from a bank. Students can play trivia games using a computer or a mobile device, similarly to popular trivia games in many restaurants.

iPads: A touch screen tablet PC made by Apple. The iPad is basically a netbook without a keyboard.

Integrated Digital Content: When teachers take digital content (such as a YouTube video, slide presentation, or website) and incorporate it into their instruction.

ISTE: International Society of Technology in Education

LearnZillion: A learning platform that combines video lessons, assessments, and progress reporting. Each lesson highlights a Common Core standard, starting with math in grades 3-9

LEQ: Lesson Essential Question

LMS: Learning Management System: An online platform to distribute course content and assess student learning.

Mobile device: A portable computing device such as a smartphone or tablet computer.

NCATE: National Council for the Accreditation of Teacher Education

NETS: National Education Technology Standards; now known as the ISTE Standards

Performance Task (PT): Part of the Smarter Balanced Assessment Consortium, this portion of the summative assessment will require students to engage with a variety of stimuli in order to address a real-world problem. For more information, please refer to http://www.smarterbalanced.org/assessments/development/

PLCs: Professional Learning Communities: A group of educators who collaborate to improve instruction and student outcomes.

Plickers: A powerfully simple tool that allows teachers collect real-time formative assessment data without the need for student devices.

ReadWorks: An online tool used by teachers to differentiate texts to meet student needs.

Rewordify: An online tool used by teachers to differentiate texts to meet student needs

SAMR: A model of technology integration coined by Dr. Ruben Puentedura. The acronym stands for Substitution, Augmentation, Modification, and Redefinition. For more information on the SAMR model, please refer to https://www.commonsensemedia.org/videos/ruben-puentedura-on-applying-the-samr-model

SBAC: Smarter Balanced Assessment Consortium – An organization that developed and implements an assessment to students based on the CCSS. As of 2017, 15

states were governing members and 2 were affiliate members. For more information, please refer to http://www.smarterbalanced.org/

Schoology: The Learning Management System used by the district involved in this study.

Screencast: a digital recording of computer screen output, also known as a video screen capture, often containing audio narration.

Sharepoint: A web-based application that integrates with Microsoft Office. Launched in 2001, SharePoint is primarily sold as a document management and storage system, but the product is highly configurable and usage varies substantially between organizations.

Smartboard: An interactive whiteboard that uses touch detection for user input (for example scrolling and right mouse-click) in the same way as normal PC input devices.

Smart Notebook: Software designed to integrate with the Smartboard to develop interactive lesson activities.

TPACK: A framework that describes teacher knowledge required to effectively utilize technology in classroom teaching. The acronym stands for Technological Pedagogical and Content Knowledge. For more information on TPACK, please refer to http://www.tpack.org/.

Twitter: An online news and social networking service where users post and interact with messages, "tweets," restricted to 140 characters. Registered users can post tweets, but those who are unregistered can only read them.

YouTube: An American video-sharing platform.

ABSTRACT

The purpose of this study is to examine the impact of targeted professional development (PD) on the integration of technology upon teachers in grades six through eight. This Executive Position Paper has three key objectives: (1) investigate why teachers opted to participate in certain voluntary PD opportunities; (2) examine teachers' reactions to the PD, specific to instructional technology; and (3) describe the pedagogical practices seen in classrooms, specific to instructional technology. This information will provide valuable data to the District's Technology Committee. It will serve as a resource for future planning of professional development and the evaluation of such.

Keywords: technology integration, professional development

Chapter 1

INTRODUCTION

Technology has become an impactful classroom tool in K-12 settings; however, there is often a disconnect between the professional development (PD) provided to teachers and the expectations set forth for them to integrate technology into their classrooms (Lawless & Pellegrino, 2007; Partnership for 21st Century Learning, 2009; NCES, 2002). The purpose of this study is to examine the impact of targeted PD on the integration of technology upon teachers in grades six through eight. Over the past five academic years, the Mid-Atlantic School District (MASD)[1] has emphasized improving its support to teachers in regard to instructional technology. The district states that it "promotes rigorous, authentic teaching and blended learning experiences that personalize the time, place, path, and pace of education to prepare students to flourish in a global society. To this end, we will ensure that all students and educators have access, support and opportunity to utilize technology that meets the demands of tomorrow." In order to ensure that all educators have 'access, support, and opportunity to utilize technology', the district has made significant investments, including the addition of instructional technology personnel, expansion of material resources, and increase delivery of PD opportunities specific to instructional

[1] Pseudonym

technology. The focus of this study is to examine the impact of the district provided PD on participating teachers' use of technology in classroom teaching.

Like students, teachers come to the classroom with a variety of skills – some are technologically proficient while others are not. Younger teachers are more likely to be exposed to instructional technologies but mostly as learners in their K-12 and university classes. Recently, however, the increasing value placed on integrating technology into pedagogical practices, has prompted teacher education programs to include stand-alone courses specific to the integration of educational technology in content-area teaching. Yet, such courses are often not required by accreditation agencies as part of an aspiring teacher's program. In fact, the Council for the Accreditation of Educator Preparation (CAEP) requires only that "candidate proficiencies related to expected knowledge, skills, and professional dispositions, including proficiencies associated with diversity and technology are aligned with the expectations in professional, state, and institutional standards" (pp. 4-5). Embedded within the five CAEP Standards are six direct references to the use or integration of technology that teacher preparation programs are expected to meet to acquire and maintain their accreditation (see Table 1).

Table 1 CAEP Standards that address technology

1: Content and Pedagogical Knowledge	1.5: Providers ensure that candidates model and apply technology standards as they design, implement and assess learning experiences to engage students and improve learning; and enrich professional practice.
2. Clinical Partnerships and Practice	2.1: Partners co-construct mutually beneficial P-12 school and community arrangements, including technology-based collaborations, for clinical preparation and share responsibility for continuous improvement of candidate preparation. Partnerships for clinical preparation can follow a range of forms, participants, and functions. They establish mutually agreeable expectations for candidate entry, preparation, and exit; ensure that theory and practice are linked; maintain coherence across clinical and academic components of preparation; and share accountability for candidate outcomes.
	2.2: Partners co-select, prepare, evaluate, support, and retain high-quality clinical educators, both provider- and school-based, who demonstrate a positive impact on candidates' development and P-12 student learning and development. In collaboration with their partners, providers use multiple indicators and appropriate technology-based applications to establish, maintain, and refine criteria for selection, professional development, performance evaluation, continuous improvement, and retention of clinical educators in all clinical placement settings.
	2.3: The provider works with partners to design clinical experiences of sufficient depth, breadth, diversity, coherence, and duration to ensure that candidates demonstrate their developing effectiveness and positive impact on all students' learning and development. Clinical experiences, including technology-enhanced learning opportunities, are structured to have multiple performance-based assessments at key points within the program to demonstrate candidates' development of the knowledge, skills, and professional dispositions, as delineated in Standard 1, that are associated with a positive impact on the learning and development of all P-12 students.
3. Candidate Quality, Recruitment, and Selectivity	3.4: The provider creates criteria for program progression and monitors candidates' advancement from admissions through completion. All candidates demonstrate the ability to teach to college- and career-ready standards. Providers present multiple forms of evidence to indicate candidates' developing content knowledge, pedagogical content knowledge, pedagogical skills, and the integration of technology in all of these domains.

Even without the mandate that all pre-service teacher candidates complete coursework in instructional technology, many administrators expect that new teachers will enter the classroom possessing strong technology integration skills (see Figure 1). This is largely due to the younger age of typical new teachers and the misplaced assumption that because they grew up as consumers of technology, they are proficient technology-using teachers. The literature, however, demonstrates that this assumption does not hold true for all pre-service teachers (Lei, 2009).

Project Tomorrow is a nonprofit group that aims to "ensure that today's students are well prepared to be tomorrow's innovators, leaders and engaged citizens of the world" (Mission Statement, Project Tomorrow). A study conducted by Project Tomorrow (2013) focused on the digital experiences and expectations of tomorrow's teachers. As part of the study, the digital practices of aspiring teachers were compared to the expectations of building principals regarding these practices. Findings from this study, as shown in Figure 1, illustrate that a significant gap still exists between the experiences encountered by aspiring teachers and their principals' expectations. This illustrates that while newer and generally younger teachers may have grown up as consumers of technology, they are not necessarily better equipped to teach with technology than their more veteran colleagues. As seen in the figure below, aspiring teachers are most comfortable with identifying and evaluating quality digital content in class, but are not confident in their abilities to teach an online class. It should be noted that in this study, principals had much higher expectations of aspiring teachers' abilities to integrate technology in all areas, with the greatest difference in the area of

student owned devices, or what is now known as Bring Your Own Device (BYOD).

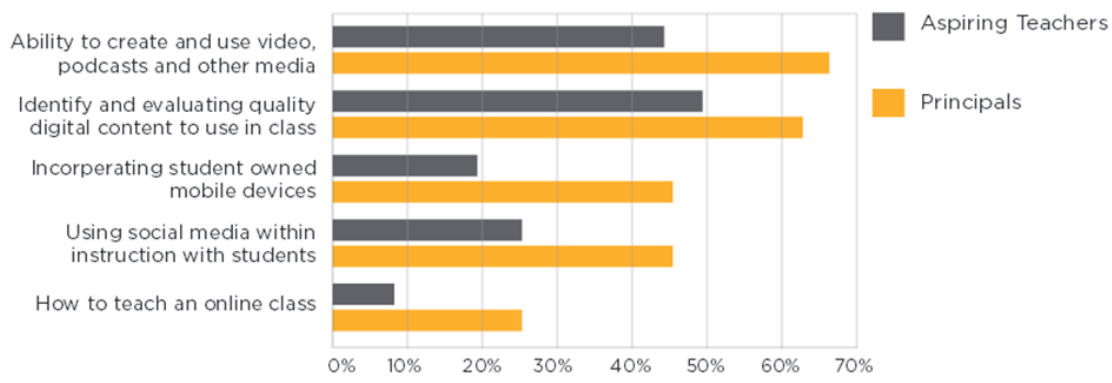

Figure 1 Technology Skill Development: Principals' Expectations vs. Aspiring Teachers' Actual Experiences
Source: Project Tomorrow: Speak Up (2013). Learning in the 21st Century. p. 5.

While Project Tomorrow looked at the comparison between aspiring teachers and principals, a 2013 Pew report indicated that experienced teachers also lack the confidence and experience to integrate technology into their professional practices (Purcell, Heaps, Buchanan, & Friedrich, 2013). The study found that only 44% of teachers over the age of 55 described themselves as "very confident" in integrating digital technology in their classroom. Moreover, 59% of those teachers shared that their students know more about emerging technologies than they do (Purcell et al., 2013). These studies reflect that neither novice nor experienced teachers possess the confidence and depth of knowledge desired to implement technology in the classroom. Considering the findings of such studies, we must continue to support our teachers

with effective PD, in order to promote the changes we wish to see in our 21st Century classrooms.

Literature Review

Why should we integrate technology into our pedagogical approaches?

Role of technology in the classroom. Technology has fundamentally changed how we live, how our students learn, and how our teachers teach. One of the driving forces for the integration of technology in the classroom has been the International Society for Technology in Education (ISTE), which set forth its first set of standards for students in 1998, known as the National Education Technology Standards (NETS). As technology integration has evolved, ISTE has expanded its standards to include teachers, administrators, instructional coaches, and computer science teachers. Over time the standards have been revised and are now known as the ISTE Standards. As of 2017, twenty-nine states plus Puerto Rico, the U.S Virgin Islands, and Guam have either adopted, adapted, or made reference to the ISTE Standards for Students within their own standards, curricula, technology plan and/or websites (see Figure 2).

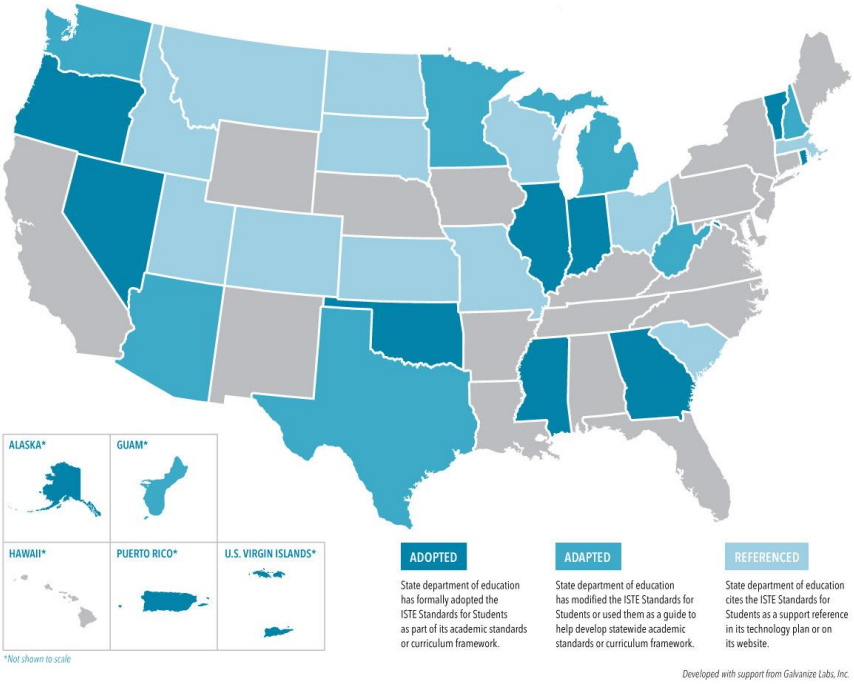

Figure 2 ISTE Standards around the nation,
Source: http://www.iste.org/standards/standards/iste-standards

Since technology has taken such an important role in PK-12 classrooms, CAEP has also looked to evaluate teacher preparation programs specific to how they provide training to pre-service candidates specific to technology integration. As the ISTE Standards have set the benchmark for learning standards for technology integration, CAEP has chosen to collaborate with ISTE, along with many other organizations, to develop the standards by which teacher preparation programs throughout the United States are evaluated and accredited. The original ISTE-CAEP standards were developed in 2002 and identified standards for technology facilitator, technology leader, and secondary computer science educator. These standards were refreshed in

2012 to include technology coach, technology director, and computer science educator, reflecting the changing roles of educators specific to technology integration. Each set of standards looks to ensure that teacher preparation programs provide a rigorous and evidence-based curriculum to make certain that all candidates are able to meet the needs of students in the 21st century classroom (ISTE-CAEP Standards for Teacher Educators, 2017).

In addition to the ISTE Standards, the Common Core State Standards (CCSS), an initiative that began in 2009 at the state-level and has since been adopted by all but

eight states (see Figure 3), also requires students to use technology to meet the CCSS.

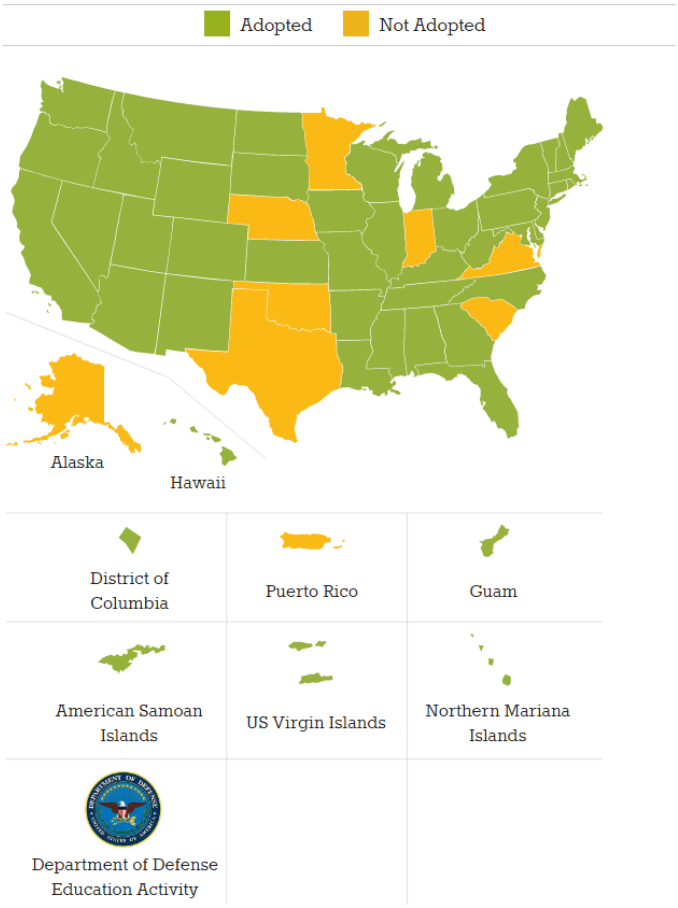

Figure 3 States that have or have not adopted the CCSS,
Source: http://www.corestandards.org/standards-in-your-state/

Within the English Language Arts Anchor Standards, for example, five of the standards require that students use technology to meet requirements (see Table 2). That is not to say that students could not use technology to achieve the goals of the other standards not listed in Table 2, but it is not a requirement to do so. In general, the purpose of the integration of technology into the CCSS is to increase creativity,

collaboration, problem solving, and critical thinking (ISTE Standards and the Common Core, 2017).

Table 2 English Language Arts Anchor Standards

Anchor Standard	**Standard Requirements**
CCSS.ELA-LITERACY.CCRA.R.7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.[2]
CCSS.ELA-LITERACY.CCRA.W.6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
CCSS.ELA-LITERACY.CCRA.W.8	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
CCSS.ELA-LITERACY.CCRA.SL.2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
CCSS.ELA-LITERACY.CCRA.SL.5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
Excerpt from the "Note on range and content of student speaking and listening	New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio.

[2] Please see "Research to Build and Present Knowledge" in Writing and "Comprehension and Collaboration" in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information for print and digital resources.

Due to the development of the ISTE Standards and the CCSS, schools have continued to expand their use of technology in the classroom. As part of Project Tomorrow's Speak Up 2014 National Findings from K-12 Students, middle school students identified what they perceived to be the benefits of learning in a blended environment. Table 3 details the benefits identified as well as the percentage of students who found that to be a benefit to them.

Table 3 Middle school students perceived benefits of digital learning
Source: Project Tomorrow (2015). Speak Up 2014 National Findings from K-12 Students
Retrieved from http://www.tomorrow.org/speakup/pdfs/SU14StudentReport.pdf

Benefit of digital learning	**% reported**
I am able to learn at my own pace	64%
I am developing creativity skills	63%
I collaborate more with my classmates	61%
I have more control over my learning	58%
I gain a better understanding of the class materials	56%
I am developing critical thinking and problem solving skills	54%
I am learning in a way that better fits my learning style	53%
I spend more time mastering a skill or learning something	51%

Technology has also changed where students learn and as such the K-12 learning community has seen an increase in online classes. According to Project Tomorrow's *2011 Trends Update*, in 2008, 10% of high school students took an online class for school, but that number increased dramatically, with 30% taking an online course for school in 2010. Further, the report claims that about one-third of students in

grades 6-12 wanted to take an online course, but did not due to lack of access to such courses (p. 4). As part of the study, students shared why they believe it would be beneficial to take online courses. These reasons included working at their own pace, getting extra help, earning college credit, attending remote classes, allowing for flexibility within their schedules, and increasing the attention from their teachers.

Clearly, technology's position is now well entrenched in the K-12 classroom. However, not all teachers have welcomed the constantly evolving nature of technology and its impact on their professional responsibilities and pedagogical practices.

Teacher Mindsets Regarding Technology Integration

There are a variety of reasons as to why teachers may not embrace technology. One factor might be the amount of technology that teachers were exposed to growing up. Marc Prensky coined the terms "digital natives" and "digital immigrants" in his two-part article, "Digital Natives, Digital Immigrants" (2001). The premise of this article is that those born in or after 1980 are native to the digital world we all live in today and those born prior to that period are immigrants to today's digital world. As such, teachers who are digital immigrants may find themselves encased in a technology rich world where they do not feel at home. According to Prensky, the major challenge facing education today is that immigrant teachers are not speaking a common language with their native students (p. 2). Decades before Prensky's writing, Sheingold (1991) shared this concern, stating, "Teachers will have to confront squarely the difficult problem of creating a school environment that is fundamentally

different from the one they themselves experienced" (p. 23). However, we must be certain to not pigeonhole all teachers born prior to 1980 into the category of digital immigrant. In 2004, Project Tomorrow published the “Insights and Ideas of Teachers on Technology” and found that most teachers use technology as often as their students and that older teachers do not vary greatly from younger teachers regarding their comfort in using technology. This may be because more experienced teachers are comfortable exploring a variety of pedagogical approaches, including technology integration, as they are more confident with their curriculum and classroom management techniques (Software and Information Industry Association Vision K-20 Survey, 2015).

In addition to growing up within a certain time period, we must also recognize that teachers have a variety of dispositions when it comes to pedagogical approaches, including technology. In particular, Collins and Halverson (2009) identify two groups of teachers: technology enthusiasts and technology skeptics. Technology enthusiasts believe that the technology revolution occurring in the private sector will be mirrored in the education system. In contrast, technology skeptics are those "who question the possibility or the value of technology in schools" (p. 30).

Technology enthusiasts argue for the increased use of technology in school settings due to two main factors. First, they argue that in a changing world, schools need to prepare students for the technological demands they will face once they enter their careers. As Collins and Halverson (2009) note, "to prepare students to communicate in this emerging world requires not simply the traditional reading and

writing, but learning how to communicate using different media with people who do not share the same assumptions" (p. 13). Second, computerized learning environments allow for greater differentiation in instructional practices, thus allowing students to develop their own personalized learning paths. For example, Schoology, the learning management system (LMS) used by the district in this study, allows teachers to group students in different configurations. The teacher can then develop multiple tasks, at different levels, and assign each specific task to the individual or small group of students. Similarly, online tools such as ReadWorks or Rewordify allow teachers to modify texts to their student needs. These tools allow teachers to identify an appropriate text for the content being studied and modify it based on the reading level of individual students. While this can be done without technology, the ease with which technology can accomplish this task helps make teachers more efficient.

In contrast to the technology enthusiasts' view that "schools would look more like technology-rich workplaces... [where] students would work together on meaningful tasks with the aid of powerful computer tools" (Collins & Halverson, 2009, p. 28), the skeptics argue that, "the school system has become locked in place, making it difficult to change the core practices without disturbing the current equilibrium" (p. 47). Skeptics argue that the traditional school system, where a classroom of students in the same grade are taught a specified curriculum, is ingrained in the American culture and that technology alone is not a strong enough force to have us change such a significant part of our cultural identity. Additionally, skeptics present failed education reforms of the past and a variety of barriers to the use of technology

in the classroom as part of the argument that technology will not dramatically change the face of education in America.

After presenting the two positions, Collins and Halverson (2009) present their own stance. They claim that schools, as they exist, are incompatible with emerging technologies. Specifically, they argue that the curricular structure of traditional schools, where a curriculum is presented that imparts knowledge of the past on to the current generation is at odds with a technology rich educational experience. Further, they claim that typically teachers focus on presenting past information rather than focusing on emerging skills and content. Considering the diversity that exists among teachers—digital natives and digital immigrants, technology enthusiasts and technology skeptics—it is no wonder that technology integration varies dramatically in K-12 schools.

Current PD Approaches in K-12 Schools

PD has historically followed a traditional "sit and get" delivery approach. That is, the district, the building, or the state administration provide content or skill related information to a large group of teachers, perhaps with readings to support the theoretical frameworks discussed, and then expect teachers to implement the new material in their classroom with little to no opportunities for practice (Cohen, Hill, & Kennedy, 2002; Cook, 1997; Garet, Porter, Desimone, Birman, & Yoon, 2001). Garet et al. (2001) found that 79% of teachers participated in traditional PD activities, such as district-level workshops, out-of-district workshops, conferences, and college courses that followed such format.

In addition, PD is rarely provided over a long period of time. In many cases, it is conducted over a day or two, perhaps even just a few hours, with little to no follow up to continually support teachers as they implement their new training (Cook, 1997; Garet et al., 2001; NCES, 2002). Cook (1997) found that only 18% of traditional PD activities lasted nine months or more. As educators will often attest, learners must be exposed to content and skills more than once or twice to achieve mastery. In fact, many educators may argue that without prolonged practice and exposure, a learner can never achieve mastery (Rosenshine, 2012). How then, can we identify and plan effective PD that honors teacher responsibilities, including lesson planning, develop and analyze assessments, and administrative tasks, while providing sustained PD on the use of technology?

How PD Should Be Designed and Evaluated

The literature related to effective teacher PD is extensive, both in its history and its breadth of theories (Corcoran, Shields, & Zucker, 1998; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Johnson, 2006; Kedzior, 2004; Lieberman, 1995; Loucks-Horsley, Stiles, & Hewson, 1996**;** National Foundation for the Improvement of Education, 1996**;** National Staff Development Council, 2001; Porter, Garet, Desimone, Yoon, & Birman, 2000). It is so extensive that one can easily get lost in the nuanced differences between studies. To ease that burden on other scholars, Zepeda (2012) conducted a meta-analysis of PD research and developed a comprehensive table of lessons learned that includes eight distinct characteristics, including - extensive duration, planned follow-up, job-embedded, content-specific,

site-based and teacher driven, promotes reflection and inquiry, includes multiple modalities of learning, and is based on student performance data. Table 4 identifies the specific research Zepeda drew upon in identifying these eight characteristics.

Table 4 Lessons Learned from Key Research on Professional Development
Source: Zepeda, S. (2012). Professional Development: What Works, 2nd Ed. Eye on Education. p. 9

Lessons and Practices	Research
Professional development extends over time	Garet et al., 2001; Loucks-Horsley, Hewson, Love, & Stiles, 1996; Porter, Garet, Desimone, Yoon, & Birman, 2000
Professional development includes planned follow-up	Corcoran, 1995; Garet et al., 2001; Joyce & Showers, 1995
Professional development is job-embedded connecting to the work of teaching (relevance)	AERA, 2005; Ancess, 2000; Borko, 2004; Wood & Killian, 1998; Wood & McQuarrie, 1999
Professional development is content-specific and related to subject matter	Birman, Desimone, Porter, & Garet, 2000; Corcoran, 1995; Garet et al., 2001; Porter et al., 2003
Professional development promotes reflection and inquiry	Guskey, 1999; Loucks-Horsely et al., 1996
Professional development includes multiple modalities of learning - active engagement	Garet et al., 2001; Joyce & Showers, 1995; Porter et al., 2003
Professional development is site-based and includes teachers from the same grade level and subject area	Corcoran, 1995; Garet et al., 2001; Porter et al., 2000
Professional development is based on student performance data	Kazemi & Franke, 2003; McDonald, 2001; Sparks, 1995

As many researchers have set out to determine what makes PD effective, just as many have explored ways to evaluate the impact of PD on teacher practices (Bull & Buechler, 1996; Haslam, 2010; Killion, 2002; Slabine, 2011; Speck & Knipe, 2005).

Each of these researchers set forth methods of evaluation that go deeper and explores how participation in PD impacts teacher practices and ultimately student outcomes. Guskey (2000) cites three reasons for the lack of success in research surrounding effective PD, including "confused criteria of the effectiveness; the misguided search for main effects; and the neglect of quality issues" (p. 34). To better define how PD should be evaluated, Guskey (2000) set forth "Five Levels of Professional Development Evaluation", which include:

1. **Participants' Reactions**: At this level, Guskey is simply exploring how the participants felt about the PD. Did they like the content? How were the environmental conditions of the PD setting (temperature, comfort of seats, writing space, collaboration space, etc.)? Such data is often gathered with an exit survey as participants are leaving or shortly after the PD has been delivered.
2. **Participants' Learning**: Here Guskey dives a bit deeper, examining how much knowledge the participants gained as a result of the PD delivered. This can be measured by administering an assessment, pre- and post-PD activities, and by having participants apply their knowledge to their own classroom environments.
3. **Organization Support and Change**: Evaluating PD at this level is more complicated compared to the previous two levels. Guskey seeks to determine what, if any, impact the culture, norms, and initiatives of the organization had on the impact of the PD. For example, did the organizational leadership

support the goals of the PD by providing sufficient material and human resources towards its implementation? Did the PD align with the overall mission of the organization? To determine the success of PD at this level, one must gather an array of data points and analyze them holistically. For example, interviews of participants, minutes from meetings, PD schedules, and organizational budgets.

4. **Participants' Use of New Knowledge and Skills**: This is where the proverbial rubber hits the road. Did the teachers use what they learned in an effective and meaningful manner? To determine this, the evaluation team could conduct observations of the participants, analyze video recordings, analyze student artifacts, and/or read journals of the participants' experiences.
5. **Student Learning Outcomes**: This level is where most school leaders want to see impact. The main question here is, 'Did the PD have an impact on student learning'? To measure this, the evaluation team can look at assessment data, student portfolios, and other data applicable to the content of the PD.

Guskey cautions that when we evaluate PD we must be aware of confounding factors that may impact the findings. Rarely, if ever, can we definitively determine that the PD alone directly impacted student outcomes. More likely, outcomes that are measured are impacted by an array of factors, such as teacher effectiveness, leadership dynamics, materials and resources, student attendance, and mental health. How then

might we take the work discussed here surrounding development and evaluation of PD and apply it specifically to instructional technology?

Technology Integrated PD

When planning PD specific to technology integration, we must not only be aware of best practices surrounding PD, but also bridge the gap between teachers who are both knowledgeable and confident using technology and those who are not. There is extensive research surrounding technology integration to guide PD efforts (Horn & Staker, 2015; Kim, Kim, Lee, Spector, & Demeester, 2013; Tucker, 2012). Further, there is a variety of frameworks to ground teacher learning in the use of technology. For instance, the framework of Technological Pedagogical Content Knowledge (TPACK) delineates the type of practitioner knowledge needed for effective technology integration while the Substitution-Augmentation-Modification-Redefinition (SAMR) model identifies levels of technology integration. While these frameworks are useful, Local Education Authorities (LEAs) should also capitalize on the ISTE Standards for Teachers (see Table 5). As noted, the ISTE Standards have been adapted, adopted, or referenced in more than half of the states. As such, regardless of the framework decided upon, grounding the professional learning experience in the ISTE Standards for Teachers will ensure that the LEAs are aligned with widely accepted standards of professional practice, specific to technology integration.

Table 5 ISTE Standards for Teachers

Standard	**Indicators**
Facilitate and Inspire Student Learning and Creativity	Develop authentic problems for students to explore; Allow students to collaborate to reflect upon their learning; and learning in both F2F and online environments.
Design and Develop Digital Age Learning Experiences and Assessments	Develop lessons that incorporate digital tools; Develop personalized learning activities for students to meet their diverse interests and needs; and provide multiple opportunities for assessments and use the data collected from such to drive their instructional decisions.
Model Digital Age Work and Learning	Teachers will increase their own knowledge of technology systems and be able to transfer that knowledge to new platforms; Collaborate with peers and students to improve student learning; Improve and increase communication between home and school using technology; and Model the evaluation and use of digital tools for learning.
Promote and Model Digital Citizenship and Responsibility	Practice and inform students about Fair Use, Copyright, and matters surrounding intellectual property rights; Use digital tools to develop students centered tasks that increase accessibility for all learners; Model appropriate digital social interactions; and Collaborate with others around the world to increase cultural awareness.
Engage in Professional Growth and Leadership	Explore professional learning opportunities to improve the integration of technology into their professional practice; Participate in leadership programs surrounding the selection and implementation of technology in their school community; Use research based strategies to inform their selection of digital tools; and Serve as a contributor of professional knowledge in their school community.

While the ISTE Standards for Teachers allow us to identify what teachers should know, they do not delineate how LEAs should develop and provide robust and meaningful PD to support these skills. In its 2002 report, *Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education*, the National Center for Education Statistics (2002) focused on this issue by defining PD specific to technology integration as, "learning activities of all kinds for school staff that prepare them to use technology in the school setting" (p. 65). Included under this statement are activities such as the following:

- familiarization with the operation of equipment and software;
- development of proficiency in the use of the technology "tools" to carry out school tasks;
- the application of software and applications to the management of school activities, whether instructional or administrative; and
- the integration of technology into teaching, learning, and administrative processes (p. 65).

Since 2002, as technology and the knowledge level of our teachers have evolved, the most recent *National Education Technology Plan* authored by the U.S. Office of Educational Technology (OET, 2016) stated that PD, "should transition to support and develop educators' identities as fluent users of technology; creative and collaborative problem solvers; and adaptive, socially aware experts throughout their careers" (p. 34). To achieve these goals, the OET shared that PD should be embedded in a teacher's' daily responsibilities as well as provided to the teacher at the time when he or she requires that specific PD. The OET recommended that for PD to be meaningful to teachers, LEAs should do the following:

- develop online PD so teachers can deepen their own digital literacy while developing skills specific to their position, such as assessments and pedagogical practices;
- broaden the resources available to teachers by harnessing online partnerships that would otherwise a teacher's access to resources for a variety of reasons, including but not limited to geography and financial resources;
- overtly focus on the skills needed to teach and learn in both blended and online platforms, as the market demand for such continues to expand; and
- develop a consistent measurement tool for instructors, PreK-College specific to technology competencies, so that all learners are assured of having teachers who know how to effectively integrate technology into their practices.

Purpose of the Investigation and Key Questions

The literature indicates that when PD is implemented effectively, teacher learning and practice can be influenced in a positive manner, thereby also having a positive impact on student outcomes. The Mid-Atlantic School District (MASD) has invested significant financial, human, and material resources to support teachers with integrating technology into their classrooms and over time has provided increased opportunities for PD that focused on the integration of technology in teaching and learning. The purpose of this study is to investigate the reasons that motivated teachers to attend those PD opportunities, the participating teachers' reactions to the

district's PD efforts, and the impact (if any) of the district provided PD on their daily practices. Specifically, this study addresses the following questions:

1. Why did teachers choose to attend the district provided voluntary PD?
2. What were teachers' reactions to the district provided PD?
3. How did teachers apply knowledge of technology in their classroom practice following their participation in the district provided PD?

Chapter 2

METHODOLOGY

Background

In the Mid-Atlantic School District, walkthroughs are conducted throughout the entire school year by all administrators in all buildings. These are relatively quick, unannounced classroom visits, generally lasting between 10-15 minutes, and take place during instructional time. The feedback provided to teachers is used for coaching, not evaluation. After each walkthrough, the teacher and administrator meet for a short period to discuss what the administrator observed, allow the teacher time to put the lesson activities into context (scope and sequence of the lesson within the unit), and discuss possible strategies to integrate into the teacher's practice. This study involved participants from one middle school within the district. It was selected for ease of access, as it was the work location of the principal investigator. In the 2014-15 school year, approximately 1,000 students in grades 6-8 attended, with 97% of students enrolled for the full academic year. Of those, 47% were African-American, 37.5% were White, and 9% were Hispanic/Latino. Further, 10% of students were classified as Special Education and 24% were classified as Low Income.

Description of the District's PD Efforts

The MASD has invested significant capital into developing PD, specific to instructional technology. These opportunities continue to increase over time, as the district increases its own capacity to develop, implement, and monitor technology related PD. To evaluate the current state of PD, the principal investigator utilized the online PD registration system used by the district to examine how many sessions were identified as targeting instructional technology over a period of three academic years (2012-13; 2013-14; and 2014-15) (see Appendix A for a complete listing of workshops offered). To complete this task, the principal investigator identified each workshop that was tagged as either "Technology" or "Instructional Technology" for each school year. For the purposes of this analysis, August 1 was used as the start of each academic year (see Table 6).

Table 6 Number of Workshops Offered Specific to Instructional Technology

2012-13	36 workshops
2013-14	87 workshops
2014-15	109 workshops

During the 2012-13 school year most technology PD targeted a small cohort of teachers who were the building level technology lead teachers[3]. However, during the 2013-14 school year, the district began to offer monthly sessions to all teachers after their contracted hours to support their efforts to integrate technology into the classrooms. The District's Instructional Technology Specialist and Coach spearheaded these monthly sessions, but they were largely facilitated by district teachers and focused on technologies they presenters had experience with. Topics included sessions on EduCanon, Embedding Media, Smart Notebook, App slams, Blended Learning and Google Apps for Education (GAFE). Teachers had the ability to select from a menu of breakout sessions depending on their interests. Generally, each night had three break-out sessions lasting approximately 45 minutes.

In December 2013, the district adopted Schoology as its LMS. In an effort to support teachers with the implementation of Schoology, the district began to offer monthly Schoology Nights in March 2014. Both the Instructional Technology Nights and Schoology Nights are incentivized PD opportunities that occur outside the teachers' contractual hours. Teachers are compensated with either an hourly stipend or the accumulation of snow hours[4]. Teachers can also use these trainings as part of

[3] Each building in the district has an EPER (Extra Pay for Extra Responsibility) position for a technology lead. This is akin to a coaching or club advisor position and is done in addition to the teacher's daily responsibilities.

[4] Within the last few years, the district has allowed teachers to make up time missed on snow days by participating in PD where they are not paid, but are allocated "snow hours". During the 2014-15 school year, there were five snow days, two of which were later "forgiven" by the state.

the PD hours necessary for recertification[5]. The district's willingness to dedicate human and capital resources to monthly PD on a consistent and expanding basis is evidence that it aims to offer continuous opportunities for teachers to deepen their knowledge of instructional technology.

With the introduction of both the monthly Instructional Nights and monthly Schoology Nights, teacher participation in technology related PD increased from 2013-14 to 2014-15 (see Table 7).

Table 7 District Registration at Monthly Technology PD Nights

		Sept	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
2013-2014	**Instructional Tech Nights**	52	40	47	44	26	51	66	44	44
	Schoology Nights	Not offered						29	26	22
	Combined	52	40	47	44	26	51	95	70	66
2014-2015	**Instructional Tech Nights**	31	29	23	26	24	36	51	47	36
	Schoology Nights	10	37	46	51	46	54	60	64	41
	Combined	41	66	69	77	70	90	111	111	77

[5] Teachers in the state studied must acquire 90 hours of professional growth every five years in order to renew their professional license.

It was the district's intent with the monthly sessions, both for Schoology and instructional technology, to encourage continuous teacher participation to help deepen participants' understanding of instructional technology. The district's hiring of a second coach for instructional technology is further evidence of its commitment to ongoing support for all teachers.

In examining the registration numbers, it becomes evident that PD workshops attract an average of approximately 30 teachers. This is regardless of format (online or in person) or whether the PD was school-based or district led. As there are nearly 800 teachers in the district, these PD offerings are clearly reaching only a small percentage of teachers. For example, Figure 4 shows the registration numbers for all the workshops that identified "Schoology" within the title. The range of registrants was one registrant (Schoology 201) to 120[6] (Schoology Online Professional Development).

[6] The system shows 120 registered at the time this figure was retrieved, however, historic data maintained by the district technology specialist confirmed that there were 125 registered participants of that course.

Workshop Name	Info	Subject	Workshop Date(s)	Section Number	Location	Number Registered	Open Seats
Curriculum & Instruction Schoology (Only available to C & I Staff)		Instructional Technology	5/11/2015	45016	Online Training - TBD	18/20	2
ESL Schoology		English Language Learners (ELLs)	4/22/2015	43675	[redacted] - Room 17	2/15	13
Handwriting Presentation Course on Schoology 2015		Support Staff	6/1/2015	43066	Online Training - TBD	117/200	83
Improving Your Workflow with Google Drive and Schoology		Instructional Technology	3/2/2015	41885	Online Training - TBD	70/100	30
Schoology 1.0		Technology	3/18/2015	43397	[redacted] - Blue/Orange Gym	6/999	993
Schoology 1.0 Option 2		Technology	3/23/2015	43398	[redacted] - Blue/Orange Gym	5/999	994
Schoology 200		Technology	4/28/2015	44099	[redacted] - TBD	13/999	986
Schoology 201		Technology	5/19/2015	44102	[redacted] - TBD	1/999	998
Schoology 201		Technology	5/19/2015	44103	[redacted] - TBD	8/999	991
Schoology Advanced		Technology	4/23/2015	44191	[redacted] - TBD	2/99	97
Schoology Advanced		Technology	5/7/2015	44192	[redacted] - TBD	6/999	993
Schoology Basics		Technology	4/22/2015	44188	[redacted] - TBD	7/99	92
Schoology Basics		Technology	5/6/2015	44189	[redacted] - TBD	6/999	993
Schoology Basics Option 3		Technology	3/30/2015	43399	[redacted] - Blue/Orange Gym	4/999	995
Schoology Basics Option 4		Technology	4/22/2015	43400	[redacted] - Blue/Orange Gym	4/999	995
Schoology Course for Colonial Assessment Protocol		Reading English Language Arts	10/22/2014	40438	[redacted] - TBD	28/999	971
Schoology in the Classroom		Technology	3/27/2015 (3)	43784	[redacted] - TBD	14/999	985
Schoology Monthly Professional Development		Technology	9/25/2014	38302	[redacted] Resource Room	10/30	20
Schoology Monthly Professional Development		Technology	10/21/2014	38303	[redacted] Resource Room	37/30	-7
Schoology Monthly Professional Development		Technology	11/20/2014	38304	[redacted] Resource Room	46/30	-16
Schoology Monthly Professional Development		Technology	12/10/2014	38305	[redacted] Resource Room	51/30	-21
Schoology Monthly Professional Development		Technology	1/29/2015	38306	[redacted] Resource Room	46/30	-16
Schoology Monthly Professional Development		Technology	2/19/2015	38307	[redacted] Resource Room	54/30	-24
Schoology Monthly Professional Development		Technology	3/18/2015	38308	[redacted] Resource Room	60/30	-30
Schoology Monthly Professional Development		Technology	4/15/2015	38309	[redacted] Resource Room	64/30	-34
Schoology Monthly Professional Development		Technology	5/27/2015	38310	[redacted] Multi-Purpose Room	40/30	-10
Schoology Online Professional Development		Instructional Technology	2/2/2015	41877	Online Training - TBD	120/150	30
Schoology Online Professional Development		Instructional Technology	5/6/2015	44578	Online Training - TBD	5/10	5
[redacted] - Schoology - Creating Quizzes		Technology	4/20/2015	43411	[redacted] TBD	8/999	991
[redacted] Sensorimotor Room Training Module in Schoology 2		Support Staff	3/31/2015	43076	Online Training - TBD	74/999	925

1

Figure 4 Schoology Workshops 2014-15 with enrollment data

The top three technology integration PD sessions for the 2014-15 school year, as based on registration, were:

- **Schoology Online Training** (125 registered). This was a PD opportunity offered to all teachers within the district to gain a deeper understanding of the functions of Schoology. This PD was delivered asynchronously, using Schoology as the platform. The description for this session read, "In this online workshop, participants will be trained on using the district adopted learning management system, Schoology. This professional development will cover an introduction to Schoology profiles, resources, groups

and courses. Participants will have the option to complete 6 different modules (each module is 60 minutes) in sequential order. Completion of all 6 modules is not mandatory; hours will be awarded based on successful module completion. Participants have the option of receiving either 1-6 snow hours or non-stipend hours." See Figure 5 for the modules available for completion. While the description noted that there were six modules to be completed, as the design team worked on developing the course, they found the need to add in modules seven and eight to ensure that participants had a well-rounded learning experience.

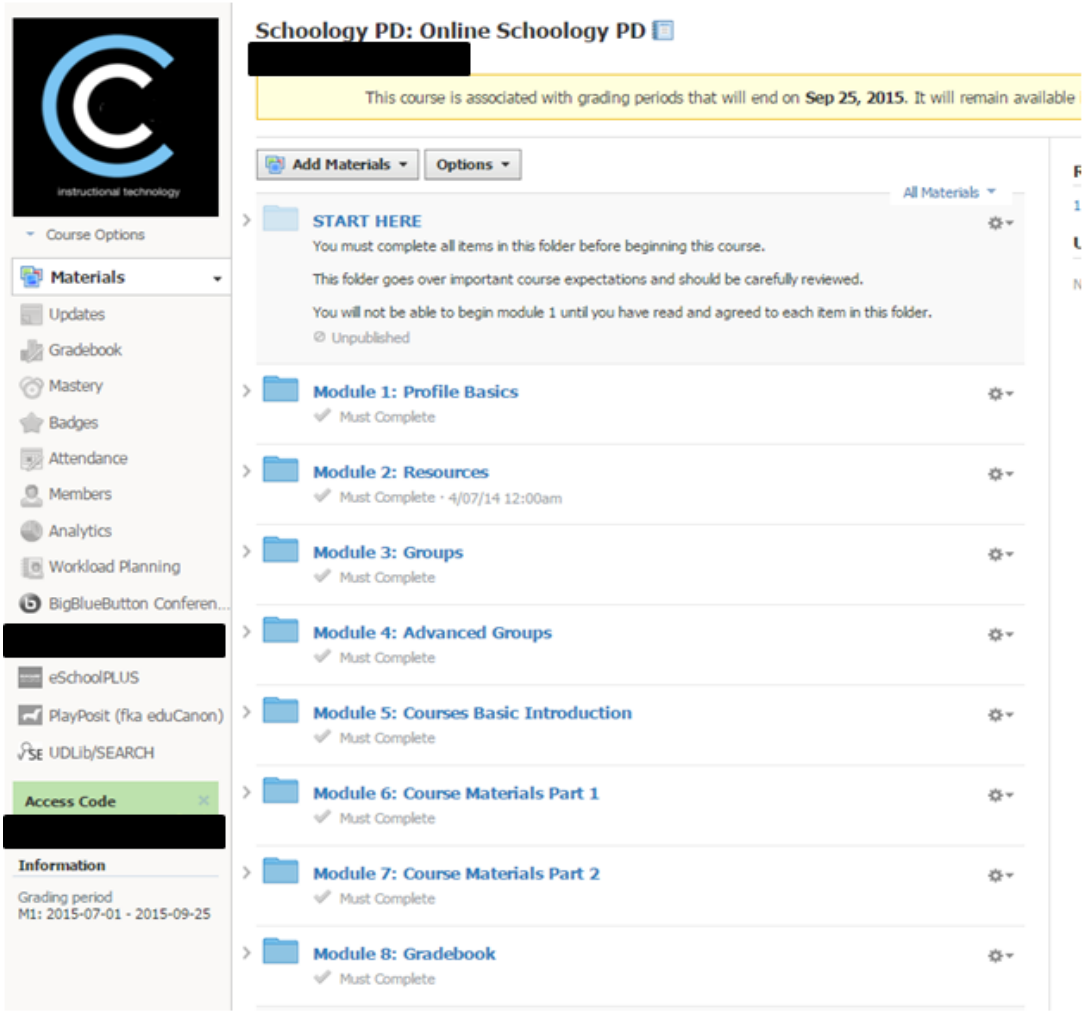

Figure 5 Course Dashboard for Online Schoology Training

It is important to note that even though 125 participants registered for this PD opportunity, 125 did not actively participate. Of the 125 registrants, only about half received any credit for module completion. Of those who did engage in at least one module, participants received on average five hours of PD credit, with a range of 1-8 hours.

- **Improving your Workflow with Google Drive and Schoology** (70 registered). This PD was also an asynchronous training opportunity open to all district teachers and delivered using Schoology. The course description for this session read, "Participants will learn how to use the advanced features in Google Docs and Schoology to improve their workflow. Topics will include the research and commenting features in Google Docs. Participants will learn how to integrate their Google Drive with Schoology in their classroom." Participants were expected to complete a total of three instructional modules and submit artifacts of learning (see Figure 6) in order to be awarded four professional development hours.

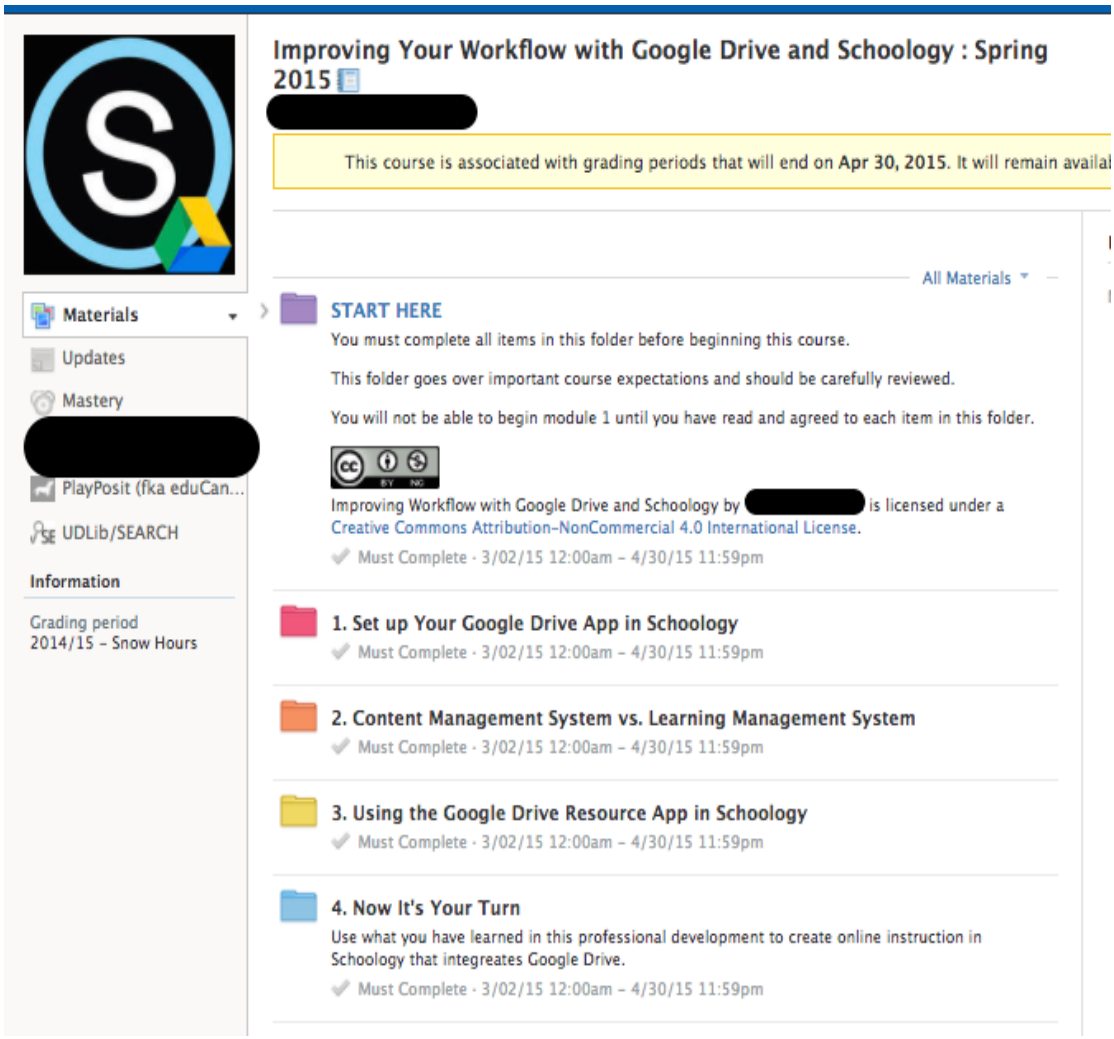

Figure 6 Course Dashboard for Improving your Workflow with Google Drive and Schoology

- **Mid-Atlantic Technology Conference** (67 registered). In 2013, the district hosted its first technology conference, open not only to teachers within the district, but outside participants as well. The 2014-15 school year saw 67 in-district registrations, with many more participants from the surrounding region. The conference

featured a keynote address by Catlin Tucker, a published author in the field of instructional technology. In addition to Tucker, there were over twenty presenters (mostly in-district personnel) on topics including gamification, Schoology, social media, augmented reality, and many others.

The Participants

Participants in the study represented a convenience sample. Specifically, the principal investigator invited all core content area teachers in her school building to participate in the study (see Appendix B). Participants were invited to take part in this study on a voluntary basis. Of those invited, fourteen agreed to participate. Those fourteen teachers were observed in their classrooms and later interviewed. This number reflects approximately 30% of the instructional staff (N=49) of the building. Table 8 provides further demographic information regarding the participants. Participants were assigned pseudonyms to assure confidentiality during the course of the study.

Table 8 Participant Demographics

Pseudonym	Grade Level	Content	Years of K-12 Experience	Education
Ms. Charles	6	Science	5	MI Applied Technology in Education
Ms. Connor	6	Mathematics	23	Unreported
Ms. Daniels	6	English	5	BA Primary Education
Ms. David	6	Special Education	4	MI Teaching & Learning
Ms. Matthews	6	Social Studies	13	MI Primary Education
Ms. Michaels	6	English	6	MI Reading
Mr. Cole	6-8	Technology Education	2	MI Education Technology
Ms. Clark	6-8	Literacy Coach	24	MI Reading Instruction / ESOL
Mr. Dennis	7	Social Studies	4	BA Elementary Education
Ms. Marks	7	English	1	BS Mid-Level Education 6-8 English
Ms. Stevens	7	English	7	MI Curriculum, Instruction & Assessment
Ms. Williams	7	English	6	MI Elementary Education
Ms. Green	8	Special Education	14	MA Educational Leadership
Ms. Kelly	8	English	1	BA English Education

Prior to volunteering, several participants voiced concerns that they were not technologically competent and would not be able to speak in great length about technology, as they were still learning it themselves. Participants were advised that this study was mostly concerned about their perceptions related to the district PD and

not their individual ability to integrate technology in the classroom. Each teacher who initially voiced such a concern agreed to participate in the study. As such, the sample group reflected teachers with a range of technology skills.

The sample also consisted of teachers who participated in a range of PD opportunities offered by the district, as well as others with limited participation. Ms. Charles, for example, has an extensive PD transcript, showing participation in numerous technology integrated PD opportunities, both as a teacher and as the presenter. Further, she often served as a facilitator at district level offerings specific to technology integration. Conversely, Ms. Michaels was only able to identify one technology specific PD opportunity that she attended, which she identified as "making a comic strip". Most teachers attended a sampling of technology related PD sessions.

Data Collection

This study involved both quantitative and qualitative research methods. Following a review of the literature specific to PD and technology integration, the principal investigator conducted 62 walkthrough observations of teachers. Subsequently, the investigator conducted interviews with all participating teachers.

Walkthrough Observations

Once consent was obtained, the fourteen teachers who volunteered to participate in the study were observed in their classroom delivering instruction. These walkthroughs were part of the regularly assigned administrative responsibilities of the

principal investigator. In MASD, walkthroughs are conducted throughout the entire school year by all administrators in all buildings. Walkthrough observations were collected using a district-approved protocol called, "I Noticed, I Wondered, and Use of Technology" (see Figure 7). For the purposes of this study, only two sections of this form were analyzed – "Use of Technology" and "I Noticed". All data collected adhered to standards of research practice, ensuring compliance with Institutional Review Board (IRB) approval, policies and procedures (see Appendix C).

1. I Noticed:	(2,000 Character Limit)
2. I Wondered:	(2,000 Character Limit)
Use of Technology	
3. Elmo	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
4. Smart Board	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
5. Amplification Device	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
6. Graphing Calculators	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
7. Computers/iPad	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
8. Integrated Digital Content	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
9. Mobile Device (SmartPhone, iPod, etc.)	☐ Teacher - Whole Class ☐ Teacher - Individual ☐ Student - Whole Class ☐ Student - Student ☐ Individual Student
10. Please email your administrator feedback regarding this walkthrough.*	○ Yes ○ N/A

Figure 7 I Noticed, I Wondered and Use of Technology Walkthrough Observation Protocol Form

In total 62 walkthroughs were conducted as part of this study, but it is important to note that not all teachers were observed for an equal amount of time (Figure 8). On average, the principal investigator completed 4.4 walkthroughs per teacher involved in the study, with a range of 1-8. The data was bimodal, with 4 and 6 being the most frequent number of walkthroughs conducted. It should also be noted that administrative responsibilities of the principal investigator focused on teachers within the English Language Arts department, and as such, those participating teachers had a higher frequency of walkthroughs than other participants.

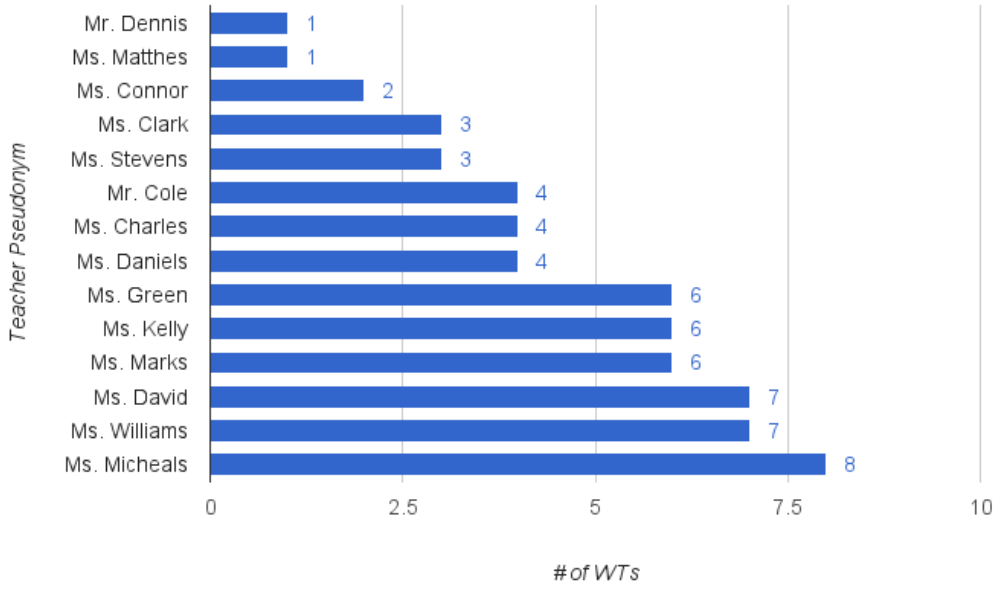

Figure 8 Number of Walkthroughs per Teacher

Teacher Interviews

At the conclusion of the school year, each participant was invited to a follow-up interview. These interviews did not focus on what was observed during the walkthroughs, but rather on teachers' reactions towards district provided PD and technology (see Table 9). The interviews were conducted in different formats. Most interviews were conducted face-to-face (F2F) in a mutually agreed upon location at a mutually agreed upon time and lasted between 30-45 minutes. These interviews were recorded and transcribed. If unable to meet F2F, the participant was interviewed at a distance using technology, such as FaceTime or Google Hangouts. These interviews were also recorded and transcribed. Finally, if neither of the above was feasible, the participant was provided with the interview protocol and responded via e-mail to the principal investigator. Follow-up questions were sent by the principal investigator via e-mail as needed. During the interview, the principal investigator utilized the following protocol to guide the questioning. Responses to each question were coded independently, drawing from themes that had emerged from the literature. All recordings and transcripts were secured in accordance with IRB procedures.

Table 9 Interview Protocol

In your opinion, what makes PD effective / valuable to teachers?
What makes you select the PD opportunities that you do? What makes certain opportunities more or less appealing than others?
What, if any, professional development did you participate in, specific to instructional technology?
How have you used technology as an instructional tool in your position? How has PD supported your use of these technologies?
Based on conversations / observations of your peers, what impact has technology PD had on pedagogical approaches?
If the district were to continue to offer PD, specific to instructional technology, what should it continue to do? What should it stop doing?
What additional support do you need in your efforts to use technology as an instructional tool? (E.g. PD, more technology resources, one to one support, PD specific to the use of technology in your own content area, etc.).

Data Analysis

Walkthrough Observations

Quantitative data from the 62 walkthroughs were analyzed by using descriptive statistics. Specifically, quantitative data included a simple tally of the frequency that specific technologies were used in the classroom, who was using the technology and who was consuming the information shared via technology. The walkthrough tool captured data for seven specific uses of technology in the classroom: Elmo, Smartboard, Amplification Device, Graphing Calculator, Computers/iPads, Integrated Digital Content, and Mobile Device. For each walkthrough, the principal investigator documented the way in which the technology was used in teaching and learning. Table 10 further explains each of these technologies and examples of what the principal investigator would look for in a walkthrough.

Table 10 Clarification of Technology Purpose and Use Identified on the Walkthrough Protocol

Technology	**Design Purpose**	**Further Reading on how this tool can be used instructionally.**	**"Look For" in a walk-though**
ELMO (aka document camera)	Project hard copies of papers or three-dimensional artifacts to a screen. Device is connected to a computer and has the ability to take still pictures and video.	Lapp, Grant, Moss, & Johnson. (2013). Students' close reading of science texts. *The Reading Teacher, 67*(2), 109-119.	Do the teacher or any of the students project and share information using the ELMO? If so, what is projected and how does it impact instruction?
Smartboard (aka interactive whiteboard)	Allows content to be displayed to the class and for the teacher and students to interact with the content.	Knight, Pennant, & Piggott. (2004). What does it mean to "Use the Interactive Whiteboard" in the daily mathematics lesson?. *Micromath, 20*(2), 14-16.	How is the Smartboard used? Does the teacher use any of the interactive functions, such as writing on the board?
Amplification Device	Allows the teacher's voice to be projected more clearly throughout the classroom. This technology is most frequently used in classrooms that have students with hearing loss as an assistive technology.	Smaldino & Crandall. (2000). Classroom Amplification Technology. *Language, Speech, and Hearing Services in Schools, 31*(4), 371-375.	Is the amplification system used by the teacher to project his or her voice? Does the teacher provide the microphone to students when they are the primary speaker?

Table 10 Continued

Technology	**Design Purpose**	**Further Reading on how this tool can be used instructionally.**	**"Look For" in a walk-though**
Graphing Calculator	A calculator that is able to graph and solve equations with variables.	Brown. (2015). Complexities of digital technology use and the teaching and learning of function. *Computers & Education, 87*, 112-122.	Are teachers modeling how to use a graphing calculator? Are students using the graphing calculator to solve mathematical equations?
Computers / iPads	Students using laptops, Chromebooks, and/or iPads (tablets) for instructional purposes.	Sahin, Top, & Delen. (2016). Teachers' first-year experience with chromebook laptops and their attitudes towards technology integration. *Technology, Knowledge, and Learning, 21*(3), 361-378.	If students are using laptops, Chromebooks, or tablets, what is the purpose? Are they working collaboratively or individually?
Integrated Digital Content	The dissemination of course content via technology, including slide presentation, online content, and multimedia.	Tucker. (2012). *Blended learning in grades 4-12*. Thousand Oaks, CA: Corwin	What role did technology play, if any, in delivering content?

Table 10 Continued

Technology	**Design Purpose**	**Further Reading on how this tool can be used instructionally.**	**"Look For" in a walk-though**
Mobile Devices	Students can use their own devices (cell phones, tablets, etc) for instructional purposes.	Song, Sun, & Jong. (2016). Enhancing students' science learning in a seamless inquiry-based learning environment leveraged by BYOD (Bring your own device). *Learning Environments for Deep Learning in Inquiry and Problem-Solving Contexts*, 37.	Are teachers using a "green zone"[7] during their instruction? If so, how are students supposed to use their devices to meet the instructional goals?

Each walk-though captured who was using the technology – students or teachers – and whom they were interacting with. These relationships were captured as Teacher-Whole Class, Teacher-Individual Student, Student-Whole Class, Student-Student, and Individual Student. The first party in the relationship is the one identified as facilitating the technology and the second as the audience. For example, one walkthrough captured students working in collaborative pairs using Chromebooks to

[7] The district allows students and teachers to "Bring Your Own Device" (BYOD) to use at appropriate times for instructional purposes. Many schools within the district, including the one involved in this study, have employed a red and green zone system to inform students when it is (not) appropriate for the student to use their own devices.

conduct Internet research on a topic that they would later present to the whole class. This walk-though was dual-tagged as "Student-Student Computer/iPad" and "Student-Student Integrated Digital Content." The same class was observed a few days later, as the students gave a presentation using the Smartboard to share their new learning with their peers. This walkthrough was tagged as "Student-Whole Class Smartboard" and "Student-Whole Class Integrated Digital Content." As part of the analysis, each interaction was tallied to examine the ways in which technology was used and by whom (see Table 11).

Table 11 Technology Use Observed during Walkthroughs

Technology		**Teacher -Whole Class**	**Teacher - Individual**	**Student - Whole Class**	**Student - Student**	**Individual Student**
Elmo	6	5	0	1	0	0
Smartboard	44	44	0	0	0	0
Amplification Device	1	1	0	0	0	0
Graphing Calculator	0	0	0	0	0	0
Computers / iPads	7	1	0	0	0	6
Integrated Digital Content	18	7	0	0	3	8
Mobile Device	4	0	0	0	1	3

Further analysis was conducted to examine how many teachers, across all 62 walkthroughs, used the technologies identified (see Table 12).

Table 12 Frequency of Teacher Use of Technology Observed during Walkthroughs

Technology	**# of Teachers who Used Each Technology**
Elmo	4
Smartboard	12
Amplification Device	1
Graphing Calculator	0
Computers / iPads	4
Integrated Digital Content	9
Mobile Device	2

The walkthroughs were then analyzed looking specifically at the "I Noticed" statements that related to the use and or integration of instructional technology into the lesson materials. To analyze the statements within the "I Noticed" comments on each of the walkthroughs, the principal investigator gathered all the feedback into one document and identified all statements that involved technology. From there, common themes emerged into a coding system. These themes were Digital Content, Classroom Management, Digital Assessments, and Data-driven and Differentiated Instruction. The final coding scheme and analytics are detailed in Table 13.

Table 13 I Noticed Statements Regarding Technology Use or Integration

Code	Frequency of Comments	Frequency of Participants
Digital Content	26	12
Technology for Classroom Management	18	9
Digital Assessments	7	5
Data-driven and Differentiated Instruction	5	3

Teacher Interviews

Analysis of interview data progressed in stages - the interview data were examined for instances where participants discussed their rationale for attending the district provided PD, explained what they valued/did not value about the PD, and ways in which they applied technology in their classroom following their participation in PD. This resulted in a preliminary coding scheme. Subsequently, codes that did not elicit many responses were eliminated or collapsed. This led to the final coding scheme.

- Code 1: Reasons for attending PD (see Table 14)

Table 14 Reasons for Selecting PD

Reason	**Frequency Discussed**	**Frequency of Teachers**
Topics relevant to current position / Content area	47	14
Format of PD (blended, online, or F2F)	9	9
Keep up with trends	9	7
Presenter	7	5

- Code 2: Elements of PD Valued / Not Valued by Participants (see Table 15)

Table 15 Elements of PD Valued / Not Valued by Participants

VALUED ELEMENTS		
Element	**Frequency Discussed**	**Frequency of Teachers**
Choice (Time, Place, Path, Pace)	13	10
Ongoing and sustained support throughout the year	12	9
Time allotted during PD to practice the skill being taught	11	7
Presenter is an engaging expert on the topic and has implemented the demonstrated technology in his / her own classroom	10	7
Short and targeted topic	9	7
Impact on student achievement (real or perceived)	8	7

Table 15, Continued

NOT VALUED ELEMENTS		
Lack of access to the technology being presented	13	10
Non-differentiated by content and/or ability/prior knowledge	4	3
Cumbersome to learn / Not worth the time investment to implement in the classroom	4	3

- Code 3: Teacher Self-Report of Types and Purposes of Technology Use in the Classrooms (see Table 16)

Table 16 Teacher Self-Report of Technology Learned in PD and Purposes of Technology Use in the Classrooms

TYPES OF TECHNOLOGY LEARNED IN PD		
Technology Learned	**Frequency Discussed**	**Frequency of Teachers**
Schoology LMS & Google Apps For Education (GAFE) Integration	23	11
Hardware (Smartboard, Elmo, Laptops, etc)	11	6
Web Based Learning Applications (LearnZillion, BrainPop, DiscoveryEd, YouTube, etc.)	9	6
Assessment Tools (Plicker, Kahoot)	6	6

Table 16, Continued

PURPOSE OF TECHNOLOGY USE IN THE CLASSROOM		
Increase student engagement	16	13
Disseminate course materials	12	11
Deliver and score assessments	11	8
Multimedia course materials / Playlists	7	7
Differentiate materials (access to data and technology to modify course content)	6	5

Limitations

There are several factors that limit the findings of this study. First, the principal investigator was also an evaluator for 9 of the participants (n=14) involved in the study. While she hopes that her professional relationship is such that the teachers felt comfortable sharing their honest thoughts and opinions during the interview process, the possibility that some participants felt beholden to answer in a manner consistent with the district's goals for technology integration cannot be discounted. However, based on many of the responses, the participants' candor during the interviews supports that they were sharing their feelings and experiences without hesitation. It is also of note that at the time of the interviews, the principal investigator had moved schools within the district, so she was not going to be the evaluator for any of the participants in the following school year, which may have increased their likelihood of being frank in their responses.

Second, while the principal investigator conducted walkthroughs of fourteen teachers, each teacher was not observed an equal number of times, or for an equal amount of time. This is because the administrative responsibilities of the principal investigator were focused on the English Language Arts (ELA) department, as the majority of observations conducted were in ELA classrooms. However, since all technology PD was option and available to all teachers, regardless of their grade level or content area, the overall impact of having a disproportionate number of ELA teachers should be minimal.

Finally, there may be some discrepancies with the participation data, given the way the district collects and maintains those in the database. For instance, participants who were no longer employed by the district were not be captured in that data. While data is available on teacher turnover rates, there is no way to identify who of the teachers who left the district may have registered and participated in the PD discussed.

Findings

Drawing from both the walkthrough observations and the interview data, this section presents the findings of this work. They are detailed below, organized by the three key questions of the study.

Key Question 1: Why did teachers choose to attend the district provided voluntary PD?

Relevance of PD. Drawing on the fourteen interviews, participants (n=14) overwhelmingly identified relevance to their position as the primary reason for selecting to attend PD opportunities. Throughout the interviews, each participant spoke about the relevance of PD at least once, with the topic emerging a total of 47 times across the 14 interview transcripts. One of Ms. Marks' responses during the interview effectively summarized the feelings of her colleagues. When asked why she selects to attend PD, she stated, "The usefulness of the content. If I believe I can use what I learn to enhance my classroom teaching, my team, and/or my PLC. I will usually lean towards those opportunities that will either enhance my current skill set or add applicable tools to my arsenal."

Throughout the interviews, participants conveyed that when they select their own PD, they choose topics related to their course curriculum or pedagogical strategies they could implement almost immediately. As shared by Ms. Stevens, "If a PD opportunity comes up that is directly related to my content/subject area and/or if it is a PD opportunity that I know would teach me new skills/strategies to use in my classroom, then I am more likely to attend." Ms. Daniels commented that she prefers topics that are related to what she is already doing and offers the opportunity to see the technology "in action" during the PD session. Her thoughts were echoed throughout the interviews, with over 50% of the participants stating that they are more likely to select PD sessions if they know the technology will target their content area and be modeled for them.

At the conclusion of each interview, participants were asked what additional PD offerings they would like for the district to offer. Of the 14 participants, 9 stated they would welcome more content-specific PD that would allow them the ability to intertwine their content with the technologies being shared. These findings suggest that the participants in the study are focused most often on their daily responsibilities and value PD options that offer them the opportunity to improve their knowledge of and delivery of their subject matter.

Format of the PD. Second to relevance, participants expressed that they selected to attend PD opportunities based upon the format of the PD, specifically if it is offered online or in a F2F setting. During the interview, 64% of participants indicated that the format of a PD opportunity influenced their selection. Some teachers, such as Ms. Clark, stated that she preferred taking PD sessions in a F2F environment. However, she clarified that her preference was based on older delivery methods of online PD that tended to be very linear, offering little to no opportunity to engage with the instructor and/or the other course participants. She shared that as the technology has evolved, she is opening up herself to more online opportunities that allow for differentiation and continued support. Ms. Clark noted the use of Schoology as a delivery tool, stating that it provides opportunities to interact with the presenter and other participants, namely through discussion boards, while also being asynchronous in nature, allowing her to complete it on her time. Ms. Clark finally shared that she likes this aspect of online opportunities as she can engage in the content at times convenient to her - even “in the middle of the night”.

Other teachers, such as Ms. David, stated that they preferred taking PD online for a variety of reasons. In Ms. David's case, she said that she is most likely to sign up and attend online PD, rather than F2F sessions, because she wanted to be efficient with her time. Ms. David discussed how she would rather use her time learning online instead of allocating an additional 30-60 minutes of drive time, depending on where and when the F2F PD was offered. For other teachers, it was less about the commute and more about competing demands in their professional and personal lives. For example, Ms. Stevens shared that for her, "Having a family makes attending PD difficult but MASD has done a great job at providing teachers with the opportunity to attend PD online. So I would definitely say that online PD is a lot more appealing to me than PD offered at school". Of the 9 participants who discussed the format of delivery, four shared that the district should continue to offer both, allowing teachers to pick their preferred delivery method. As stated by Ms. Stevens, "I think the district should continue to provide the instructional technology in different forms (online and in person) so that all teachers are able to choose a PD opportunity that best fits their individual schedule".

Trends in Education. A third factor that was identified by 50% of the participants focused on keeping abreast of trends in education. This topic arose 9 times throughout the interviews by 53% of the participants in the study; however, the discussion about emerging trends was from two different positions, with some teachers expressing a desire to stay ahead of trends, while others expressing fear of moving too fast. In discussing what she sought from PD, Ms. Clark shared that

technology PD needs to "keep up with the times", but also needs to balance the technology tool with the pedagogical needs of teachers. She shared that she is easily frustrated with PD that focuses on a tool rather than the process, noting that some PD she has attended targeting a specific technology quickly becomes obsolete. Ms. David mirrored those sentiments, sharing that she felt as though the district abandoned some technology applications or platforms just as teachers were becoming familiar and effective at using them, citing Sharepoint and Dropbox as recent examples. She stated that this was becoming frustrating for her and that several of her colleagues had voiced similar emotions. However, other teachers stated that they enjoy learning about a new technology tool for their classroom. Ms. Michaels stated, "On my team I see teachers who are not as willing to change their practice get excited about the fact that they learned a new assessment tool that only takes five minutes to set up." Ms. Kelly shared her own sentiments, referencing a training she received on Plickers. She stated that "It's fun and exciting learning about new ways to incorporate technology within the classroom".

Impact of the Presenter. A less prominent theme that emerged, but cannot be ignored as it was brought up by one-third of the participants, is the presenter of the PD. Ms. Daniels stated that she looks for PD opportunities that are intriguing to her, technology specific or not, but that what really determines what she signs up for is the presenter. During the interview she shared that if she or a colleague has had a previous positive experience where the presenter was engaging and allowed them time to work on the skill, she was very likely to register for that opportunity. However, if she or a

trusted colleague had a negative experience, which was described as either a "sit-and-get" or disorganized PD session, she was more apt to register for a less relevant PD session with a more promising presenter.

Key Question 2: What were teachers' reactions to the district provided PD?

Elements of PD that were valued by participants.

Choice of learning opportunities. During the interviews, teachers shared mixed reactions to the technology focused PD they attended, citing some specific aspects of PD that they found valuable and other elements that were not as valuable. Specifically, 71% of participants discussed how some type of choice helped increase the value of the PD. This issue aligns with the participants' input surrounding relevance as a reason for selecting particular PD opportunities. As stated by Ms. Green, "choice allows teachers to select trainings that are most applicable to their needs and that are appropriately differentiated according to their levels of competency."

Ongoing support in learning. In addition to having choice, 64% of the participants felt that having some form of ongoing support had a positive impact on their PD experiences. The idea of ongoing support emerged 12 times in the interviews, but in different manners. Some teachers, such as Mr. Dennis, felt that conversations with peers, especially with PLC members, had a positive impact on the integration of technology in classroom teaching after participation in PD. Mr. Dennis shared that his PLC is "pro-technology" and that as a group they often attend PD together. He noted

that this approach made the PD more impactful to both his PLC and his students. Other teachers felt that having online PD allowed them to go back and review concepts as needed, increasing their likelihood of implementation. Ms. Clark stated that she appreciated having screencasts of how to go through a process housed in Schoology so she could review the material at the time she needed it.

Further, a number of teachers discussed the value of expanding their network beyond their building and district to find peer support. Ms. Connor stated that her Professional Learning Network (PLN) in Twitter, allowed her to keep up with the technologies she was integrating into the classroom. Specifically, three participants who had experienced working in a cohort of teachers for technology PD shared that smaller cohorts were more effective than larger group settings, especially for technologies that teachers were learning for the first time. Mr. Dennis cited a specific example where he was able to build a support network with his PD cohort, allowing him to discuss successes and obstacles he was experiencing in the classroom as a teacher. These findings indicate that teachers find great value in ongoing and sustained PD to help them integrate technology into their practice.

Other factors. Other themes that emerged included embedded practice time in the PD sessions, an engaging and knowledgeable presenter, and short and targeted topics as increasing the value of PD. Participants shared that when practices are embedded in the session, and they are given time to work and develop authentic materials that they can implement in their classes, they are more likely to do so. In contrast, PD sessions that did not provide time to practice and develop class activities

but expected teachers do complete those tasks on their own were viewed as a barrier to successful implementation. Ms. Kelly stated, for instance, that she enjoys learning new technologies and is excited at PD sessions, but "it's hard to apply them [new technologies] after the PD has been given and you're back to all the other responsibilities you have as a teacher".

In looking at the engagement and expertise of the presenter, participants acknowledged that they judge a lot of their overall PD experience on their feelings about the presenter at the end of the session. The overall sentiment was that teachers found value in peer facilitators who were experts in the topic and understood the demands of a classroom teacher. Participants also aligned modeling and practice time to the level of engagement of the teacher. Ms. Kelly expressed frustration in a Smartboard training she attended, saying "The SmartBoard PD I encountered wasn't helpful at all. I felt like I was watching someone go through a lesson they created, and that was it." While she recognized the presenter knew the content she was teaching, the lack of time allotted to practice the skill decreased the level of engagement in the PD for Ms. Kelly. Because of this, she said she would be less likely to sign up for future PD sessions with that specific presenter. Several participants also discussed how feedback from peers, specific to the presenter, influenced their decision as to what PD to sign up for and what to avoid.

Participants also liked PD that was quick and targeted a specific skill or tool. Ms. Daniels summed up the feelings of many of her colleagues when she said, "Sometimes the best ones are short and sweet. To the point, but let us try it out in the

classrooms." Multiple times in her interview, Ms. Michaels referenced her short-learning curve when it came to technology, noting that she likes to learn a little at a time, with time to go back to her classroom and try the technology out before adding on another layer.

Elements of PD that were not valued by participants.

During the interviews three themes emerged that illustrate what was not valued by the participants - lack of access to the technology being presented, lack of differentiation to the PD sessions, and cumbersome tools that required a significant investment of time to master.

Lack of access to technology. Overwhelmingly participants identified the lack of access to technology as an obstacle to implementation, with 71% of participants discussing it at some point during the interview. Overall, participants felt that when they could not easily and consistently access the technology there was less value in the PD. During her interview, Ms. Marks stated, "The sparse availability [of technology] sometimes makes it difficult to incorporate tech into lessons." This was a sentiment that was echoed by many of her peers as well, as the building in this study did not offer a 1:1 model, where every student could have access to a networked device.

Lack of differentiation. Three participants also discussed the lack of differentiation as limiting the value of the PD. As Ms. Michaels pointed out, "I know differentiating the PD days would be hard, but that's what we are expected to do every day in the classroom. Some [PD] days are less appealing because I already have an understanding of what's being taught. On the flip side, there are some that really go

over my head." Other teachers voiced similar thoughts, and one noted that he felt this was especially true when looking at technology versus content. As he said, "we all teach social studies and we studied that in college. But we are all at different levels of knowing and using technology in the classroom." Many participants (57%) shared the belief that the district needs to continue to extend PD opportunities that are differentiated to each teacher's current level of understanding and ability of the skill being taught to allow for greater impact on professional practice. Ms. Green shared that when the district did that, she was more apt to select a PD opportunity and implement what she learned, as she was able to work with a smaller group of teachers who were all at a similar skill level.

Learning curve. Finally, teachers shared that if they found a technology to be too cumbersome to learn, or required too much time to master the implementation in the classroom, they were unlikely to follow up with integration in their classroom. An example would be when Mr. Dennis discussed his use of Class Dojo. He shared that he learned about it in a PD session and was excited to implement it in his classroom, believing that as a newer teacher he could benefit from greater classroom management. However, he said that he used it only for a week or two before discontinuing. As he indicated, use of the software was taking too much time away from teaching his lessons and created downtime for students, which in his opinion increased off-task student behaviors.

Key Question 3: How did teachers apply knowledge of technology in their classroom practice following their participation in the district provided PD?

What technologies were observed in use? To answer this question the principal investigator analyzed both the walkthrough data and responses to the interview questions. As seen previously in Table 11, teachers most frequently utilized the Smartboard as a tool to display information to the class as a whole. During the 62 walkthroughs, there were 44 recorded instances of teachers using the Smartboard at a low-level of technology integration, mainly dispensing information to the whole class. However, the district only offered five workshops addressing the Smartboard from 2012-2015 (see Appendix A), and only five of the fourteen teachers who participated identified having attended a Smartboard training during the interviews. During the walkthroughs, 64% of participants were observed integrating digital content into their lessons, during 18 walkthroughs. However, the majority of PD sessions offered targeted specific tools and strategies to do such. These workshops included sessions on Blended Learning, Schoology, Screencasts, Flipped Learning, GAFE, and cultivating a digital repository for learning.

How was the technology integrated into the lesson? To put each technology in context, a few examples of what was observed during walkthroughs and how each was categorized is provided. In one walkthrough, "Ms. David, read an article about Amelia Earhart to the class. The Smartboard read, *The Incredible Shrinking Notes*. After reading the text, Ms. David provided students with a large index card and

directed them to fill the card up with details from the story in their own words. Ms. David reminded the students of the LEQ[8]. Students were seated collaboratively, but worked individually on the task. Ms. David explained that the next steps in this lesson would be to have students shrink their summaries to a smaller index card, then to a post-it note." This interaction was categorized as "Smartboard: Teacher - Whole Class".

Another walkthrough of Ms. David's class captured the following; "Students worked in small collaborative groups in different roles (health care providers, students, parents). Students analyzed different media about one topic (video, article). Students worked in groups to take notes from their different sources. Students were assigned roles based on academic ability (lower groups were assigned students, and the "top" group was assigned to the role of health care providers. Based on Readability-Score.com, article shows a 7.9 avg grade level (based on diff[9] [sic] quantitative measures)." This observation was classified as Computers/ iPad: Student-Student, as well as Integrated Digital Content: Student-Student.

Analysis of the "I Noticed" comments revealed the following themes: digital content, classroom management, digital assessments, and data-driven and differentiated instruction. For the purposes of this study, digital content included any dissemination of course content via slide presentation, online content, and multimedia. Examples of each are detailed in Table 17.

[8] LEQ: Lesson Essential Question
[9] Abbreviated in the walkthrough by the principal investigator for 'different'.

Table 17 Sample Statements for the theme “Digital Content”

Element of Digital Content	**Sample “I Noticed” Comment**
Slide Presentation	Students worked in small collaborative groups in different roles (health care providers, students, parents). Students analyzed different media about one topic (video, article) Students worked in groups to take notes from their different sources. (Mr. Dennis)
Online Content	Students are making a GO [graphic organizer] about Hurricane Katrina to help them organize their essays. Students are using technology to find additional information from multimedia sources about Hurricane Katrina. Ms. Green shared a good resource (History Channel) video for students to reference in their research.
Multimedia	Students worked in small collaborative groups in different roles (health care providers, students, parents). Students analyzed different media about one topic (video, article) Students worked in groups to take notes from their different sources. (Ms. David)

Throughout the walkthroughs there were 26 comments made in the “I Noticed” fields specific to digital content for 12 participants (n=14).

When technology was used to manage classroom behaviors, in both preventative and reactive methods, the comments reflecting such were identified as classroom management. Comments included class procedures, lesson objectives / key questions, and timers. Sample comments for each are provided in Table 18.

Table 18 Sample Statements for the theme “Classroom Management”

Element of Classroom Management	**Sample “I Noticed” Comment**
Class Procedures	Students reading collaboratively (An American Plague). Smartboard directions guide students to circle words / phrases that show something terrifying is happening. (Ms. Kelly)
Lesson Objectives / Key Questions	Students seated in large groups, working individually. Ms. Williams had posted two prompts on the Smartboard to focus students as they read.
Timers	Ms. Stevens used a timer displayed on the Smartboard to keep students on pace. Ms. Stevens saw that students needed more time to complete the task, so she added 5 minutes to the class timer.

The third most frequent theme that emerged surrounded digital assessments. At the time of the study, the accountability rating for the school was largely based on a test developed by the Smarter Balanced Assessment Consortium (SBAC). This was a computer based test administered to all students in grades 6-8 in both English Language Arts and Mathematics. Students in seventh grade also took a SBAC in Social Studies and those in eighth grade took a SBAC test in Science. As such, teachers in the school were trained in developing and administering such tests and encouraged to allow students opportunities to practice being assessed in a similar environment. Further, reading inventories were largely done through computer programs, such as the Scholastic Reading Inventory (SRI). Comments specific to digital assessments were found seven times in the “I Noticed” data for five teachers.

However, it is noted that there was significant overlap of this theme with digital content. An example of a comment that was tallied both as digital content and digital assessment came from a walk-though of Ms. Green's classroom, and read, "Honors Section Students are working on their performance task, in order to prepare for what they will encounter on the SBAC this spring. Topic: *Zoot Suit Riots Task*. Students have to write a section for a Social Studies textbook about the Zoot Suit riots based on the research information they have been provided. This is an instructional PT [performance task], so Ms. Green has previously reviewed the research information with the students. Steps are provided to the students to keep their task on point. PT includes a video clip that students need to take notes on to mirror the multimedia component of the SBAC." As one can see, this comment intersects the use of digital content, though the video clip watched, as well as the setting of an environment similar to the one the students will experience on the SBAC.

The final code that emerged from the comments in the "I Noticed" field of the walkthrough was data-driven and differentiated instruction. The MASD has collaborated with surrounding districts to offer its teachers and other instructional staff access to a wealth of data, which is managed by a local data center. For example, Figure 9 illustrates the data that a teacher can access for an individual student in his or her class, which includes, but is not limited to high-stakes accountability tests (such as the Delaware Common Assessment System), as well as longitudinal data, including

the STAR reading scores[10] for the student. Teachers also have the ability to access whole-class data by looking at their "data dashboard" for whole class data on norm referenced tests, such as the STAR, accountability tests, district common assessments and other factors, such as disciplinary referrals, Response To Intervention (RTI)[11] groupings, and attendance.

[10] Advantage Learning Systems' STAR Reading Computer-Adaptive Standardized Test is a reading assessment used by the district to evaluate various literacy skills, including phonics, fluency, and comprehension.

[11] RTI is a process used by educators to help students who are struggling with a skill or lesson; every teacher will use interventions (a set of teaching procedures) with any student to help them succeed in the classroom—it's not just for children with special needs or a learning disability. Source: http://www.specialeducationguide.com/pre-k-12/response-to-intervention/

Screening Assessment Information

Add/Edit Screener

DCAS				Reading				Math			
Test Year	Test Grade	School	Season	PL	Accountability Score	Instructional Score	Lexile	PL	Accountability Score	Instructional Score	
2013/2014	08	470	Spring	1	751	750	915	2	782	784	View Chart
2013/2014	08	470	Fall	1	689	687	720	1	668	665	View Chart
2012/2013	07	470	Spring	1	740	738	880	2	766	768	View Chart
2012/2013	07	470	Fall	1	736	750	915	2	768	769	View Chart
2011/2012	06	470	Spring	1	711	729		2	732	734	View Chart
2011/2012	06	470	Winter	1	662	662		1	715	723	View Chart
2011/2012	06	470	Fall	1	612	632		1	659	663	View Chart
2010/2011	05	422	Spring	3	757	767		2	724	725	View Chart
2010/2011	05	422	Winter	2	718	703		3	749	748	View Chart
2010/2011	05	422	Fall	1	612	605		1	683	679	View Chart

STAR Reading											ZPD			
Test Year	School	Test Date	Assessment	GE	PR	NCE	IRL	IRL Comments	Est. ORF	Scaled	Lower ZPD	Upper ZPD	Lexile	SGP
2014/2015	392	1/28/2015	STAR Reading Winter	4.3	4	13.1	4			483	3.1	4.8	625	
2013/2014	470	1/8/2014	STAR Reading Winter	7.1	36	42.5	6.3			788	4.3	7.1		
2013/2014	470	9/6/2013	STAR Reading Fall	6.9	39	44.1	6.2			773	4.3	6.9		
2012/2013	470	6/7/2013	STAR Reading Spring	3.2	2	6.7	3.1			369	2.7	3.8		
2012/2013	470	6/6/2013	STAR Reading Spring	3.4	3	10.4	3.3			389	2.8	3.9		
2012/2013	470	6/6/2013	STAR Reading PM	3.4	3	10.4				389	2.8	3.9		
2012/2013	470	12/4/2012	STAR Reading PM	3.7	6	17.3				424	2.9	4.2		
2012/2013	470	12/4/2012	STAR Reading Winter	3.7	6	17.3	3.6			424	2.9	4.2		
2012/2013	470	9/6/2012	STAR Reading Fall	2.2	1	1	1.7			230	2.1	3.1		
2011/2012	470	5/29/2012	STAR Reading Spring	1	1	1	-1			82				
2011/2012	470	1/17/2012	STAR Reading Winter	4.1	13	26.3	3.8			454				
2011/2012	470	11/2/2011	STAR Reading PM	1.3	1	1				90				
2011/2012	470	9/27/2011	STAR Reading Fall	2.4	1	1	2.2			267				
2011/2012	470	9/19/2011	STAR Reading Fall	1.3	1	1	-1			90				
2010/2011	422	5/12/2011	STAR Reading	5.4	42									
2010/2011	422	1/10/2011	STAR Reading	4	25									
2010/2011	422	8/19/2010	STAR Reading	2.4	7									
2009/2010	422	5/5/2010	STAR Reading	1.1	1									
2009/2010	422	1/6/2010	STAR Reading	0.9	1									
2009/2010	422	9/1/2009	STAR Reading	2.7	21									
2008/2009	422	5/4/2009	STAR Reading	3.4	40									

Figure 9 Student Data Snapshot

Teachers have been trained on both how to access the data and how to use the data to inform their instructional decisions. However, it is not surprising to the principal investigator that this theme was the least frequently tallied, as this would most likely be witnessed during PLC conversations and in lesson plans. As such, it

was only observed on the walkthroughs of 3 participants (n=14). A sample comment using the data-driven and differentiated instruction theme read, “Ms. Matthews selected a variety of informative texts for students. The text marked "highest" (Ancient Ghana) was pulled from ReadWorks. It is identified as a 4th grade level text, and an 820L”. ReadWorks is an online tool used by teachers to differentiate texts to students. This comment is significant only in context, as the walkthrough was conducted in a sixth grade classroom.

It is significant to recognize that this study did not seek to evaluate the level of technology use in the classroom; rather it aimed to examine the first step, the mere presence of technology in teacher practice. Other researchers have examined the levels of technology use in the classroom to determine the level of blend between traditional instruction and technology integration (Hall, Dirksen, & George, 2006; Puentedura, nd.).

What was garnered from the interviews?

Benefits of PD. In addition to documenting the implementation of technology during the walkthroughs, the teachers were also asked how the PD has supported their use of technology in the classroom during their interviews. Ms. Green stated that, “PD has supported my use of [these] technologies by providing best practice examples and training.” Ms. Connor stated that she is “learning as much as [she] can” and “attend[s] as many professional development courses as possible.” Mr. Dennis stated the PD allows him “time to explore these tools, share ideas with other educators, and learn

how to implement and manage" the technologies. He also shared that his PLC is finding it easier to share materials, then modify as needed for their classes, with technology, specifically Schoology.

Limited impact of PD. Several teachers voiced that the PD did not have a significant impact on their pedagogical choices, specific to technology integration. This is also reflected in the lack of technology witnessed during the 62 walkthroughs conducted as part of this study. Ms. Charles noted her belief that, "instructional technology is only as effective as the teacher who is implementing it" and that a roomful of devices will not impact student learning if the technology is not used effectively. Ms. Marks shared that "aside from the Plicker tool, PD was not the source of much use in aiding my technology needs." Ms. Clark echoed that sentiment, sharing, "I can't really say, other than Schoology, that PD has supported my use of technology." Teachers often shared that they normally found and explored technologies on their own, not in PD. For example, Ms. Williams shared that she normally just searches for things on the Internet to find out more about them and that PD does not have anything to do with her self-learning of the technologies she implements.

Chapter 3

DISCUSSION AND RECOMMENDATIONS

This Executive Position Paper has three key objectives: (1) investigate why teachers opted to participate in certain voluntary PD opportunities (2) examine teachers' reactions to technology related PD, and (3) describe pedagogical practices specific to instructional technology use observed in classrooms. This section discusses the findings of this work.

Why teachers selected the PD they did. This study indicates that teachers often select PD opportunities based on convenience and relevance to their specific assignment. Teachers stated that if they do not see value in the PD offered, they would not select to participate. Further, teachers stated that the location, presenter, and time investment were contributing factors to their decision making process as well. Overall, teachers appeared willing to dedicate time outside of their contractual hours to improve their practice, but only if they found value in doing so.

The belief that teachers must continue to learn and grow is well supported through the literature (Berry, Johnson, & Montgomery, 2005; Bolam, McMahon, Stoll, Thomas, & Wallace, 2005). In spite of the wealth of research surrounding PD, research specific to motivation for attending PD is sparse most likely because many PD opportunities are mandatory and thus a job requirement. However, that discounts

the dedication of many teaching professionals who have always sought to improve their practice outside of their contractual hours and professional obligations.

Some participants also shared that they attended PD sessions as a PLC or grade-level team because they perceived greater value from a shared experience with a colleague. The research supports this and indicates that PLCs can have a positive impact on teacher practices. Vescio, Ross, and Adams (2008) conducted a meta-analysis of the literature specific to the impact of PLCs on both teacher practices and student learning. They found that teachers perceived that PLCs did have a positive impact on pedagogical practice; however their analysis was specific to the DuFour model of PLC (DuFour, DuFour, Eaker, & Many, 2006), and not the shared experience of PD discussed by teachers in this study.

How did teachers react to the district provided PD? The participants' reactions to the PD were mixed, as some teachers found great value in the experience, while others did not. Specifically, teachers valued having a choice in learning platform (F2F, blended, or online), access to ongoing support, engaging and knowledgeable presenters, short and targeted topics, and perceived positive impact on student outcomes. In his meta-analysis of electronic networks amongst teachers, Barnett (2001) found that technologies that allow teachers to expand their PLN reduce teacher isolation and support sharing, foster reflection on practice, influence teacher practice, and support the formation of communities of practice. However, he claims that professional networks were best built first in person, then supported online. This also mirrors what many teachers shared, in that they valued the F2F interactions to

identify and build a relationship and then harness technology to continue to engage and gain support online.

When asked how the district might improve its technology related PD offerings, participants expressed interest in continuing to utilize the LMS as a delivery tool for on-demand PD offerings. Teachers shared that this allowed them greater flexibility in choosing the time, place, path, and pace of their learning. The participants also voiced some opportunities for improvement as well, including the need to reduce the pace of technology changes advocated by the district. Specifically, participants shared that they felt the district changed technology tools that served the same purpose too often, citing the move from Google Drive and SharePoint to Drop Box back to Google Drive as an example of the "moving target" of technology tools. This was frustrating to many of the participants, as they felt they dedicated personal time to professional growth, only to find that time wasted on obsolete technology. The participants shared that they are more confident with integrating technology after they have prolonged exposure to the tool, allowing them to deepen their own understanding of the functionality and time to practice integrating it into their pedagogical repertoire.

It is important to recognize that this study did not seek to evaluate one PD session, or even target a specific cohort of teachers who had shared PD experiences. Rather, the participants were a convenience sample composed of teachers in the work site of the principal investigator who responded affirmatively to the investigator's request for participants. Participants were asked to describe their reactions to PD

holistically. Because of this, the investigator was unable to solicit feedback on each PD opportunity attended, as recommended by Guskey (2000).

How did teachers apply knowledge of technology in their classrooms?

Considering both the teachers' feedback during the interviews and the walkthrough observations, it is ambiguous as to what, if any, impact the PD had on teacher practices in the classroom. Most walkthrough observations saw limited, if any, technology integration, with most being the teacher's use of the Smartboard as a projection screen. Specifically, the walkthrough data showed the most frequent use of technology observed was the teacher using the Smartboard to display information to the class. While this study did not seek to evaluate the level of technology integration, Table 19 shows how different researchers may have evaluated these interactions.

Table 19 Technology Integration Rating of Smartboard Use

Framework	**Researcher**	**Level of Integration**
SAMR	Puentedura, nd.	Substitution: Computer technology is used to perform the same task as was done before the use of computers.
TPACK	Technology Integration Assessment Rubric (Harris, Grandgenett, & Hofer, 2010)	Curriculum Goals and Technologies: Technologies selected for use in the instructional plan are <u>not aligned</u> with any curriculum goals.
Levels of Use	Hall et al. (2006)	Mechanical Use: State in which the user focuses most effort on the short-term, day-today use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.

While the walkthrough data indicates that there was little to no impact in pedagogical practices, during the interviews, some teachers indicated the need for sustained time to implement the new skills in the classroom setting with follow up support from the trainers. Further, they expressed desire for targeted training specific to pedagogical practices in a blended environment. The desire of teachers for time to improve their practice is by no means unique to the participants in this study. Purnell and Hill (1992) published *Time for Reform,* which was an in-depth exploration of how time is a critical factor to all areas of education and to all stakeholders in the education process. Their study concluded that in order for any significant change to be witnessed

in schools, time had to be allocated to facilitate such changes. In the course of their study, Purnell and Hill (1992) found that schools have six strategies to create time – increase non-instructional time for teachers, revise how time is allocated, change the daily school schedule, increase the time in school, encourage teachers to use their personal time, and promote efficiency for increased productivity.

In summary, the teachers' overall view was that the district is on the right path regarding PD offerings specific to technology. Most of the teachers felt that the district should continue to invest human, physical and financial capital into developing PD opportunities specific to instructional technology. Many teachers shared that they hope to see an increase in offerings to support them.

Recommendations

The recommendations set forth here target the technology committee of the district, the administrative team of the school studied, and the participants of the study, specific to each of the key questions presented here.

Key Question 1: Why did teachers choose to attend the district provided voluntary PD?

Recommendations for the Technology Committee of the District

Be more visible on-site. During the interviews many teachers acknowledged that the district offers a lot of opportunities for teachers to participate in PD. However, the times that the PD were offered were not attractive to the teachers involved in this study. Several teachers voiced that they would be willing to dedicate their planning

time to work with the coaches to improve their integration of technology into their lessons. As such, it is recommended that the district technology coaches establish on-site "office hours" where teachers can solicit feedback and training during the school day. As it is mandated that all teachers participate in 90 minutes of PLCs weekly, it is recommended that the coaches work with the administrative team at the building level to harness the PLC time for technology development.

Provide content-specific PD. During the interviews teachers repeatedly emphasize the need for technology related PD that has a direct and immediate connection to their content areas. Most teachers felt they were proficient with their content and increasingly more proficient with technology, but that the greatest opportunity for them was to identify specific tools, applications, and / or strategies for their content area. Darling-Hammond et al. (2009) found that one of the tenets of effective PD is a focus on student learning and the content of the curriculum being taught. By focusing PD opportunities on cohorts of teachers from the same discipline, the presentation can be tailored to highlight how the skills could be transferred to that domain. For example, if a technology PD opportunity is on using Google Docs for extended writing pieces, that PD will look similar in English Language Arts classrooms and most Social Studies classrooms, such as U.S History and World History. However, it will likely look vastly different in other classes, such as Mathematics and Physics. By tailoring PD to the audience, the participants will see the value of the skill being displayed in their daily routine and may become more likely to integrate the skills into their own practice.

Continue to explore ways to deliver PD in both synchronous and asynchronous learning environments. The teachers recognize the tremendous effort the district is taking to provide a wide variety of PD offerings (see Appendix A). Many voiced that the ability to participate in asynchronous PD via Schoology has impacted their willingness and ability to participate in those offerings and they hoped these opportunities would continue to expand. Nevertheless, a number of teachers also indicated appreciation for F2F time they had with the experts. Teachers also shared that their desire to attend PD online or F2F depended on their background knowledge and current skill set as it related to the topic offered. Consistently, teachers voiced that the less knowledgeable they were, the more likely they would select a F2F session over an online session. It is recommended that the district continue to expand its current offerings, allowing teachers to select F2F, blended, or online PD, depending on their learning preference.

Recommendations for the Administrative Team of the School

Provide site-based PD. A determining factor for many teachers in opting to attend PD was time and location. There is an opportunity here for the administrative team to address both concerns at once. It is clear from this study that there are a number of teachers who have the skill set to facilitate PD specific to technology. For example, Ms. Charles is a part-time instructor at a local university and teaches college level courses on technology integration. Mr. Cole previously worked at a different university as an instructional technologist. The administrative team should capitalize on these staff members, and others, and use their expertise locally to provide PD that

is built within the contracted hours, such as during their PLCs. This will allow teachers to remain on-site and use the time they are already allocated to learn how to integrate technology into their pedagogical practices.

It is important to note, however, that several researchers provide cautionary tales when using in-house "experts" to deliver PD. For example, Corcoran, Fuhrman, and Belcher (2001) found that when teachers led the charge they often would focus less on results and more on what fit into their preconceived notion of good practice. Timperley, Wilson, Barrar, and Fung (2008) also stressed the importance of active leadership when developing PD - whether it is done by in-house experts or outside consultants. However, they also note a benefit of developing and using in-house experts - that those experts, regardless of their job title (teacher, administrator, or instructional coach) - are on-hand for the whole school year to provide ongoing PD and support of implementation.

Recommendations for the Participants of the Study

Be part of a team. Teaching can be a very isolating profession if allowed. However, if educators take their practice seriously, as the participants of this study do, they should invest some time in collaborating with colleagues in order to improve their craft. Many of the teachers involved in this study shared the belief that their colleagues' encouragement and participation in technology PD allowed them to attend and integrate more technology into their classrooms. This is also evident in the extensive body of research germane to teacher collaboration to support this recommendation (Berry et al., 2005; Louis & Marks, 1998; Phillips, 2003). Teachers

should be encouraged to plan together, participate in peer observations, and reflect on the impact of the lesson on student understanding. When we see our peers being innovative in the classroom - with or without technology - it emboldens others to do the same. Considering this, it is recommended that teachers attend PD with those they work with - either on a grade level team or within a content specific PLC. This will allow teachers to have a teammate who they can discuss the implementation of their new learning and reflect upon the successes and opportunities for improvement.

Key Question 2: What were teachers' reactions to the district provided PD?

Recommendations for the Administrative Team of the School

Provide material support. During the interviews, teachers acknowledged that there is greater access to technology now than in years past and in comparison with access colleagues have in other schools. However, all teachers voiced that not having access to technology all the time, such as a 1:1 model, limits their ability to practice integrating technology into their pedagogical approaches. Accessibility to equitable technology is not a new or unique challenge to the school studied. In 2008, the National Education Association (NEA) published a policy brief addressing *The Ongoing Challenge of Access, Adequacy and Equity* of technology in schools. In it, the NEA acknowledged, "Educators have been remarkably creative with limited computer access, but if technology is to be integrated into instruction, more computers must be made available for students' use" (p. 3). While there are always constraints on administrators to be responsible stewards of their building's budget, they must find

a way not only to maintain, but to expand the number of devices deployed in order to allow teachers and students greater access.

Recommendations for the Participants of the Study

Advocate for your classroom needs. It was apparent by the teacher responses that a key obstacle that prevented them from fully integrating technology in the classroom was consistent access to student devices. Teachers were willing to attend PD and dedicate their time to improving their practice of technology integration, but were frustrated that they could not always implement the skills they learned in a setting that was not 1:1. In fact, several teachers expressed what can best be described as "device envy" of their peers who had participated in several specific and ongoing trainings who then received a classroom set of computers. To this end, the National Education Association (NEA) recommended in 2008 that teachers seek out funding sources for their classrooms. This included lobbying local authorities for more funding to purchase materials needed to teach in the 21st Century as well as seeking private funding through grants and partnership ventures.

Key Question 3: How did teachers apply knowledge of technology in their classroom practice following their participation in the district provided PD?

Recommendations for the Technology Committee of the District

Require artifacts of implementation. It is clear from the district's PD system that it is making a concerted effort to support teachers with the integration of technology while balancing the needs of the teachers' contract. However, even though

teachers are attending the PD provided, the skills are not being implemented pervasive enough to be captured in classroom observations. This is noted by the overwhelming use of technology as a projection device, while in fact the majority of the PD sessions offered were specific to pedagogical strategies and digital content. It is recommended that teachers be offered additional hours towards their re-certification and/or snow hours if they can show evidence of implementation and reflection of the skill taught in PD. Artifacts might include a video of the teacher integrating the skill into his or her classroom and / or a lesson plan with student work samples to illustrate implementation. This will allow the F2F support of the traditional PD to be blended with the digital submission of the artifacts of learning. By harnessing the need for re-certification hours and snow hours, this will require minimal financial investment from the district and should have a significant impact on actual implementation in the classrooms.

Recommendations for the Administrative Team of the School

Encourage Innovation and Risk-Taking. In comparing the PD attended to the technology witnessed in walkthroughs, it appears that teachers are not taking the next step and putting their new skills and knowledge into practice. Teachers voiced the concern during interviews that if the technology did not work, or if the integration was not appropriate for the lesson, that their observation record would suffer. This may be the most daunting task for the administrative team as it requires a culture of trust and a change of mindset. Albert Einstein is credited as saying, “Anyone who has never made

a mistake has never tried anything new" and this belief must be reinforced with the staff if they are willing to take the leap of faith and be innovative in their classrooms without fear of redress by their supervisor. Howard and Gigliotti (2015) examined risk-taking specific to technology integration and found that a major obstacle to technology integration was the teachers' confidence in the reliability of the technology, the teachers' abilities to integrate the technology, and their confidence to solve any problems that might arise during a technology based lesson activity. However, as their study spanned three years, they also found that as the teachers gained confidence, they were more likely to engage in experimentation within their classroom.

Recommendations for the Participants of the Study

Learn by Doing. Based on the observations from the walkthroughs, the number one use of technology in the classrooms is the teacher disseminating information to students displayed on the Smartboard. Teachers have invested significant amounts of time away from their personal lives to improve their craft, especially in the realm of technology integration; however, that was not translated in the observation data. During interviews, many teachers said they would like more time to practice the new skill they learned in PD. However, there was not always a direct connection between what they learned in PD and what they were doing into the classroom. If the PD more directly related to the teachers' current assignments, one might hope that the implementation levels of technology activities learned in PD would increase. Research conducted by Cohen and Hill (2001) support this claim, as

their study showed that practices learned in PD were more likely to be integrated into the classroom practices of teachers when the PD was directly related to their curriculum and could be immediately implemented. Considering this, if teachers were tasked with developing authentic technology-based activities that related to their current curriculum or assessments, they will be more likely to implement the technology-rich learning experiences into their classrooms.

Conclusion

This study sought to identify how PD influenced participating teachers' technology integrated practices. The findings indicate that teachers understood the value of integrating technology into their classroom practices and were willing to attend voluntary PD specific to technology. Teachers shared that they were most likely to attend PD outside of contractual hours if it was directly tied to their current assignment, offered in an appealing format (F2F, online, or blended), helped them keep up with emerging trends in the field of education, and was offered by an engaging and insightful presenter. While teachers are willing to attend such PD opportunities, the walkthrough data indicated that they are only integrating technology into their practices at rudimentary levels, such as using a Smartboard to project basic information and / or class agendas. It is recommended that the administrative team of the school in collaboration with the district technology committee review the recommendations set forth within this paper and identify plans moving forward. It is also recommended that the district technology committee continue examining the impact of technology integrated PD on daily teacher practices in order to identify longitudinal trends.

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Appendix A

DETAILED LIST OF INSTRUCTIONAL TECHNOLOGY WORKSHOPS OFFERED 2012-13 ACADEMIC YEAR

- 2012-13 Tech Committee Meetings (2 sessions)
- 2nd Virtual Technology Session with John Kuglin
- Becoming a Digital Educator Follow-Up Session
- Mid-Atlantic School District Instructional Technology Workshop (7 sessions)
- Committee Meeting
- Curriculum & Instruction Tech Subcommittee
- Instructional Technology Monthly PD
- Instructional Technology Training – Cohort 2
- Instructional Technology Training Cohort 1
- Next Steps in Becoming a Digital Educator
- STC Monthly Meetings (8 sessions)
- Summer Technology Meeting
- Taking the First Steps in Becoming a Digital Educator
- Using Screencasts to help parents inspire excellence
- Vision Subcommittee

2013-14 Academic Year

- Basics of Google Apps
- Beginner and Advanced Weebly Sites
- Blended Learning (5 sessions)
- Blended Learning Cohort (Secondary) – Group 4 (2 sessions)
- Blended Learning Cohort (Elementary) – Group 1 (2 sessions)
- Blended Learning Cohort (Elementary) – Group 2 (2 sessions)
- Blended Learning Cohort (Secondary) – Group 3 (2 sessions)
- Technology Consortium Professional Development 2 (2 sessions)
- Building a Professional Learning Network with Twitter (2 sessions)
- Cell Phones in the Classroom
- Cohort Training – John Kuglin (2 sessions)
- Mid-Atlantic School District's 1st Annual Instructional Technology Conference
- Creating a Weebly Website
- DCET Spring 2014

- Designing a Curriculum for Blended Learning (2 sessions)
- eLearning Delaware: Finding, Organizing, and Sharing Educational Resources on the Web
- Google Drive: Digging Deeper
- Google Forms
- iEducator 2 Training (Previously John Kuglin Cohort 2 Training)
- Instructional Technology Cohort 1
- Instructional Technology Cohort 2 (2 sessions)
- Instructional Technology Monthly Professional Development (9 sessions)
- Integration A Pilot
- Introduction to the iPad
- Learning.com Training
- LMS Review
- Looking Closely at Smarter Balanced
- Modern Teacher Conference (4 sessions)
- NCE Schoology (2 sessions)
- Organizing your Google Drive
- Progress Monitoring
- School Technology Coordinator Schoology Training
- Schoology for Administrators
- Schoology Monthly Professional Development (3 sessions)
- Schoology Training – Instructional Coaches & STC Only
- Simple K12 Online Instructional Technology Webinars
- Smart Board Conferences
- Smart Board Training (2 sessions)
- SSP Mid-Year Review
- STC Monthly Meeting (9 sessions)
- Symbaloo
- Symbaloo Webmix
- Tech Leads Sky Curriculum Training
- Technology Conference Committee Meetings
- Technology School Visits Debrief
- Technology Tools and Resources (2 session)
- Using Blended Learning and Wikispaces
- Using Google (3 sessions)
- Using Google Drive to Increase Productivity
- Using Google Forms for Assessment
- Using Schoology for PIP (2 sessions)
- Using the iPad to Program for Specific Student Needs
- Using Twitter to Connect Globally
- Utilizing the most of your Google Account
- YouTube and EdCannon in your Classroom

2014-15 Academic Year

- Technology Consortium Train the Trainer
- Technology Consortium Cohort 1 Year 2 Day 3
- Technology Consortium Cohort 1 Year 2 Day 4
- Technology Consortium Conference with Catlin Tucker
- Technology Consortium MS Cohort
- Technology Consortium MS Cohort Day 3
- Technology Consortium MS Cohort Session 5
- Technology Consortium Unit Sharing
- Code.org
- Code.Org April
- Code.Org Training
- Mid-Atlantic Technology Conference 2014
- Curriculum & Instruction Schoology
- High Stakes Testing Training (2 sessions)
- State Digital Learning Conference: Online
- EdTech Conference
- ETT/Lib Universal Tools Planning Smarter Balanced
- Google Classroom
- iEducator (4 sessions)
- iEducator 1 (4 sessions)
- iEducator 1 6-12 ELA/EXPL (4 sessions)
- iEducator 1 Group (4 sessions)
- iEducator 2 Help Session (2 sessions)
- iEducator 2 Middle School (4 sessions)
- iEducator 3 Training – Secondary (2 sessions)
- iEducator Elementary Group (4 sessions)
- Improving your Workflow with Google Drive and Schoology
- Instructional Technology Monthly Professional Development (9 sessions)
- Learning.com Training Ed Tech Teachers / Librarians
- Learning.com Trainings
- Modern Teacher Personalization of Learning (5 sessions)
- MT Principal Training
- Planning Cognitive Growth Targets into an existing lesson using SAMR
- Schoology 1.0
- Schoology 1.0 Option 2

- Schoology 200
- Schoology 201 (2 sessions)
- Schoology Advanced (2 sessions)
- Schoology Basics (2 sessions)
- Schoology Basics Option 3
- Schoology Basics Option 4
- Schoology in the Classroom
- Schoology Monthly Professional Development (9 sessions)
- Schoology Online Professional Development (2 sessions)
- Screen casting 101 (2 Sessions)
- Smartboard Techniques
- Smartboard Techniques II
- School based – Schoology – Creating Quizzes
- School based Kahoot
- School based Plickers
- Tech Tools
- Tech Tools 2
- Technology (3 sessions)
- Technology – Google Docs / Socrative (2 sessions)
- University Ed Tech Conference
- Voxer Strategies
- Weebly Basics
- Weebly Extensions Workshop
- School based Technology Mondays

Appendix B

INVITATION TO PARTICIPATE IN THE STUDY

Barnello Kristen

From: Barnello Kristen
Sent: Monday, August 03, 2015 8:43 AM
Cc: cmouza@udel.edu
Subject: IRB - Invitation to Particaipate in a Research Study
Attachments: TaggertIRBConsentFormAug2015.docx

Dear Colleagues,

I am a doctoral student at the University of Delaware's School of Education. I am writing to invite you to participate in a study that will evaluate the effectiveness of a district-wide Professional Development (PD) program that targets the use of instructional technology in middle school core content classrooms. Specifically, the study will examine the non-Mandatory professional development opportunities offered by the district during the last three years, specific to instructional technology, and examine their impact of the technology practices of middle school teachers. Findings from this work will be used within my Educational Leadership Paper (ELP) at the University of Delaware.

You are being asked to participate because...

- You were observed in a Walk Through by myself during the 2014-15 school year;
- You have been invited to participate in district facilitated Professional Development surrounding technology, however, you may or may not have attended such opportunities; and
- You have insight into the effectiveness of such technology Professional Development opportunities as directly related to your current position.

Should you decide to participate in this study, you will be one of approximately 15 other participants. Refusal to participate in the research study will not impact your status at the school.

As part of this study you will be asked to:

- Allow me to conduct an analysis of any walk-throughs I completed during the 2014-15 school year on the district's "I Noticed, I Wondered, and Use of Technology" form.
- Participate in an interview examining the effectiveness of the district's PD, specific to instructional technology. I anticipate this interview will last 30-60 minutes and can be conducted face-to-face, via telephone, or utilizing a web-program, such as FaceTime or Skype.

No time will be required of you, beyond the time it takes to review and complete the Consent Form as well as participate in the interview.

There is no compensation for your participation in this study. However, the knowledge gained from this study may contribute to our understanding of the effectiveness of the current professional development program within the district. Feedback gathered from this study may help direct future professional development initiatives aligned with teacher needs. Additionally, there are no risks posed to you as a participant of this study.

The confidentiality of your records will be protected to the extent permitted by law. Your research records may be viewed by the University of Delaware Institutional Review Board, which is a committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans. Records relating to this research will be kept for at least five years after the research study has been completed. All electronic records will be stored in a password protected format accessible only to the principle investigator. All hard copies of materials will be stored in a locked cabinet in the principle investigator's office. All records will be kept for a period of five years following the conclusion of the study in a locked file cabinet or encrypted computer files. The investigator will make every effort to keep all research

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Appendix C

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

UNIVERSITY OF DELAWARE
RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: March 3, 2015

TO: Kristen Taggart, EdD
FROM: University of Delaware IRB

STUDY TITLE: [664258-1] Technology Professional Development: Investigating the Effectiveness of Professional Development on Technology Integration in Middle School ELA & Social Studies Classrooms

SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: March 3, 2015
EXPIRATION DATE: March 2, 2016
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # *(6,7)*

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.