

TECHNOLOGY INTEGRATION AND ONLINE PROFESSIONAL
DEVELOPMENT FOR K-12 EDUCATORS IN THE EDUCATION UNIT

by

Amy M. Mooney

An executive position paper 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

Fall 2016

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DEDICATION

This work is dedicated to my family, who believed I could accomplish my dreams.

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ABSTRACT

Teachers in Delaware's mental health day/residential treatment centers and detention centers need more accessible professional development that is focused on their needs. In Delaware, these teachers form a group within a state agency called the Education Unit. These teachers are spread throughout the state and do not have the luxury of being able to attend face-to-face, school-wide and content-based professional development where they work. This executive position paper (EPP) describes an effort to address this problem by making use of online modules accessible to teachers anytime, anyplace, thus eliminating a number of existing barriers.

Seventy percent of the licensed educators (N = 34) in the Education Unit completed the Teaching, Empowering, Leading and Learning (TELL) survey in early 2013. The TELL Survey was intended to measure teacher opinions on subjects such as: school climate and professional development needs. Using findings from the survey, the short-term goal of this study was to improve access to professional development resources by creating and delivering one online module that addresses the concerns and needs identified by the Education Unit staff. The long-term goal of this study is to improve teaching practices among teachers in the Education Unit through effective online professional development modules in a variety of areas.

The professional development module intended to help participants integrate technology into instruction in conjunction with the Common Core State Standards.

The design for the module was aligned with key principles of effective professional development (face-to-face and online). The teachers from the Education Unit who agreed to participate in this study were given the opportunity to complete the online module and provide feedback through a survey and interview.

The key questions for this study were designed using the Practical Guidelines for Evaluating Professional Development (Guskey, 2000) as the framework. This evaluation framework was used to determine if this type of online professional development can meet the professional needs of the teachers and determine what changes should take place in the content and design of the module. Participants indicated that they improved their understanding of the role of technology within Common Core State Standards, gained information on new resources related to the integration of technology within Common Core State Standards, and took steps to integrate technology into lesson plans. However, the participating sample was small. Future research should continue to examine the role of online modules focusing on different areas, in addressing the professional development needs of teachers.

Chapter 1

INTRODUCTION

This executive position paper (EPP) focuses on creating online professional development opportunities for Delaware teachers working in mental health day/residential treatment centers. In Delaware, these teachers form a group within a state agency called the Education Unit. The Education Unit includes thirteen locations, serving all three counties in Delaware. Education Unit locations, or schools, are located inside mental health centers, youth rehabilitation centers, or youth detention centers. The students and teachers participate in classes year-round. Students who attend these schools are considered at “high risk” for school failure. They are in treatment for mental health related behavior problems or for having being detained due to criminal offenses that range from misdemeanors to felonies.

Student populations at each site vary from ten to sixty students, depending on the location and the placement of students (by the courts and other agencies). There are approximately 300 students served by Education Unit schools at any one time. Most of the schools are separated into elementary or middle-high school levels. There are 80 employees in the Education Unit and approximately 45 of those employees are licensed

educators who work directly with students. There are additional staff members at each site to manage behavior, provide therapy and run the facilities.

The classrooms usually consist of students who are in multiple grade levels. Teachers must have excellent differentiation skills in order to manage these unique classrooms. Even the most skilled teachers struggle to teach all the content standards to the students in these multi-age class environments. Yet, obtaining professional development can be a challenging endeavor for these educators. The worksites are sparsely distributed across the state. Thus, classroom-based professional development courses cannot be delivered locally, which makes attendance challenging for educators in remote locations. Online professional development presents a promising alternative to addressing teachers' need within the Education Unit.

Problem Statement

Teachers in the Education Unit lack opportunities for face-to-face content based professional development due to distance and time constraints. This study focused on addressing this problem by utilizing online delivery methods, thus eliminating barriers related to distance. The starting point of this study was the Teaching, Empowering, Leading and Learning (TELL) survey developed by the New Teacher Center (NTC) for the Delaware Department of Education (2013). The TELL survey is anonymous and is distributed statewide to all licensed school-based educators. The purpose of the survey is to assess teaching conditions at the school, district and state level. The Delaware Department of Education (2013), described the TELL survey as “a project of the Delaware Department of Education's Teacher and Leader Effectiveness Unit, funded by the Federal Race to the Top Grant, administered by The New Teacher Center. Since 2008, The New

Teacher Center has conducted similar surveys in 20 states, including almost one million educators” (par. 6). The TELL survey included questions on community engagement, teacher leadership, school leadership, managing student conduct, use of time, professional development, facilities and resources, instructional practices and support, and new teacher support.

The survey was administered between January 22 and February 25, 2013. Educators were able to access the survey 24 hours per day, during the 5-week window, through the Internet. According to the 2013 TELL Delaware Survey Validity and Reliability Report (TELL Delaware, 2013), “Delaware had a 59% response rate, representing 6,153 licensed educators of 10,392 school-based educators” (par. 2). According to the TELL Delaware Survey Results Report, in the Education Unit (Special Schools) there are 48 licensed educators. Of those, 34 completed the survey yielding a 71% response rate. The TELL survey provided valuable information regarding professional development opportunities in the state of Delaware broadly and to teachers in the Education Unit specifically.

The Delaware TELL Survey results for the Education Unit were similar to the results for Delaware educators, as a whole. As I reviewed the results of this survey, I focused on questions related to professional development. Table 1 reports the results from the Delaware TELL Survey, 2013 for the Education Unit (Special Schools).

Table 1. TELL Survey 2013 Results: (Question 8.2) Teacher Ratings for the Professional Development Offered at Their Schools

Area	Strongly agree	Agree	Disagree	Strongly disagree	No response or don't know response
a. Sufficient resources are available for professional development in my school.	24%	39%	21%	15%	1
b. An appropriate amount of time is provided for professional development.	18%	58%	9%	15%	1
c. Professional development offerings are data driven.	16%	52%	23%	10%	3
d. Professional learning opportunities are aligned with the school's improvement plan.	17%	30%	43%	9%	11
e. Professional development is differentiated to meet the needs of individual teachers.	18%	24%	36%	21%	1
f. Professional development deepens teachers' content knowledge.	19%	34%	16%	31%	2
g. Teachers are encouraged to reflect on their own practice.	21%	58%	15%	6%	1
h. In this school, follow up is provided from professional development.	18%	24%	36%	21%	0

Area	Strongly agree	Agree	Disagree	Strongly disagree	No response or don't know response
i. Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices.	9%	51%	21%	21%	0
j. Professional development is evaluated and results are communicated to teachers.	9%	26%	38%	26%	0
k. Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs.	18%	47%	24%	12%	0
l. Professional development enhances teachers' abilities to improve student learning.	24%	45%	18%	12%	1

N = 34.

The TELL Delaware Survey results revealed that 40% or more of the educators indicated that professional learning opportunities are not aligned with the school's improvement plan, are not differentiated to address teachers' needs, do not deepen teachers' content knowledge, do not provide ongoing opportunities for teachers to work with colleagues, are not evaluated, and results of evaluations are not communicated to teachers. These issues were considered when the content of the professional development module was developed.

Question 8.2 of the TELL Survey asked educators if they need professional development in specific topics common to the K-12 school system. Answers were in yes or no format. Table 2 lists Delaware teachers' responses as well as those who are employed through the Education Unit. As seen on Table 2, the overall needs of teachers in the state are similar to those who work in the Education Unit. However, there were a few areas of higher need for the Education Unit teachers.

The results of this survey, for the Education Unit teachers, suggested *a strong need for professional development in the context of Common Core State Standards (CCSS) and integration of technology into instruction*, with 88% and 84% "Yes" responses respectively. Other strong needs were identified, including *"your content area"* and *"differentiating instruction."* The group of Education Unit educators, that participated in the survey, work in grade levels K-12 and Adult Education in a various subject areas in general and special education. Due to the variety in academic areas taught and this researcher's experience and educational specialization in technology, this work focuses on developing an online professional development module focusing on the integration of technology in CCSS.

Table 2. TELL Survey 2013 Results: (Question 8.2) Teacher Self-Ratings for Their Professional Development Needs in Special Areas for Delaware Teachers and Education Unit Teachers

Area of Need	DE Teachers			Education Unit Teachers		
	Yes	No	No Response	Yes	No	No Response
Your Content Area	47%	53%	1197	76%	24%	9
Common Core Standards	70%	30%	1185	88%	12%	9
Student Assessment	51%	49%	1211	64%	36%	9
Special Education (with disabilities)	63%	37%	1223	61%	39%	11
Special Education (gifted and talented)	57%	43%	1308	43%	57%	11
English Language Learners	58%	42%	1325	59%	41%	12
Differentiating Instruction	59%	41%	1193	76%	24%	9
Closing the Achievement Gap	63%	37%	1241	54%	46%	10
Methods of Teaching	45%	55%	1229	56%	44%	9
Reading Strategies	50%	50%	1256	64%	36%	9
Integrating Technology Into Instruction	68%	32%	1170	84%	16%	9
Classroom Management Techniques	40%	60%	1246	58%	42%	10

Theoretical Framework

The framework of Technological Pedagogical Content Knowledge (TPACK) proposed by Mishra & Koehler (2009) describes the knowledge teachers need to develop and deliver instruction that utilizes technology to support content-delivery. The TPACK framework extends the work of Shulman (1986) and centers on the interactions among three bodies of knowledge: technology knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). These domains combine to form four additional constructs as illustrated in Figure 1. When technology, content and pedagogy are combined, the result is TPACK – a body of flexible knowledge that helps teachers develop effective technology-integrated instruction (Harris, Mishra & Koehler, 2009). The TPACK framework, particularly the need to situate technology in the context of content (i.e., CCSS) and pedagogy has informed both the design of the professional development module, as well as the analysis of participants’ artifacts (e.g., lesson plans).

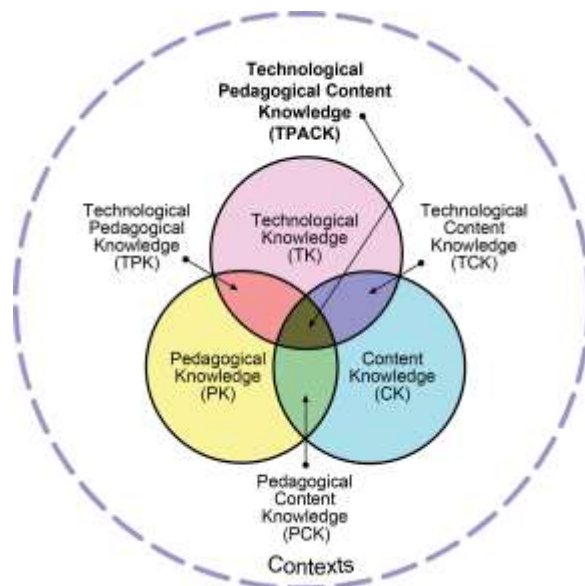


Figure 1. The TPACK framework and its knowledge components. Reproduced by permission of the publisher, © 2012 by tpack.org

Literature Review

Professional development is necessary for educators to keep current on best practices in their content areas as well as pedagogical methods. Advancements in technology have made it easier to make professional development accessible but questions remain regarding the design of effective online experiences. This literature review began with a search of articles and books on professional development and online professional development, in the United States (U.S.). The review was expanded to an international level to review a small sampling of professional development courses offered in other countries of similar economic status to the U.S. Similar philosophies and practices were found. Topics on the benefits and drawbacks of online delivery of professional development topics were sought out. A key limitation of online professional development identified in the literature is low completion rate (Bocchi, Eastman, & Swift, 2004). Disappointingly, little research was available on the reasons for the lower completion rate in online professional development; some of the reasons cited (Bocchi et al., 2004) were: lack of time and being uncomfortable with technology. There were studies that indicated that when there are incentives put into place the likelihood of completion increases. The lack of available research impacted this study's design.

Professional Development

Deepening professional knowledge and skills are important for many professions, including educators (Borko, Koellner, Jacobs, & Seago, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Lipowsky 2004; Shulman & Sparks, 1992). Trends change over

time in the delivery of professional development in education, just as instructional practices shift. Traditional teacher in-service days (large group presentations) have been shown to be largely ineffective in changing teacher practice (Borko, 2004; Borko et al., 2011). Teachers learn more and make better sense of their learning in context (Borko, 2004; Borko et al., 2011). Specifically, engaging practices such as modeling, visits to classrooms for observation, and discussion of teaching methodology have been found to increase teachers' abilities to apply new learning into practice (Darling-Hammond, Wei, Richardson, and Orphanos, 2009).

Many researchers have examined the relationship between teacher quality and student gains. This body of research indicates that high-quality professional development has an essential role in both improving teacher quality and ensuring students meet the rigorous academic standards spurred on by standards-based education reform policy (Darling-Hammond, 1999; Darling-Hammond, et al., 2009; Darling-Hammond & McLaughlin, 1995). The CCSS, adopted by most states in the U.S., are one of these reforms. The standards have changed what is taught and how it is taught, furthering the need for more professional development to keep pace. Researchers argue that the success of these teacher reforms depend on teacher qualification and effectiveness (Corcoran, Shields, & Zucker, 1998).

Characteristics of Effective Professional Development

Research on the characteristics of effective teacher professional development indicates coursework focused on content and opportunities for active learning, used in

coherence with other learning activities, increases teacher knowledge and skills (Garet et al., 2001; Hiebert & Hofer, 2003; Hiebert, Morris, & Glass 2000).

Specifically, Garet and colleagues (2001) researched the central features of professional development and their relationship to teacher outcomes. The features focused on specifically were: a) using longer periods of time to expand the amount of activities included in the learning experience (measured over years), b) clear learning goals to improve student learning with deeper understanding of the way students learn and think about the curriculum, c) and teacher access to modeling of methods and opportunity for observation and reflection (Borko, et al., 2011; Elliot, Kazemi, Lessig, Mumme, Carroll, & Kelley-Peerson. 2009; Lipowsky, 2004; Lipowsky, 2011). The study demonstrated that an increase in the time spent doing professional development activities and providing a broader time period to work with the skills learned were key features of effective professional development. These features, along with coherence and building content knowledge, produced more positive changes in teacher practice than traditional single session professional development.

Garet et al. (2001) used best practices in the professional development literature to create a set of scales describing the characteristics of the activities funded by a federal program and tested them to see their effectiveness (according to the participants) on teacher outcomes. The core elements of the professional development they considered were content focus, active learning opportunities, and coherence. The structure areas they focused on were time frame, contact time, and collective participation. The authors created a visual showing the relationships between the different design and structure elements and their effect sizes as seen in Figure 2 below.

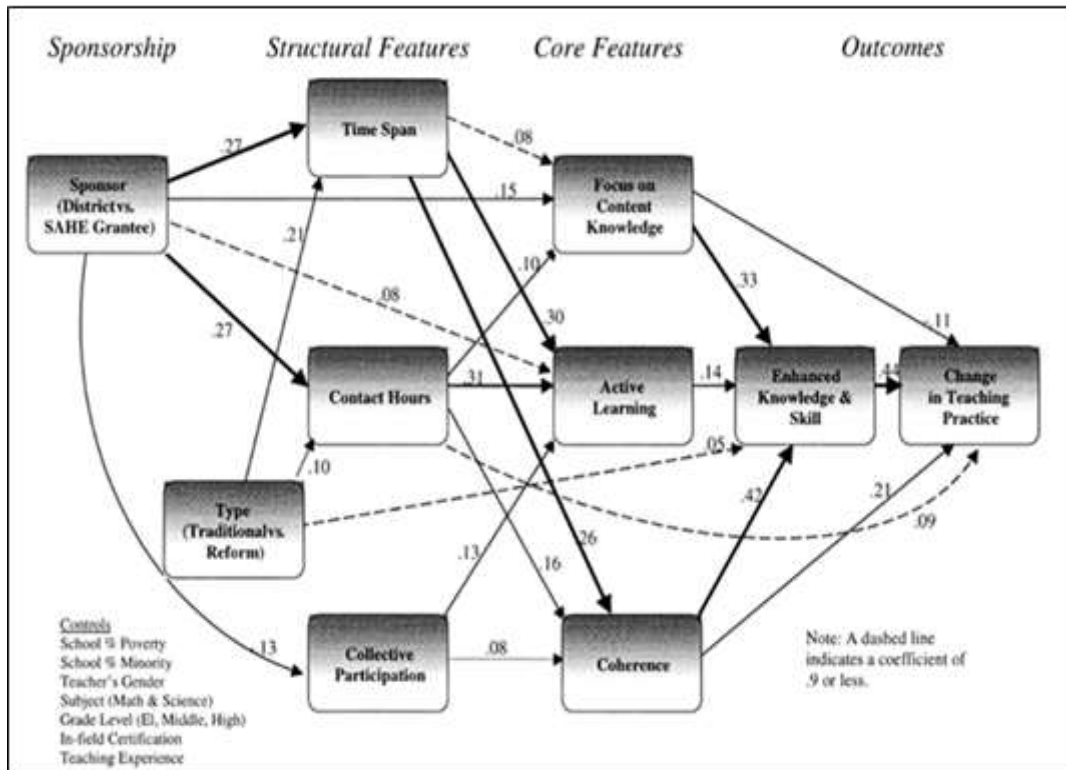


Figure 2. The Relationship between Features of Professional Development to Teacher Outcomes (Garet, et al., 2001, p. 933)

The statistics displayed in Figure 2 are expressed as standardized path coefficients. The paths indicated are statistically significant at the .05 level. The study found that when the time span and contact hours increased during the professional development there was a greater positive change in teaching practice (.30 and .31), especially when they were used with active learning opportunities. Adding time to the professional development opportunity tended to improve teacher learning due to the added opportunity to work on planning, observation, modeling, etc. There were more opportunities over time (measured over months and years) to increase the teachers understanding of the content and the ways students understand and learn the material. With increased time and contact hours,

teachers were able to communicate with others and reflect on the teaching experiences they had afterward.

The focus on classroom activities in the content area and coherence were also a positive influence on teacher effectiveness (.33 and .42). The greater emphasis on specific content, active learning opportunities, and the ability to use professional development in their day-to-day work was highly effective in changing teacher practices for the better. There were added benefits if schools had multiple teachers participate as a group.

Garet et al. (2001) found professional development affects teachers differently. Specifically, Garet et al. suggest that professional development is explicitly linked to lessons or experiences in the classroom while practices introduced during the professional development can transfer between subjects and grade levels. Further, Garet et al. suggest that the school's leadership plays a large role in the implementation of new practices learned in professional development. To accomplish these goals, Garet et al. recommend that professional development be content-specific and that principals use rubrics to identify areas of needs as well as evaluate implementation of professional development practices in classroom instruction.

Bulger (2007), studied the benefits of using video-taped episodes of targeted practices, in the classroom, to enhance pre-service teachers' understanding of teaching mathematics and found that teachers were given insights into the teaching and learning process. And in 2014, Cooper, Semich and Morris used YouTube videos of specific teaching practices as a teaching tool for educators. The results of their study indicated that videos could reinforce in-person professional development. Toward this end, video

resources can be used as exemplars in facilitating instructional shifts towards best practices.

Delaware educators are involved in several programs focused on the content areas of New Normal Mathematics and Next Generation Science Standards. Professional development can provide content based training with a focus on instructional shifts to come with the adoption of the new science, mathematics, and English standards. These new content based professional development methods give educators a chance to practice in the student role, execute the lessons or practices in their classroom, and provide feedback and reflection afterward.

Several states are providing resources, such as a video library of exemplar lessons and best practices to help teachers improve their instruction. One example is the New York State Department of Education's site, available at Engageny.org. This site is free to everyone, even those outside New York. With "Race to the Top" federal funding, the New York State Education Department gathered and developed materials for educators of Pre-K to 12 students. Another state organized site of videos containing best practices in education is Georgia, available at GeorgiaStandards.org.

There are also free collections provided by the Common Core, the Teaching Channel, and others. Edutopia's video library can be found at <http://www.edutopia.org/videos>. These videos are available for quick viewing of specific skills or content areas with which the teachers may be struggling. The hope is that teachers will be able to view the videos, generalize the practices into their situation, and positively affect their own teaching practices (Bulgar, 2007; Cooper, et al. 2014). Many of these resources provide activities for reflection in order to deepen the quality of the experience.

Online Professional Development

Online professional development has many benefits for teachers including the reduction of geographical and time barriers (Killeen, Monk, & Plecki, 2002). Mandatory, school-based professional development workshops for teachers may or may not be relevant to their needs compounding teachers' already busy schedules and time constraints (Corcoran, 1995). In the Education Unit, some educators are required to attend professional development workshops that are an hour and a half drive from their homes, due to the large geographical area supported by the department. Another benefit to online or blended professional development is the ability to collaborate and communicate outside the training, allowing the professional development to be ongoing - one mark of effectiveness (Garet et al., 2001). The collaboration of colleagues to produce learning activities, support each other, mentor each other, and share resources is beneficial to teachers and students (Ingvarson, Meiers, & Beavis, 2005). It provides a meaningful context for continuously adapting learning environment through discussion and review of practice (Twining, Raffaghelli, Albion, & Knezek, 2013).

Getting meaningful professional development is important to already overburdened teachers (Borko, 2004; Dede, Ketelhut, Whitehouse, Breit, & McCloske, 2009). In fact, both Borko and Dede et al. used terms such as *superficial* and *fragmented* to describe the current state of professional development and found that many of the existing professional development programs lack the ongoing support necessary to transform teachers' learning into classroom practice. According to these researchers, the key areas of need for high quality, online professional development is: using flexible

scheduling, being ongoing, making resources available, offering school-based support at school, and providing opportunities for feedback and reflection.

Reeves and Pedulla (2011), in particular, identified seven elements of effective online professional development that include: a) fosters high-quality interactions among learners, b) provides clear expectations for participation, c) is well-organized, d) features a user friendly interface, e) is easily transferred to the classroom, f) provides adequate compensation, and g) features beneficial discussion topics.

In summary, researchers indicate that quality professional development content must a) be useful in the classroom, b) include collaboration, c) be ongoing in the context of the school environment, d) allow better use of resources, and e) has clear expectations. The pilot professional development module developed for the purpose of this project was focused on these areas.

Barriers to Learning Online

One of the unfortunate problems with online courses and professional development is the rate of completion. Student retention is typically close to 40% in graduate online courses (Bocchi et al., 2004). With professional development offered as “optional”, it seems less likely teachers will complete the entire module or workshop.

The degree of variability in participants' technical abilities further complicates providing support and participation (Schrum & Hong, 2002). To alleviate some of the participants' frustration, it is suggested that there be an online orientation and a tutorial for the course management system used in professional development. Course developers should also consider the user-friendliness of the online interface.

Additionally, although online professional development programs may be appealing to teachers, it may become an additional burden in their everyday practice. (LePage, Boudreau, Maier, Robinson & Cox, 2001). Education Unit teachers are bogged down with the added responsibilities and requirements from the administration to offer more tutoring and intervention support, to write curriculum, learn to use new curriculum tools, learn about new testing requirements, and have more parent involvement. Some teachers say they simply do not have the time to learn and grow professionally in ways that are not required.

One study by Aragon and Johnson (2005) focused on an online class completion rate at a community college. In this study of 305 students, 38% did not complete the online course. Of the 38%, two-thirds reported why they chose not to complete their online course, stating “although each student answered the question in his or her own words, the general emphasis of the answers fell into five schematic themes: personal/time, course design/communication, technology/WebCT tutorial, institutional issues, and learning preference” (p.151).

Evaluation of Professional Development

Guskey (2000; 2012) outlined Practical Guidelines for Evaluating Professional Development based on five levels. Table 3 summarizes Guskey’s evaluation levels and the types of information needed for each level. The first level asks for participants' reactions to the professional development. The second level focuses on participants’ learning the objectives taught during professional development. The third level emphasizes the area of organizational support and change due to the learning that took place. The fourth level,

considers the knowledge and skills learners are able to use in their work environment. Finally, the fifth level focuses on the impact of professional development on student achievement. The reader will note that the time span required to address each level grows from the first to the fifth. For instance, evaluation questions at the first level can be answered immediately at the end of the professional development, while questions at the fifth level often require substantial time to reliably measure. The questions posed by Guskey's (2000; 2009) evaluation guidelines helped guide the evaluation of my efforts to provide online professional development for teachers in the Education Unit.

Table 3. Guskey’s Five Levels of Professional Development Evaluation

Evaluation Level	What Questions Are Addressed?	How Will Information Be Gathered?	What Is Measured or Assessed?	How Will Information Be Used?
1. Participants' Reactions	<p>Did they like it?</p> <p>Was their time well spent?</p> <p>Did the material make sense?</p> <p>Will it be useful?</p> <p>Was the leader knowledgeable and helpful?</p>	Questionnaires administered at the end of the session	Initial satisfaction with the experience	To improve program design and delivery
2. Participants' Learning	Did participants acquire the intended knowledge and skills?	<p>Paper-and pencil instruments</p> <p>Simulations/ Demonstrations</p> <p>Participant reflections (oral and/or written)</p> <p>Participant portfolios</p>	New knowledge and skills of participants	To improve program content, format, and organization

Evaluation Level	What Questions Are Addressed?	How Will Information Be Gathered?	What Is Measured or Assessed?	How Will Information Be Used?
3. Organization Support and Change	<p>What was the impact on the organization?</p> <p>Did it affect organizational climate and procedures?</p> <p>Was implementation advocated, facilitated, and supported?</p> <p>Were sufficient resources made available?</p> <p>Were successes recognized and shared?</p>	<p>District and school records</p> <p>Minutes from follow-up meetings</p>	<p>The organization's advocacy, support, accommodation, facilitation, and recognition</p>	<p>To document and improve organizational support To inform future change efforts</p>

Evaluation Level	What Questions Are Addressed?	How Will Information Be Gathered?	What Is Measured or Assessed?	How Will Information Be Used?
4. Participants' Use of New Knowledge and Skills	Did participants effectively apply the new knowledge and skills?	Questionnaires Structured interviews with participants and their supervisors Participant reflections (oral and/or written) Participant portfolios Direct observations Video or audio tapes	Degree and quality of implementation	To document and improve the Implementation program content

Evaluation Level	What Questions Are Addressed?	How Will Information Be Gathered?	What Is Measured or Assessed?	How Will Information Be Used?
5. Student Learning Outcomes	<p>What was the impact on students?</p> <p>Did it affect student performance or achievement?</p> <p>Did it influence students' physical or emotional wellbeing?</p> <p>Are students more confident as learners?</p> <p>Is student attendance improving?</p> <p>Are dropouts decreasing?</p>	<p>School records</p> <p>Questionnaires</p> <p>Structured interviews with students, parents, teachers, and/or administrators</p> <p>Participant portfolios</p>	<p>Student learning outcomes:</p> <ul style="list-style-type: none"> • Cognitive (Performance & Achievement) • Affective (Attitudes & Dispositions) • Psychomotor (Skills & Behaviors) 	<p>To focus and improve all aspects of program design, implementation, and follow-up</p> <p>To demonstrate the overall impact of professional development</p>

Organizational Improvement Goal

The organizational improvement goal of this EPP was to design, implement and evaluate one online professional development module for teachers in the Education Unit focusing on the integration of technology in CCSS. Evaluation data were used to examine participants' reactions towards the online module as well as the impact of the module on

their learning and practice. Findings were used to generate recommendations regarding modifications to the module and the design of future professional development opportunities for teachers in the Education Unit through the use of technology.

Key Questions

1. What are teacher perceptions of the pilot professional development module's content and design?
2. Did participating teachers acquire knowledge related to the role of technology in CCSS?
3. How did participants adapt the ideas learned in their professional development to their practices?

These key questions are based on Guskey's Practical Guidelines for Evaluating Professional Development (2000). The first question asked for the reactions of the professional development's participants in the course content and the design of the module, measuring Guskey's first level of evaluation. The second question asked about participant learning, which correlates to level two in the evaluation framework. Finally, the third key question, asked about teachers' ability to use their new knowledge in the classroom. This question was designed to measure Guskey's fourth level of evaluation. Levels three and five were beyond the scope of this work.

Chapter 2

PROFESSIONAL DEVELOPMENT MODULE

The design of the professional development module followed key principles of effective professional development (face-to face and online) described in the literature. Table 4 lists key features of effective professional development reported in the literature that informed the design of the pilot module. Using the Blackboard learning management system, the module was available any time of day. Throughout the module there was: a) a discussion board to encourage discussion of teaching methodology, reflection, and follow-up over time; b) opportunities to analyze technology-integrated lesson plans; and c) an assignment requiring teachers to create a technology-integrated lesson plan in their content area, provide feedback to each other, and reflect on the module at the end.

Table 4. Elements of Effective Professional Development Informing Pilot Module Design

Best Practices from Literature Review	Face to Face Professional Development	Online Professional Development	Pilot Module Design
Modeling/observation of exemplars		x	x
Discussion of teaching methodology	x	x	x
Active learning, using information to create lessons or do an activity	x	x	x
Continued over time/follow -up	x	x	x
Opportunity for practice	x	x	x
Reflection	x	x	x
Content related to teachers area(s)	x	x	x
Available any time of day		x	x

Based on results from the TELL survey, CCSS and technology were the most common *need category* chosen by educators. Thus, the online professional development module was focused on technology integration within the context of CCSS. The overarching objective of the module was to deepen teacher understanding of using technology in ways suggested by CCSS. The delivery of the module was differentiated to address diverse learning preferences. There were readings, videos, collaboration exercises, and activities participants could use in their classrooms.

The pilot professional development module was designed to be four weeks long with activities to aid participants in the integration of technology within CCSS. The Education Unit has had limited access to technology in the past and a key objective of the study was to help educators become more comfortable with using technology in their own learning. The module introduced participants to CCSS, particularly components of CCSS not previously addressed by Delaware State Standards. These components focused primarily on writing across the curriculum and use of technology. Teachers were introduced to each element through key course strategies that included reviewing exemplary lessons on writing across the curriculum and planning technology-integrated lessons.

The learning objectives for this module were:

1. Teachers will be able to understand technology use, as it pertains to the CCSS grade and subjects taught in their classrooms.
2. Teachers will learn about resources available for use in their classrooms and be able to help students learn through the use of technology.

3. Teachers will be able to develop a lesson plan, for use in their own classroom, integrating technology and writing in the CCSS.

The module registration was placed into the Delaware Department of Education's Professional Development Management System (PDMS). This is where teachers would typically register for upcoming professional development opportunities. The module was listed as a 15-hour course offered over 4 weeks. However, the time allowed for the module's completion was extended by two weeks upon request from participating teachers. Several reminder emails were sent to participants at work throughout the course. Table 5 illustrates the course content and weekly activities of the module.

Table 5. Professional Development Module Outline

Online Professional Development Module Outline

Week 1: Overview of Common Core Standards with Respect to Technology Integration

Week 1 Activity 1 Learning More CCSS: Looking at Examples of Lessons

Look closely at the Examples of Writing Lessons in the Context of the Common Core Standards available at <https://learnzillion.com/search?utf8=%E2%9C%93&query=Examples%20of%20Writing%20Lessons%20in%20the%20Context%20of%20the%20Common%20Core%20Standards&page=1&sort=Relevance&models%5B%5D=LessonPlan&models%5B%5D=LessonSet&models%5B%5D=Resource> (LearnZillion, 2015)

The CCSS are a set of items that students need to learn with the following design principles:

- Result in College and Career Readiness
- Based on solid research and practice evidence
- Fewer, higher, and clearer

Week 1 Activity 2: Technology- Where Does it Fit in the CCSS and What does the Research Say?

Reading 1: There are technology components embedded throughout the CCSS. Take a look at this presentation to see the standards with the technical components highlighted – available at <http://commoncore.fcoe.org/sites/commoncore.fcoe.org/files/resources/SPIRAL%20FINAL.pdf> (Kings County Office of Education (nd).

Reading 2: Technology Research - Research from Using Technology with Classroom Instruction that Works by Pitler, Hubbell, Kuhn, & Malenoski (2007), based on the work of Robert Marzano – available at <http://ecsdtchacademy.wikispaces.com/Research> (ECSDTechAcademy, 2016)

Online Professional Development Module Outline

Week 1 Activity 3: **Discussion**

Go to the Technology and Media Blog and respond to the following questions. Subsequently, respond to at least two other people's blog responses.

- A. In the Common Core Standards, the content is set up to “spiral” in difficulty and depth. Why is it important to the overall purpose of the Common Core Standards?
- B. CCSS regarding Media and technology: Just as media and technology are integrated in school and life in the twenty-first century, skills related to media use (both critical analysis and production of media) are integrated throughout the standards.
- C. In your view, how could technology and media enhance student learning in the context of the CCSS? Examining your own experiences as a learner and/or teacher, please provide at least 1 example where technology can be used to support student learning. Make sure to include: (a) the specific content and learning goals, (b) teacher role, (c) student role, and (d) specific technology tools (e.g., Internet resources).

Online Professional Development Module Outline

Week 2: **Instructional Planning Strategies for Integrating Technology with CCS**

Week 2 Activity 1: **Planning for Technology Integration**

Reading 1: Harris, J., & Hofer, M. (2009). Grounded Tec Integration: *Learning & Leading with Technology*. Available at <http://files.eric.ed.gov/fulltext/EJ859576.pdf>

Reading 2: Technology Vocabulary - Use social media, programs, and websites that allow communication between people (for example: blogs, Facebook, Twitter, Edmodo) See the sample blog for Linda Jones's, available at <http://eighthfloor.ning.com/profile/LindaJones759> and review the definitions:

- social media--programs and websites that allow communication between people (for example: blogs, Facebook, Twitter, Edmodo)
- back channel--the side questions and conversation about a topic, while a presentation or video is taking place
- blog--a web-based internet page on which people can communicate and collaborate about any topic
- wiki--a website that contains a collection of resources and links to websites about a common topic
- post--a statement or response about a topic on a blog or in a web-based conversation
- trending--the topics that people are discussing the most online
- webquest--an inquiry based lesson that includes research on the internet

Online Professional Development Module Outline

Week 2 Activity 2: **Review the Online Presentation**

Grounded Technology Integration VoiceThread Presentation by Dr. Chrystalla Mouza and Dr. Rachel Klein (Mouza & Klein, 2013)

Week 2 Activity 3: **Getting Specific with CCSS**

Review examples of technology-integrated lessons aligned with CCSS

Examples of Writing Lessons in the Context of the Common Core Standards available at

http://learnzillion.com/courses/58?collection_id=1085#collection_1087

Areas where technology could be integrated and links to help you:

- Prewriting:
Graphic Organizers Templates or Interactive Organizers
- Writing:
Blogs (This is a link to Edublogger to help you get started creating a blog.)
Word Processors (like Microsoft Word or Open Office)
- Editing and Proofreading:
Using the word processing programs to check grammar and spelling
You can use peer review strategies in your classroom.
You can use the Smart Board or a laptop and projector to teach students how to edit and review writing using whole class strategies.
- Citations:
It is important to teach students about citations and giving proper credit to others for their work.
This citation generator will help students create citations and learn the different types of citations.
Review examples of integrating technology into the writing process to meet the writing standards.

Online Professional Development Module Outline

Week 2 Activity 4: **Discussion**

Go to the course's Technology and Media Blog and respond to the following question, then respond to at least two other people's blog responses.

- Describe the "Five Basic Steps to Planning" a learning event from the article you read this week.
- Briefly describe a teacher-centered activity using technology. Briefly describe a student-centered activity using technology
- In the next part of the course, you will create a lesson based on Common Core Writing Standards that includes technology. Write a brief description of what you are planning.

Week 3: **Planning a Lesson**

Week 3 Activity: Writing a lesson plan incorporating technology to meet CCSS

Questions to Guide your Lesson using the framework of Grounded Technology Integration

1. What is the learning goal? What standards does it address? (CCSS, NGSS, DE)
2. Describe the pedagogical knowledge:
 - a. Is it teacher or student centered?
 - b. Will students come to the same conclusions when completing the lesson (convergent) or their own conclusions (divergent?)
 - c. Will students need to rely on few prior experiences or more prior experiences to understand the lesson?
 - d. Does the lesson focus on surface comprehension or deeper, complex comprehension?
 - e. Is the lesson short or require a longer duration for learning to take place?
 - f. Is the lesson very structured or less structured?
 - g. How are the learners configured for the lesson? Whole group, small group or individualized instruction
 - h. Describe the resources required for this learning experience.
3. Describe the activity types used in the lesson.
4. Describe the assessment strategies used in this lesson.
5. How does technology support common core standards identified in this lesson?

Week 4: **Lesson Collaboration and Feedback**

Online Professional Development Module Outline

Week 4 Activity 1: **Blogging**

This week, the assignment is to help at least two colleagues with their lesson plan by giving each of them at least one positive comment and a suggestion for improvement for their lesson be more effective with students, on our blog. (12 points)

Your feedback should focus on the connection between content, technology and teaching approaches presented in the lesson. You might comment on the role/necessity of technology, ways in which technology enhanced the lesson, fit of the technology tool selected, the specific activities implemented, and the assessment strategies, among others

Week 4 Activity 2: **Reflection**

Course Survey

Chapter 3

METHODOLOGY

This study used a mixed methods methodology. Surveys, interviews, blog entries, and lesson plans were used to document participants' opinions and learning in order to evaluate the success of the online module.

Sample

Licensed educators employed by the Delaware Education Unit were invited to participate in the pilot online professional development module. Teachers who agreed to participate were given the opportunity to complete the online module and provide feedback through a survey and interview. Twenty-five of the 48 educators (52% of the sample) signed up at the beginning of the module; of those, 9 completed all parts of the module (19% of the sample) while 4 partially completed the module, and 12 either did not start or did not continue past the week 1 material. Twelve teachers completed the post-module survey.

Of the educators invited to participate 30% were male and 70% were female. Their teaching experience ranged from a few months to 32 years. The majority of them had between 3-15 years of experience. They taught a variety of grade levels ranging from K-12. In addition, they offered some Adult Education classes to students who have previously withdrawn or graduated from high school. The majority of students enrolled in the Education Unit, however, are in grades 9 and 10.

Participating Sample

The participating sample was almost entirely female. Most of the teachers who participated lived/worked in Sussex and Kent County, which is further away from the central office, where most whole group professional development is held.

Those educators who completed, or mostly (at least 2 weeks of the blogging activities and lesson outline) completed the online module were asked to complete a survey at the end of their participation. All of the educators who registered for the Module were interviewed, regardless of whether or not they completed the module. Interview questions, however, differed for each group (i.e., those who completed the module and those who did not complete the module).

Table 6 describes the years of experience for each participating teacher. As shown on Table 6, participating teachers had diverse teaching experiences and taught at different grade levels. Specifically, most teachers had between 7-15 years of teaching experience.

Table 6. Post Module Survey: Participating Sample's Years of Teaching Experience

Response	Number	Percent
Less than 1 year	1	8
1 to 3 years	2	17
4 to 6 years	1	8
7 to 9 years	3	25
10 to 15 years	3	25
More than 15 years	2	17

N=12.

Table 7 illustrates the grade levels that each educator was responsible to teach at one time. Most educators listed more than one grade level due to the way the schools within the Education Unit band students (e.g., K-8 in one classroom). As expected, due to

the population of students served by the Education Unit, most participating teachers taught in the upper grades (highest enrollment was in the 9th grade).

Table 7. Post Module Survey: Participating Sample’s Current Teaching Positions

Response	Number	Percent
Pre K - 2nd	1	8
3rd - 5th	2	17
6th – 8th	8	67
9th – 12th	10	83

N = 12. Some participants selected more than one grade.

A consent to participate form was developed and approved by the University of Delaware’s Institutional Review Board (IRB) for Human Subjects Research (Appendix A). The form provided information about participation in the online module for four weeks, completion of the end of module survey, as well as interview procedures. The consent form was sent to the 25 teachers who registered for the online professional development module. Twenty-four completed and returned the consent forms, one from each person who participated. One teacher terminated employment.

Data Collection and Analysis

Surveys, interviews, blogs entries, and lesson plans were used to obtain rich data on the participants’ experience throughout the module. The data was collected between August 2014 and August 2015. An anonymous survey was administered at the end of the module online using the Qualtrics program. Interviews were conducted with teachers who did complete the course and with those who registered for the course, but did not complete it.

Table 8 aligns the study’s key questions to the collection of data methods and the subsequent use of the data.

Table 8. Data Collection Matrix

Guskey Level	Key Questions	Collection Methods	Use of Data
1	What are teacher perceptions of the pilot professional development module’s content and design?	<ul style="list-style-type: none"> • Post Surveys • Interviews with participants • Interviews with non-participants 	Participant reactions; improve the content provided in this module
2	Did participating teachers acquire knowledge related to the role of technology in CCSS?	<ul style="list-style-type: none"> • Blogs • Post Surveys • Interviews with participants 	Participant learning; improve the content provided in this module
4	How have participants adapted the ideas learned in their professional development to their practices?	<ul style="list-style-type: none"> • Teacher lesson plans • Interviews with participants 	Application of new learning in practice; changes in the classroom to improve delivery of instruction

Level 1: Participants’ Reactions

To evaluate participants’ reactions, two data sources were used: a survey and interviews. Most professional development initiatives assess participants’ reactions because data aligned with this Level are easy to obtain.

Survey: The survey was constructed based on Guskey’s (2000) evaluation framework. Items assessed participants’ reactions to or satisfaction with the design and content of the pilot module. The survey was a combination of 13 Likert-scale and 8 short answer and multiple choice questions (See Appendix C). The Qualtrics software made collection and analysis of the data more efficient. Likert-scale items were analyzed using

descriptive statistics (e.g., frequencies, means and standard deviations). Short answer responses were analyzed qualitatively to identify emergent themes and were recorded with frequencies and percentages.

Interviews. Interviews were completed for two groups. The first set of interviews was completed with participants of the pilot module to obtain detailed reactions to the content and design of the module (Level 1) as well as their learning and plans for implementation (Levels 2 and 4) (See Appendix D). The second set of interviews was completed with teachers who registered for the pilot module, but did not complete the work (Appendix E). The purpose of this second set of interviews was to obtain information on reasons for withdrawing from the module to inform changes that could lead to increase completion in the future. Interviews were semi-structured to allow a formal questioning strategy that would yield comparable data, while at the same time maintain flexibility to probe for a deeper understanding. The interviews were approximately 10-15 minutes each. A combination of handwritten notes and audio recordings were used to capture the interviews, which were later transcribed into a word processing program. All names were changed to preserve the confidentiality of the participants. Transcripts and notes were reviewed and coded for recurring themes.

Interview data were analyzed qualitatively. The focus was on identifying emergent themes aligned with the objectives of the evaluation, which included: a) teacher reactions to the professional development module, b) the impact of the professional development module on participants' learning and future practice, and c) suggestions for future improvements. Responses were aggregated and organized and excerpts, by the researcher, and were used to illustrate emergent themes, reported in the Findings.

As noted, interviews were conducted for both teachers who registered for the pilot module but did not complete it as well as those teachers who completed the module. The purpose of including those who did not complete the pilot module was to identify reasons for non-participation. For instance, participants' perceptions of the course (Level 1), including design, content issues, and timing could be a barrier to this type of professional development. The information gathered could help inform changes for future designs of online professional development.

Level 2: Participant Learning

Blogs. For the purpose of this study, blog entries for Weeks 1 and 2 were used to collect qualitative data on participants' learning related to the integration of technology in CCSS (Level 2 of Guskey's evaluation framework). Blogging activities were assigned each week of the pilot professional development module. Specifically, each week participants were provided with readings, presentations, and video activities, and were asked to post a response in relation to the readings following specific prompts. Further, each participant had to respond to at least two other blog entries. Blog entries during Weeks 1 and 2 were required and more structured, thus providing uniform data that could be analyzed. Blog entries during Weeks 3 and 4 were optional and focused on providing feedback to peers. As a result, those entries were not utilized in the data corpus.

Blog responses for Weeks 1 and 2 were assessed using rubrics, by the researcher, which focused on the role of media and technology in the context of CCSS accompanied by specific examples (Appendix G). During analysis, these rubrics were used to examine teachers' performance related to the course objectives (Level 2 of Guskey's evaluation

framework). In addition, all participant blog responses were collected, organized, and analyzed qualitatively to identify important themes across participants' responses.

Excerpts were selected whenever appropriate to illustrate each code. The coding scheme and associated blog excerpts are presented in Appendix H.

Level 4: Applying Learning into Practice

As part of their participation in the professional development module, the teachers designed a lesson plan focusing on the integration of technology in CCSS. Lesson plans were aligned with Level 4 of professional development evaluation. This level focuses on how teachers have adapted their learning to their classroom settings. In the case of the pilot module, teachers developed a lesson plan to use in their classrooms. They were expected to use the plan, reflect on the experience and discuss with the participants in a follow-up session of professional development.

The design of the lesson began on Week 2. After initial brainstorming, participants were given feedback and suggestions for improving the lesson. Participants were asked to use the template for Learning Focused Lessons, which is the adopted format for the Education Unit. Lesson Plans were scored using the TPACK technology integration rubric (see Appendix I), a valid and reliable instrument that can be used to evaluate teachers' lesson plans (Harris, Grandgenett, & Hofer, 2010). These lessons were written in a variety of subject areas and grade levels but had to illustrate connection with common core writing standards and technology, which was the focus of the professional development module.

The TPACK Rubric rates lesson design (4-point scale for each category for a total of 16 possible points) based on a) alignment of technologies to curriculum goals; b) use of technology supports and instructional strategies; c) ways in which technology supports curriculum goals and instructional strategies; and d) the overall fit among content, technology, and pedagogy. This rubric has been used in prior studies to assess effective integration of technology with content (e.g., CCSS) and pedagogy (e.g., teacher-centered, student-centered), and thus was deemed appropriate for the objectives of this study. Lesson plan rubric scores, provided by the researcher, are presented in the Findings Section.

Findings

Key question 1, Level 1: Participants Reactions to the PD Module

At the end of the online course, the participants were asked to reflect on their experiences through an anonymous online survey. Twelve participants who completed the course completed the survey (25% of the sample). Table 9 presents the mean scores and standard deviations on the Likert Scale survey questions (1 meaning Strongly Disagree to 5 meaning Strongly Agree). As shown on Table 9, the mean for each response are all between “agree” and “strongly agree” (between 4 and 5). The standard deviations were all close to .5.

Table 9. Post-Module Survey Questions 1-13

Responses	M	SD
1. The content of the professional development is relevant to my professional responsibilities.	4.58	.51
2. The facilitator helped me understand how to implement my learning.	4.50	.52

Responses	M	SD
3. This professional development session will extend my knowledge, skills, and performances	4.58	.51
4. This professional development was tailored to meet my needs as a learner.	4.42	.51
5. The professional development was supported by effective/appropriate use of technology.	4.67	.49
6. New practices were thoroughly explained.	4.58	.57
7. Sufficient time was provided for guided practice and tasks.	4.75	.45
8. The facilitator was knowledgeable and helpful.	4.83	.39
9. The instructional techniques used facilitated my learning.	4.50	.52
10. The materials used were accessible and enhanced my learning.	4.50	.52
11. The professional development activities were carefully planned and well organized.	4.58	.51
12. The professional development goals and objectives were clearly specified.	4.67	.49
13. The professional development included a variety of learning activities relevant to the topic.	4.50	.52

N = 12.

When invited to identify the best aspects of the pilot module, participant responses centered on collaboration with peers, the connection between technology and CCSS, and availability of resources. Table 10 illustrates participant responses to the open-ended survey questions.

Table 10. Post-Module Survey: Best Aspects of Module

Response Area	Number	Percent
Collaboration	4	33
CCSS and Technology Integration	3	25
Resources	3	25
Accessible to Beginners	2	17

N = 12.

As shown on Table 10, collaboration was noted as the best aspect of the module. This is an area naturally limited by distance between schools and the small number of staff members at some of the Education Unit schools. Some schools, for instance, only have one teacher. Teachers who participated in the pilot module were able to collaborate online with other teachers. Some of those teachers taught the same age groups and the same subjects, thereby sharing valuable insights.

When participants were asked how the module could be improved, most indicated that they would like access to more examples or model lesson plans (Table 11). One of the participants specifically mentioned PD360 (<http://pd360.com>). This is a collection of professional development videos and online reflection questions available to the Education Unit via a subscription. In the past, this resource was available to teachers in the Education Unit but was discontinued due to funding issues.

Table 11. Post Module Survey: Suggestions for Improvement to Pilot Module

Response Category	Number	Percent
Exemplar/Model Lessons Plans	7	58
Participants On-time Completion	2	17
Face to Face Meeting(s)	2	17
Increased Technology Resources	1	8

N = 12.

Participants were also asked to provide an overall rating for the pilot module quality. As shown on Table 12, all participants rated the module as Average or Above. In fact, the majority of the participants rated the module quality as excellent. This feedback indicates overall teacher satisfaction with the pilot module.

Table 12. Post Module Survey: Overall Rating of Module

Response	Number	Percent
5 = Excellent	7	58
4 = Above Average	3	25
3 = Average	2	17
2 = Below Average	0	0
1 = Poor	0	0

N=12.

Completion Interview Data

In addition to survey responses, interview data from teachers who completed the module also provided feedback related to the best aspects of the pilot module.

Specifically, the seven interviewees indicated that the best aspect of the module was collaboration with their peers. The second most common answer was new resources and ideas to use in the classroom. Table 13 summarizes participants' responses.

Table 13. Completion Interview: Best Aspects of the Pilot Module

Answers	Number	Percent
Supports Collaboration	7	88
Provides ideas for the classroom/resources	5	63
Forces me to look closely at CCSS	3	38
Has relevance to my job	3	38
Includes steps to integration	1	13
Supports online participation	1	13

N = 8. Some participants offered more than one response.

Teachers who completed the pilot were also asked to offer suggestions for improving the professional development module. Those suggestions are listed in Table 14. Most teachers suggested a shorter time commitment and more examples in videos and lesson plans. One suggested a calendar could be used for tracking the assignments and due dates while another suggested at least one face-to-face meeting. Finally, one teacher suggested recruiting more administrators and teachers, to have a larger learning community.

Table 14. Completion Interview: Suggestions for Improvements to the Module

Answers	Responses	Percent
Shorter time commitment/smaller modules	3	38
More videos of teacher's using technology	3	38
More sample lesson plans	2	25
Calendar with reminders	1	13

At least one face to face meeting	1	13
Involve more administrators and teachers	1	13

N = 8. Participants selected more than one response.

The most common challenge to integrating technology into CCSS, according to Education Unit teachers who completed the pilot module, is the lack of working or updated technology devices. As shown on Table 15, the lack of training on technology devices is the second most common challenge.

Table 15. Completion Interview: Anticipating Challenges

Answers	Responses	Percent
Technology devices that are old/not working	7	88
Not being properly trained on devices (SMART Board, Learn Pads, and software)	4	50
Network not working	2	25
Kids using the internet/computer inappropriately	2	25

N = 8. Participants selected more than one response.

Non-completion Interviews. To gain more insights regarding the reasons for not completing the module, interviews were also conducted with 15 teachers who registered for the pilot module but did not complete it (or partially completed it). Participants were asked to indicate the elements of the online module experience they felt were the most challenging. The results of this question are detailed in Table 16. Most commonly, participants indicated that the online nature of the module contributed to forgetting about it. A number of participants also noted too many commitments. The third most common reason was that the pilot module was too long.

Table 16. Non Completion Interview: Most Challenging Parts of the Module

Answers	Responses	Percent
Online- Forgot about it	14	93
Too many commitments/too busy	10	67
Too long	8	53
Overwhelmed	4	27
Bad time of year	3	20
Online- Hard to focus/get motivated	2	13
Retiring, don't need it	1	7

N = 15. Participants selected more than one response.

When asked about their motivation to enroll in the module, most teachers noted that they needed more information regarding technology integration. Helping the researcher understand more about the elements of effective online professional development was also very high on the list of reasons. The researcher prompted all teachers within the Education Unit to sign up for the module via email. Although the researcher has no administrative power over other teachers, they felt compelled to help. Responses are shown on Table 17.

Table 17. Non Completion Interview: Motivation to Register for the Module

Answers	Responses	Percent
To learn about technology integration	14	93
To help researcher	13	87
To learn about CCSS	8	53
To get professional development hours	1	7

N = 15. Participants selected more than one response.

Of those who did not complete the module, but registered to participate, the most common suggestions for improvement were making the module shorter and offering

additional modules to prepare the participants for the technology programs and methods they will need to use (see Table 18).

Table 18. Non Completion Interview: Suggestions to Improve the Module

Answers	Responses	Percent
Shorter time commitment	11	73
Smaller modules that build up knowledge	5	33
Meeting face to face	2	13
Calendar with reminders about the schedule	1	7
No answer/Don't know	1	7

N = 15. Participants selected more than one response.

This group of teachers was also asked if they would be interested in participating in a revised version of the pilot module. Eighty percent of this group said they would be interested in this module. When these teachers were asked if they would participate in it if it were offered again, 12 (80%) said they would.

As a follow-up question, participants were asked what they felt was the most important factor which prohibited completion of the course. As seen in Table 19, the majority of participants interviewed responded that the length of time required for completing the module was the most important factor (60%). Specifically, they noted competing expectations and home/school responsibilities as major time constraints. Other factors included the time of the year that the module was offered, the online format of the course, and the need for more professional development hours associated with the module.

Table 19. Non Completion Interview: Factors Influencing Participation

Answers	Responses	Percent
Length of time for completion	9	60
Time of year offered	3	20
Online format	2	13

Hours of professional development earned	1	7
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N = 15.

Key question 2, Level 2: Participants' Learning

Key question 2 addressed participants' learning of new content. This is consistent with Level 2 of Guskey's evaluation framework. Data for this level were collected from blog entries during the first two weeks of the module, a post-course survey, and interviews conducted at the end of the module.

The quality of blog entries for Weeks 1 and 2 of the module were assessed using the rubric presented in Appendix G, which focuses on participants' understanding of how technology can support student learning in the context of CCSS. Further, the coding scheme presented in Appendix H was used to analyze the blog entries qualitatively.

Table 20. Scores on Week 1 and 2 Blogging Activities

Score	Frequency Week 1	Frequency Week 2
6/6	10	6
5/6	0	2
4/6	1	3
3/6	1	1
2/6	0	0
1/6	0	0
0/6	0	0

N = 12.

As shown on Table 20, rubric scores for week one blog and week two entries were good overall. During week one, ten participants scored 6/6 pts. They responded to the areas of discussion (Tables 21, 22, and 23) with specific details from the readings on the role and importance of technology in teaching learning. Further, they referenced their

classroom experiences and technology tools they use. During week two, six participants scored 6/6. They responded to prompts regarding steps for integrating technology into lessons and student vs. teacher-centered activities (Tables 24 and 25).

Qualitative analysis of blog discussions during Week 1 revealed three general themes: a) CCSS builds on prior knowledge to prepare students for life-long learning, b) technology integration in the CCSS prepares students for their future, and c) technology increases the number and quality of resources available to students in Education Unit schools. There were 9 participants who discussed all three of the themes in their posts, and 2 others who mentioned two of the three themes. There were a few participants who started this week's activities then did not finish the rest of the activities in the module.

As noted, the first theme focused on how CCSS built on prior knowledge to increase the depth of student learning. Sue used this analogy to describe her opinion: "Just as a staircase begins with a base and each step is connected in order to make it to the top, the Common Core requires students to have a foundation and each step they take is built on prior knowledge from the step before." Tammy responded to another post with this suggestion to extend the technology integration when she stated, "if you take it a step further and have students present their arguments using Educreations, Prezis or Power Point, you are delving deeper into the technology realm." Table 21, illustrates participating teachers' responses regarding the role of CCSS in preparing students for life-long learning.

Table 21. Blog Excerpts, Week 1: CCSS, Student Prior Knowledge and Preparation for Life-long Learning

Participant	Blog Excerpt
Tiffany	They (CCSS and Technology) are an integral part of education and instruction in this century and absolutely necessary to ensure the success of each and every one of our students in the modern day classroom.
Beth	The core purpose of the CCSS is to prepare students for college and career readiness it only makes sense that the critical analysis and production of media be integrated throughout the standards.
Sue	Just as a staircase begins with a base and each step is connected in order to make it to the top, the Common Core requires students to have a foundation and each step they take is built on prior knowledge from the step before.
Zoey	I will say that I think a spiraling curriculum is absolutely necessary for the long term retention and application of higher level material.
Karrie	Spiraling is necessary so students can successfully transition from basic content to more rigorous sophisticated concepts and be able to apply the information to real world situations.
Molly	It encompasses critical reading, speaking and listening, providing opportunities for student voices in a variety of mediums.
Bob	As you spiral up, you revisit the information that you previously learned and use that to understand and conceptualize more sophisticated material.
Anne	CCSS is helping to prepare students for real world applications and skills.

The second theme, focused on the role of technology in the context of CCSS.

Tiffany, for instance, stated regarding the role of technology in CCSS: “they [CCSS and technology] are an integral part of education and instruction in this century to ensure the success of each and every one of our students in the modern day classroom.” Tiffany’s blog entry points out the students need to be technologically aware and need exposure to CCSS, so they can be competitive in school. Beth took this idea further by stating “the core purpose of the CCSS is to prepare students for college and career readiness; it only makes sense that the critical analysis and production of media be integrated throughout the

standards.” Similarly, Molly stated, “learning is not an isolated experience, but connects to lifelong learning for all.” These statements really “drive home” the idea that integrating technology into the CCSS, prepares students for the future. Table 22 illustrates teachers’ ideas regarding the role of technology in CCSS.

Table 22: Blog Excerpts, Week 1: Technology for Building Student College and Career Readiness

Participant	Blog Excerpt
Tiffany	I think that CCSS will ensure our students, nationwide, get the material and concepts necessary to succeed in a global economy.
Beth	As a core purpose of the CCSS is to prepare students for college and career readiness it only makes sense that the critical analysis and production of media be integrated throughout the standards. Technology and media are inherent to enhancing student learning in the context of the CCSS.
Sue	As a teacher, I feel it is crucial to integrate technology into learning due to the use of it throughout the world and need to understand it. The teacher role with particular technology tools is more of a facilitator.
Tammy	Teachers can use technology to present information in different medias, help organize data, differentiate instruction, and provide learning opportunities outside the constraints of the classroom such as virtual tours of museums or labs.
Zoey	I think you can’t move into the future without including technology. It is truly central and integral to everything we do in society.
Karrie	Students need to utilize technology to enhance their learning. This is accomplished through research, writing, discovery and making connections.
Molly	I think that technology can be applied across content areas to enhance student learning.
Bob	I cannot see how technology could not be included in the standards, since the world is becoming more and more dependent on technology and there continues to be new and better technology being developed every day.
Anne	CCSS is helping prepare students for real world applications and skills. Using a Smart Board, I was able to create lessons that students were all eager to participate and excited to learn.

The final theme developed during the first week’s blog was the role of technology in increasing the number and quality of resources available to students in Education Unit schools. Zoey asked rhetorically, “why wouldn’t you want to tap into that potential for our students?” She then added, “Virtual dissections, lab involving chemicals, etc. are generally off limits to our youth...but not with technology!” Anne responded to Zoey’s post with this reflective statement, “I didn’t really think about how important and significant technology would be in your setting, due to not having access to the outside and the necessity to bring the world in!” Table 23 demonstrates participants’ responses regarding the role of technology in increasing the number and quality of resources available in the Education Unit Schools.

Table 23. Blog Excerpts, Week1: Increase the Number and Quality of Resources

Available in Education Unit Schools

Participant	Blog Excerpt
Tiffany	It has been my experience that the use of technology in the classroom has served to bring the outside in. As a teacher in a secured facility, it has been an important part of my instruction.
Beth	I can utilize basic databases, the SmartBoard and LearnPads, as well as other technology and media to assist students and enhance instruction.
Tammy	If you take it a step further and have students present their arguments using Educreations, Prezis or Power Point, you are delving deeper into the technology realm.
Zoey	Why wouldn’t you want to tap into that potential for our students? Virtual dissections, labs, involving chemicals, etc. are generally off limits to our youth...but not with technology!
Karrie	Technology can provide our students with experiences and exposure to elements and things in the world that we are not privy to.
Molly	Technology is another strategy teachers need to have to TEACH the standards.
Bob	Technology just provides an additional vehicle for instruction. AND...since it is engaging and familiar to students, why not use that to our advantage?!

Anne	Response to a teacher in detention: I didn't really think about how important and significant technology would be in your setting, due to not having access to the outside and the necessity to bring the world in!
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The above responses indicated that participants understood the role of CCSS in building on students' prior knowledge, the importance of integrating technology within CCSS, and the role of technology in expanding classroom resources. Participants posted very thoughtful comments and responses and the blog was very active the first week. Several of the participants who posted in week one, however, did not finish the course. The following weekly discussions had active participation from the remaining participants.

Week 2 blog entries focused on using a grounded approach to technology integration and value of student and teacher-centered activities. Grounded technology integration includes five specific steps that help teachers design lessons to align technology with specific content and pedagogy: choose learning goals, make pedagogical decisions, select activity types, select assessment strategies, and select technology tools/resources. During Week 2 participants brainstormed ideas for their lesson and posted initial thoughts in their blogs.

Week 2 blog entries focused primarily on issues around pedagogy, particularly the need to balance teacher-centered and student-centered activities to maximize learning. Sue shared, "a student-centered learning activity would have students empowered and playing an active role in their learning." Beth agreed and added "teachers need to choose from the educational technology integration efforts without shifting away from the student needs."

In response to Molly’s post, Tammy replied, “I agree there needs to be a balance of teacher vs. student-centered activities.”

Week 2 blogging activities were assessed with a 6-point rubric (Appendix G) which focused on a) the ability to explain how the “Five Basic Steps to Planning” can be applied in their own classroom to create a technology-integrated lesson based on CCSS, and b) the ability to explain the difference between teacher-centered and student-centered lesson activities. Scores achieved by the participants were widespread. Table 20 shows the scoring frequencies.

Qualitative analysis of Week 2 blog entries, however, indicated that all participants were able to accurately describe the 5-steps to grounded technology integration presented in the readings. Many of them also added information about how or why you complete the process this way. Further, they were able to explain teacher-centered and student-centered technology integrated activities and provide relevant examples. Tables 24 and 25 illustrate teachers’ learning of grounded technology integration as well as pedagogical issues around technology. As shown on Tables 24 and 25, teachers who participated described the steps they learned in the activities for the week.

Table 24. Blog Excerpts, Week 2: Describing Steps to Planning Technology Integration

Participant	Blog Excerpt
Tiffany	Make pedagogical decisions. Decide how you are going to differentiate your instruction. This where you analyze your students’ strengths and weakness in learning a new concept and what steps you will need to take to allow the students to succeed. Selecting multiple ways to review the material to your students’ strengths and interests.
Beth	After the learning goal is determined, decisions need to be made to

	determine the parameters of the learning experiences that are being planned (student-centered or teacher centered, type of learning: convergent vs. divergent, the prior knowledge of students, the depth of understanding sought, time needed, structure needed, etc...).
Sue	The “5 Basic Steps to Planning” are: 1.) Choose learning goals- Goals need to be measurable and reflect content based curriculum standards. 2.) Make pedagogical decisions. 3.) Select activity types to combine. 4.) Select Assessment Strategies- both formative and summative. 5.) Select Resources- Choose technology that is recommended for selected learning activities rather than focusing instruction on technology. “Learners First, Technology Last”.
Tammy	The fifth step is when it is proper to determine the technology necessary to accomplish the learning experience. It is important to remember that this planning process can be utilized in conjunction with many other planning processes for example the Learning Focused Planning Model.
Karrie	Choosing learning goals. This should be easy because you have CCSS to be your guide.
Molly	Make pedagogical decisions- Determine the specific parameters of the learning experience you are planning. Take into account learning needs and preferences.
Bob	Choose a way to evaluate student progress. This includes both formative and summative assessments. There needs to be check points to determine if the students are actually learning or if there are misconceptions or confusion.

Table 25. Blog Excerpts, Week 2: Describing Student-centered and Teacher-centered Activities

Participant	Blog Excerpt
Tiffany	An example of a student-centered activity comes from the PBL Project Foundry: Students have the opportunity to participate in a local community revitalization effort by developing a walking tour

	throughout town. Working in teams of four, students identify community landmarks that should be included on the walking tour, research history surrounding those landmarks using primary and secondary resources, and communicate their findings by writing and recording a narrative that will guide the tour
Beth	An example of a teacher-centered activity would be using a Smartboard, embedding a video into a lesson, or showing a power point as part of a lesson. An example of a student-centered activity would be to conduct research using the Internet or creating a power point.
Sue	A teacher-centered activity using technology could be students watching a book being read via a Smartboard or, reading information off of a web page, or listening to a videotaped lecture. The teacher has the control over what the students will learn as well as how they will learn. In contrast an example of a student-centered learning activity would have the students being empowered and playing an active role in their learning.
Tammy	Response to Molly: I also agree there needs to be a balance of teacher vs. student centered activities. I think when we don't intentionally plan instruction it ends up being too heavy on the teacher-centered activities.
Karrie	Teacher centered activities are things like utilizing power point to enhance a lecture. Student centered is students going to a website like energy skate park and exploring the different variables the can affect kinetic energy for themselves by making adjustments to the skater, track, and even planet.
Molly	A teacher-centered activity would include video clips, power points, images, smart boards used by the teacher, Elmos. Student centered activities include web quests, research, analyzing documents, creating a presentation, participating in virtual labs.
Bob	A teacher-centered activity can be a simple lecture, or the presentation of a PowerPoint that accompanies an activity. A student-based activity would be where the student takes the role of a self-teacher. This may be in the form of a research activity, a self-paced interactive program.

When the participants of the module rated themselves, using the post-course survey, on their own knowledge before and after taking the module they averaged a better rating after the module (see Table 26). This shows the participants felt they learned from the pilot module.

Table 26. Post Module Survey: Self-Assessment Before and After Pilot

Self-Assessment	Mean	Standard Deviation
Before Module	2.67	0.62
After Module	4.33	0.47

N = 12. Scale ratings can range from a low of 1 (Poor) to a high of 5 (Excellent).

In the survey, participants were also asked to provide input on follow-up professional development they need in order to sustain their learning from this module. Table 27 illustrates participants' responses. Specifically, most teachers indicated that they would like to receive follow-up professional development on the use of technology devices they have access to, strategies and techniques learned during their module, and continued sharing of resources. These ideas are incorporated into the Recommendations section of this paper.

Table 27. Post Module Survey: Follow-up Needed

Response Category	Number	Percent
Technology Equipment Training	5	42
Practice Using Techniques	4	33
Resource Sharing	3	25

N = 12.

Finally, interviews were also helpful in determining participants' learning. Specifically, participants who completed the module were asked to identify knowledge and skills learned by completing the module. Participants provided a variety of responses

including the realization that technology is integrated into many of the CCSS; teaching the standards is the responsibility of all teachers, regardless of the content area they teach; steps involved in integrating technology in CCSS; and new resources (see Table 28). Most of those interviewed offered more than one answer.

Table 28. Completion Interview: New Skills and Knowledge

Answers	Number	Percent
Technology is integrated into many of the Common Core Standards	6	75
New resources	5	63
The step to integration	4	50
Responsibility of all teachers	4	50
The internet plays a big role in technology integration	2	25

N = 8. Participants selected more than one response.

When the interviewees were asked if they had remaining questions about the topic, they all responded “no”.

Finally, Table 29 lists the type of follow-up support participants said they needed in order to make the most of their new knowledge; most frequently they asked for training on the Learn Pads (tablet devices) and SMART Boards. They also asked for continued support with questions and continued sharing of resources. This question was valuable because the TELL Survey showed teachers would like more follow-up to their professional development (see Table 1).

Table 29. Completion Interview: Follow-up Support Needed

Answers	Number	Percent
SMART Board Training	6	75
Continue to provide resources	5	63
Check back/Answer questions later	4	40
Learn Pad Training	4	50

N = 8. Participants selected more than one response.

Key question 3, Level 4: Applying New Learning into Practice

Key question 3 addressed participants' learning of new content. This is consistent with Level 4 of Guskey's evaluation framework. Data for this level were collected from technology-integrated lesson plans developed by participants as well as interviews at the end of the module. The development of technology-integrated lessons occurred during weeks 3 and 4 of the module. Participants were provided a set of guiding questions illustrated in Table 30. They were also encouraged to post draft of their lesson plan and receive feedback from peers. Blog responses for Week 3, however, were optional. Most of the participants posted first drafts of their lesson plans, in order to receive feedback and suggestions for changes. There was valuable feedback exchanged and suggestions made for changes to posted lessons.

Table 30. Guiding Question for Lesson Development

<p>Week 3: Planning your Lesson</p> <p>** Assignment: Using the Lesson Template, create a lesson using the Common Core Writing Standards and technology to enhance the lesson, post it to the class blog in an attachment. (36 points of the total grade for this course)</p> <p>Lesson Template and Learning Focused Resources</p> <p><i>Questions to Guide your Lesson using the framework of Grounded Technology Integration</i></p> <p>What is the learning goal? What standards does it address? (CCS, NGSS, DE)</p> <p>Describe the pedagogical knowledge:</p> <ol style="list-style-type: none">Is it teacher or student centered?Will students come to the same conclusions when completing the lesson (convergent) or their own conclusions (divergent?)Will students need to rely on few prior experiences or more prior experiences to understand the lesson?Does the lesson focus on surface comprehension or deeper, complex comprehension?Is the lesson short or require a longer duration for learning to take place?Is the lesson very structured or less structured?
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- g. How are the learners configured for the lesson? Whole group, small group or individualized instruction?
 - h. Describe the resources required for this learning experience.
 - 3. Describe the activity types used in the lesson.
 - 4. Describe the assessment strategies used in this lesson.
 - 5. How does technology support common core standards identified in this lesson?
- Source: Chrystalla Mouza, Ed.D

To evaluate whether participating teachers were able to apply their new learning on the integration of technology in CCSS, all lesson plans were collected and assessed using the TPACK technology integration rubric (see Appendix I). Table 31 depicts the results of lesson plan assessment with the Technology Integration Assessment Rubric. These results indicated that participants were able to apply their new learning in the design of lessons that aligned technology with CCSS and pedagogy. The participants identified curriculum goals aligned with CCSS and incorporated a variety of technology resources, including: the use of SMART Boards, document cameras, iPads, lab simulation (Biology), digital storytelling software, digital comic strip creation software, a wiki, videos, and a research project. The technology was well-placed in the lesson and supported the instructional strategies used in the lesson plans.

Table 31. Average Scores on Technology Integration Assessment Rubric

Criteria	Possible Points	Mean	Standard Deviation
Curriculum Goals and Technology	4	3.33	0.50
Instructional Strategies and Technology	4	3.22	0.83
Technology Selection(s)	4	3.11	0.60
“Fit” (Content, Pedagogy and Technology)	4	3.22	0.67
Total	16	12.89	2.32

N = 9.

In addition to scoring each lesson plan using the technology-integration assessment rubric a qualitative analysis was also made on whether the lesson clearly integrated technology with CCSS and sound pedagogy. Tables 32 and 33 present two examples that illustrate these connections.

Table 32: Lesson Plan Summary, Example 1: Rain Garden Design Proposal

Learning Activity 1: Research

Using the Rain Garden Worksheet, Students will research the Internet website <http://www.rainscaping.org/index.cfm/fuseaction/plants.main/typeID/37/index.htm> And find three to five viable plants/shrubs for the rain garden. They will be able to defend their choices with information from the text about each plant/shrub.

Students should be able to report on their choices using information gathered. They must have evidence to support their selections. Students will listen to other proposals of foliage and comment on their viability as well.

Learning Activity 2: Planning Your Garden

Students will plot their rain garden on an index sheet. They will use examples of planning sheets to guide them found at the following websites placed in their LearnPad lesson http://www.lowimpactdevelopment.org/raingarden_design/templates_SunPiedmont.htm

Students must list, define, and plot the mandatory structures in the rain garden before adding chosen plants. (items listed above). After indexing those items, students will work individually, with a partner, or in a small group, depending on their desire, to map out a viable rain garden.

Learning Activity 3: Get Ready To Build

After a consensus of plants has been reached (approximately 8-10), the class will create a viable rain garden on paper to share with Ms. Watson with DNREC and have a discussion about their choices. Students will learn about the proposal process and be ready to give support to their choices with evidence.

Once a final proposal is made, students will begin actual work on the rain garden with the assistance of DNREC and Sussex Conservation.

In Lesson Plan Example 1, the teacher has integrated technology for students (grades 6-8) who will use the Internet to do research on plants to inform the design of a garden (including several student-centered activities). The students use Learn Pads (Tablets) to design the garden, with the plants they researched, visually on the garden plot template. Then, students are asked to write proposals using word processing software. This teacher used technology to help students meet technology, writing, and science standards in this lesson. The technology supported the curriculum goals and the instructional strategies, and the pedagogy, curriculum, and technology are well-balanced, indicating a “fit”.

Table 33: Lesson Plan Summary Example 2: Use of Media to Present Information Texts

Lesson Plan Summary, Example 2

Learning Activity 1: Show the first minute of the history video clip for the selection (Online Extras: History Video) Holt McDougal Literature Online text: M3 Man, Moment, Machine about the Apollo 13 voyage. Create a Headline that produces anticipation based on the video clip. List 3 ideas that you would want to answer in this potential article.

Write a \$2.00 summary explaining the term anticipation as it relates to author’s choices. Turn and talk to your partner. Exchange responses and decide which response captures the essence of the term clearly and concisely. If neither is clear and concise, revise as a team. Share the finished product with the class.

Learning Activity 2: Explain to students that authors like film directors use various methods to create anticipation for the readers. While students read the selection using the PALS method, they will search for techniques that the author uses to build anticipation or suspense. Each student will complete a graphic organizer listing the descriptions, vivid verbs, phrases that cause fear and frightening facts that indicate methods the author uses to build suspense. Have pairs read from pg. 120 -123. Instruct students to meet with another group of two and discuss their answers. Students may list additional ideas they heard from new team on their charts.

Assessment Prompt for Learning Activity 2: Students will complete a 3, 2, 1 prompt answering the following: Provide three techniques authors use to build anticipation and suspense; two examples of these techniques from the story “Race to Save Apollo 13”; and one prediction as to what might happen next. If time, share

predictions with the class.

Learning Activity 3: Read pages 124 & 125 aloud to the students. Tell them that they will continue to listen for techniques that the author uses to build anticipation and suspense and list them in the charts. **Model the skill suspense.** After completing the pages, explain that authors often use time to create suspense. When there is a limited amount of time to do something important, a sense of urgency is created. Have pairs identify the references to time in lines 126 -129. Then point out to them that time gets shorter and shorter with each mention. Explain that these time references create suspense by raising the question of whether the astronauts will be able to get out of the Odyssey before the total power shutdown. **Think, Ink, Pair, Share:** Have students review their notes and choose the section of the story they felt was the most suspenseful so far. Write two sentences explaining their choice and why. Share answers with their partner. Take a survey to see if one segment was chosen more than the others. Create graph depicting choices made by each student. Share via Smart Board.

Assessment Prompt for Learning Activity 3: Quick Write: Explain how an author uses time to build anticipation and suspense.

Learning Activity 4: Continue to have students use the PALS reading method to complete pages 126 -132. Students will continue to list examples of the techniques the author uses to build anticipation and suspense. Students will stop every two pages to summarize the story and make predictions. Teacher will move around the classroom facilitating the PALS process, note-taking process and summarizing process for groups. Finally, students will review their anticipation guides to analyze their predictions. Students will make corrections to predictions that were incorrect and indicate the pg. number in the text that proves their answer is now correct.

Assessment Prompt for Learning Activity 4: Writing Prompt: The author, Michael Useem, included extensive technical information in his account of Apollo 13. How well did he balance the need to explain with the need to tell a suspenseful story? Find examples to support your answer. **(Use a cloze procedure for students that may have written expression disorders or processing struggles)**

Learning Activity 5: Explain to students the author, Michael Useem, used the problem-solution organizational pattern to order the events of the story, “Race to Save Apollo 13”. Problem and Solution is a pattern of organization where information in a passage is expressed as a problem or dilemma and a solution or attempted solution. There are also a few signal words which may indicate that information in a passage is ordered in the problem and solution pattern of organization: proposes, suggests, solution, answer, remedy, prevention, and fix. Have students return to the text with their partners and reread pages 122, 126, and 130 to find examples of the problems and solutions discussed in the story “Race to

Save Apollo 13. Students will list examples in the chart provided. Student will share out answers. If additional support is needed, show students video clip on detecting problem-solution patterns in text. <https://wikis.engrade.com/patternsoforganization2>

Create a three question multiple choice quiz on problem-solution organizational patterns. Administer the quiz to your partner and score. Provide feedback to your partner.

The second lesson plan example contains digital media to present an informational text for a 10th grade English class. The teacher included an opportunity for students to meet writing standards by using digital storytelling software. The Frayer Model is in electronic form, and supporting instructional strategies for vocabulary. There are also opportunities to use a SMART Board in this plan. The use of technology is balanced and supports curriculum goals and instructional goals stated in the lesson. The pedagogy, curriculum and technology are well-balanced in this plan too.

Despite the fact that all teachers developed technology-integrated lessons that scored well on the rubric, qualitative analysis indicated some variability in the use of teacher-centered and student-centered activities. Some of the lesson plans had traditional activities that would be enhanced by the introduction of technology. Others had technology added, but the use did not fully support the curriculum or instructional goals any more than the traditional one. For example, one teacher included the use of a SMART Board but only to be used as a projection screen. Although the SMART board aligned with the goals and pedagogy of the teacher, there are a number of interactive activities that could be used to enhance the quality of the lesson's technology integration. This finding indicates that although participants were able to explain student-centered technology

integrated activities in their blog entries, they were not all able to apply such strategies in their lesson plans. This finding could help strengthen future offerings of the module.

Finally, interviews with participating teachers provided additional information regarding the ways in which they plan to apply their learning into practice. During the interview, participants indicated that they will use technology in their lessons, utilize the steps they learned to technology integration, deploy technology resources learned about in the module, and utilize resources acquired through the module to improve their teaching practices (see Table 34). This is a positive note about the professional development in general. It is very important to be able to generalize and use the information learned.

Table 34. Completion Interview: Plan to Use Learning

Answers	Number	Percent
Technology in Lessons	7	88
Technology resources	4	50
Steps to Integration	3	38
CCSS resources	2	25

N= 8. Participants selected more than one response.

Chapter 4

RECOMMENDATIONS AND CONCLUSIONS

The pilot online module assessments, blog entries, post-module survey, and interviews provided lessons that would help establish a more successful online professional development program. Participants offered suggestions about the course, such as time frame, to overcome the obstacles preventing their completion (as seen in Table 18). Several participants asked for the course to be offered again with shorter modules to take less time. One respondent mentioned that they were being inundated by new initiatives and suggested offering the module again when things “calm down.”

Key Question 1, Level 1: What was Learned from Teachers Perceptions of the Online Module?

The participants were surveyed and interviewed to inform this study on the experience of the respondents and the design of the online module. The two groups of teachers' interviews, those who completed the module and the group who registered and did not complete it, both gave valuable input.

When the participants who completed the online module participated in the survey, they rated the module with positive results. They also offered feedback on what changes they would like to see (Table 11). During the interviews, those who signed up for the module but did not complete it were asked whether they would be interested in participating, if the course was revised and offered again online. Twelve of the 15 participants interviewed (80%) said they would be interested in taking the course, after the revisions. They gave feedback on what they would like revised (Table 18).

Further, teachers who participated in the module also provided valuable on what parts of the module they liked the most (Table 13) and suggestions for changes they would like to see for the module (Table 14). Specifically, during the interviews participants suggested a calendar with reminders of date assignments, more video examples, and offering it at a different time of year. This group also supplied a list of anticipated challenges in putting their new knowledge into practice (Table 15) in their classrooms. These barriers can now be investigated and dealt with.

Key Question 2, Level 2: What Was Learned About Teacher Learning?

Results indicated that teachers built on their knowledge about the CCSS, learned how to integrate technology into their instruction, and gave constructive feedback in the discussion board (Tables 21 through 25). The discussion board was very valuable for formative assessment; it became a center of collaboration that allowed participants to receive feedback for improving assignments, generalize the material through discussion, and adapt existing lessons to integrate technology (Table 32 and 33).

Results also indicated that teachers need shorter time commitments and reminders of the schedule to maintain the pacing of an online course (Table 18). This is a lesson from those who registered but did not finish the course. There are many demands for teachers' time and shorter time commitments can help make completion seem more likely.

Further, participants requested additional support with the technology devices they have access to in their classrooms (Table 14). This will be made a priority, so that teachers feel comfortable using them to teach.

Key Question 3, Level 4: What was learned about applying knowledge to practice?

The focus in the professional development must be an area of need for the professional growth of the participants, must be adaptable, and must be aligned with the standards teachers use in their classroom. Each teacher has a variety of experiences, so sharing of lesson plans provided feedback that helped enhance participants' work. Lesson plans reviewed by peers received higher ratings on the TPACK rubric (Table 31).

Teaching the lesson in the classroom and reflecting on the experience is an essential part of the learning process (Twining et al., 2013.).

Limitation

This study is not without limitations. The teachers in the Education Unit all know and work with this researcher, so this work relationship could bias their responses. Although this researcher does not have any direct supervisory role in the district, our friendly peer-to-peer communication on an everyday basis could have affected responses.

These findings are subject to a confirmatory bias. This researcher had a vested interest in the outcomes of this study; having designed the PD, coded the data, and interpreting the results.

Another limitation is the time that passed between the TELL Survey in 2013 and the Professional Development module survey and interviews in August 2014 - August 2015. The limited number of teachers in the sample and the limited number of teachers who completed the online module also impacted the analysis. Participation of the entire teacher population in the Education Unit (N=48) could help provide better insights regarding experiences in online professional development.

Finally, the limited amount of time students in the Education Unit spend with each teacher makes it hard to evaluate the impact of professional development on student outcomes. Further, time constraints associated with the implementation and evaluation of the professional development module made it difficult to assess student outcomes.

Recommendations

The recommendations of this study reflect the areas in which professional development was most successful and should be continued, as well as the areas where further improvements are needed. Each recommendation is discussed below.

Recommendation 1

After considering all the data sources and the literature, the Education Unit should continue to offer online professional development modules for teachers and staff to save money and time. Ongoing professional development maximizes the learning for teachers (Garet, et al., 2001). Professional Learning Communities present a good platform for sharing and reflection, after learning and using concepts in the classroom. Research on the characteristics of effective professional development indicates that teacher professional development which focuses on content, gives opportunities for active learning and is coherent with other learning activities, increases teacher knowledge and skills (Garet et al., 2001; Heibert 2000, 2003).

Online professional development has many benefits for the Education Unit and teachers like reducing geographical, monetary, and time barriers (Killeen, Monk, & Plecki, 2002; Corcoran, 1995). Following this pilot module, it is recommended that administrators within the Education Unit continues to promote the additional online

modules developed to date: a yearly refresher on Special Education Law, a tutorial on the Goal Book Application Software, and three courses for the Comprehensive Induction Program (new teacher mentoring program).

Participants would like follow-up training on technology devices they have access to in their schools. Many of the teachers expressed a feeling of discomfort in using the tools to which they have access. Future modules offered by the Education Unit, should provide opportunities for teachers to learn more about the learning management system Schoology available in the Education Unit, SMART Boards, Learn Pads, and the software programs used by these teachers.

Of those who did not complete the module, but registered to participate, the most common suggestions for improvement were making the module shorter and offering additional modules to prepare the participants for the technology programs and methods they will need to use (Table 18). A shorter time commitment is hard to accommodate due to the amount of information being covered by the pilot module. Perhaps allowing more time throughout the school year specifically for professional development would address this issue.

Recommendation 2

The pilot module should be revised, offered again, and re-evaluated. According to Table 12, all of the survey participants rated the overall pilot module “average to excellent”. Further, according to the self-assessment of the participants (Table 26), they grew in their knowledge about the subject area.

Tables 11 and 18 highlight the suggestions for changes to the module. The participants would like to see more exemplar videos, calendar reminders and increased participation. Re-evaluation should take place to make sure that the module meets the professional development needs of the teachers. Twelve of the 15 participants interviewed (80%) said they would be interested in taking the course again, after the revisions.

Recommendation 3

Meaningful professional development makes the most of the time of already overburdened teachers (Borko, 2004; Dede, Ketelhut, Whitehouse, Breit, & McCloske, 2009). More research, such as the TELL survey, should be done to determine current areas of professional development needs for teachers. Based on this information, new content can be added to the pilot and other online modules can be developed and used by teachers to meet their professional development needs.

New professional development methods give educators a chance to practice in the student role, execute the lessons or practices in their classroom, and provide feedback and reflection afterward. Online availability in professional learning creates an opportunity to make the context meaningful, providing a continuously available and adaptive learning environment through discussion and review of practice (Twining, et al., 2013.)

Recommendation 4

Teachers learn more and make better sense of their learning in context (Borko, 2004; Borko et al., 2011). Engaging practices such as modeling, visits to classrooms for observation, and discussion of teaching methodology have been found to increase teachers' abilities to make use strategies learned in professional development. So, in the

future, teachers who participate in the module would be required to teach the lesson they produce in their classroom and subsequently reflect and share their reflection in the discussion board. The teaching of the lesson is an important part of the professional development process. Reflecting on the lesson and learning that took place in the classroom, gives teachers time to consider what went well, what needs to be changed, and whether the student gained the knowledge and met the objectives of the lesson. Further, sharing of the reflection gives the teacher more perceptive and feedback to improve practice (Twining, et al., 2013.).

Recommendation 5

Teachers spend a great deal of time preparing and executing lesson plans, assessments, etc. (Borko, 2004; Dede, Ketelhut, Whitehouse, Breit, & McCloske, 2009). Professional development is necessary, but takes precious time. An incentive program for taking professional development, such as bonus pay or compensatory time, would increase the participation in online professional development, and encourage teachers to complete the entire module. If there were more participation, the collaboration and feedback would be vaster and the learning opportunity would be greater (Twining, et al., 2013.).

Conclusion

This study provided participating teachers the opportunity to attend an online professional development module focusing on the role of technology within CCSS. The objectives of the module appear to have been met by the content of the module and can be deemed successful, overall. Participants provided insightful feedback that has been used to

improve the module and guide future evaluations. Participant feedback is useful in expanding knowledge of online professional development design (Guskey, 2000), and to aid in the development and revision of future modules. The process of getting feedback and using it for revision should continue. One highlight found in the literature was how meaningful professional development makes the most of the time of already overburdened teachers (Borko, 2004; Dede et al., 2005; Salmon 2004).

There were areas of the participants' learning that were not transferred to practice inside the lessons. Perhaps with revisions those areas could facilitate in the generalization to the lesson and be observable in the practice of the teachers who participated in the learning. For example, participants were able to explain student-centered technology integrated activities in their blog entries however they were not all able to apply such strategies in their lesson plans. Further research would be helpful to see if a different approach to those areas would aid in its transferability.

This study suggested that there may be benefits to giving teachers voice in their professional growth and development. There are constantly changing pedagogical methods, requirements on teachers, research-based best practices, and new resources (not to mention advancements in technology). Teachers need to be able to fulfill their professional development needs as efficiently as possible and apply their new learning to their own classrooms.

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Appendix

Appendix A

CONSENT FORM FOR PARTICIPANTS

UD IRB Approval from 08/25/2014 to 08/24/2015

University of Delaware
Informed Consent Form

Title of Project: Technology and the Common Core State Standards
Principal Investigator (s): Amy Mooney

Dear Participant,

My name is Amy Mooney and I am writing to invite you to participate in a study that examines the potential of online professional development to improve teachers' understanding of the role of technology in Common Core State Standards (CCSS). The project's results will serve as a resource for future designs of high quality online professional development for teachers. You will be part of a study of approximately 20 teachers. This professional development program and research is part of my Executive Position Paper (EPP) at the University of Delaware.

As part of your participation in this study you are asked to participate in a 4-week professional development program for Education Unit staff in the Delaware Department of Services for Children, Youth, and Their Families (DSCYF). This program focuses on the following topics: (a) Overview of Common Core Standards with Respect to Technology Integration; (b) Instructional Planning Strategies for Integrating Technology with Common Core State Standards; and (c) Planning and reviewing lesson plans that integrate technology with Common Core State Standards. Specifically, every week you will engage in a series of activities that include reading educational materials, watching relevant videos, responding to questions in a class blog, responding to blogging entries of other participants, and developing and peer-assessing lesson plans.

To evaluate the professional development program, all course materials produced during your participation in the professional development program (e.g., blog entries and lesson plans) will be collected and analyzed. In addition, at the end of the program you will be asked to complete a program evaluation online survey and, if you agree, an interview on your experience with the online professional development program. The interview will take approximately 20-30 minutes and will be audio-taped and transcribed. In total you are expected to spend a total of 15 hours.

I believe that there are no risks from your participation in this study. The survey responses in Qualtrics will be highly protected by the investigator's account password. The original surveys in Qualtrics and responses will be destroyed upon completion of the Executive Position Paper. Interview responses and notes will be saved on a password-protected computer in the investigator's office. Teachers' names will be removed and replaced with assigned pseudonyms Interview responses and notes on paper will be permanently destroyed after they are saved electronically, within six months after the completion of the study. Printed data will be stored in a locked file cabinet for 5 years after completion of this study.

Page 1 of 3 Participant Initials _____

Participation in all activities is strictly voluntary. Even if you decide to participate, you may withdraw from this study at any time without any consequences or penalty. If you choose to withdraw from this study, data collected from you will be destroyed immediately. You will earn 15 professional development hours in the Professional Development Management System. Those hours will be earned even if you do not participate in the research study. However you will get partial credit hours if the module is not completed by the end of the 6 week period. (3 hours credit per week of completed assignments). The study offers no direct benefits to participants. Participants who volunteer to be interviewed will be entered in a drawing for a \$20 gift card. Results will help investigators learn more about professional development for teachers. We hope that, in the future, other people might benefit from this study through improved understanding of professional development of educators in technology.

Findings from this study might result in scholarly publications and conference presentations. Pseudonyms will be used in all reports resulting from this study. Results will be reported in my Executive Position Paper as generalizations, even though individual participant's comments might be used to illustrate a particular theme emerged from the data. In case you would like to receive a summary of the results of the study and/or copies of any publications derived from the study please feel free to contact the investigator using the information provided on the top of this letter.

If you agree to participate in this study, please do the following:

1. Sign and date the form where indicated below.
2. Return the signed copy of both pages of the form to: Amy Mooney, 132 Laurel Rd. Millsboro, DE 19966, or amy.mooney@state.de.us.
3. Be sure to keep a copy of this form for your own records.

WHO SHOULD YOU CALL IF YOU HAVE QUESTIONS OR CONCERNS?

If you have any questions about this study, please contact the Principal Investigator, Amy Mooney at amy.mooney@state.de.us or 302-448-0505.

You may also contact the principal investigator's academic advisor, Chrystalla Mouza, Ed. D., at cmouza@udel.edu or (302)831-3108.

If you have any questions or concerns about your rights as a research participant, you may contact the University of Delaware Institutional Review Board at 302-831-2137.

Page 2 of 3 Participant Initials _____

___ I voluntarily agree to participate in the study, “Technology and CCSS”, as explained above. Any questions that had have been explained satisfactorily.

Signature

Date

___ I do not want to participate in the study, “Technology and CCSS”, as explained above.

Signature

Date

Page 3 of 3

Appendix B

QUESTIONS STUDIED FROM THE TELL SURVEY 2013

Q8.1 Please rate how strongly you agree or disagree with statements about professional development in your school.

Strongly Disagree

Disagree

Agree

Strongly Disagree

Q8.2 In which of the following areas (if any) do you need professional development to teach your students more effectively? Yes or No (n = number of responses)

- Area of Need
- Your Content Area
- Common Core Standards
- Student Assessment
- Special Education (with disabilities)
- Special Education (gifted and talented)
- English Language Learners
- Differentiating Instruction
- Closing the Achievement Gap
- Methods of Teaching
- Reading Strategies
- Integrating Technology Into Instruction
- Classroom Management Techniques

Appendix C

END OF COURSE SURVEY

1. Content: The content of the professional development is relevant to my professional responsibilities.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2. Content: The facilitator helped me understand how to implement my learning.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3. Content : This professional development session will extent my knowledge, skills, and performances.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4. Content: This professional development was tailored to meet my needs as a learner.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5. Context: The professional development was supported by effective/appropriate use of technology.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
6. Process: New practices were thoroughly explained.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
7. Process: Sufficient time was provided for guided practice and tasks.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
8. Process: The facilitator was knowledgeable and helpful.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
9. Process: The instructional techniques used facilitated my learning.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

10. Process: The materials used were accessible and enhanced my learning.
 Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
11. Process: The professional development activities were carefully planned and well organized.
 Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
12. Process: The professional development goals and objectives were clearly specified.
 Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
13. Process: The professional development included a variety of learning activities relevant to the topic.
 Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
14. What were the best aspects of this professional development module?
15. What could be done to improve this PROFESSIONAL DEVELOPMENT MODULE?
16. Satisfaction (Slide Bar Response) Please give an overall rating for the quality of this professional development
 Poor Below Average Average Above Average Excellent
17. Please rate your knowledge before and after the professional development module.
 a. BEFORE THIS MODULE
 Sliding scale: 1 being Poor 5 being Excellent
- b. AFTER THE MODULE
 Sliding scale: 1 being Poor 5 being Excellent
18. What follow-up assistance is needed to maximize your success in this area?
19. Could I interview you as a follow up to this module? If so please enter your name here.

20. How many years have you been teaching?

- 1 Less than 1 year
- 2 1 to 3 years
- 3 4 to 6 years
- 4 7 to 9 years
- 5 10 to 15 years
- 6 More than 15 years

21. What grade level(s) are you currently teaching?

- 1 Pre K - 2nd
- 2 3rd - 5th
- 3 6th - 8th
- 4 9th - 12th

Appendix D

INTERVIEW QUESTIONS FOR THOSE WHO COMPLETED COURSE

Interview Questions

Date:

Professional Development Module: Technology Integration

Interviewer: Amy Mooney

Pseudonym: _____

1. What, if any, new knowledge and skills did you learn on the role of technology in common core state standards?
2. What remaining questions do you have about the role of technology in common core state standards?
3. What did you like best about the online module on the role of technology in common core state standards?
4. What, if any, follow-up support would you like to receive on?
5. What suggestions do you have for improving the online professional development modules on the role of technology in common core state standards?
6. What, if any, of the ideas presented during your participation in the online professional development modules do you plan to try out in your classroom?
7. What challenges do you anticipate in your efforts to integrate technology in your classroom to support the implementation of common core state standards?

Appendix E

INTERVIEW QUESTIONS FOR THOSE WHO DID NOT COMPLETE THE COURSE

Amy Mooney

Interview Questions for Registered Non-Participants or Partial Participants

Introduction: I saw that you expressed an interest in the Technology Integration Module, on PDMS. I have a few questions about your experience with the module and the obstacles that you encountered during the course time frame.

Pseudonym_____

1. What parts of the online module experience did you find most challenging and why?
2. What parts of the module or online learning experience motivated you to register for the course?
3. Do you have suggestions about the course, time frame, etc. to overcome those obstacles?
4. If the course were revised and offered again online, do you think you would be interested in participating in it?

Follow up: what would be the most important factor to your completion of the course (time of year, length of time for completion, offered as a face to face training, number of hours of Professional Development...) and why?

Appendix F
IRB APPROVAL

DATE: August 25, 2014
TO: Amy Mooney, BS
FROM: University of Delaware IRB
STUDY TITLE: [622820-1] EPP Technology Integration Professional Development Modules DSCYF Ed Unit
SUBMISSION TYPE: New Project
ACTION: APPROVED
APPROVAL DATE: August 25, 2014
EXPIRATION DATE: August 24, 2015
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review category # (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.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.

Appendix G

ASSESSMENT OF PILOT MODULE

Rubric for Scoring Week 1 Blog Entries

<p>3 pts: Uses course readings and classroom experiences when applicable to present well-reasoned arguments for how technology and media can support student learning in the context of CCSS.</p>	<p>2 pts: Minimally uses course readings and classroom experiences when to present arguments for how technology and media can support student learning in the context of CCSS.</p>	<p>1 pt: Does not use course readings and classroom experiences to present arguments for how technology and media can support student learning in the context of CCSS.</p>	<p>0 pts: No post for this section of the blog</p>
<p>3 pts: Provides at least 1 well developed example that illustrates the proposed arguments.</p>	<p>2 pts: Provides at least 1 example that illustrates the proposed arguments.</p>	<p>1pt: Does not provide an example that illustrates the arguments.</p>	<p>0 pts: No post for this section of the blog</p>

Rubric for Scoring Week 2 Blog Entries:

3 pts: Clearly explaining the 5 steps of planning technology integration.	2 pts: Vaguely explaining the 5 steps of planning technology integration.	1 pts: Not explaining the steps to integration, but explaining planning with reference to CCSS.	0 pts: Not posting steps to integration of technology into lesson plans.
3 pts: Clearly explaining the difference between teacher centered and student centered lesson activities.	2 pts: Vaguely explaining the difference between teacher centered and student centered lesson activities.	1 pts: Not explaining the difference between teacher centered and student centered lesson activities, but discussing learning activities.	0 pts: Not posting the difference between teacher centered and student centered lesson activities.

Appendix H

BLOGS CODING SCHEME AND ASSOCIATED DATA EXCERPTS

Code	Example of Participant Excerpts
Week 1	
Student prior knowledge and preparation for life-long learning	The core purpose of the CCSS is to prepare students for college and career readiness it only makes sense that the critical analysis and production of media be integrated throughout the standards. (Beth)
Technology for building student college and career readiness.	Why wouldn't you want to tap into that potential for our students? Virtual dissections, labs, involving chemicals, etc. are generally off limits to our youth...but not with technology! (Zoey)
Technology to increase the number and quality of resources available to students in DSCYF schools.	Response to a teacher in detention: I didn't really think about how important and significant technology would be in your setting, due to not having access to the outside and the necessity to bring the world in! (Anne)
Week 2	
Describing steps to planning technology integration	The "5 Basic Steps to Planning" are: 1.) Choose learning goals- Goals need to be measurable and reflect content based curriculum standards. 2.) Make pedagogical decisions. 3.) Select activity types to combine. 4.) Select Assessment Strategies- both formative and summative. 5.) Select Resources- Choose technology that is recommended for selected learning activities rather than focusing instruction on technology. "Learners First, Technology Last". (Sue)
Describing teacher-centered and student-centered technology integration	Response to Molly: I also agree there needs to be a balance of teacher vs. student centered activities. I think when we don't intentionally plan instruction it ends up being too heavy on the teacher-centered activities. (Tammy)

Appendix I: Lesson Plan Rubric: TPACK technology integration rubric

(<http://activitytypes.wm.edu/Assessments/TechIntegrationAssessmentRubric.pdf>)

Technology Integration Assessment Rubric¹²³

<u>Criteria</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>
Curriculum Goals & Technologies (Curriculum-based technology use)	Technologies selected for use in the instructional plan are strongly aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are partially aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are not aligned with any curriculum goals.
Instructional Strategies & Technologies (Using technology in teaching/ learning)	Technology use optimally supports instructional strategies.	Technology use supports instructional strategies.	Technology use minimally supports instructional strategies.	Technology use does not support instructional strategies.
Technology Selection(s) (Compatibility with curriculum goals & instructional strategies)	Technology selection(s) are exemplary , given curriculum goal(s) and instructional strategies.	Technology selection(s) are appropriate, but not exemplary , given curriculum goal(s) and instructional strategies.	Technology selection(s) are marginally appropriate , given curriculum goal(s) and instructional strategies.	Technology selection(s) are inappropriate , given curriculum goal(s) and instructional strategies.
“Fit” (Content, pedagogy and technology together)	Content, instructional strategies and technology fit together strongly within the instructional plan.	Content, instructional strategies and technology fit together within the instructional plan.	Content, instructional strategies and technology fit together somewhat within the instructional plan.	Content, instructional strategies and technology do not fit together within the instructional plan.

¹ Harris, J., Grandgenett, N., & Hofer, M. (2010). Testing a TPACK-based technology integration assessment instrument. In C. D. Maddux, D. Gibson, & B. Dodge (Eds.). *Research highlights in technology and teacher education 2010* (pp. 323-331). Chesapeake, VA: Society for Information Technology and Teacher Education (SITE).

² Adapted from: Britten, J. S., & Cassady, J. C. (2005). The Technology Integration Assessment Instrument: Understanding planned use of technology by classroom teachers. *Computers in the Schools*, 22(3), 49-61.

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