Preparing Teacher Candidates for 21st Century Classrooms:

A Study of Digital Citizenship

by

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ABSTRACT

Mary Lou Fulton Teachers College at Arizona State University recently adopted a "technology infusion" approach to prepare teacher candidates (TC) to integrate technology into their instruction and meet the International Society for Technology in Education Standards for Teachers (ISTE Standards•T) by infusing technology integration approaches into methods courses. At the onset of the technology infusion approach, one important ISTE Standard-T was neglected in the curriculum—that is, digital citizenship (DC), i.e., the responsible, legal, and ethical use of technology. To address this problem of practice, a suite of teaching materials and support services was created, the Technology Infusion Support System (TISS), to help instructors effectively teach DC. The suite consisted of four online modules on essential DC topics including copyright/fair use, digital footprint/social media, acceptable use policies, and responsible student behavior. The support component consisted of ongoing just-in-time support from a technology integration specialist, an instructor's guide, and a resource folder.

This mixed methods action research study was conducted to examine: DC instruction by those who used the TISS and the influence of DC instruction on TC's intention to promote and model DC in their future classrooms. With respect to the second objective, the Theory of Planned Behavior (TPB) guided study efforts.

Participants included teacher education faculty members who taught DC in technology-infused methods courses, their students, and the technology infusion specialists who provided ongoing support to instructors throughout the duration of the study. Data gathered included survey data, observations, focus group interviews, instructor interviews, and researcher journal entries. Results suggested the TISS was a

useful intervention in a college using a technology infusion approach. Course instructors provided consistent instruction on a topic outside of their area of expertise. Further, there was a significant increase in the students' intention to promote and model DC in their future classrooms. The discussion focuses on explaining: the effectiveness of DC instruction; how instruction in DC changes students' intentions to promote and model DC; and the usefulness of the TPB model in understanding how attitudes toward DC, and perceived behavioral control, i.e., efficacy, influence intention to promote and model DC.

DEDICATION

I dedicate this work to three people, whose strength and courage I admire deeply.

To my husband, Shawn "Cat" Lindsey: I love you and am proud of us. May we always lift each other up the way we have these last few years. *Team Lindsey forever.*

To my mom, Ruth Wallace: Everything I have, and everything I am, I owe to you and Dad. Thank you for giving me a beautiful life. I love you.

To my dear friend, Renee Michelle "Mic" Carbone: You lived life with style and grace, and you fought until your very last breath. Rest in peace, beautiful warrior.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

Chapter 1

INTRODUCTION

An otherwise ordinary school day takes a turn for the worse when a highly inappropriate and personal photo of a student is posted to a popular social media site. At first, only a few students see the photo but in less than an hour, it spreads to nearly a hundred students by way of mobile devices such as smart phones and tablets. The incident causes havoc around the school, disrupts learning, and brings about obvious adverse effects to the students and their families (summary of narrative shared by an anonymous school principal, 2013).

In 2010, the U.S. Department of Education (US ED, 2010a) released the National Education Technology Plan, which emphasizes a model of engaged and personalized learning whereby students take control of their own learning using technology as a critical tool. The plan calls for "applying the advanced technologies used in our daily personal and professional lives to our entire education system to improve student learning, accelerate and scale up the adoption of effective practices, and use data and information for continuous improvement" (p. 3). The US ED also urges us to "ensure that every student and educator has at least one Internet access device and appropriate software and resources for research, communication, multimedia content creation, and collaboration for use in and out of school" (p. 17). Similarly, the ConnectEd Initiative that was announced by President Obama in 2013 prioritizes upgraded connectivity in schools, increased access to mobile devices and digital learning resources, and training and support for teachers over the next five years (US ED, n.d.-a). Moreover, increased Internet access in schools seems even more plausible due to the Federal Communications

Commission (FCC) announcement in February 2014 regarding their plans to invest an additional $2 billion over two years to support broadband connectivity in schools. The FCC claims the investment will connect 20 million students in 15,000 schools nationwide (FCC, 2014).

Since the National Education Technology Plan's release in 2010, many schools and districts nationwide have examined the value of emerging technology, especially mobile devices, for teaching and learning—and have adopted policies and initiatives to put more technology devices into students' hands. For example, Creighton School District, an urban K-8 district in Phoenix, Arizona has invested close to one million dollars to equip classrooms with class sets of iPads and iPod Touches; similarly, Sunnyside District in southern Arizona has provided approximately 16,000 technology devices, including laptops and Chrome books to students in grades four through twelve, providing classrooms with a one-to-one student-to-device ratio. Both Creighton and Sunnyside Districts will request even more technology to increase one-to-one access for the 2015-2016 school year (Griffith, personal communication, January 13, 2015; McCormick, personal communication, January 19, 2015). Scottsdale Unified and Dysart Unified School Districts, serving K-12 students in the greater Phoenix area have taken a different approach, recently adopting a BYOT or "Bring Your Own Technology" policy, otherwise known as BYOD or "Bring Your Own Device." These districts permit students to bring their personally owned mobile devices to school, and encourage teachers to allow their use in the classroom. Consistent with these districts' adoptions, a key finding from the 2012 national Speak Up Survey states that over a third of principals, 36 percent, believed that a new Bring Your Own Device (BYOD) school policy for

students would be likely within the year (Project Tomorrow, 2013a). Given the recent surge of technology in schools, current national plans and initiatives that call for increased technology access (US ED, 2010a; n.d-a), and significant increases in federal funding to support schools' Internet access (FCC, 2014), it seems reasonable to expect this upward trend for student technology use, including mobile devices, to continue.

Student access to technology, combined with the growth of Web 2.0 tools that allow individuals to discuss and share information online, creates exciting opportunities for student engagement, collaboration, and learning. On the 'flip side' however, the increased potential for technology misuse in the form of disruptive, unsafe, or unethical behaviors is also frightening to many teachers, administrators, and parents (Notley, 2008). The growing number of students using technology both inside and outside the classroom begs the questions: *What rules and norms of behavior should apply to this new technology?* and *Who will teach these new standards to our students?* (Hollandsworth, Dowdy, & Donovan, 2011).

The International Society for Technology in Education (ISTE) is the authoritative organization in the field of educational technology and the source of the National Education Technology Standards for Teachers, called ISTE Standards•T. Intended to guide "skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society" (ISTE, 2015, "Digital Age Teaching," para. 1), these standards define expectations regarding teachers' use of technology. Digital citizenship (DC), a term which refers to "the norms of appropriate, responsible behavior with regard to technology use" (Ribble, n.d., "Nine Themes of Digital Citizenship," para. 1) is emphasized in the ISTE Standards•T as one of the five main strands comprising the

teacher standards. According to the ISTE Standards•T, effective teachers "promote and model digital citizenship and responsibility" and more specifically, "teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices" (ISTE, 2008, p. 2).

With student technology use on the rise because of various one-to-one and BYOT initiatives, it is and will continue to be increasingly important for teachers to understand, model, and teach the rules and ethics of technology use. Unfortunately, many classroom teachers do not themselves firmly grasp the critical aspects of DC and therefore do not effectively model or promote DC in their classrooms in ways that are consistent with the ISTE Standards•T (Hollandsworth et al., 2011). Confounding the issue is the fact that in general, school administrators also do not understand DC, nor do they designate resources to address it (Hollandsworth et al.). Further, it seems that many teacher preparation programs have not paid sufficient attention to preparing new teachers to meet the DC standard for teachers.

Situated Context

Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU) is the largest teacher preparation program in the nation. Spanning four campuses across the greater Phoenix area plus over thirty sites throughout Arizona, the college is committed to preparing excellent teachers.

In 2009, the college's faculty members conducted a thoughtful and thorough assessment of its programs with regard to effective teacher preparation. As a result, they made plans to increase the relevancy and rigor of program requirements for teacher candidates (hereafter TC; i.e., students preparing to become teachers) by adding an extra

semester of student teaching and more content courses beginning with the 2012-2013 school year. To accommodate the increase in student teaching and content courses while maintaining a four-year program, the college removed some of the previously required courses. One such course was an educational technology course that had been used to prepare TC to meet the ISTE Standards•T. With the removal of this course from the required program of study, *the college adopted a new approach in which technology standards would be infused—that is, taught within other education and teaching methods courses.* These courses would combine technology instruction, pedagogical instruction, and content instruction in an integrated manner, an approach underpinned by Mishra and Koehler's (2006) TPACK framework. In August 2011, I was hired to lead this change in the college to the new *technology infusion* approach.

My primary responsibility was to guide the infusion of technology into methods courses to prepare TC to meet the ISTE Standards•T. The idea was that instructors would model the effective use of technology to teach, while simultaneously teaching TC how to do so in their future classrooms. To that end, I first set out to determine the specific technology integration skills that TC would need, which would drive my subsequent work on the infusion of technology. To accomplish this, I considered the previous stand-alone education technology course. Because it had a long-standing, positive effect in the college, mining the course for best practices, a process known as "benchmarking" seemed like an effective way to identify elements that could be infused into the methods courses (Foulger, Buss, Wetzel, & Lindsey, 2012). Next, I closely examined the ISTE Standards•T and synthesized the skills and knowledge acquired from the previous course with the expectations outlined by ISTE to create a new set of

objectives. The new set of ten technology-infusion curricular objectives comprised four objectives related to using technology for instruction, two regarding information literacy content knowledge, one related to the use of technology for productivity, and three related to DC. The three DC objectives were: (a) respect guidelines including copyright and fair use, FERPA, and acceptable use policy; (b) maintain a clean digital footprint and presence on social media; and (c) instruct K-12 students on legal, safe, and ethical behaviors with regard to technology use—including cybersafety and cyberbullying.

After creating the technology-infusion objectives, eight methods courses were identified in which these objectives would be taught. The courses were strategically selected so that all students, regardless of their specific program area (e.g., elementary, secondary, special education, etc.), would take two "technology-infused courses" throughout the span of their program.

Next, I worked with the course coordinators, i.e., lead instructors, of the eight courses to develop technology-rich course assignments and prepare instructors to teach them. For example, the elementary writing methods, EED 433 course coordinator and I established three assignments aligned to the technology-infusion objectives, including a digital storytelling, i.e., telling a story using multimedia, project. I created materials for the new assignment and provided digital storytelling professional development and ongoing support for the instructors who taught EED 433.

Identifying a Need in Practice

The majority of instructors were enthusiastic about learning how to integrate technology into their content areas and receive training on educational technology tools. They seemed to instinctively understand that teaching TC to integrate technology within

methods courses made sense. Instructors positively commented about the new assignments and topics that had been infused into courses, such as digital storytelling and online collaborative presentations. I was pleased with the progress made toward integrating the technology-infusion objectives related to instruction, information literacy, and productivity into coursework. However, infusing the DC objectives proved to be more challenging.

DC did not align nearly as well with the methods courses as the other technology objectives that primarily focused on using technology to enhance pedagogy. It was more difficult to conceptualize how to infuse DC with methods, which then caused more difficulty in convincing course coordinators to add these new objectives into the courses which they oversaw. Although several course coordinators agreed that it was valuable content within a teacher preparation program, they felt that DC was not a topic well suited in the course that they coordinated. Consequently, DC was rejected from the course content lineup at that time.

Moreover, I suspected that even if course coordinators had agreed to infuse DC into courses, the individual instructors would find teaching the content, e.g., copyright and fair use, digital footprint, cybersafety, etc., arduous because the topics were outside of their area of expertise and likely outside their area of interest. For these reasons, in the spring of 2011, it appeared a new innovation was needed to prepare teacher candidates to "promote and model digital citizneship and responsibility" (ISTE, 2008, p. 2) within the technology infusion model.

Online modules. In fall 2011, my vision was to create online modules containing DC content. When assigned in an education methods course, the instructor's role would

be that of content facilitator, rather than the more traditional role of content disseminator. Instructors' main responsibility would be to assign the modules and hold students accountable for their learning, rather than to create lectures and learning activities from scratch.

College administrators agreed that this approach would be beneficial because the modules would contain standard content authored by educational technology specialists who were knowledgeable about DC and who had previously taught it to TC. Additionally, using the modules would ease the pressure for course instructors to teach the unfamiliar content. Students would gain the content knowledge through the modules, rather than depending on direct instruction provided by the course instructors who lacked topic expertise and who already felt pressed for time to include their own material. Moreover, course instructors would be able to complete the modules themselves, thus serving as a form of embedded professional development. In fall 2011, the division director granted me permission to begin the long and intensive process of developing four online modules for DC. I was confident that once the modules were developed and course coordinators could view them, they would be more enthusiastic and willing to infuse them into the methods courses.

Evolution of the online modules and support systems. The intervention began simply as four online modules. Although I led their development and implementation, it was a collaborative effort: An educational technology lecturer within the college created some content for the copyright module; a graduate student created videos for two modules; staff, faculty, and students provided input on draft versions of the modules; and,

a staff member redesigned the modules in Moodle, making them more aesthetically pleasing with a cleaner design.

As time passed, the project gradually morphed from modules into a complete instructional unit in which instructors were to assign the modules to be completed outside of class time, then disseminate quizzes and lead higher order follow-up discussions during class. This approach, combining online instruction with face-to-face instruction, is referred to as "blended learning" as well as "flipped learning" which involves assigning basic knowledge learning activities usually leveraging some form of technology, prior to class, and using in-class time for higher level application and critical thinking activities.

In spring 2014, the modules were ready for the first college-wide implementation. It was clear that to implement this approach, instructors would need support, because not all of them understood the assignment details, knew how to get students registered for the modules, or how to grade students' learning. Hence, I offered training and established three support systems for instructors who taught the DC instructional unit: (a) an instructor's guide, (b) a resource folder within instructors' course Blackboard shells, and (c) ongoing support from a technology infusion specialist.

Following the spring 2014 semester, I made minor revisions and improvements to the DC materials, based on instructor feedback. Additional information was added to the Instructor's guide, a few quiz questions were modified to improve clarity, and a graphic element in one module was refined. These revisions were completed in preparation for the fall 2014 semester, when this study was to take place.

Problem of Practice and Purpose of the Project

The literature from the past decade regarding preparing teachers to integrate technology is abundant. In 1999, the US ED began offering Preparing Tomorrow's Teachers to Use Technology (PT3) grants to teacher preparation organizations throughout the nation that focused on better preparing future teachers to effectively integrate technology into the K-12 curriculum. In fact, MLFTC has received multiple PT3 grants since 2001. Despite the high interest level for technology integration and high levels of federal funding aimed at improving effective classroom technology use and implementation of the ISTE Standards•T, surprisingly little research existed that examined *teachers' and students' appropriate and responsible use of technology*, i.e. DC. There was even a greater deficiency in literature when one considered teacher education in conjunction with DC.

Throughout the past three years, I've discussed the topic of DC with numerous faculty members, administrators, and teacher candidates in my own institution, as well as several K-12 school principals. In doing so, it has become even clearer that:

(a) there is a strong need for teacher candidates to be good digital citizens and for in-service teachers to teach their students DC. As one principal of a BYOT school explained, "When I hire new teachers, I need to know that they can teach in a technology-rich classroom and that includes digital citizenship" (anonymous principal, personal communication, 2013);

(b) most teacher preparation faculty members lack expertise regarding DC as well as the desire to study the topic to gain expertise;

(c) since the transition from the stand-alone educational technology course to the technology infusion approach in my institution, instructors have not taught DC unless it was explicitly stated on the master syllabus and considerable support was provided; and

(d) without explicit instruction, teacher candidates have limited knowledge about the legal, responsible, and ethical behaviors of technology use, i.e., DC as applied to their role as a future teacher.

With respect to the final observation, four TC in their sixth semester of the program participated in a focus group held in a previous cycle of the action research project. During the focus group, all four participants stated they had never heard the term "digital citizenship." One teacher candidate's comment illustrated a total misconception of the term. "I have no idea what that is. If I was to take a guess, I would say that through online education you can gain citizenship" (teacher candidate, personal communication, September 23, 2013). Even after the TC in the focus group were given a working definition of the term, they revealed a limited range of knowledge about responsible technology use.

Overall, the evidence suggested the *problem of practice* driving this project was that TC did not understand DC. Hence, they were not likely to consider DC in their own practice when they graduated and became teachers, although it was an expectation articulated in the ISTE Standards•T, and although it was likely that many would be teaching in classrooms with a high number of students using technology. This problem was confounded in the Teachers College where I worked by its change from using a stand-alone educational technology course to an infusion approach in which students

were prepared to meet the ISTE standards in education courses that were taught by instructors whose understanding about DC was limited. As a result, an intervention whereby DC instruction was infused into teaching methods courses in such a way that course instructors need not be experts in the material and where adequate support was provided was needed at my institution. Thus, the *purpose* of this action research project was to address the problem of practice, i.e., the teacher candidates' lack of understanding about DC within the context of a teacher preparation program using a technology infusion approach, with a Technology Infusion Support System (TISS) intervention, examined through quantitative and qualitative data. The intervention and the associated action research study was intended to have an effect in the Teachers College in which I worked and inform my own practice as a technology infusion coordinator in a higher education institution.

Research Questions

This study was conducted to investigate four research questions that stem from the problem and purpose statements. The first research question addresses DC instruction. The second and third research questions focus on changes in teacher candidates' beliefs and intentions, respectively. The fourth research question focuses on validating the use of the Theory of Planned Behavior (TPB) for this inquiry. The research questions were:

RQ 1: How does the TISS influence instruction of digital citizenship in a teacher preparation program?

a. How do instructors use the TISS materials?

b. In what ways is instruction similar or different among instructors?

RQ 2: How and to what extent does instructors' use of the TISS to teach digital citizenship influence teacher candidates' beliefs about promoting and modeling digital citizenship?

a. How and to what extent does it influence teacher candidates' exogenous beliefs from the Theory of Planned Behavior?

b. How and to what extent does it influence teacher candidates' endogenous beliefs from the Theory of Planned Behavior?

RQ 3: How and to what extent does instructors' use of the TISS to teach digital citizenship influence teacher candidates' intention to promote and model digital citizenship?

RQ 4: To what extent do behavioral beliefs, behavioral attitudes, normative beliefs, subjective norms, control beliefs, and perceived behavioral control predict teacher candidates' intention to promote digital citizenship in their future classrooms?

Chapter 2

THEORETICAL PERSPECTIVES AND RESEARCH GUIDING THE PROJECT

Three areas of research guide this study. In the first section of the chapter, topical content of this study is highlighted. Content involves computer ethics and digital citizenship (DC), including the historical aspect of responsible technology use, DC within K-12 education, measures that schools have relied on to keep students safe online, and the perceived effectiveness of those measures. Teacher preparation with respect to DC is also discussed. In the second section, blended learning and flipped learning are reviewed because they serve as the pedagogical approach that underlies the study's intervention. Both terms, blended learning and flipped learning, are defined and their relation is explained. Studies on the effectiveness of both practices are then reviewed. The Theory of Planned Behavior (TPB) serves as the theoretical perspective for study's design and it is explicated in the third section of the chapter. Further, reviews of other relevant studies that have used the theory in similar ways that it will be used in this study—to predict pre-service teachers' intention to use technology will be examined.

Computer Ethics and Digital Citizenship

Computer ethics has been a popular topic of philosophy for the past three decades as computer technology has evolved and usage has revolutionized modern society (Floridi, 1999; Gorniak-Kocikowska, 1996; Luppicini, 2009; Moor, 1985). Moor's (1985) award-winning meta-philosophy paper elucidated the challenge that new technology presents with regard to ethics. "Computers provide us with new capabilities and these in turn give us new choices for action. Often, either no policies for conduct in these situations exist or existing policies seem inadequate" (Moor, p. 266). Moor called

the lack of policy for new computer technology a "policy vacuum" and the collective lack of understanding of the new technology and its ethical use a "conceptual vacuum." Policy vacuums are brought about when technological development outpaces ethics development and there is a collective lack of understanding about possible misuse (Floridi, 1999; Moor, 1985, 2005).

One well-known controversy that forcefully illustrates the conceptual and policy vacuums associated with emerging technology is the Metallica v. Napster lawsuit in 2000. At that time, Metallica, a popular rock band, filed a lawsuit against Napster for violations of copyright and racketeering (Brewer, 2000). Napster was an Internet service that, at the time, allowed its users to share MP3 digital music files. This behavior was not adequately addressed in the copyright laws that originated in the U.S. in 1790 (U.S. Copyright Office, n.d.), considering they were written to address the current technology at that time—the printing press. In 2000, the technology had surpassed the law, causing a policy vacuum for copyright law dealing with digital music file sharing. The conceptual vacuum exacerbated the controversy because there was no agreement on the ethical use of this new technology.

Although conceptual and policy vacuums may be inevitable when it comes to emerging technology, Moor (2005) believed vigilance was critical. He asserted that we must not allow ourselves to become complacent, that we must at least attempt to understand the technology, and anticipate the uses and abuses of new technology to proactively establish policies that will minimize problems of ethical behavior in using new technologies.

According to Ribble (n.d.; 2011), the term *digital citizenship* is used to describe "the norms of appropriate, responsible technology use" (p. 10; para 1). Use of the term can be tracked prior to 2000, although its specific origin is unknown (Ribble, personal communication, December 7, 2013). Evidence suggests the term entered the popular lexicon in 2004 when ISTE published an article in *Learning & Leading with Technology*, entitled "Digital Citizenship: Addressing Appropriate Technology Behavior" (Ribble, Bailey, & Ross, 2004).

The term and its definition were derived from the idea that computer users are inhabitants, or "citizens" of the digital society, and as such, they have a responsibility to behave appropriately when using technology (Hollandsworth et al., 2011; Ribble, 2011). Dictionary.com (n.d.) defines *citizenship* as "the character of an individual viewed as a member of society; behavior in terms of the duties, obligations, and functions of a citizen," which further suggests that individuals should be expected to conduct themselves responsibly and ethically within the digital society. As it is used today, the term is not limited to the field of education, though it seems to be common when referring to responsible technology use by children. In an online video, Stephen Balkam (2009), CEO of the Family Online Safety Institute, emphasized the following about DC:

> We're not just talking about keeping kids safe from 'the bad stuff'—the bad content and the bad people on the Internet. But, we're talking about safety to enable them and to empower them to do the great things online—to access the world's information, collaborate with kids in Russia or South America on a school project, to immerse themselves in this digital world, providing of course they keep a balance and go out in the real physical world too. So it's safety with a

purpose, safety to enable them to have the opportunity to form and create relationships online that are healthy, that are productive, and ultimately will become the foundation for what we call digital citizenship.

To help technology users further understand what comprised DC, Ribble (2011; n.d.) delineated nine elements of DC. The elements and brief descriptions of each follow:

(a) Digital Access: Full electronic participation in society

(b) Digital Commerce: Electronic buying and selling of goods

(c) Digital Communication: Electronic exchange of information

(d) Digital Literacy: Process of teaching and learning about technology and the use of technology

(e) Digital Etiquette: Electronic standards of conduct or procedure

(f) Digital Law: Electronic responsibility for actions and deeds

(g) Digital Rights and Responsibilities: Those freedoms extended to everyone in a digital technology world

(h) Digital Health and Wellness: Physical and psychological well-being in a digital technology world

(i) Digital Security: Electronic precautions to guarantee safety (p.11)

Digital citizenship efforts in K-12. Although online safety is not synonymous with DC, it is an important component, and efforts to keep students safe online have heightened awareness for the importance of responsible technology use. Educators and policy makers have paid some attention to matters of online safety for over a decade because computers have become more commonplace in classrooms and student Internet

use has been on the rise. The following section includes some of these efforts with respect to policy and practice to keep children safe online.

Children's Internet Protection Act. The Children's Internet Protection Act (CIPA) was enacted in 2000 as a response to concerns about children's access to obscene and harmful content through the Internet, and is still relevant today (American Library Association, n.d.; FCC, 2013). CIPA requires that educational institutions receiving discounted Internet service through E-rate, put certain Internet safety procedures in place. E-rate is a universal service program that provides significant discounts for telecommunications and Internet services to schools and libraries (US ED, n.d.-b). Originally, CIPA required an educational institution's Internet Safety Policy to accomplish two things. First, the policy was enacted to protect students against visual depictions that are obscene, pornographic, or otherwise harmful to minors. Second, the policy called on schools to account for "monitoring the online activities of minors" (FCC, p. 2). Then in 2008, the Protecting Children in the 21st Century Act was passed, leading to a CIPA amendment. In addition to the two original Internet Safety Policy requirements, the amendment instructed E-rate applicants to certify their efforts in "educating minors about appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms and cyberbullying awareness and response" (FCC, p. 3).

Evidence of CIPA has been, and continues to be observed in schools and districts nationwide through the wide adoption of two measures that facilitate online safety and appropriate use. They are: (a) Internet filtering, and (b) acceptable use policies.

Filtering. As of 2013, CIPA required educational institutions who apply for E-rate to use some kind of system to "block or filter Internet access to pictures that are: (a) obscene; (b) child pornography; or (c) harmful to minors" (FCC, 2013, p. 1). Perhaps as a result of the requirement, today almost all schools use an Internet filter to control Internet access (Cable in the Classroom, 2012; Hollandsworth et al., 2011; Ribble, 2011). These automated filtering systems have been somewhat effective at blocking inappropriate content from reaching classrooms, but according to Hollandsworth, et al. (2011) and Ribble (n.d.), the sole use of filtering has been both inadequate in protecting students from accessing harmful content and incongruous with teachers' desire to use online content for instruction. The recent literature has presented three primary arguments against the sole use of filtering: (a) an Internet filter is not foolproof; (b) students work on unfiltered networks outside of the school environment; and (c) internet filters block valuable content that could be used in the classroom. These shortcomings render it imperative that teachers and students understand how to use technology responsibly and ethically.

An Internet filter is not foolproof. Most Internet filters use either a "blacklist" system or a keyword system to block content. Blacklists work by blocking all material that a system administrator designates as inappropriate. A keyword system restricts access to sites that are tagged with objectionable words. These systems are automated through computer software, which makes it impossible to block every website with questionable content. Regarding filters, Amanda Lenhardt, a researcher at the Pew Internet and American Life Project stated, "they're not perfect, and it's hard to see how they ever really would be" (cited in Gilbert & Olsen, n.d., para. 7). Students working

within a filtered Internet system can still access inappropriate content, so it is better that they are equipped with a code of ethics and know-how to access appropriate content online. Fondren stated, "If we filter out everything in a school, we lose that teaching moment. Filters are not foolproof; we need to educate students on the safe use of the Internet" (cited in Sturgeon, 2008, p. 5).

Students work on unfiltered networks outside of the school environment. Even if a school has a well-functioning filter, educators must consider their students' Internet access at home or on another network that is not filtered, as well as how to best prepare students with college and career readiness skills with regard to appropriate technology use in an unfiltered world. Hollandsworth et al. (2011) contended that instead of strict attempts to block students from Internet content, educators can (and should) teach DC by discussing acceptable use issues as they arise in a safe classroom environment with teacher facilitation. The goal is to develop students who are responsible technology users now and in the future.

Internet filters block valuable content that could be used in the classroom. A common complaint of educators has been that useful classroom content, including videos and instructional websites is blocked by their school's filtering system (Project Tomorrow, 2013a). One library media specialist responding to a survey about DC stated, "Our county protects the students well with our filter system but it also keeps the students out of some great sites and teaching tools" (Hollandsworth et al., 2011, p. 45). Additionally, Notley (2008) asserted the following about filters required by the Australian government:

> While governments can provide parents with a PC filtering system, encourage them to block uses of online networks and ensure that all public schools do the same, this is likely to be denying some young people crucial opportunities to learn to use online networks in safe, meaningful and effective ways. (p. 13)

Acceptable use policy. An acceptable use policy (AUP) is a set of rules that define how technology is to be used within a corporation, educational institution, or other organization. AUPs intend to keep technology users from engaging in harmful or illegal activities, as well as to protect the network and technology assets (Fitzer & Peterson, 2002; Ribble, 2011). Their use in schools and districts has become standard practice; it is common for a school to include an AUP document in the paperwork given to parents at the beginning of each school year to sign and return, signifying that they have read and understand the rules, and give permission for their child to access the Internet at school. In some states, such as Kentucky, state law requires school districts to establish policies for technology use (Jury, n.d.). A 2011 survey of library media specialists representing fourteen states found that 86% of schools rely on AUPs to control Internet use (Hollandsworth et al., 2011).

A simple Google search on "creating an acceptable use policy" reveals an abundance of information and suggestions about how to do so. For example, the Kentucky Department of Education has a page on their website called "Guidelines for Creating Acceptable Use Policies" which lists best practices for appropriate use of technology and AUP considerations for districts (Jury, n.d.). The website contains information about how to create an AUP, recommended components of an AUP, specific rules to be included for online security of personal information, and more.

However, having an AUP does not of itself solve acceptable technology use problems in schools and districts. It seems that too often, AUPs have been developed, but they have not been implemented appropriately. Employing an AUP to specify rules of technology use does not work unless it is enforced (Fitzer & Peterson, 2002; Hollandsworth et al., 2011; Ribble, 2011).

Multiple findings suggest that as schools continue to increase technology and seek policies to guide its use, they should involve teachers, administrators, technology leaders, parents, and community members to help define acceptable use for their school community (Fitzer & Peterson, 2002; Hollandsworth et al., 2011; Jury, n.d.; Ribble, 2011). Additionally, schools should provide teachers with professional development on DC so they can practice rules of appropriate use themselves, as well as teach their students to be good digital citizens.

Current technology use and misuse. In 2005, Moor defined *technological revolution* as a situation in which technological development leads to an enormous social effect. He also presented a hypothesis called *Moor's Law* that states, "as technological revolutions increase their social impact, ethical problems increase" (Moor, 2005, p. 117). Today, we see this "law" realized as technology use increases at breakneck speed, revolutionizing day-to-day life for both adults and teens. It was estimated that in 2013, 77-78% of teens owned a cell phone, and of those, almost half were smart phones (FOSI, 2012; Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). The percentage of teens who owned a smart phone increased from 23% in 2011 to 37% in 2013 (Madden et al., 2013). Additionally, over 90% of teens had access to a computer (Madden et al., 2013). Even

teens living in low socioeconomic households regularly used cell phones to access the Internet (Madden et al., 2013).

Moreover, a report by FOSI (2012) stated that children and teens use technology to access information, socialize, and to create and share information with others. In 2012, 91% of teens with smartphones accessed social networking sites and 26% of children ages 9-16 had their social media profile set to "public" (FOSI, 2012). Of Internet-using teens, 27% recorded and uploaded video to the Internet (FOSI, 2012).

As Moor's law would suggest, problems stemming from inappropriate use of technology have also increased. In 2011, reports indicated 88% of teens who used social media reported witnessing cruel behavior on social media sites (Lenhart et al., 2011) and the media has captured several stories in the last decade chronicling technology misuse in the form of cyberbullying (Lara & Naval, 2009), sharing too much personal information, violation of copyright law, and online security issues. Further, parents have voiced concern about their children's use and possible misuse of technology. In response to a 2012 survey that asked parents how important is was for their children to learn about DC issues, approximately 70% of parents said that *Internet safety and security* was "very important" and 67% indicated that *ethical and responsible online behavior* was "very important." Additionally, 80% of parents were concerned about how teens treat each other online or through cell phone communication (Cable in the Classroom, 2012). To date, few rules concerning ethical computer behavior have been established and it has been suggested that U.S. schools are not preparing students for the digital age (Hollandsworth et al., 2011; Ribble, 2011).

Teachers, administrators, and curriculum. Findings from a national DC survey revealed that overall, teachers and school administrators lacked awareness of DC issues (Hollandsworth et al., 2011). The survey was administered to over 500 education professionals, most of whom were library media specialists, who responded to questions about DC within their schools. Survey respondents represented fourteen states in the US.

Only 55% of the survey respondents believed their schools' administrators were aware of DC issues and slightly less believed the teachers with whom they worked possessed adequate DC awareness. The authors of the study asserted that relying on AUPs to control computer behavior was inadequate and therefore teachers and school administrators needed to better understand DC so that all members of the school community could support a strong and healthy digital community. Moreover, for educators and parents to productively participate in dialogue about DC, they needed professional development to bring them up to speed on matters of technology and DC. For example, those who were establishing technology use policies needed to understand the limitations of filters so they can effectively participate in seeking DC solutions for their school (Hollandsworth et al., 2011; Ribble, 2011).

In terms of teaching DC to students, survey respondents indicated that plagiarism and copyright were taught at their school, 95% and 94%, respectively. However, other DC topics did not fare as well. About three-fourths said their students were taught online safety issues such as sharing personal information online, and two-thirds said their schools taught students about cyberbullying. It should be noted that presidents of state library media and educational technology associations disseminated the online survey from which these data were collected. Participation was voluntary and respondents were

predominantly library media specialists, which may have accounted for inflated results. Likely, the individuals who took the survey cared about and therefore taught DC topics; perhaps those who cared less about DC did not respond. For these reasons, it seems plausible that fewer schools have taught DC than what this study suggested.

Despite the 2008 addendum to CIPA that requires schools that receive discounted telecommunications and Internet access via E-rate to provide DC instruction to students, evidence suggested implementation has fallen short in many schools throughout the nation (Hollandsworth et al., 2011). The extent to which DC has been taught as well as the manner in which it has been taught has varied greatly among schools across the nation, suggesting that schools' interpretation of this requirement itself has varied. Some schools have taught aspects of DC as a "one-time" course solely focused on DC, whereas other schools have integrated DC topics into coursework at certain grade levels. Some have not focused much on DC at all.

Two questions have been driving the conversations about teaching DC in school. First, when should students begin learning DC? Some have suggested that DC instruction should start in kindergarten and continue throughout high school (Hollandsworth et al., 2011; Jury, n.d.). Nevertheless, it appears that few schools have used such a comprehensive approach. Second, is DC best taught through a curriculum that is implemented by library media specialists, or integrated throughout lessons in regular K-12 classrooms that involve Internet use (Hollandsworth et al., 2011; Jury, n.d.; Sturgeon, 2008)? When asked about DC instruction in their own school settings, some educators stated that it was not well addressed and further contended that it will not be taken seriously until it is a tested standard (Hollandsworth et al., 2011).

Digital citizenship in Australia. In 2008, an Australian government initiative called "The Digital Education Revolution" launched several improvements to technology access and included a one-to-one program for students in grades nine through twelve. In 2010, a DC program commenced that aimed to teach tenth grade students to be safe and constructive online citizens. The curriculum included six key domains and was available online for anyone to use. Designed for students aged fifteen through sixteen, the curriculum included teaching materials and parent information. At the end of 2010, a mixed methods study was conducted to evaluate the effectiveness of the curriculum (O'Brien & Stavert, 2011). Data from student surveys and focus groups, school logs of related incidents, and observation and monitoring of hits on social networking sites during the trial indicated that the modules had considerable effects on student knowledge and behavior related to DC. Between 60-80% of students who participated in the study agreed they would be more careful about netiquette and digital footprint, as a result of having taken the modules; over 80% agreed that they would be more careful about security. Overall, the results indicated that teaching DC using the identified curriculum had positive outcomes for students' learning to behave safely and responsibly when using social networking and other new technologies (O'Brien & Stavert, 2011). Further, the authors averred:

> The concept of digital citizenship was barely relevant a decade ago. Now with students of all ages spending significant time in both the real and virtual worlds, educators are starting to identify a new collective responsibility–to teach our young people what it means to be a good digital citizen so as to help shape students' behaviour in the virtual world. (p. 115)

The study also found general agreement among teachers and parents that the DC lessons should start much earlier than grade ten. Although some indicated they thought kindergarten was the proper place to begin, there was strong support for starting in grades five or six. In 2011, the curriculum expanded to include lessons for students aged 5-16. As of March 2015, the full curriculum still remains online and free of charge at http://www.digitalcitizenship.nsw.edu.au/.

Teacher Preparation in the Digital Age

The Speak Up Survey is an annual national educational technology survey open to educators, parents, students, and pre-service teachers. Findings from the survey are available on both a local and national level to inform educational technology discussions and decision-making (Project Tomorrow, 2013-b). In 2012, 1,351 pre-service teachers responded to the Speak Up Survey. One key finding indicated that principals held high expectations for future teachers' use of technology, but pre-service teachers' experiences with technology in teacher preparation programs did not align with that expectation. For example, approximately 45% of principals indicated their expectation of future teachers to incorporate student owned mobile devices in the classroom, although less than 20% of pre-service teachers indicated learning this in their preparation program.

Today, many Colleges of Education, including Mary Lou Fulton Teachers College at Arizona State University align their programs to professional teaching standards, which indicate the knowledge, behaviors, and skills expected of K-12 teachers. Two sets of professional standards—the Interstate Teacher Assessment and Support Consortium (InTASC) standards and the International Society for Technology in Education standards for teachers (ISTE Standards • T) guide the curriculum in MLFTC.

Both sets of standards explicitly specify teacher competencies regarding responsible technology use and acknowledge DC as an important understanding for teachers and their students (Council of Chief State School Officers, 2011; International Society for Technology in Education, 2008).

ISTE standards. The International Society for Technology in Education (ISTE) is a membership organization comprised of over 100,000 education professionals that aims to advance educational technology by providing information, professional development, networking opportunities, and advocacy in the field. ISTE is also the author of both the previous and the current National Education Technology Standards for Teachers (ISTE Standards • T), Administrators (ISTE Standards • A), Students (ISTE Standards • S), Coaches (ISTE Standards • C), and Computer Science Educators (ISTE Standards • CSE).

The current set of ISTE Standards • T (2008) is comprised of five standards further specified with four performance indicators that articulate how teachers should apply technology within their practice to be effective in a global and connected society. One of ISTE's five standards is devoted solely to DC, which calls on teachers to promote and model responsible technology use, it as noted in the following:

> Promote and Model Digital Citizenship and Responsibility: Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.
>
> a. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources

b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources

c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information

d. Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools (Standard 4, p. 2)

InTASC standards. The Council of Chief State School Officers (CCSSO), through the Interstate Teacher Assessment and Support Consortium (InTASC), offers the current InTASC teaching standards which outline what teachers should know and be able to do to adequately prepare K-12 students for college and career success (CCSSO, 2011). The InTASC Model Core Teaching Standards define the skills and competencies for all teachers across K-12 grade levels and content areas. This set of standards does not contain a standard devoted solely to technology or DC. Instead, "[…] cross-disciplinary skills (e.g., communication, collaboration, critical thinking, and the use of technology) are woven throughout the teaching standards because of their importance for learners" (CCSSO, p. 4). DC indicators are entwined throughout the set of ten standards, including three performance indicators for Standard #3 Learning Environments, one for Standard #5 Application of Content, and three for Standard #9 Professional Learning and Ethical Practice. InTASC standards (2011) with performance indicators that express DC are as follows:

Standard #3: Learning Environments

3(g) The teacher promotes responsible learner use of interactive technologies to extend the possibilities for learning locally and globally.

3(m) The teacher knows how to use technologies and how to guide learners to apply them in appropriate, safe, and effective ways.

3(q) The teacher seeks to foster respectful communication among all members of the learning community (Standard 3, p. 12).

Standard #5: Application of Content

5(k) The teacher understands the demands of accessing and managing information as well as how to evaluate issues of ethics and quality related to information and its use (Standard 5, p. 14).

Standard #9: Professional Learning and Ethical Practice

9(f) The teacher advocates, models, and teaches safe, legal, and ethical use of information and technology including appropriate documentation of sources and respect for others in the use of social media.

9(j) The teacher understands laws related to learners' rights and teacher responsibilities (e.g., for educational equity, appropriate education for learners with disabilities, confidentiality, privacy, appropriate treatment of learners, reporting in situations related to possible child abuse).

9(o) The teacher understands the expectations of the profession including codes of ethics, professional standards of practice, and relevant law and policy (Standard 9, p. 18).

Blended Learning

Technology innovation within the past decade has opened new pathways for teaching and learning. For example, today, learners can access a variety of instructional materials through the Internet, making it possible to take classes fully online. Educational organizations and individual teachers also use the Internet and online technology tools to enhance face-to-face instruction. This "blend" of face-to-face and online instruction is a relatively new phenomenon that has emerged at a number of educational institutions in various ways (US ED, 2010-b).

The Innosight Institute (now called the Clay Christensen Institute) saw a need to develop a common language for new models of instruction afforded by technology to make it easier for people to talk about and continue to advance the field of online and "blended" learning. Staker and Horn (2012) examined over 80 educational blended learning programs and received input about various models from approximately 100 educators at the International Association for K-12 Online Learning's (iNACOL) Virtual School Symposium. In 2011, they released a paper that offered a definition of blended learning as well as a taxonomy of various blended learning models. Staker and Horn (2012) defined blended learning as:

> A formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace; and at least in part in a supervised brick-and-mortar location away from home (p. 3).

Then, in 2013, the Clay Christensen Institute revised the definition of blended learning to incorporate a new component, "the modalities along each student's learning

path within a course or subject are connected to provide an integrated learning experience" (Clay Christensen Institute, n.d., para. on blended learning). Although this was not part of Staker and Horn's 2012 definition, the authors alluded to the connection between modalities in their original paper stating, "What the students learn online informs what they learn face-to-face, and vice versa" (Staker & Horn, 2012, p. 4).

The United States Department of Education conducted a meta-analysis of online learning studies (US ED, 2010-b). The analysis included twenty-seven studies comparing purely online with purely face-to-face instruction and twenty-three studies comparing purely face-to-face with blended learning instruction. Findings of the meta-analysis revealed a statistically significant difference favoring blended learning over purely face-to-face instruction. However, the authors cautioned individuals against concluding that blended learning in and of itself is a superior learning format, despite the strong support for blended learning based on the studies reviewed. They noted that the studies that favored blended learning compared instructional models where several other differences in the content and pedagogy of the blended learning experiences could have accounted for the difference in learning gains. For example, some blended learning models in the studies offered additional instructional time and learning elements that were not offered in the purely face-to-face instruction to which they were compared.

Flipped Learning

The term "flipped learning" has grown in popularity among K-12 educators over the past few years, which may be attributed to the work of two high school science teachers, Bergman and Sams who began creating video lectures in 2007 for students who were missing class due to extracurricular activities (Bergman & Sams, 2012; Tucker,

2012). Students in Bergman and Sam's classes watched video lectures outside of class to gain content knowledge that they otherwise missed due to being absent. Eventually, Bergman and Sams (2012) realized that if all students watched the videos before class, in-class time would be available for application and practice activities. Over time, this model of instruction became known as flipped learning—learning activities intended to transmit basic knowledge (e.g., lecturing) are done prior to class, usually using some form of technology, which allows for in-class activities to include higher level application and critical thinking.

Flipped learning was one of the models identified in Staker and Horn's (2012) taxonomy of blended learning models in K-12 education. The taxonomy delineated four categories of blended learning that encompass most of the programs in K-12 schools today. The four models identified were: flex model, self-blend model, enriched-virtual model, and rotation model. According to the definitions offered in the taxonomy, programs using the *flex model* deliver instruction online and offer support by a teacher-of-record on site. Students shift among online and face-to-face learning modalities on an individual and fluid schedule. In the *self-blend model*, students supplement their traditional face-to-face courses with at least one fully online course. The *enriched-virtual model* is a whole-school program in which students are required to participate in both face-to-face and online modalities for each class. One example is a school in which the first session of each course is taken in-person and the remainder of the learning takes place online. In the *rotation model*, teachers direct students to rotate between modalities, on a fixed schedule that has been determined by the teacher.

The rotation model is composed of four sub-categories: the *station-rotation model* in which students rotate through various stations in class that have been pre-determined by the teacher; the *lab-rotation model* in which students divide their time among online and face-to-face learning for a given course, similar to the enriched-virtual model, except within a single class rather than a whole-school program; *flipped-classroom model* in which teachers deliver content online outside of school time and they facilitate guided practice or projects during face-to-face class sessions; and *individual-rotation model*, in which students rotate through various stations, including at least one online station, per a schedule that has been individualized for each student. Staker and Horn (2012) postulated that the other three models will also eventually have sub-categories. See Figure 1 for an illustration of the blended learning models included in the current taxonomy.

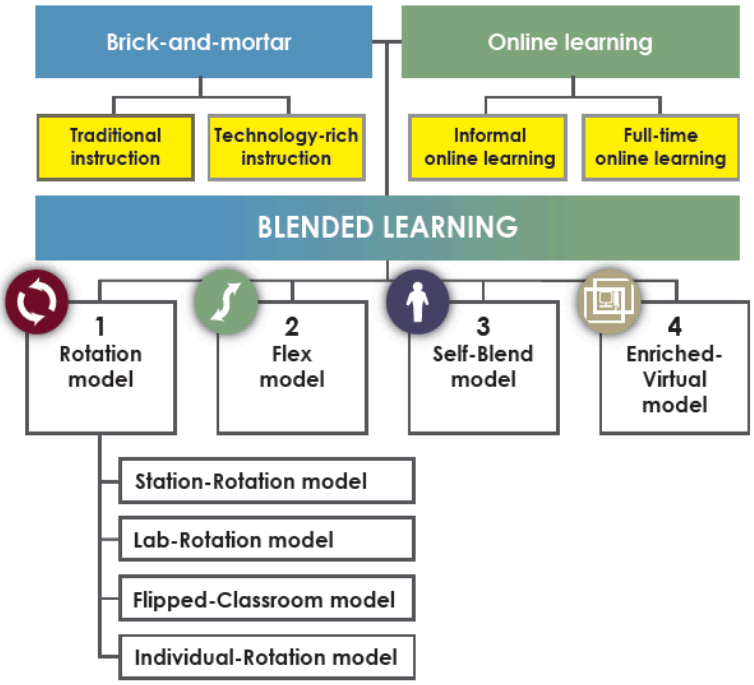

Figure 1. Taxonomy of Blended Learning Models in Relation to Other Education Practices

Flipped learning in higher education. According to Berrett (2012), the recent surge of interest in flipped learning in higher education stemmed from the confluence of various factors. First, the economic landscape made decreasing college class sizes and creating low student to professor ratios unattainable. That hundreds of students can fill a college lecture hall and passively receive information from the professor, a subject-matter expert, has contributed to the survival of lecture as the primary instructional strategy in higher education. However, recently policy makers have called for more accountability for student learning in higher education. Additionally, technological innovation has made it possible to offer cost-effective instruction online. As the expectations for higher

education institutions to increase performance with decreased resources grew, some looked to flipped learning to make large classes in traditional lecture halls more effective. Michael S. Palmer, an associate professor of chemistry and assistant director of the Teaching Resource Center at the University of Virginia declared, "I see a paradigm shift and it's coming soon. Content is not going to be the thing we do. We're going to help unpack that content" (cited in Berrett, 2012, p. 2)

Flipped learning in higher education emerged from several different roots (Brame, 2013). For instance, in their book, *Effective Grading* (1998), Barbara Walvoord and Virginia Johnson Anderson proposed a model in which students gain *first-exposure learning* prior to class and engage in higher order *processing* in class. Similarly, Maureen Lage, Glenn Platt, and Michael Treglia introduced the idea of the *Inverted Classroom* (2000) in which students were given learning materials such as textbook readings, video lectures, and PowerPoint presentations prior to class. A third comparable model, *Peer Instruction* (Mazur, 2009, Crouch & Mazur, 2001), is an approach that has been used by a physics professor at Harvard University for several years. Mazur has required his students to prepare for class prior to it; then during class, he has presented students with questions that necessitate higher order thinking and application. This strategy has allowed Mazur to use these questions to encourage critical discussion among students, and from the discussion, to identify and clarify student misconceptions.

Though they had different names and different origins, these practices all shared a common feature—students came to class equipped with basic information, which enabled engagement in higher-level activities in class (Berrett, 2012). "The immediacy of teaching in this way enables students' misconceptions to be corrected well before they

emerge on a midterm or final exam. The result, according to a growing body of research, is more learning" (Berrett, 2012, p. 1).

Although of the preponderance of evidence supported flipped learning in higher education, some concerns have also been expressed. Melissa D. Franklin, chair of Harvard's Physics Department, claimed that not all students have liked the flipped learning style of instruction (as cited in Berrett, 2012). Further, Crouch and Mazur (2001) agreed that some students were resistant to being taught in a nontraditional manner and hypothesized that the resistance may be due to forcing students to be active, rather than passive class participants (Berrett, 2012). Franklin was also concerned about the demands on faculty when adopting a flipped learning model, claiming that transforming a traditional class to a flipped learning model was labor intensive for faculty in terms of development and implementation (Berrett, 2012).

Research on effectiveness of the flipped learning approach. Studies on Crouch and Mazur's (2001) Peer Instruction model of instruction (a model closely related to flipped learning in higher education) yielded data that supported an approach whereby students come to class equipped with basic knowledge and the instructor uses higher order questioning techniques in class. In a ten-year study on the use of Peer Instruction in their introductory physics classes at Harvard, Crouch and Mazur (2001) found dramatic gains in students' scores on the Force Concept Inventory, the Mechanics Baseline test, and performance on quantitative problems, using Peer Instruction. Moreover, in the ten-year period from 1991 to 2001, as the authors continually revised their implementation of Peer Instruction to improve students' pre-class reading activity and in-class student engagement strategies, student learning increased.

Shenandoah University's School of Pharmacy conducted a study on student learning in flipped classrooms (Pierce, 2013). The researchers studied an intervention in practice, which was a flipped classroom instructional model for one of nine required courses within the pharmacy program. Students who received the intervention were instructed to listen to lectures prior to class, and then engage in application level activities during class. Student learning data from this class were compared to data from a previous section of the course, taught by the same instructor using a "non-flipped" approach. Findings supported use of the flipped learning model; student performance on assessments increased in the flipped learning classroom overall, whereas there were decreases on specific exam questions that were not addressed by the intervention.

According to Karen Rhea, a lecturer and director of the introductory mathematics program at the University of Michigan, calculus classes taught there have been "flipped" since the mid-1990s. Students in Rhea's class completed readings before class; then in class, they solved problems in groups and presented to classmates. Rhea explained that the benefit of asking students to solve problems in class was the ability of the instructor to clarify student misunderstandings as they arose (Berrett, 2012). In 2008, students at the University of Michigan took concept inventories before they began the calculus course and after they completed it, which allowed computation of the difference relative to the maximum gain they could have attained. Results showed learning gains for students in the flipped courses at about twice the rate of those in traditional lectures at other institutions who took the same inventories.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) explains the relation between individuals' beliefs, intentions, and behaviors (Ajzen, 1985; n.d.). The TPB is diagrammatically represented in Figure 2. See Figure 2. Icek Ajzen proposed the theory in 1985 as an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975). The Theory of Reasoned Action proposed that having a more positive attitude toward a behavior and a stronger belief that performing the behavior is important to others would lead to a stronger intention to perform the behavior and increase the likelihood of that behavior. TPB expanded the Theory of Reasoned Action by adding a third construct linking beliefs and behavior, the belief that an individual is capable of performing the behavior, which Ajzen called perceived behavioral control.

According to the TPB, three endogenous beliefs influence an individual's intention to perform a behavior. They are: beliefs about the degree to which a behavior produces positive or negative outcomes (attitudes toward the behavior), social pressure to perform the behavior (subjective norm), and perceptions about one's ability to perform the behavior (perceived behavioral control). In turn, exogenous beliefs influence the endogenous beliefs: behavioral beliefs influence attitudes toward a behavior; normative beliefs induce subjective norms; and control beliefs prompt perceived behavioral control. Thus, individuals' attitudes toward a behavior, subjective norms, and control beliefs influence the formation of a behavioral intention. Further, the theory posits that more positive attitudes, stronger subjective norms, and greater control beliefs result in a stronger behavioral intention. Finally, the theory suggests that an individual who holds

stronger intentions and who has the ability to do so is more likely to perform the behavior.

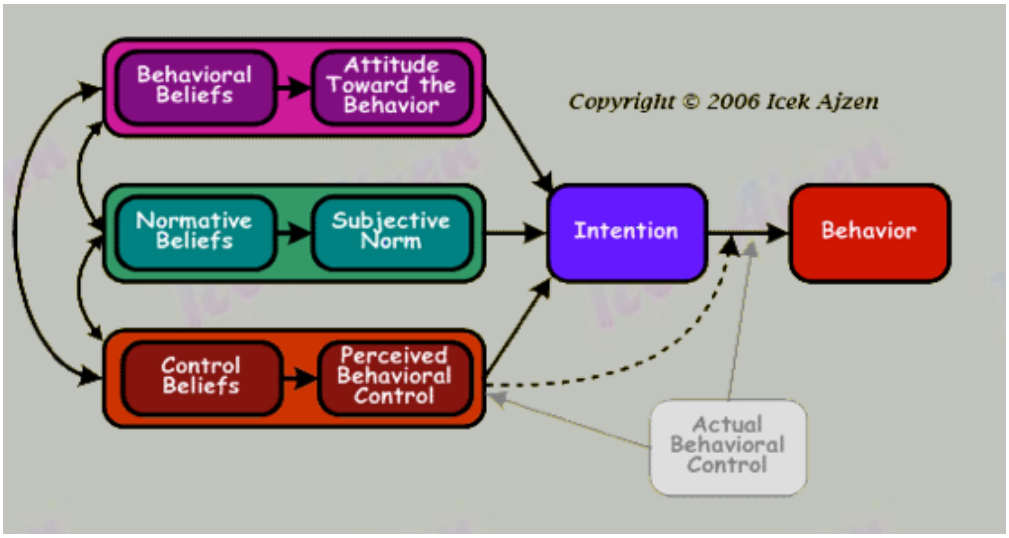

Figure 2. Graphic representation of the Theory of Planned Behavior from Ajzen's website (n.d.). Used by permission.

Studies that have used the Theory of Planned Behavior. The TBP has been widely accepted as a model linking beliefs, intentions, and behaviors. It has been applied across many fields such as healthcare, advertising and marketing, and technology-based services to better understand and predict people's intentions. The theory has started to emerge in the field of education, predominantly in the area of classroom technology use (Sadaf, Newby, & Ertner, 2012; Shiue, 2007; Sugar, Crawley & Fine, 2004; Teo & Tan, 2012).

Validation of the tool. Although some educational researchers have used TPB to predict teachers' use of technology, its use in the field has been limited. For that reason, Teo and Tan (2012) conducted a validation study of the TPB to explain pre-service

teachers' acceptance of technology and intention to use technology. The researchers conducted a quantitative study with 293 pre-service teachers, who took an online survey with previously validated items addressing the three constructs said to predict intention—attitude towards computer use, subjective norms, and perceived behavioral control, as well as behavioral intention. All three constructs were found to significantly influence behavioral intention to use technology, supporting the validation of the theory to explain pre-service teachers' technology acceptance and their intention to use technology.

Similarly, findings from a study conducted by Sadaf, Newby, and Ertmer (2012) supported using TPB to examine teachers' intentions to use Web 2.0 technologies. Study participants were pre-service teachers taking an educational technology course. Findings suggested pre-service teachers' beliefs about the value of the technology and its ability to meet their students' needs, and their self-efficacy in using the technology influenced their intention to use Web. 2.0 technologies. The survey results were consistent with TPB because they were predictive of intention to use Web 2.0 technologies. Results from the study also found that pre-service teachers named their future students, administrators, and colleagues as those who would influence their normative beliefs with respect to technology use. And, finally, these prospective teachers were more likely to be influenced by their students' expectations about using technology than the expectations of their administrators.

In a 2007 study of prospective teachers, Andersen and Maninger found that self-efficacy beliefs, value beliefs, and gender were the three strongest predictors of intention to use technology in their future classrooms. Although they did not use the TPB to frame the study, their findings lend support to the usefulness of the TPB because two of the

three most useful predictors from their study, self-efficacy beliefs and value beliefs, are analogous to control beliefs and behavioral beliefs from the TPB.

In 2007, Shiue examined 242 secondary science teachers' use of various technology tools for class preparation. Participants took surveys containing questions about their beliefs and intentions to use technology to prepare for class, based on the TPB framework. As a result of the survey and observed data analysis, the researcher determined that the TPB model was too simplistic to accurately illustrate the determinants for technology use. Rather, Shiue contended, "Teachers' use of instructional technology is influenced by a 'tangled web' of determinants […]" (Shiue, 2007, p. 441) and thus, the model was revised to include several additional paths beyond those offered by the TPB model. Data from the study also suggested that subjective norms and perceived behavioral control had little or no effect on teachers' intention to use technology or actual technology use. For these reasons, Shiue rejected the TPB model with respect to explaining teachers' technology use.

Although Shiue was diligent in confirming reliability of his survey items, the researcher overlooked one key step in the survey development process. According to Ajzen (n.d.), researchers administering TPB surveys should first elicit salient beliefs from a group of participants representative of the research population to develop appropriate direct measure survey items to ensure validity. The identified group should be asked a series of questions, designed to elicit behavioral outcomes, normative referents, and control factors, for instance, *Who would approve of your using technology for class preparation?* The responses to the questions should then guide the development of semantic differential items for the research sample survey. For example, if several

individuals answered students' parents in response to who would approve of their technology use, then an item such as *The parents of students in my class think that I should use technology for class preparation* would be included on the direct measure survey instrument. Rather than gathering this information from a representative population, Shiue adapted survey items from several other studies (Baylor & Ritchie, 2002; Compeau, Huggins, & Huff, 1995; Davis, Bagozzi, & Warshaw, 1989; Taylor & Todd, 1995), whose participants may not have been representative of the study population. Therefore, although the items on the survey were reliable, it was unclear whether the items were appropriate (i.e., valid) for the study population. Had Shiue elicited salient beliefs of a representative population, the survey items would have likely been different and thus, the TPB framework may have been shown to be a better fit to the data.

Strength of Predictors. The TPB is comprised of seven major constructs, three of which represent exogenous beliefs—behavioral beliefs, normative beliefs, and control beliefs; three of which represent endogenous beliefs based on the exogenous beliefs—attitudes toward the behavior, subjective norms, and perceived behavioral control; and the seventh is intention to perform the behavior. Although studies have shown attitudes toward the behavior, subjective norms, and perceived behavioral control to have significant influence on behavioral intention regarding teachers' use of technology, attitude toward the behavior has had the greatest influence (Sugar, Crawley & Fine, 2004; Teo & Tan, 2012). As they performed a validation study of TPB on teachers' computer use, Teo and Tan (2012) analyzed survey data from 293 pre-service teachers studying in Singapore. The online survey included demographic items, as well as questions related

to their behavioral intentions to use computers, attitudes toward computer use, subjective norms, and perceived behavioral control. The data were analyzed using a structural equation modeling approach to find relationships among the constructs. Results of the study suggested attitude toward computer use is the strongest predictor of teachers' intention to use technology, followed by perceived behavioral control, and then subjective norms.

Another study found that perceived abilities to use software, self-efficacy, value beliefs, computer access, and gender all influenced teachers' computer use (Andersen & Maninger, 2007). Although TPB was not used as a framework in this study, the results bolstered Teo and Tan's (2012) assertion that attitudes toward the behavior (i.e., value beliefs) and perceived behavioral control (i.e., self-efficacy) are strong predictors of intention to use instructional technology.

These studies have strong implications for teacher educators. Those who aim to prepare pre-service teachers to use technology might look to strategies intended to influence pre-service teachers' attitudes and beliefs about the value of instructional technology, as well as bolster their confidence in doing so. Andersen and Maninger (2007) stated, "While teacher educators cannot directly affect external factors that may impact their students' future technology use, they can attempt to influence intrinsic factors such as preservice teachers' abilities, beliefs, and intentions regarding integrating technology in classrooms" (p. 152).

Implications for the Study based on the Literature

Three main areas of literature have been explored and discussed—computer ethics and DC, blended and flipped learning, and the Theory of Planned Behavior. Each of these topics pertained to this study in a different way.

The responsible use of technology, i.e., digital citizenship (DC) was the content for the intervention in this study. The review of literature revealed that computer ethics has been a topic of discussion for the last few decades; however, it is a relatively new topic in education. One study, whose participants were limited to members of state library and media associations revealed that teachers and administrators need to know more about DC to effectively participate in or guide any initiatives for improving responsible technology use. There has yet to be any additional national data identifying trends in how schools and districts are handling computer ethics and ensuring that its teachers and students are meeting the standard for DC. Given the recent surge in technology use in K-12 schools and districts, and the likelihood that student technology use will continue in an upward manner, it is reasonable to expect teacher preparation programs to guide future teachers in their use of classroom technology. As both the InTASC and ISTE•T standards indicate, responsible technology use is a priority that all teachers should promote and model. For these reasons, this study's intervention aimed to teach DC to students who were preparing to become teachers within an undergraduate teacher preparation program, strengthening their intention to promote and model it in their future classrooms.

The literature on blended learning and flipped learning related to this study, in that the study's intervention capitalized on a model of blended learning. The study took

place in traditional classes that met in-person once or twice per week for a fifteen-week semester. The intervention included four online learning modules for students to take independently, in preparation for an in-class quiz and class discussion about the topic. Online and in-person learning were "blended" to comprise the instructional strategy. Also part of the intervention was a suite of supported resources that support the flipped learning manner in which DC was taught. According to the literature on flipped learning, assigning students activities that expose them to content prior to class has been a strategy used in higher education for some time. Studies have shown this to be an effective model that increases student learning in higher education classes (Crouch & Mazur, 2001; Pierce, 2013).

The Theory of Planned Behavior (Ajzen, n.d.; Ajzen, 1985; Fishbein & Ajzen, 2010) drove the intended outcome of the intervention and underpinned the study's research design. The TPB offered a framework to understand the relation between beliefs, intentions, and actions. The theory posits that intention is the strongest predictor of action, and that beliefs influence more proximal predictors such as attitudes toward the behavior, subjective norms, and perceived behavioral control, which collectively guide individual intentions to perform a specific action. The TPB is beneficial in understanding teacher preparation because one of the aspects of teacher preparation is to shape the actions of future teachers, ergo their intentions to perform various actions. The purpose of the intervention in this study was to increase teacher candidates' intentions to promote and model DC in their future classrooms, as stated in the InTASC and ISTE•T standards. A survey instrument that is consistent with the tenants of the TPB was used to quantitatively measure teacher candidates' beliefs about promoting and modeling DC and

their intention for doing so in their future classrooms. Qualitative tools were used to gather data with respect to promoting and modeling DC.

Chapter 3

METHOD

Setting

This study took place during the fall 2014 semester in the Mary Lou Fulton Teachers College (MLFTC) of Arizona State University (ASU). MLFTC is a large college of education, which offers various degree programs culminating in teacher certification. Classes are held at four campus sites throughout metropolitan Phoenix as well as over 30 K-12 school sites throughout the state.

Recall from chapter 1 that MLFTC has used a technology infusion approach to prepare TC to meet the ISTE Standards•T since 2012, meaning that educational technology lessons have been integrated into other education methods courses, in lieu of requiring a standalone educational technology course. I was hired in 2011 to lead the charge toward technology infusion, and since then, project growth prompted the college to hire additional Technology Integration Specialist (TIS) support staff—a part-time TIS was hired in 2013; then a year later, an additional full-time TIS was hired. As a TIS team, we have continued the initial technology infusion work, designing lessons and providing formal professional development and just-in-time support for instructors. In addition, we have developed college-wide systems, such as an iPad checkout process, to support faculty and student technology integration. As of fall 2014, eight undergraduate courses have successfully been infused with assignments, objectives, and assessments aligned to the ISTE Standards•T, including DC.

During the semester this study took place, DC was infused into five courses, and instructors who taught those courses used the modules for DC instruction. The five courses comprised a combined total of nineteen sections, including:

(a) nine sections of EED 324 "Social Studies in the Elementary Classroom" which is required for elementary education majors and special education majors;

(b) five sections of SED 322 "Classroom Leadership in Secondary Education" which is required for secondary education majors;

(c) two sections of ECD 418 "Instructional Methods for Young Children" which is required for early childhood education majors;

(d) two sections of EED 521 "Instructional Planning and Management in the Inclusive Classroom" which is a graduate level course for master's students seeking elementary certification; and

(e) one section of BLE 324 "Social Studies for Diverse Language Classrooms" which is required for elementary education majors who are specializing in bilingual and English as a second language education.

Participants

This study included two primary groups of participants from whom data were collected: Teachers College instructors and teacher candidates. The college's technology infusion specialists also participated in the study by providing support to instructors to teach DC. Because the instructors taught courses in which DC had been infused and the TIS's job is to support them, the TISS intervention was implemented in a natural setting for the instructors, the TC whom they taught, and the TISs, this study notwithstanding.

Instructors. Purposive sampling was used to deliberately choose study participants based on specific characteristics deemed important by the researcher (Tongco, 2007). In this study, I considered a number or characteristics, such as the specific program in which instructors were assigned and how much experience each had teaching DC. Ultimately, five instructors were invited and agreed to participate in the study. The sample represented the college's two largest programs, elementary and secondary education, respectively. Three elementary course instructors taught a combined total of six class sections of EED 324, and two secondary course instructors taught a total of four class sections of SED 322. The sample also included two instructors who had experience teaching DC, and three with no experience teaching it. Logistical convenience was also considered in the selection of instructor participants; I chose instructors who taught classes during varied days and times to ensure feasibility of observation and survey data collection throughout the semester.

Trish. Trish taught two sections of EED 324 as an adjunct professor during the semester the study took place. Prior to that semester, Trish had served in a full-time capacity within the college as a clinical instructor for four years and course coordinator (i.e., lead instructor) for EED 324 for three years. Trish had experience teaching DC to teacher candidates from previous semesters. In fall 2013, she piloted an initial version of the modules; then in spring 2014, she used a revised version of the modules as part of the first full iteration of the TISS.

Bryan. As a full-time clinical instructor in the college for two years, Bryan taught a full load of classes and served as the SED 322 course coordinator and secondary education program coordinator during the semester this study took place. Bryan had

shown enthusiasm about teaching DC for two years prior to the study. In previous semesters, he had supported the development of the TISS by volunteering students in his class to pilot test the modules and provide feedback on them as the modules were developed. In fall 2013, he pilot tested a previous version of the modules with all of his SED 322 students. Then in spring 2014, he used a revised version of the modules as part of the first full iteration of the TISS. During the semester this study took place, he taught a total of five course sections, three being SED 322.

Ashley. Ashley took over one section of SED 322 during the fifth week of the semester when the previous instructor accepted a different position within the college. Ashley was a faculty associate who had taught other teacher education classes in the graduate program; this was her first time teaching SED 322, her first time teaching DC, and her first time using the TISS. Ashley also taught high school part time during the semester this study took place.

Val. Val was a full-time faculty member in the college, serving in the role as iTeach site coordinator in which she taught classes and oversaw a cohort of student teachers in one of the college's partner districts. Val taught two sections of EED 324 during the study—one section to her student teaching cohort and another section to a different student teaching cohort in another district. The semester that this study took place was Val's first time teaching EED 324, her first time using the TISS, and her first time teaching DC to TC.

Carrie. Carrie was a full-time iTeach coordinator in the college, working with a cohort of student teachers in a partner school district. She also taught two sections of EED 324. One section consisted of her student teacher cohort and the other section was a

different group of student teachers. Carrie had previously taught EED 324 during the fall 2013 semester, but did not implement the DC modules at that time. This semester was her first time using the TISS intervention and the first time teaching DC to TC.

Teacher candidates. TC from a total of six class sections were recruited to participate in the study—two sections of SED 322 and four sections of EED 324. One of the instructor participants taught each section in which student data were collected. Although instructors taught more than one section of the course, typically student data were collected from only one section per instructor. There was one exception, in which student data were collected in two class sections taught by the same EED 324 instructor.

On average, the TC who participated in the study were 24.33 years old with a SD = 5.96. Of the 114 TC who completed the post-intervention TPB assessment, 73 were females and 41 were males. With respect to program, 84 were in elementary education programs and 31 were in secondary education programs. Data from these 114 TC were used to assess the TPB model for predicting intention to promote DC in their future classrooms. In all, 73 of the 114 students completed both the retrospective-pre- and post-intervention TPB assessments and these data were used in the repeated measures ANOVA to determine whether there were changes in the TPB variables over time.

Technology infusion specialists. Although my title was technology infusion coordinator, for clarity throughout this paper, I used the term "technology infusion specialists" to refer to the part-time TIS (Jan), the full-time TIS (Stacey), and me. We three supported the teaching of all of the ISTE•T standards in "technology-infused" courses, ergo we supported instructors teaching DC. Each of us took on the lead position to support different courses in which DC was taught. With respect to this study, Stacey

was the lead technology infusion specialist for EED 324; I primarily supported SED 322; Jan provided backup support for both courses. Our participation in this study occurred through our typical work for the college.

Role of the researcher. In this action research study, my role was that of content creator for the modules and instructor's guide, technology infusion specialist (i.e., trainer, support provider), observer, and collector of data. For two years prior to the study, I had worked to develop the online DC modules, shape the flipped learning concept for use with the modules, and created the Instructor's Guide and additional materials to support instruction. During the semester of this study, I trained course instructors to implement the DC modules, offered corresponding classroom instruction, and provided ongoing support through face-to-face meetings, phone conversations, and email communication.

As an action researcher, I also collected data for the study. I observed class sessions, administered surveys to TC, conducted student focus groups and instructor interviews, and kept ongoing notes about intervention implementation throughout the study.

Intervention

When the college removed the stand-alone educational technology course from the teacher education program of study in 2012, DC instruction was also unintentionally removed from the program. Each of the course coordinators in charge of individual technology-infused courses viewed DC to be unaligned with the objectives for the course(s) they led and thus, declined its inclusion as a required element of coursework. As the college's technology infusion coordinator, I viewed DC as a vital component in a teacher education curriculum to prepare TC to meet the ISTE Standards•T and teach with

technology. Hence, I developed online modules to provide high quality instruction to TC without requiring instructors to be experts on the subject or spend a great deal of time learning it. Over time, the modules evolved into a fully structured "flipped learning" unit for DC.

The Technology Infusion Support System (TISS) intervention was a suite of teaching collateral materials and support for DC instruction. Because my position in the college entailed working with course instructors to influence TC, the primary audience for the TISS intervention was instructors; however, some materials in the TISS were intended for TC consumption. The intervention's primary aim was to increase DC instruction for TC in MLFTC. As a result of increased instruction, I further hoped that TC would cultivate intention to promote and model DC in their future K-12 classrooms.

The TISS consisted of four components: (a) four online modules that provided instruction on DC topics; (b) an instructor's guide which detailed the "flipped learning" approach; (c) a resource folder in Blackboard; and (d) ongoing instructor support by a technology infusion specialist. The TISS was developed based on my observations as the college's technology infusion coordinator, conversations with faculty and administrators, the ISTE Standards•T (n.d.; 2008) that guided teacher competencies, and the literature on blended learning and flipped learning techniques used in higher education.

Online modules. With the help of a few educational technology experts, I developed four "self-paced" asynchronous DC online modules. Each of the four modules covered a different topic about DC and was designed to take approximately an hour to complete. The four module topics are described below:

(a) Copyright and Fair Use—This module provided information about acceptable use of various media types for educational purposes. Learners were guided through several scenarios of classroom media use and asked to determine the legality of each scenario, under fair use.

(b) Digital Footprint and Social Media Use—This module presented both negative and positive possible consequences for sharing information online, specifically within the context of a classroom teacher. The module also offered opposing views about teachers who "friend" students on social media and introduced alternative social media platforms intended for classroom use.

(c) Acceptable Use Policies—This module introduced a type of compliance policy set forth for school or district-issued technology, known as "acceptable use policy." It unpacked a "typical" school district acceptable use policy and encouraged learners to seek understanding of the documents they sign for all district-owned equipment. The module also discussed technology use related to the Family Educational Rights and Privacy Act (FERPA).

(d) Fostering Responsible Student Behavior using Technology—This module focused on responsible technology use by K-12 students. It presented information about cybersafety and cyberbullying and listed several classroom resources for learners to investigate, which teach K-12 students to be safe and responsible technology users.

I designed the modules with an intention different than having students memorize facts or "right" answers about how teachers should behave online. Rather, I wanted the modules to generate awareness about ethical issues using technology and to prompt

critical thought so that ultimately, teachers can make informed and responsible decisions about their own technology use and promote responsible use in their classrooms. Consistent with that goal, the modules presented multiple perspectives to various DC dilemmas and asked TC to consider multiple factors in determining appropriate use.

Each of the four modules began with a "scenario" that provided a realistic classroom teacher context to frame the specific DC topic addressed in the module. Following the scenario, specific steps were listed to guide the participants through the module. They included watching short video lectures, reading online articles, exploring technology tools, and reviewing educational standards. Throughout the modules, learners were also asked to actively engage with the presented content. All four of the modules were aligned to the InTASC and ISTE•T Standards.

Instructor's guide. An instructor's guide served three purposes for faculty members who taught DC. First, the guide contained technical information, such as how to create an account and register for the modules. Second, it described the recommended approach for using the modules with a "flipped learning" approach, and provided materials such as hard copies of quizzes and student handouts. The third function of the guide was to provide assessment information such as grading recommendations and TK20 requirements. TK20 was a digital platform used in MLFTC to record completion of specific assignments, including DC modules. The guide was ten pages, plus appendices.

Resource folder in Blackboard. Several instructor-facing and TC-facing DC materials were housed in a digital folder and placed into the instructors' individual class shells in Blackboard. The contents of the folder included such things as electronic quizzes for each module, contact information for troubleshooting assistance with the

modules, and tutorials for module registration. A short screencast video describing the contents of the resource folder was sent to each of the instructors. The screencast video can be seen at http://www.screencast.com/t/rSL3pZJXq.

Technology infusion specialist support. In all, 2.25 FTE technology infusion specialists, including myself, assisted course instructors in teaching DC. Before the semester began, we offered a training session specifically on the DC unit. One of us also visited each of the twelve class sections at the beginning of the semester to provide an introductory lesson in which we explained the importance of DC in a twenty-first century classroom, helped TC register for the modules, demonstrated how to navigate through them, and explained the process to request technical assistance.

We also provided just-in-time support throughout the semester through phone, e-mail, and in-person meetings. Sporadically, we also sent instructors DC resources such as websites or articles to use for their own professional reading or to pass along to their TC.

Instruments and Data Sources

In this study, I used a mixed methods approach for data collection. Both quantitative instruments and qualitative approaches provided data to better understand the influence of the TISS on DC instruction in the teachers college in which I work. Quantitative data was obtained through TPB surveys given to teacher candidates; qualitative data was obtained through teacher candidate focus groups, instructor interviews, classroom observations, and my own "just-in-time" journaling as the practitioner of the intervention throughout the study.

Theory of Planned Behavior surveys. After TC completed the set of four DC modules, quizzes, and in-class discussions, they took a post-intervention TPB survey, which I proctored in class. Designed to gauge TC's beliefs, attitudes, and intentions regarding DC, the survey was comprised what Ajzen (n.d.) classifies as "direct measure items" for seven TPB constructs: (a) behavioral beliefs, (b) normative beliefs, (c) control beliefs, (d) attitudes toward the behavior, (e) subjective norms, (f) perceived behavioral control, and (g) intention to promote and model DC. The direct measure survey items had been previously determined through a process of surveying MLFTC students, other than the study participants, to elicit salient beliefs of a sample representative of the study's population (Ajzen, n.d.).

To illustrate the nature of the constructs, I've provided three sample survey items. One item used to assess *attitudes toward promoting and modeling DC* was, "For me to promote and model digital citizenship in my future class is…" with a 7-point semantic differential scale ranging from "extremely worthwhile" to "extremely worthless" on which TC responded. Another item used to tap *subjective norms* was, "Most people in education whom I respect professionally think that I should promote and model digital citizenship in my future class" on which TC responded using a 7-point semantic differential scale with options ranging from "should" to "should not." A third item that assessed *perceived behavioral control* was, "I am confident that if I wanted to I could promote and model digital citizenship in my future class" on which TC responded using a 7-point scale ranging from "definitely true" to "definitely false." The complete set of survey items is provided in Appendix A.

One week after completing the post-intervention survey, TC were given time in class to complete a retrospective pre-intervention survey, which was proctored by the course instructor. This survey consisted of the same direct measure items from the post-intervention survey; however, in this version, TC, knowing what they did now about DC, were asked to reflect on their beliefs, attitudes, norms, control beliefs and intentions about DC on the first day of the semester, and to rate themselves on each item, retrospectively.

Although the use of a pre- and post-intervention assessment is a more traditional methodology to gauge program effectiveness, ratings in this study presented a high likelihood for bias. This limitation was apparent from a previous cycle of action research, which took place in a prior semester, when TC were asked to take a pre-intervention survey. The vast majority was not familiar with the term "digital citizenship," which was used in every item on the survey. Thus, they were not able to complete the survey without a fairly extensive discussion, which then biased the results of the survey intended to gauge pre-intervention beliefs. The literature on survey methodology included some discussion about response-shift bias i.e., erroneous self-judgment of knowledge and attitude during pre-testing conditions when using a traditional pre-intervention survey (Hill & Betz, 2005; Howard, Ralph, Gulanick, Maxwell, & Gerber, 1979; Lam & Bengo, 2003; Pratt, McGuigan, & Katzev, 2000). This occurs because participants' frames of reference shift as they proceed through an intervention, causing systematic differences (biases) in pre-intervention survey responses. Because of the likelihood of bias using a traditional pre-intervention survey, this study employed a "post + retrospective pretest method" (Lam & Bengo, 2003), what has been

called above the "retrospective pre-intervention survey" to maximize validity of pre-intervention survey scores.

Student focus groups. Following completion of all four DC modules, quizzes, and in-class discussions, I conducted focus groups with 5-7 TC from each participating class section. TC's participation in the focus groups was both purposive and voluntary. Instructors were asked to identify 5-8 TC who represented the class in terms of their performance on the DC modules and attitudes during the class discussions. For instance, they included some students who performed well on the DC modules, some who had average performance, and some who performed poorly on the modules. The TC who were identified by the instructors were then asked if they would be willing to participate in the focus group.

Using a semi-structured interview protocol, I began with a standard set of questions, then probed and varied questions as the focus group discussion unfolded. The following two questions provide a sense of the nature of the items asked during the focus group: "How important is it for teachers to be good digital citizens?" and "How confident are you in your ability to model and teach digital citizenship in the future?" The student focus group protocol is provided in Appendix B. The focus groups were recorded using a voice-recording app on my iPhone and then transcribed.

Teacher interviews. At the end of the semester, I interviewed each of the five instructor participants, using a semi-structured interview protocol. This method allowed me to ask pre-determined questions, but remain flexible with the ability to create new questions within the course of the interview, based on instructors' responses. The interview questions were designed to elicit instructors' input TC's beliefs and attitudes,

reflection on the DC instruction they provided in class, and thoughts regarding the support they received from the technology infusion specialist(s).

Each of the interviews was audio-recorded, using a voice-recording app on my iPhone and then transcribed. The following sample questions provide a sense of the nature of the interview questions asked during the interview: "Now that digital citizenship instruction is complete, how do you think it went?" and "What helped you to teach digital citizenship?" The complete teacher interview protocol is provided in Appendix C.

Classroom observations with field notes. During the semester, I observed each of the six participating class sections, twice. I scheduled the observations with instructors to be there during class sessions when they planned to give one of the four DC quizzes and hold a debriefing discussion on the topic of the assigned module. During the observations, I used my laptop and word processing software to take notes. The notes included an objective description of class activities and a reconstruction of the class dialogue, obtained through scripting. Just after the observation, I "cleaned up" the document by editing typos, filling in gaps in which the speed of my typing did not keep pace with the class discussion, and adding additional details that I had observed. This approach parallels Sowell's (2001) method of "jotted notes," in which the researcher records notes about verbal and nonverbal communication and circumstances as much as possible, and then shortly thereafter, fleshes out the areas of jotted notes into more concise field notes.

Journaling and impromptu reporting. Insomuch as I was the researcher for this study, I was also the practitioner leading the innovation's implementation in the

college. Accordingly, I constantly garnered data about the invention through my interactions with study participants and involvement with situations pertaining to TISS implementation. Thus, throughout the duration of the study, I kept a journal of my observations and thoughts related to the intervention; I recorded journal entries as the context demanded (i.e., as things happened). At times, situations called for multiple journal entries within a single week, whereas at other times, several weeks would pass before situations necessitated a journal entry. This "just-in-time" method made it easier to record those details accurately as the situations arose.

Procedure and Timetable for Implementation

All of the preparation for the intervention and the data collection took place during the summer, as courses were scheduled. I contacted each instructor who was assigned to teach one of the courses in which DC would be taught and invited them to the DC training. The training took place on July 29, approximately three weeks prior to the first day of the semester; I began recording my just-in-time journal entries on the same date. I also distributed the instructor's guide to all of the instructors, including those who did not attend the training, and created the resource folder and quizzes in each instructor's Blackboard shell. Additionally, Jan, Stacey, and I contacted the instructors to schedule the introductory lessons in each of the nineteen course sections. Fall 2014 classes began on August 21, 2014.

In the few weeks preceding the semester, I selected and invited instructors to participate in the study. Five instructors were invited to participate—three elementary program instructors and two secondary; all five agreed and signed consent forms in August 2014. The letter of consent template is provided in Appendix D.

Throughout September, October, and the beginning of November, course instructors utilized the intervention, assigning the four modules one at a time, disseminating quizzes, and facilitating in-class discussions; throughout this time, instructors called upon the TIS assigned to support the course they taught, as needed.

The post-surveys, teacher candidate focus groups, and instructor interviews took place at the end of November. Specifically, they were scheduled one week after each class completed the fourth DC module. The retrospective, pre-intervention survey was then disseminated in class one week following the post-intervention survey, which was consistent with typical procedures for using the method. Table 1 illustrates the timeline of the study.

Table 1

Timeline and Procedures of the Study

Time frame	Actions	Procedures
July – August	Contacted instructors assigned to teach courses infused with DC instruction	• Determined who was assigned to teach courses with DC • E-mailed instructors to introduce myself and invite them to training
July – November	Recorded just-in-time journal entries	• Wrote entries about the intervention, as various situations occurred
August	Prepared intervention resources	• Set up resource folders and quizzes in instructors' Blackboard shells • Sent instructors video tutorials guiding them through the resources and electronic quizzes
August	Trained course instructors to use the	• Conducted training session

	online units of study	• Administered instructor's guide
August	Recruited faculty member participants	• Offered the opportunity to participate in the study • Distributed consent forms and letters
August – December	TISs provided instructor support for DC modules and instruction	• Conducted introductory lessons in each instructor's class • Offered e-mail, phone, and in-person support, as needed
September – November	Observed classes debriefing DC unit content	• Took jotted notes • Revised to field note format
November	Administered post-intervention TPB survey to teacher candidates	• Proctored survey administration in participating faculty members' classes
November	Administered retrospective pre-intervention TPB survey to TCs	• Course instructors proctored survey administration in their own classes
November	Conducted TC focus groups	• Facilitated and recorded focus groups
November	Conducted instructor interviews	• Facilitated and recorded interviews
December	Analyzed data	• Transcribed audio recordings • Conducted qualitative analysis • Conducted quantitative analysis

Chapter 4

DATA ANALYSIS AND RESULTS

Results from the study are presented in the following two sections. The first section includes results from the quantitative data. In the second section, results for qualitative data are presented. For the qualitative data, assertions are presented and reinforced with themes, theme-related components, and quotes from participants. In addition to the presentation of results, the initial portion of this chapter includes a section that outlines data collection processes and analyses procedures.

Quantitative data included a set of post-intervention scores and retrospective pre-intervention scores for 73 students who completed both Theory of Planned Behavior (TPB) surveys, which were used in the repeated measures analysis of variance to assess change in TPB variables. By comparison, a larger group of 113 students provided post-intervention data for the path analysis conducted to assess adequacy of the TPB model to predict teacher candidates' intent to promote and model digital citizenship (DC). Recall, the TPB surveys assessed seven constructs associated with teacher candidates' intent to promote and model DC in their future classrooms. These constructs were: beliefs about the behavior (promoting and modeling DC), attitudes toward the behavior, normative beliefs, subjective norms, control beliefs, perceived behavioral control about the behavior, and intention to promote and model DC.

The quantitative data were analyzed in several ways. First, reliability of the TPB constructs was examined. Following the reliability analysis, preliminary data analyses were conducted on the data. These analyses were followed by a confirmatory path analysis of the post-intervention data. Finally, a repeated measures analysis of variance

(ANOVA) was conducted on the retrospective pre-intervention and post-intervention data to determine whether there were changes in the scores.

Qualitative data included focus group interviews of teacher candidates (TC) and interviews of instructors, field notes from observations conducted in classrooms, and journal entries I made as the study progressed. These qualitative data were entered into HyperRESEARCH (HyperResearch 3.5.2, 2014) and analyzed using the constant comparative method (Strauss & Corbin, 1998). In this procedure, qualitative data were coded using initial open codes, which included key words or short phrases. Subsequently, these initial codes were grouped into larger categories. The categories were then collected into theme-related components, which were then brought together into themes. The themes led to the development of assertions, which were supported with quotes from the original data.

Results

Results from Quantitative Data

Results from the quantitative data are presented in four sections. First, reliability data are presented. Second, preliminary data analyses leading up to the examination of the confirmatory path analysis of the TPB is provided. Third, results for the confirmatory path analysis pertaining to the Theory of Planned Behavior and intention to promote and model DC are presented in detail. Fourth, the repeated measures ANOVA of the seven TPB variables for the retrospective pre-intervention and post-intervention survey scores are presented for a smaller group of students who completed both TPB surveys.

Reliability of the Theory of Planned Behavior constructs. The surveys used to examine students' perceptions about promoting and modeling DC included the seven

constructs from the TPB. These constructs were: (a) behavioral beliefs (about promoting and modeling DC), (b) attitudes towards the behavior, (c) normative beliefs, (d) subjective norm, (e) control beliefs, (f) perceived behavioral control, and (g) intention to promote and model DC. Items for each of these constructs are presented in Appendix A for the post-intervention and retrospective pre-intervention scores. For each construct, Cronbach's α was computed using SPSS to determine the reliability of the constructs. In examining the post-intervention responses, the reliabilities for the constructs were: .88, .82, .92, .85, .78, .78, and .89 respectively for the seven TPB constructs. The reliability coefficients were all above .70, which is a minimally acceptable level of reliability, and confirm the reliability of the subsets of items for each of the constructs assessed by the survey. For some of the constructs, it was necessary to remove one item, which was not consistent with the other items, to attain these levels of reliability.

Preliminary data analyses leading up to the confirmatory path analysis of the TPB model for intention to promote and model digital citizenship. To better understand the confirmatory path model of the TPB, a number of descriptive, correlational, and predictive statistics are presented in the following three tables. SPSS was used to analyze data including the descriptive, correlational, and regression analyses. The confirmatory path model was conducted using AMOS.

In Table 2 descriptive statistics for intention to promote and model DC and the other TPB constructs are presented. These statistics are from the same group of 113 TC who were also used in the analysis of the confirmatory path model. As noted in the table, scores were all quite high with means ranging from 5.50 to 6.13 on the 7-point response scale. See Table 2 on the next page.

Table 2

Descriptive Statistics of Post-intervention Theory of Planned Behavior Constructs

TPB Construct	M	SD
Behavioral Beliefs	5.53	1.08
Normative Beliefs	5.89	0.96
Control Beliefs	6.13	0.95
Attitudes Toward the Behavior	5.97	0.95
Subjective Norm	5.50	1.03
Perceived Behavioral Control	5.95	0.90
Intention to Promote and model DC	5.97	1.02

Table 3 depicts the correlation coefficients for intention to promote and model DC and the other TPB constructs. The pattern of correlation coefficients showed the latter three TPB constructs, representing endogenous beliefs, were highly correlated with intention to promote and model DC, but not the first three TPB constructs, representing exogenous beliefs toward the behavior. These correlation coefficients were also used in development of the confirmatory path model. See Table 3 on the next page for the correlations.

Table 3
Correlations for Theory of Planned Behavior Constructs

	Behavioral Beliefs	Normative Beliefs	Control Beliefs	Attitude Toward the Behavior	Subjective Norm	Perceived Behavioral Control
Intention to Promote and model DC	.015	-.062	.086	.872*	.726*	.757*
Behavioral Beliefs		.578*	.494*	-.002	-.011	-.035
Normative Beliefs			.471*	.015	.068	-.060
Control Beliefs				.143	.067	.118
Attitude Toward the Behavior					.675*	.700*
Subjective Norm						.677*

Note: Correlation values denoted with an asterisk were significant, $p < .001$. All others were not significant.

Table 4 provides information about the regression of intention to promote and model DC on other TPB constructs. The regression was significant, $F(3, 109) = 161.02$ and $R^2 = .82$, but only the latter three TPB constructs, which represented teacher candidates' endogenous beliefs about DC, were significant in predicting intention to promote and model DC. The three exogenous belief constructs were not useful in predicting intention to promote and model DC. In Table 4 the second column in the table

below presents the b weights, the unstandardized regression coefficients, for each of the TPB constructs. In columns 3-5, other information about the standard error, *t* test statistics for the b weights, and the significance levels of the regression coefficients of the TPB variables are presented. Finally, in the last column, *standardized* regression coefficients are presented. These standardized regression coefficients depict that for every unit of increase in the standard deviation there is an increase in scores equal to the standardized regression coefficient. For example, with respect to attitudes toward the behavior there is a .604 increase in the intention to promote and model DC score for every unit increase in standardized score. Attitudes toward the behavior and perceived behavioral control were the two most important predictors. See Table 4.

Table 4
Regression of Intention to Promote and Model DC on other TPB Constructs

Variable	Unstandardized Coefficient, b	Standard error of b	*t* value	*p* <	Standardized coefficient, β
Behavioral Beliefs	0.106	0.049	2.14	.034	.111
Normative Beliefs	-0.126	0.055	-2.27	.025	-.119
Control Beliefs	-0.039	0.053	-0.74	.463	-0.036
Attitudes Toward Behavior	0.649	0.067	9.69	.001	0.604
Subjective Norm	0.168	.060	2.80	.006	0.169
Perceived Behavioral Control	0.250	0.071	3.53	.001	0.220

Results from the confirmatory path analysis of the Theory of Planned Behavior and intention to promote and model digital citizenship. Figure 3 provides information about the confirmatory path analysis model that was evaluated including the TPB constructs represented as rectangles and the standardized path coefficients in the model. In the figure, only the path coefficients for endogenous beliefs—attitudes toward the behavior, .76; perceived behavioral control, .28, and subjective norm, .21, were significant in predicting intention to promote and model DC in their future classrooms. Taken together, these three variables accounted for 71% of the variation in the scores for intention to promote and model DC. By comparison, the path coefficient from behavioral beliefs to attitudes toward the behavior was .00 and accounted for 0% of the variance in the attitudes toward the behavior scores. Similarly, the path coefficient from normative beliefs to subjective norms was only .07 and accounted for less than 1% of the variance in the subjective norm scores. Further, the path coefficient form control beliefs to perceived behavioral control was .12 and accounted for only 1% of the variance in the perceived behavioral control scores.

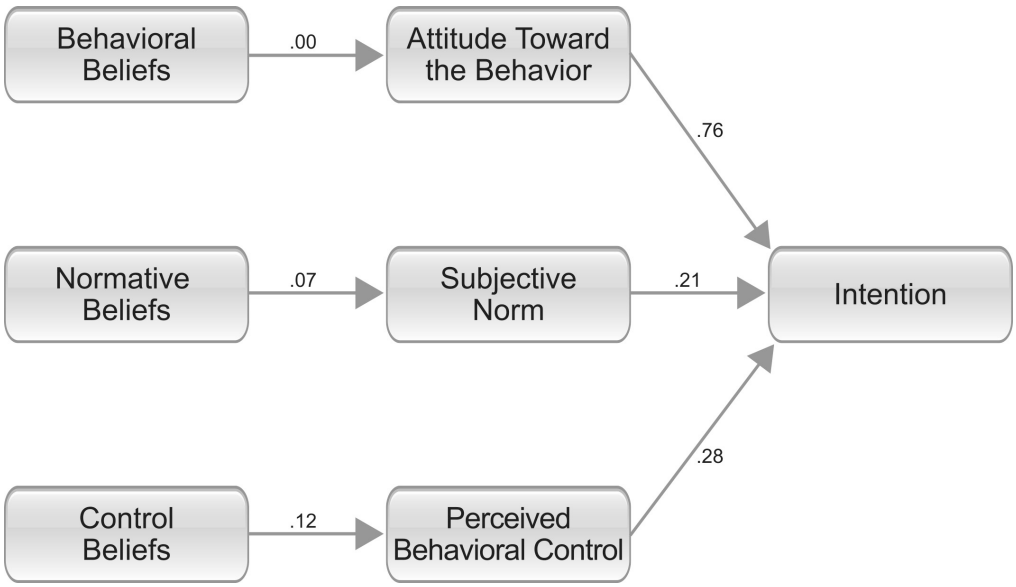

Figure 3. Confirmatory Path Analysis Results for the Theory of Planned Behavior Model.

Repeated measures analysis of retrospective pre- and post-intervention scores. A multivariate repeated measures analysis of variance (ANOVA) was conducted to determine whether there were changes in scores from the retrospective pre- to post-intervention survey results for the group of 73 TC who completed both surveys. The seven scores that were assessed were: (a) behavioral beliefs, (b) normative beliefs, (c) control beliefs, (d) attitude toward the behavior, (e) subjective norm, (f) perceived behavioral control, and (g) intention to promote and model DC. The multivariate $F\,(7, 66) = 24.95$, $p < .001$ was significant and $\eta^2 = .73$, which is a large effect size for a within-subjects design based on Cohen's criteria (Olejnik & Algina, 2000).

Individual, univariate repeated measures ANOVAs showed scores differed reliably for all the constructs when retrospective pre-intervention scores were compared to post-intervention scores. Specifically, the repeated measures ANOVA for behavioral

beliefs was significant, $F(1, 72) = 26.59$, $p < .001$ and $\eta^2 = .27$, which is a large effect size for a within-subjects design (Olejnik & Algina, 2000). Similarly, the repeated measures ANOVA for normative beliefs was significant, $F(1, 72) = 50.75$, $p < .001$ and $\eta^2 = .41$, which is a large effect size. Likewise, the repeated measures ANOVA for control beliefs was significant, $F(1, 72) = 120.44$, $p < .001$ and $\eta^2 = .63$, which is a large effect size for a within-subjects design. The repeated measures ANOVA for attitudes toward the behavior was significant, $F(1, 72) = 114.79$, $p < .001$ and $\eta^2 = .62$, which is a large effect size. Correspondingly, the repeated measures ANOVA for subjective norm was significant, $F(1, 72) = 80.85$, $p < .001$ and $\eta^2 = .53$, which is a large effect size. In the same way, the repeated measures ANOVA for perceived behavioral control was significant, $F(1, 72) = 137.35$, $p < .001$ and $\eta^2 = .66$, which is a large effect size. Finally, the repeated measures ANOVA for intention to promote and model DC was significant, $F(1, 72) = 116.18$, $p < .001$ and $\eta^2 = .62$, which is a large effect size. The large effect sizes indicated reliable differences in the retrospective, pre- and post-intervention means; not differences due to a large sample. For example, differences between post-intervention and retrospective pre-intervention scores, ranged from 0.87 points to 2.38 points with the median being 1.48 points, which indicated substantial differences in perceptions on a 7-point scale. The retrospective pre- and post-intervention means and standard deviations for the seven TPB constructs are presented in Table 5.

Table 5

Retrospective Pre- and Post-Intervention Scores on the Seven Constructs of the Theory of Planned Behavior Surveys

	Retrospective Pre-int Score		Post-int Score	
TPB Construct	M	SD	M	SD
Behavioral Beliefs	4.64	1.21	5.51	1.09
Normative Beliefs	4.79	1.23	5.89	0.96
Control Beliefs	3.72	1.51	6.10	1.00
Attitudes Toward the Behavior	4.57	1.22	6.05	0.90
Subjective Norm	4.39	1.24	5.63	0.99
Perceived Behavioral Control	4.29	1.30	5.98	0.93
Intention to Promote and Model DC	4.40	1.34	6.05	0.91

Results from Qualitative Data

In this section, results from qualitative data are presented. First, Table 6 displays the themes and their associated theme-related components and assertions. Then, each of the themes is discussed, including quotes from the data to support the assertions.

Table 6

Themes, Theme-related Components, and Assertions*

Themes and Theme-related Components	Assertions
Professional Development for Teacher Preparation Instructors 1. Most instructors had little, if any, knowledge about DC prior to teaching it. 2. Instructors completed the TISS modules to prepare for the in-class components of DC instruction. 3. Instructors relied on the TISS materials and support to teach DC. 4. Instructors learned DC "along with students."	1. Preparation for the in-class components of DC instruction served as a form of professional development for instructors who used the TISS.
DC Instruction in Teacher Preparation Classes 1. DC instruction was consistent. 2. In-class discussions were similar. 3. Instructors employed a variety of discussion strategies to debrief the modules in class.	2. There was a high level of consistency in DC instruction and discussions during debriefing of the modules. Instructors used a similar lesson plan template, but added their own "twist" to DC instruction through the use of various discussion strategies.
Barriers to TISS Implementation in Teacher Preparation Classes 1. Instructors perceived technology and time as mild barriers. 2. Technology was an observed barrier. 3. Throughout the semester, instructors had backend support for challenges and barriers.	3. Technology-related problems were the primary barrier; support provided by Technology Infusion Specialists on the "backend" assuaged various TISS challenges.
Learning Gains 1. Instructors primarily gained awareness of DC, in addition to modest gains in content knowledge. 2. Teacher candidates primarily gained awareness of DC, in addition to modest gains in content knowledge.	4. The primary learning gain for instructors and teacher candidates was an increased awareness of DC—awareness of its importance in K-12 classrooms and awareness of their own behaviors related to responsible technology use.
DC in Future K-12 Classrooms	5. Teacher candidates' positive

1. TC perceived little, if any expectation from school administrators, and slightly more expectation from parents. 2. TC placed a high value on promoting and modeling DC. 3. TC believed students should learn how to use technology responsibly both inside and outside of the classroom. 4. TC considered the parent role in DC instruction for children. 5. Most TC primarily believed that DC should be infused into the curriculum and modeled by teachers; some believed it should be taught as a separate unit. 6. Instructors believed that TC will be good digital citizens in the future, but were unsure as to the extent of their teaching it to future students. 7. Instructors believed that TC will remember what they learned. 8. Some TC intend to promote and model DC. 9. TC feel a responsibility to promote and model DC.	attitude toward promoting and modeling DC in their future classrooms outweighed their belief that doing so will be expected of them. 6. TC have a foundation upon which they can draw to promote and model DC in their future classrooms.

*--Note: Themes are in italic font.

Professional development for teacher preparation instructors. *Assertion 1—Preparation for the in-class components of DC instruction served as a form of professional development for instructors who used the TISS.* Post-intervention interviews with five instructors provided insights into their preparation for facilitating DC instruction using the TISS. The following theme-related components comprise the theme that led to assertion one: (a) most instructors had little, if any, knowledge about DC prior

to teaching it; (b) instructors completed the TISS modules to prepare for the in-class components of DC instruction; and (c) instructors learned DC "along with students."

Instructors' initial knowledge. Four of the five instructors who were interviewed reported initially having very little, if any, initial knowledge about DC. For a few, seeing "digital citizenship" on the course syllabus that was provided to them by the course coordinator was their first exposure to the term, and teaching it became the impetus for learning it. Ashley affirmed this when she said, "I had to research [digital citizenship] and figure out what it was because that term was not familiar to me. I didn't know what it meant in all honesty…" Carrie shared, "Teaching something you know nothing about is stressful to many teachers, and college instructors are no exception." And then, Carrie further explained,

> As a college instructor I feel like most of the time when you go in; I most of the time feel like I know what I'm talking about, but if you've never heard the term until somebody gives you the manual for digital citizenship, that seems overwhelming to be the expert at something when you're not the expert at all.

Module completion and class preparation. All five instructors who were interviewed reported having completed the TISS modules themselves to prepare to teach the in-class instructional components of the TISS, including giving a quiz and facilitating class discussion. In response to a direct question about how they prepared, Ashley said, "Like [I] did that first module, that was the first thing I did" and Val said, "I would read through the modules myself." Val further explained, "I did really make sure I watched the modules carefully and understood the content for it." Similarly, when asked what most helped her to be able to teach DC, Trish responded, "Well the modules, doing the

modules…" and then explained why she has completed the modules each of the three semesters she has taught DC, "because otherwise I'm stumped by some of the questions on the quiz and then how do I know how to direct [students who have questions]…"

Bryan expounded on his reasons for completing the modules, stating that doing so helped him to make sense of the material such that he could integrate DC with other course content as illustrated when he claimed,

> I had never taken modules like this before I started teaching them. So initially I had to really familiarize myself with as much information as possible and the resources that [the TISS] provided were extremely helpful because you know, at the same time that I was bringing these into the course I was trying to build these other areas of the course as well. So it was really just trying to connect the dots to where I felt, 'okay if I'm a student in this course how do I make sense of this for myself?'

Instructor reliance on the TISS materials and support. During interviews, most of the instructors discussed their dependence on the TISS materials to learn DC and teach it to their teacher candidates. One instructor who was asked about what she would have done to teach DC had she not had the TISS materials was at a loss for words. Her response was, "Oh my goodness, wow, I don't know, that's a good question….That's a really good thought provoking question. What resources would I go to, what would I do, wow." A few days later, she emailed saying that in response to the question about what she would do to teach DC without the TISS, she would rely on people with educational technology expertise to guide her and also look to professional journals for information. Her email ended with the comment, "But, wow, how challenging without you and Jan

(and [name] at PLL)." Along the same lines, Carrie made a comment during her interview about the support she received to teach DC. She said, "…going through the manual with you step-by-step, like really defining what digital citizenship was, the purpose behind it, and then I have to say that was like the most beneficial. You coming in and helping my students get started. I feel like there was a lot of hand holding this semester and it helped a lot."

Instructor learning "along with students." Classroom observations revealed some instructors, particularly those teaching DC for the first time, divulging to TC that they too, were completing the modules and learning new material. For example, during an in-class discussion about one of the modules, Val declared to teacher candidates, "I thought this [module content] was eye opening," During the class observation, Ashley said to her teacher candidates, "[As I went] through the module, I was like, 'huh'..." And during a post-intervention interview, Carrie affirmed learning DC as she was teaching it when she said, "I liked having the opportunity to say to [teacher candidates], 'I don't know, like let's investigate that further, this is a new topic to me.'"

Classroom instruction using the TISS. *Assertion 2— There was a high level of consistency in DC instruction and discussions during debriefing of the modules. Instructors used a similar lesson plan template, but added their own "twist" to DC instruction through the use of various discussion strategies.* Classroom observations of five instructors provided insight into how instructors were using the TISS materials to facilitate instruction. Post-intervention interviews with the instructors who were observed provided some complementary data. The following theme-related components comprise the theme that led to assertion two: (a) DC instruction was consistent; (b) in-

class discussions were similar; and (c) instructors employed a variety of discussion strategies to debrief the modules in class.

Consistent instruction. Six classes (taught by five different instructors) were each observed two times throughout the study during class sessions when DC modules were debriefed. All twelve observations revealed a high level of consistency, despite being taught by different instructors and focusing on different topics. The most noticeable similarity was the composition of instruction. For each lesson observed, instructors followed the instructional plan that was laid out in the TISS Instructor's Guide. Each instructor had assigned TC a module to be completed outside of class. On the date the module was to be completed (also the date of the classroom observation), the instructor disseminated an online quiz, which took between five and ten minutes; instructors also facilitated a discussion, which lasted between 15 and 30 minutes.

Another point of consistency was the instructor's use of multimedia during the in-class portion of instruction. According to classroom observation notes, instructors projected PowerPoint or Prezi slides during ten of the twelve observations, listing such things as objectives and standards aligned with DC, the classroom scenario copied from the module, and guiding discussion questions.

Consistent conversations. The twelve classroom observations were conducted during class sessions that debriefed different modules, and therefore different topics. Nevertheless, classroom observation notes revealed many similarities in the conversation between the instructor and the teacher candidates. In seven of the twelve classes observed, the instructor seeded the class discussions with guiding questions that were listed in the TISS Instructor's guide. As a case in point, Carrie began the digital footprint

and social media class discussion by posing the questions, "Should teachers filter their online presence? Why or why not?" Trish began her class discussion with identical questions. A quote by Trish offered during her interview supports this idea when she stated,

> We implemented [the discussion questions from the instructors guide] but I didn't do it personally as far as creating them. Just maybe tried to vary a little bit with the discussion [strategies] but I relied on what you had come up with. So I don't think I strayed too far from what you had already laid out.

Of the five class discussions that did not begin with discussion questions, four were seeded with questions from other TISS materials such as the modules themselves. Bryan, for example, began a class discussion by asking, "How do you define digital footprint?" a question derived from the module's stated objectives.

Another similarity among class discussions was the way in which TC and instructors debriefed the module content. In all twelve observations, the sharing of examples and personal connections to the topic dominated the discussion. Instructors and TC shared examples about irresponsible technology use, such as Carrie, who, during a class discussion about maintaining a professional image on social media, told her class about a teacher acquaintance who posted a negative statement about a student. They also shared examples that emphasized the importance of understanding technology and norms for use, such as when a teacher candidate in Ashley's class recounted an experience when she accidentally projected lingerie ads to the children's youth group she was teaching. They also provided examples that illustrated a responsible use of technology, such as

when a teacher candidate in Bryan's class described his former high school teacher's use of Twitter—which was used solely to post assignments and resources for class.

Also consistent was the inclusion of discussion pertaining to the classroom or district in which the teacher candidates were interning. For example, all of the TC in Val's class were student teaching in the same school district. During the class in which they debriefed acceptable use policies, a portion of the discussion was devoted to that district's specific policy. The teacher candidate shared, "In [district name] orientation, we were told, 'This is your computer. Do with it what you want—shop, etcetera. It's signed over to you.'" Class discussion about this policy ensued for a few minutes. Similarly, Trish asked her TC, "Is there an Acceptable Use Policy in [district name]?" during class discussion, to which teacher candidate responded "Yes, but we weren't issued one…"

Varied instructional strategies. According to classroom observation notes, the most prominent distinction among classes using the TISS was the structure of the class discussion. For example, in one class that was observed, TC sat in a large circle around the room, everyone facing inward to discuss. During another class, TC walked around the room, talking to classmates. And in yet another class, TC spoke in small groups and sent one representative to write key points on the whiteboard in front of the class. *Although the discussion structures varied, this illustrated a consistency of instructors employing various strategies that TC can use in their future classrooms.*

In the class where TC sat in a circle, the instructor was employing/modeling a teaching strategy called "Socratic Seminar." Carrie, the instructor, began by displaying a multimedia slide that listed the norms for Socratic circle participation and instructing her

class, “Bring your notes to the Socratic seminar.” The TC then moved the chairs and desks to form a circle for the discussion. When her TC asked about the strategy, Carrie clarified that it was just a discussion, but “…the key is to use open ended questions.” After the DC discussion concluded, Carrie asked her TC, “Did you like Socratic?” and “How did you feel about it from the teacher’s perspective?”

Val took a similar approach in modeling a discussion strategy. According to the notes from the classroom observation, the instructor passed out various colored cards to TC while they took the quiz. After the quiz, she facilitated a short whole-class discussion about acceptable use policies. Val projected a multimedia slide with information about a teaching strategy called “Six Thinking Hats” and said to her TC,

> … Edward De Bono has developed a strategy called ‘Six Thinking Hats.’ It is a way to do collaboration and thinking. In a really good collaboration discussion, these six areas should all come out. The six areas are blue hat for the big picture, yellow is for benefits, green is creativity, red is feelings, white is the facts, and black is for cautions.

She then gave directions for the next part of the DC discussion. “You all have a thinking hat at your table, which are different colors. Each one has a question written on it. And you will share out the answer to your question to close our discussion.” TC proceeded to follow these instructions, then to close the lesson, Val referred to the discussion strategy by saying, “The thinking hats help us think about a topic from multiple perspectives. Think about in your [future] class when you talk about controversial issues. How could you use these hats when you teach social studies?”

During post-intervention interviews, instructors verified their intentional use of discussion strategies to debrief the modules when they discussed preparation for class, such as when Val said, "I knew what the big main learning key was from [the module] and then I just really added like little discussion [strategies]." Ashley commented about her use of discussion strategies by stating, "I was trying to have ways to get everyone involved in the conversations." When asked if her TC could then use the discussion strategies as future teachers, her response was, "That was my hope, yeah."

Barriers to TISS implementation in teacher preparation classes. *Assertion 3—Technology-related problems were the primary barrier; support provided by Technology Infusion Specialists on the "backend" assuaged various TISS challenges.* Instructors were asked about barriers to implementing the TISS for DC instruction during post-intervention interviews. Their feedback, combined with classroom observation data provided information for this theme. The following theme-related components comprise the theme that led to assertion three: (a) instructors perceived technology and time as mild barriers; (b) technology was an observed barrier; and (c) throughout the semester, instructors had backend support for challenges and barriers.

Instructors' perceived barriers. When asked about barriers, instructors had little to say. A few commented that there were no barriers such as when Carrie said, "Oh barriers? I guess none, I can't really think of anything that made this difficult." Bryan also claimed, "I think this semester more than in the past was pretty barrier free." The other instructors indicated two challenges, technology and time, with modest emphasis. For example, Trish said, "The barriers, just the technology aspect of it, although it went

much better this semester." And, regarding time, Val reflected, "Time maybe [was a barrier]. I know that course is like a big course, so there's a lot happening…"

Observed barriers. Classroom observation data indicated technology was a challenge. For example, during a classroom observation in Carrie's class, she instructed the TC to go online to take the DC quiz, however, the iTeach district's wifi signal was very weak in the classroom and only about half of her students were able to access it. Thus, she asked her students, "Does anyone need my hotspot?" which referred to her personal device which allowed more students to get online. In similar fashion, during an observation of another class, which was conducted on an ASU campus, the instructor directed students to take the quiz, but two had technical difficulties that prevented them from doing so.

In addition to technology being a barrier to TC taking a quiz, it also affected teacher candidates' ability to register for the modules. The modules were created in Moodle and "housed" in the Professional Learning Library (PLL). To complete the modules, TC needed to register for the modules within the PLL portal. In several of the classes in which I conducted the DC introduction lesson, one to four TC could not access the modules in the PLL to register for them. This problem was caused by backend technology mapping issues.

Technology infusion specialist support for instructor and TC challenges. Throughout the intervention, I kept a journal to chronicle the experience from the technology infusion specialist perspective. The journal contained numerous entries related to work done on the "backend" of the intervention, by a TIS. TIS actions were conducted to prevent potential problems, coach instructors, figure out solutions to

individual instructor questions, or investigate unique issues that emerged throughout the semester. Below are a few examples of journal entries that illustrate these efforts.

The first example exemplifies a situation that sprung up during the first week of school when a teacher candidate reported a module error in the PLL, which continued for two weeks. The following journal entry illustrated my initial confusion in determining who sent the message,

> This morning, I received an email from the PLL that a student was having the manual enrollment error come up. I emailed Trish and Val to see if it was a student in their classes. Trish emailed back no; Val didn't respond. Now, I tend to think it may have been a student in another class, who hasn't had the DC intro lesson yet. If it is someone from Val's class, I'd be surprised because I emphasized to email asupll with any technical issues (and they seemed to get that).

The following entry was recorded on the next day,

> It turns out that student email was from a student whose class no one had visited yet. Not sure if the instructor had told them to begin working on the modules (because the instructor hasn't emailed Stacey or me back yet) so either the student was eager and just went ahead, or the teacher told them to begin working on them but was misinformed on who they should email with technical difficulties.

After resolving the technical problem with the teacher candidate, he continued to email me with criticism of the copyright module. I responded to his email each time and copied the course instructor and secondary program coordinator. A journal entry written two weeks after the problem was introduced related,

> After several emails with the student who had taken the copyright course from the college of law, [TIS name] was finally able to do the intro lesson in [instructor's name] class. I think this situation is finally wrapped up.

The second example of backend TIS support illustrates the interaction with an instructor who needed help with the DC quizzes in Blackboard. The journal entry stated,

> I received an email from [instructor's name] who said that he was planning to deploy the first quiz and couldn't remember the instructions. I re-sent him the screencast video explaining how to deploy the quiz and reminded him that the link to the video was in his Bb shell so he could get to it any time. He emailed back asking about how the students get to the quiz. We emailed back and forth several times about this.

The third example illustrated an issue that came up multiple times in the journal, when TC missed quiz questions and instructors could not adequately respond. The journal entry pertains to a teacher candidate who claimed he answered the question correctly but that Blackboard marked it wrong. It reflects how, instead of responding directly to the teacher candidate, the TIS coached the instructor on how to respond,

> I tried to guide [instructor's name] in how to handle the student concern. I told him that I know of ONE previous case in which Bb marked the answer wrong and if that were the case, he could change it manually in the Grade Center. If the student did mark the wrong answer and he needs help explaining the correct answer, let me know.

Learning Gains. *Assertion 4—The primary learning gain for instructors and teacher candidates was an increased awareness of DC—awareness of its importance in*

K-12 classrooms and awareness of their own behaviors related to responsible technology use. Instructor interviews and teacher candidate focus groups yielded data regarding learning gains. The following two theme-related components led to assertion four: (a) instructors primarily gained awareness of DC, in addition to modest gains in content knowledge; and (b) teacher candidates primarily gained awareness of DC, in addition to modest gains in content knowledge.

Instructor learning. A few instructors acknowledged gaining a better understanding of specific DC content by teaching it. Trish acknowledged this when she said, "…the copyright concerns, the copyright issues I think were brought more to my understanding…" However, more so than content knowledge, instructors discussed ways in which they felt more *aware* of DC—aware of its importance in K-12 teaching, as well as being aware of their own technology use as a professional.

Separately, during their post-intervention interviews, Trish and Val both commented that by taking the modules, they now have a *heightened awareness for the importance of DC in K-12*. Val said:

> Some things…had a bigger impact than I really realized, cause when I saw some [examples of K-12 students' irresponsible technology use presented in the modules] I was like, 'oh I didn't even think about how a student could lose their scholarship [for posting illegal behaviors on social media]'.

Trish said, "I think it's made me much more aware of how important it would be," with regards to teaching K-12 students about DC.

Instructors also indicated a *heightened awareness of DC issues within their own professional context*. According to class observation notes, Ashley, whose primary

professional role is that of high school teacher, made the following comment during a class discussion, "So honestly, when I did the module, I read [the rule about technology use] and thought about what I'm doing in the [high school] classroom." She then explained her thoughts regarding a practice at her high school that was in opposition to the information in the module. "Going through the module, I was like, 'huh?' I was going to go talk to my [high school] principal about it today."

Carrie related DC to her full time role as MLFTC teacher preparation faculty member. During her interview, she related, "I can tell you from an instructor's standpoint going through [the modules] has changed my practice. I see myself like citing more and questioning myself, like can I use this image within this Prezi or PowerPoint?" Trish also spoke about her increased awareness of copyright as a teacher education faculty member during her interview. She claimed, "I'm much more aware of [copyright and fair use] when I'm working with [my students'] assignments, when they turn in things, I'm looking for that."

Teacher candidate learning. Like their instructors, some TC acknowledged learning new information about various topics, particularly copyright and fair use. During a focus group conversation, one teacher candidate said, "I know one of my 'ah-has' was … copyright, just the definition of copyright and what that incorporated." A teacher candidate from Bryan's class shared the same idea when he eloquently stated, "The copyright and fair use kind of blew my mind." However, several other TC reported that much of DC was common sense or material they already knew. A teacher candidate who participated in a focus group said, "Personally I think a lot of it is common sense…" And, another teacher candidate made the following comment during an in-class

discussion, "…lots of stuff we've heard before. Good reminders, but a repeat." That being said, there were several indications that the salient outcome of TC having taken the modules was not learning brand new information; rather, it was an increase in *awareness* and a shift in *perspective*.

Although many responsible technology use behaviors seem like common sense, many TC had never given DC any thought, prior to taking the modules. Comments made by TC during class discussions suggested taking the modules gave rise to *increasing thought about DC*, fostered by awareness. TC said things such as, "[The modules] made me wonder…", "You never really think about things like that", and "The module made you think, 'what is okay?'" Ashley made a complementary comment when she mentioned teacher candidates' reaction to one of the in-class discussions during her interview. She said, "They were kind of like, 'whoa!' You know, just things like that, that they never really thought about…" Bryan also related this perspective when he offered the following comment,

> As many students as I have that have gotten this information before or for them it's common sense, I have just as many students if not more that said, 'wow I never thought about that, like that's really important for teachers to think about.'

Moreover, evidence supported a *shift in teacher candidates' perspective about the importance of DC in K-12 classrooms*. During Ashley's interview, she claimed, "I don't feel as though [prior to taking the modules], they had enough information or insight in the idea that they really need to teach their [future] students these things." A teacher candidate also mentioned increased awareness of the importance of DC during a focus group by stating, "I think personally because we've been through the digital citizenship

modules and stuff; I think that we have a better understanding of how important it is." Further, a comment made by one of Trish's teacher candidates during a focus group spoke to the modules' influence on her awareness and perspective when she averred,

> Every time I completed a module I was like, 'oh that seems like common sense,' like 'oh, we should obviously be doing that. Of course, why didn't be [sic] more aware of that before?' …So I feel like [taking] the modules was mostly like my teacher college education on digital citizenship. Whereas … there's technology in [some of the] classes, but no one tells you how important and just kind of brings to light what it's like as a teacher in the digital citizenship role [until we took the modules]."

TC also reported that, as a result of this newfound awareness of responsible technology use, they *noticed their own behavior, and the behavior of others' more*. One explained,

> I think I've just become more aware. Like my Facebook friends they'll post something and I'll just in my mind—I'm thinking why would you do that, or even other teacher friends from different districts … posting pictures of their students and I'm just like cringing because I've been taught the right way to portray myself on Facebook. I've been taught—like don't unload your dirty laundry and make yourself look awful if someone is looking you up, like a professional wanting to hire you. So I think I've just become so much more aware of my surroundings and I feel like that's the most important thing we could have taken from this.

A few TC also expressed how it had *influenced their own behavior*. During the in-class discussion about digital footprint, one teacher candidate in Bryan's class

commented, "When I went back to the module and went back to my social media, I saw there were 500 followers on my Instagram and I changed my privacy settings. The key factor is 'pause before you act.'" Another teacher candidate, during a focus group, said, "I know every time [teacher candidates in my cohort] want to post something on Facebook we're always like, 'Is this appropriate, like what are the ten different angles that somebody could take this?' Like I feel like we all do that now."

A few TC mentioned *feeling "stressed out"* because of having more DC awareness. One student said, "I get kind of stressed out about it now that I watch [*sic*] the digital citizenship. 'Aware' may be a better way of putting it." Another teacher candidate during the same focus group said, "I think the thing I learned most was how kind of stressful it is a little bit especially with the whole copyright thing."

A comment made by a teacher candidate during a focus group summarizes the overall theme about *awareness* when she suggested,

> …Everything you do is pretty much affected by digital citizenship in one way or another, if it's copyright or if it's what you're posting or how you're using the technology. Pretty much everything you do somehow connects to it and I didn't know until [taking] these modules [or] even think of it in that aspect.

Digital citizenship in future K-12 classrooms. *Assertion 5—Teacher candidates' positive attitude toward promoting and modeling DC in their future classrooms outweighed their belief that doing so will be expected of them.* Six post-intervention focus groups with TC provided a wealth of data regarding their beliefs and attitudes toward promoting and modeling DC in their future classrooms. Comments made during class observations also added to this theme. The following theme-related

components led to assertion five: (a) TC perceived little, if any expectation about DC from school administrators, and slightly more expectations from parents; (b) TC placed a high value on promoting and modeling DC; (c) TC believed students should learn how to use technology responsibly both inside and outside of the classroom; and (d) most TC believed that DC should be infused into the curriculum and modeled by teachers; some believed it should be taught as a separate unit.

Expectation to model and promote digital citizenship. During focus groups, TC were asked if they will be expected to promote and model DC when they are teachers. The question did not yield an abundance of responses and, those that were given were varied. The responses differed because a few TC spoke about modeling DC (being a good digital citizen themselves), others discussed promoting (teaching) DC to their future students, and others combined the two and provided an overall answer. Responses were also mixed; some believed there would be an expectation by parents, as opposed to formal expectations dictated by the district, administration, or curriculum. A student from Trish's class expressed this view when she maintained,

> I think it's more of the parents that kind of expect you to model [responsible technology use] for their kids because they look you up…they talk about teachers and if they see something that you're doing that's not a good role model for their kids they're more apt to bring it up to you…. [Parents will] check what [their child's teacher is] doing and if something happens to their kid [with] cyber bullying or something, [or] they see an inappropriate ad pop up that you have tried to show a video and this ad pops up [in front of the class], and now all the

> kids go home and tell their parents, then the parents are going to be on you about it. So I think [expectation] more comes from that angle.

Others did not believe there will be an expectation for DC because they do not see any repercussions for teachers who violate DC norms or policies currently. One teacher candidate explained this when he claimed, "Nobody is enforcing it. So I feel like yeah you have to sign like an AUP or whatever, but I feel like it's not really enforced at all."

Attitude toward promoting and modeling DC. Many TC offered comments indicating their belief in the importance of promoting and modeling DC in K-12 classrooms. In terms of being a good digital citizen themselves, TC expressed their desire to "be professional" and "maintain a positive image" as a teacher, during focus groups and class discussions. One teacher candidate explained her feelings about maintaining a professional image at all times when she stated,

> In all aspects of your profession, you're choosing to be a teacher, and so regardless if you're at home personally or here professionally, you should always have that professional outlook to everybody at school. So I feel that just being here you need to be professional and out in public as well.

TC also discussed why teachers should filter what they post on social media to maintain a positive and professional image. One teacher candidate explained,

> …you get parents and you get other people looking at certain things that you post on personal [social media] pages and they're going, 'you're with my kid all day long.' Like, 'I don't trust you with my kid,' and then that can cause some serious repercussions in your professional life.

TC had even more to say about teaching their future students to be good digital citizens. “I believe it’s very important for us to be teaching [responsible technology use] to our students,” said one teacher candidate during a focus group, a sentiment that was echoed by TC throughout each of the six focus groups. Another stated this even more adamantly when she asserted, “I think [digital citizenship] should be required of every student in every school at every grade level, and I think it should be done every year at minimum.” And, a third simply stated, “So I think it’s really important that we teach our students about [digital citizenship] because I wish that someone would have taught me.”

Digital citizenship in the classroom. TC articulated a variety of reasons that teachers should teach DC to their students. Some discussed the need for DC to precede technology use in the classroom. One TC offered such an assertion when she testified,

> …we’re giving them access to the Internet. In our computer lab, we have like mobile laptops and stuff, so it’s important for them, like we’re giving them like the opportunity to do that so we need to teach them how to be responsible.

Another teacher candidate offered the following comment regarding DC, related to integrating technology into classroom learning experiences: “We finally have the iPads and so I think as we start incorporating iPads into our daily curriculum it’s going to, it will change things where we will be teaching [digital citizenship] much more often.”

Digital citizenship as a life skill. TC also discussed the teaching DC as a skill they will need to be successful outside of the classroom. As one teacher candidate pointed out:

> …whatever guidelines you give [students] to use in the classroom, you want them to extend that into their personal use because what you're telling them to do in the class is not any different than what you want them to do when they're not in class.

TC often mentioned child safety and "teaching right and wrong" in relation to teaching students to use technology responsibly outside of the classroom. This concept was illustrated in a quote given by a teacher candidate during a focus group when she affirmed, "I think it's our responsibility not just because we're trying to teach them how to be good people, but because it's like ethically you want them to be safe and protected."

Also related to why DC should be taught as a life skill, TC noted the prevalence of technology in students' lives. As one teacher candidate declared, "…at some point in time [students] will be on computers, they will be on social media, they will be on their cell phones, they'll be on their tablets, laptops…" Another teacher canddiate explained what makes her nervous when she claimed,

> … how available all this technology is even to the young 6-7 year olds, even younger than that in some cases. I know a 2-and-1⁄2 year old that knows how to navigate YouTube. So it scares me because they need that education of what to do and what not to do.

Beliefs about parental role and teacher responsibility. During focus group discussions about teaching students responsible technology use, a few TC voiced their desire for parents to be the primary source of information, "I just feel that it's the parents job..." However, more TC claimed that teachers should teach it, in case parents are not doing so. One teacher candidate who is also a parent reflected this position when she commented,

> …they're not going to learn this from home, it's not something I've ever taught my own kids, so it's something you don't really think about until you're the teacher and you're like, 'oh we need to set some rules and we need to know how, you know, what it is to be a responsible digital citizen.' So it's up to us to teach it to our [students].

Another teacher candidate acknowledged the need to teach DC, in case parents do not. She declared, "I'm okay with taking on the responsibility for making sure that they get this information across to them because like what if I'm the only person that could teach them. What if their parents aren't being responsible for that?"

Implementation strategies. TC asserted their opinions about how DC should be taught in the classroom. Overwhelmingly, they claimed that DC should be infused into the curriculum, and that teachers should teach through modeling. Additionally, some TC claimed that DC should be taught explicitly as a stand-alone lesson or unit. One teacher candidate's comment that speaks to integrating DC was,

> I think it's absolutely your responsibility any time that it's relevant to your curriculum. For example, if you're doing something where the students need to cite their sources, or where they need to be on social media. You know, you have to teach your students to use the tools responsibly that you're asking them to use.

Another teacher candidate suggested infusion into the curriculum when she explained,

> I feel like you have to scaffold that digital citizenship learning. I'm in a first grade classroom and they have their username which is their student ID number and a password and we talk to them about how important their password was and how they shouldn't be sharing that with anybody. Maybe at that age a parent or a

> teacher if they can't logon, but that's their personal information and as [another student] was saying, in second grade that's maybe when we can start touching on cyber bullying when they actually start venturing out on to the Internet. First graders are just kind of doing basic Word, Excel, Microsoft Office things, but when they start venturing of the Internet I feel like each grade should build and build on their digital citizenship knowledge. Even us as college students probably learned a lot from these modules that we never learned in elementary school or even high school.

One teacher candidate who discussed modeling DC for students offered the following comment,

> …as we teach these children how to cite sources and that type of thing for copyright, I mean when we show them like you were saying earlier, being a good model when we do it, then we teach them through ELA standards how to cite and write papers and all that, do research the right way, then if they don't see us doing that then it's going to be contradictive and they're not going to want to do it either.

Another teacher candidate said, of modeling DC,

> [As teachers] we have to keep [cell phones] in our desk or away, we can't have them on us, just like we expect for our students. So it's just the same as modeling, the same as you would model how to do 2 x 2, it's just the same thing.

And, pertaining to teaching DC as a separate lesson one teacher candidate during a class discussion suggested, "Maybe have a crash course in DC for students."

DC in future K-12 classrooms. *Assertion 6—Teacher candidates have built a foundation upon which they can draw in their own future classrooms to promote and model DC.* Instructor interviews and teacher candidate focus groups provided information related to teacher candidates' intention to promote and model DC in their future classrooms. The following theme-related components led to assertion six: (a) instructors believed that TC will be good digital citizens in the future, but were unsure as to the extent of their teaching it to future students; (b) instructors believed that TC will remember what they learned; (c) some TC intend to promote DC; and (4) TC feel a responsibility to promote and model DC.

Instructor perception of intention. When asked about whether or not their TC would promote and model DC in their future classrooms, instructors expressed confidence that they would be good digital citizens themselves, but less confidence that they would explicitly teach their students. Val offered the following comment,

> I think they'll be good digital citizens, especially this group just from my experience with them. I don't know how much they'll explicitly teach their students though. Like I didn't really get the impression from the discussions and from them that they were really fired up about making sure that their students knew how to be digital citizens, and I don't know…

Carrie expressed her hope that DC would trickle down into her teacher candidates' future classrooms, yet she was somewhat unsure in her comment when she suggested,

> I do think [they will promote and model digital citizenship]. I think that there were good materials within the modules about what this looks like in a K-12 classroom. But I also, I can't say for sure…

All five of the instructors who were interviewed discussed some aspect of having laid a foundation for TC upon which they can draw in their future classrooms. Val shared, "Well maybe when they run across a situation [dealing with technology use]…they'll at least remember." She also added,

> They might even notice things before they happen because they have all of this knowledge, you know what I mean. They might be able to see things coming or you know, as they start having their students work with technology they might start to think oh it might remind them about things that they've learned, hopefully.

And Bryan agreed with this position, when he claimed,

> A lot of how they're going to use it, how much it's going to resonate, a lot of that depends on them, but I think that [by] giving them that information, letting them think about it, letting them apply it, letting them start to sort of graph how they're going to bring this into their classrooms, I think is the most important thing.

Teacher candidate perspective. When talking to TC in focus groups, only a few explicitly indicated their intention to promote and model DC in their future classrooms, such as one who proclaimed, "…I want to go through [digital citizenship] explicitly, I mean even if it's literally taking a day out of my teaching to cover this." And, another teacher candidate echoed the instructor's comments about being having a foundation on which to draw. This was reflected in the comment, "That's probably where what we're going to use in our classroom is we just always revert back to what we can use and how to prepare yourself for when we need to use it."

TC also expressed their own feeling of responsibility for promoting and modeling DC in their future classrooms. One teacher candidate expressed this thought when she

averred, “I think for me knowing what we know now [about digital citizenship] I think it’s part of my job to push that information forward to the students” And, another affirmed, “So I think as pre-service teachers we should like want to teach digital citizenship on top of just how to use the computer properly.”

Chapter 5

DISCUSSION

Initially, the problem driving this action research project was the absence of digital citizenship (DC) instruction as part of teacher preparation in our college since transitioning to a "technology infusion" model in which ISTE Standards•T were taught through content methods courses. An intervention called the Technology Integration Support System (TISS) was developed to assist content methods instructors to provide beneficial DC instruction to teacher candidates (TC) that would influence their future teaching practice. This study was designed to examine the use of the TISS intervention to determine its influence on DC instruction in the college, and the concomitant influence on beliefs and intention to promote and model DC.

Complementarity and Integration of Quantitative and Qualitative Data

Complementarity between quantitative and qualitative data is defined as elaborating, enhancing, or illustrating the findings of one method with those from the other method (Greene, 2007; Greene, Caracelli, & Graham, 1989). Results from this study reveal complementarity in three areas pertaining to the attitudes, beliefs, and intentions held by TC with regard to promoting and modeling DC in their future classrooms.

First, results from post-intervention surveys indicate that after completing the modules and in-class DC instruction using the TISS system, TC had strong positive attitudes about promoting and modeling DC, with a mean score of 5.97 out of 7. This finding was *enhanced* by qualitative data from teacher candidate focus groups, which suggested TC valued the behavior of promoting and modeling DC. Qualitative data also

elaborated on why TC believe promoting and modeling DC is a valuable practice for teachers and what they consider to be favorable outcomes of DC. These ideas are reflected in the theme *Digital Citizenship in Future K-12 Classrooms.*

Qualitative and quantitative data also cross-validated a finding pertaining to beliefs about expectations. Scores from post-intervention surveys revealed that the construct subjective norms, or the belief that they will be expected to promote and model DC in their future classrooms, had the lowest mean score (M=5.50) of the seven constructs measured on the survey. Qualitative data *corroborated* this finding, with several TC claiming that important others, such as school administrators, will not expect them to promote and model DC in their future classrooms. This theme was also reported in *Digital Citizenship in Future K-12 Classrooms*.

According to Greene et al. (1989), complementarity can also *enrich* understanding of a finding. In the present study, qualitative data indicated a belief that TC will be good digital citizens in the future. However, the qualitative data regarding TC teaching DC to their future K-12 students was less clear. Nevertheless, the quantitative data, with a strong mean score (M=5.97) on the post-intervention TPB survey for the construct measuring intention to promote and model DC in their future *enriched* the finding that was present in the qualitative data.

Taken together, the qualitative data are quite complementary to the quantitative data. The qualitative data provide greater depth to the quantitative data because they allow for a better understanding of the numerical data.

Discussion of Findings

Because my position involves working with instructors to influence appropriate use of technology with K-12 students, the TISS intervention was designed primarily as a tool to provide instructor support, while keeping in mind that instructors will influence skills, dispositions, and behaviors with respect to DC and technology use in general during instruction. Appropriately, results of this study include findings related to changes in both instruction and teacher candidates' learning, plus others related to validity of the TPB model in the study's context. Therefore, the discussion of findings is presented in three sections: (a) TISS influence on DC instruction in the college; (b) TISS influence on beliefs, and intent to promote and model DC, and (c) usefulness of the TPB Model. Connections to literature and theoretical perspectives are integrated into each of these sections.

Changes in digital citizenship instruction in the college. When MLFTC first began transitioning to a "technology infusion" approach to prepare TC to meet the ISTE Standards•T, there was an absence of DC instruction for TC. In comparison, during the semester this study took place, DC was taught in nineteen class sections within the teacher preparation program, using the TISS. The mere presence of DC in classes throughout the teacher preparation program is a substantial change from 2011, when the problem of practice for this study was first identified.

Findings of this mixed methods action research study further reveal the manner in which instructors who use the TISS intervention teach DC. Consistent with Staker and Horn's (2012) definition of blended learning, the TISS online modules were designed as an online learning component to be combined with traditional in-class instruction.

Further, the instructional recommendation for using the modules, described in the TISS Instructor's Guide align with Staker and Horn's description of flipped learning, in which teachers deliver content online outside of school time, followed by a face-to-face class session consisting of guided practice or projects.

In the present study, data from classroom observations reveal a striking consistency among instructors teaching all four DC topics using a flipped learning approach, which has been found to be an effective strategy for teaching in higher education settings (Crouch & Mazur, 2001; Mazur, 2009; Pierce, 2013). Instructors uniformly assigned the modules for TC to complete outside of class, and then used in-class time to disseminate the TISS quiz and facilitate discussion, using questions from the Instructor's Guide. When interviewed, instructors verified their use of, and in some cases, their reliance on the TISS materials to teach DC, which gave rise to the consistent instructional approach. Moreover, instructors expressed a high opinion of the content and instructional protocols represented in the TISS.

Changes in beliefs and intent to promote and model DC. Within teacher education, especially methods coursework, goals for student learning go beyond obtaining knowledge about particular teaching topics; rather, instructors hope to shape the future behaviors of TC who will one day be K-12 teachers. In this case, as the action researcher, I hoped to influence intention to promote and model DC in their future classrooms, per the ISTE Standards•T (2008). Thus, the Theory of Planned Behavior (TPB), which has a strong focus on intentions, in this instance, intention to promote and model DC, played a meaningful role in this study as a framework to examine change and predict intention for future TC behavior. Recall from chapter 2, the TPB connects

individuals' beliefs, intentions, and behaviors (Ajzen, 1985; n.d.). The theory maintains that endogenous beliefs about the outcomes of performing a behavior—attitude, beliefs about expectations to perform a behavior—subjective norm, and beliefs about one's ability to perform the behavior—perceived behavioral control influence an individual's intention to perform a behavior. In turn, attitudes, subjective norm, and perceived behavioral control are influenced by exogenous beliefs—behavioral beliefs, normative beliefs, and control beliefs, respectively. Further, more positive attitudes, stronger subjective norms, and greater control beliefs foster a stronger behavioral intention.

In the current study, TC were given retrospective pre-TPB surveys and post-TPB surveys, which were used to measure changes in their beliefs and intent to promote and model DC. According to data from survey results, statistically significant increases were found in all seven TPB constructs, ranging from 0.87 points to 2.38 points on a 7-point scale. Qualitative data from classroom observations and teacher candidate focus groups also indicate a more positive attitude and stronger control beliefs toward promoting and modeling DC in the future. Taken together, these findings suggest that intention to promote and model DC in their future classrooms increased after receiving instruction utilizing the TISS.

Usefulness of the TPB Model. Previous studies examining pre-service and in-service teachers' intention to use technology in the classroom have claimed that the strongest predictors of intent are attitude toward the behavior and perceived behavioral control (Andersen & Maninger, 2007; Sugar, Crawley & Fine, 2004; Teo & Tan, 2012). Attitude has consistently been shown to have the greatest influence, followed by perceived behavioral control. Teo and Tan also found subjective norm to have a

significant, but smaller effect than the other two constructs. Consistent with those earlier findings, quantitative results in the present study show attitude toward the behavior to have the greatest influence on intention to promote and model DC, by a notable margin, followed by perceived behavioral control, and subjective norm, respectively. Further, attitudes toward the behavior, perceived behavioral control, and subjective norm were the only three TPB constructs with which intent was significantly related. The qualitative data in this study corroborated this finding. Specifically, an assertion from chapter 4 suggests positive attitude toward promoting and modeling DC in their future classrooms outweighed their belief that doing so will be expected of them.

Less clear in the present study was the connection between endogenous beliefs and exogenous beliefs about promoting and modeling DC. In the TPB, Azjen (1985; n.d.) asserts, behavioral beliefs influence attitude toward the behavior, normative beliefs influence subjective norm, and control beliefs influence perceived behavioral control. In this study, however, the path coefficients between these constructs were extremely low, scoring .00, .07, and .12 respectively. This was surprising, given the longevity of the theory in the scholarly literature and the vast number of studies in which it has been successfully used to frame the inquiry into an intention.

In chapter 2, the Teo and Tan (2012) study was cited as a TPB validation study, for use in studies with teachers using technology; however, it is important to note that the researchers did not focus on the correlation between the exogenous beliefs and the antecedent endogenous beliefs. Rather, the validation study examined the TPB as a model to predict intention of computer use, focusing solely on the endogenous belief constructs—attitude toward the behavior, perceived behavioral control, and subjective

norm as predictors of intention. Moreover, another study performed by Shiue (2007) rejected the TPB because the researcher found the TPB to be too simplistic to accurately predict teachers' use of technology. As a result, the researcher revised the model to include additional pathways beyond those typically present in a TPB model. See Figures 2 and 3 on pages 41 and 71. Note there are a limited number of paths indicating specific narrowly assumed influences. For example, behavioral beliefs influence attitudes toward the behavior; normative beliefs influence subjective norms; control beliers influence perceived behavioral; and attitudes toward the behavior, subjective norm, and perceived behavioral control influence intention. Thus, although the quantitative findings from the present study were not fully aligned with all aspects of the TPB, neither did they conflict with the previous validation studies using the theory with teachers and classroom technology cited in chapter 2. The outcomes obtained in the present study suggest additional research may be warranted to more closely examine how the three exogenous belief variables on the far left-hand side of Figure 2, influence the endogenous belief variables in the middle of the TPB model in Figure 2.

Limitations

As with any study, there are factors that may have influenced outcomes in the present study and which are not directly related to the intervention. One limitation that should be noted is selection bias of instructor participants (Creswell, 2014). During the semester the study took place, thirteen different instructors utilized the intervention throughout the teacher preparation program. The five instructors who participated in the study were invited to do so, and each one agreed. Although they were selected based on criteria such as their role as an elementary or secondary instructor and their experience or

lack thereof with respect to teaching DC, all five instructors were also available, communicative, and willing to be observed. These characteristics may have biased the sample toward more collaborative and engaged instructors, rather than non-communicative and uninvolved instructors.

Another limitation to consider is the Hawthorne effect (Smith & Glass, 1987). Consistent with the typical action research process, I was both the researcher and the observer/data gatherer for this study. As the researcher, I was in regular communication with instructor participants, observed their classes throughout the semester, and facilitated individual interviews with each. The extra attention they received may have influenced their implementation of the TISS intervention. Because the study's methodology called for the observations and interviews with participants, this threat to validity was unavoidable. However, to minimize disparity between instructors who were study participants and those who were not, I made an effort throughout the semester to communicate with all instructors on a regular basis. I emailed all thirteen instructors with tips on teaching DC, clarification on various quiz items, and supplementary resources to use for in-class discussions. Additionally, Jan, Stacey, and I (the three technology-infusion specialists) offered to meet with all instructors on an individual basis.

A third limitation has to do with the pre-survey. In a previous semester, I gave TC a pre-intervention survey similar to the one used in this study. The completion of this survey was hampered by the fact that they did not understand the term "digital citizenship" and were unable to appropriately evaluate and rate items regarding their beliefs and intention toward promoting and modeling it in their future classrooms. To remedy that issue, a retrospective pre-intervention survey was used in the present study.

Specifically, in this type of procedure, a typical post-intervention survey is followed about one week later by a retrospective assessment that asks participants to think back to before the study began and rate themselves on the survey items based on what they now know about the topic, in this case DC. Although the use of retrospective pre-intervention surveys is a topic of debate in methodology research literature, some maintain that it is preferable to minimize response bias. Lam and Bengo (2003) specifically recommend the post-intervention survey plus retrospective-pre-intervention survey approach, which this study employed; however, the researchers also claim additional research is needed to validate approaches for measuring change.

The length of the study is the final limitation that should be noted. During the course of this study, which was a 15-week semester, beliefs and intentions to promote and model DC were examined. However, the TPB is intended to link beliefs, intentions to perform a behavior, and the actual manifestation of the behavior itself (Ajzen, n.d.). Ideally, a longitudinal study would allow observations of TC as in-service teachers and follow-up interviews to determine whether they perform the behavior (promote and model DC) in their classrooms. Because this study was confined to one semester, data on actual classroom behavior were not collected.

Implications for Practice

Using a technology infusion approach to prepare TC to meet the ISTE standards makes a lot of sense, considering it presents models for the integration of technology, pedagogy, content in which we want TC to engage in their future classrooms. Nevertheless, methods instructors' lack of expertise in instructional technology and the ISTE standards presents a barrier to implementation. Prior to embarking on this action

research project, MLFTC instructors were not well versed in a critical ISTE standard, which focuses on the responsible use of technology, i.e., digital citizenship.

Data from this action research study provide evidence that the TISS can effectively break down these barriers and afford a way to effective DC instruction in content methods courses. The findings from this study reveal several positive outcomes resulting from use of the TISS, including the following: (a) instructors used a flipped learning approach, which research suggests is an effective teaching strategy in higher education, to teach DC, (b) TC received accurate information about DC by completing the modules, and (c) intention to promote and model DC increased after receiving instruction. In addition, instructors conveyed having completed the DC modules themselves to prepare for in-class discussions, rendering the TISS as an embedded form of professional development.

Based on these outcomes, I plan to continue using the TISS for DC instruction in MLFTC and hopefully expand its use to additional teacher preparation courses in the college's graduate programs. I will also consider developing additional TISS interventions for technology infusion topics other than DC. Further, I plan to find additional ways to serve as a leader in the area of instructional technology and DC, such as joining the leadership team for the new ISTE Digital Citizenship Professional Learning Network (PLN), which I have recently committed to per invitation from leadership personnel at ISTE.

Moreover, I believe that this study has implications for practice beyond my own situated context, as other colleges of education begin to infuse technology into content methods coursework. For example, the University of Nebraska Omaha is one such

university whose college of education is embarking on a pathway toward a technology infusion approach (anonymous faculty member, personal communication, July 2014). I suspect that as colleges of education begin this journey, they will face similar challenges as MLFTC, since instructors teaching content methods courses will have the added responsibility of teaching the ISTE standards, perhaps without benefit of being proficient with it themselves. Should other institutions encounter difficulty in ensuring DC instruction for TC, the TISS intervention may be a useful tool. Additionally, the TISS model could serve as a guide for the development of similar interventions for other topics with which instructors may be unfamiliar. For example, modules for college methods courses on the use of specific technology tools might be developed to demonstrate how the tools can be used to effectively integrate technology into K-12 instruction, consistent with the ISTE Standards•T.

Implications for Future Research

Results from this study suggest two main areas of future research. The first area pertains to measuring change in instructors who use the TISS. At the onset of this study, I was interested in how the instructors would use the TISS materials and what their classroom instruction would entail, whereas I focused on *measuring change* in beliefs and intentions of TC. As I analyzed the qualitative data, I realized that, during post-intervention interviews, instructors began to describe ways in which they had changed during the course of the study; however, I had not employed instructor surveys to quantitatively measure the extent of instructor change. In future cycles of action research, I would include a research question such as, "How and to what extent does the TISS influence instructor change?" I would also incorporate an instructor survey to

quantitatively measure increases in DC content knowledge and efficacy for teaching it to TC. I suspect this line of inquiry would produce compelling findings that would shed further light on the value of the TISS as an intervention for higher education instructors.

A second implication for future research involves longitudinal data collection. I chose the TPB to guide this study because of its focus on intention to perform a behavior, which is befitting a teacher preparation context in which instructors strive to influence the intentions of TC and ultimately, their future behaviors. According to the TPB (Ajzen, 1985; n.d.) individuals' beliefs influence intention; and, intention influences behavior. As previously noted in the Limitations section, the one-semester time frame of this study did not allow for examination of actual behaviors in the classroom. For that reason, I would extend this study into student teaching and in-service teaching experiences to determine whether TC who participated in the present study do, in fact, promote and model DC in their future classrooms.

Personal Lessons Learned

I have been a practitioner in the field of education for over 20 years, and in a position of change leadership for approximately 14 years. Prior to my experience conducting action research, my perception of scholarly research was limited. Due to that limitation, I previously held beliefs that were consistent with many other educators who believed that research could be found to support just about anything, including the inane, therefore rendering it somewhat pointless. As a result, my practice was devoid of a scholarly base on which I could draw. Thus, I relied primarily on my experience and intuition to guide me. Then, when I embarked on this action research journey, the adage,

When the student is ready, the teacher appears held true, as I learned the value of being a "scholarly and influential practitioner."

Through the experience of identifying a problem of practice, exploring the scholarly literature and theoretical frameworks, planning, implementing, and evaluating an innovation, I learned how to consume research in a discerning manner. By evaluating various components of published studies, such as the methodology, data analysis, results, and findings, one can determine its quality and rigor. Gaining this understanding has changed my perspective about the value of educational research because I can now discern quality, reliable research that contains useful information, from substandard or highly biased research. Additionally, I am better prepared to then use the research I deem valuable to begin an inquiry or gain perspective on a problem.

I also learned that skills and processes employed in effectual research are also extremely valuable for practitioners and leaders of change. Many examples come to mind, one being related to complementarity as a way to enrich understanding. Mixed methods researchers seek complementarity to obtain more complete understanding of results from data. Quantitative and qualitative data can corroborate one another by building upon the other to enrich interpretation and deepen meaning. As a leader-practitioner, I learned that complementarity is a useful concept that can be easily applied to practice. Specifically in my current practice, complementarity can apply to obtaining information about professional development and other initiatives that I lead. This can be achieved by collecting data through multiple sources, such as surveys that contain both Likert-scale and open-ended items, informal and formal discussions with participants, and observation protocols. The qualitative data, which include rich discussions, can be

used to enhance, clarify, or elaborate the quantitative data provided by participants, and vice-versa. By collecting both quantitative and qualitative data, I can obtain a more thorough understanding of participants' needs and the effectiveness of my attempts to support them with professional development.

In sum, the most valuable lessons of the action research process resulted in the development of my personal belief system about what it means to be a "scholarly and influential practitioner" who values research and who can use it to guide my professional practice and influence the efforts of other educators. I now feel more confident to consume research and ascertain what can be useful in my practice. I also feel better prepared to employ newfound skills acquired through my experience as an action researcher to improve my practice as a leader-practitioner.

Conclusion

By viewing education through the lens of educational technology, 2015 is indeed an exciting time. Schools and districts are acquiring technology at a rate faster than ever before. It appears that a new generation of teachers and administrators are embracing the ideas articulated in the National Education Technology Plan (US ED, 2010-a) regarding the use of technology for research, communication, collaboration, and problem solving, and other 21st century competencies. And, although in some cases the motivator for technology purchases is imminent testing that students will complete online, it is likely that teachers and students who have not previously had access to technology for classroom use, soon will.

I began my teaching career over two decades ago and became passionate about educational technology when I realized how teachers can use it to encourage critical

thinking and problem solving skills through constructivist and project-based approaches. Since that time, I have worked tirelessly to spread my passion to others so that students can benefit from increased use of classroom technology, integrated effectively into teaching and learning practices. Perhaps needless to say, I am overjoyed to see so much technology entering classrooms!

In my current position in MLFTC, I have the opportunity to share what I know about instructional technology with teacher preparation instructors and TC. I do this by leading a team of three technology infusion specialists (including me) to develop lessons that model technology integration strategies, provide professional development to course instructors, and on occasion, visit education classes to talk to TC about the advantages of using technology to teach. That being said, I feel strongly about teaching the tenets of responsible use, i.e., digital citizenship. Further, I believe that it is irresponsible to profess the use of classroom technology without also discussing DC. Besides being one of the five themes articulated in the ISTE Standards•T, preparing TC to promote and model DC is simply the right thing to do. Initially, as we began to infuse technology into methods coursework and DC was left out of required coursework, I felt very concerned. As a result, I set out to develop an intervention that would afford DC instruction for TC in MLFTC. The resulting outcome was the TISS.

The findings of this action research study suggest that using the TISS led to positive outcomes for the college and for TC. Now, all MLFTC undergraduates in teacher preparation programs receive DC instruction through the modules and in-class instruction. This instruction led to more positive beliefs and a stronger intent to promote and model DC in future classrooms. These outcomes exceeded my expectations. Now, I

feel comfortable with respect to the instruction the TC in our college receive about how to use technology responsibly and ethically, and to teach their K-12 students to do the same. I look forward to seeing how far this intervention goes in our college and beyond, and the influence it may have on classrooms of tomorrow and this generation of 21st century learners!

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APPENDIX A

THEORY OF PLANNED BEHAVIOR

POST AND PRE-RETROSPECTIVE SURVEY INSTRUMENT

Dear Student:

I am a graduate student in the Mary Lou Fulton Teachers College at Arizona State University. I am conducting a research study to measure the effectiveness of an instructional practice designed to prepare teacher candidates to be successful in 21st century classrooms.

I am recruiting individuals to take a survey, which will take approximately 10 minutes in class.

Consent to Participate: Your participation in this study is voluntary. Please read the following consent statement and if you agree, please click the "next" button to give consent and proceed to the survey.

After reading the recruitment letter for this project, I agree to participate in the survey being conducted. I understand the survey will take approximately 10 minutes to complete. I understand that my grade in this class will not be affected if I opt out of taking the survey.

If you have any questions concerning the research study, you may contact the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Thank you,

LeeAnn Lindsey

This survey contains questions regarding your beliefs about promoting and modeling digital citizenship in your future class. Please read each question and click the radio button for the number that best represents the extent to which the belief holds true for you.

PERCEIVED BEHAVIORAL CONTROL, SUBJECTIVE NORM, ATTITUDE, AND INTENTION

1. For me to promote and model digital citizenship in my future class will be

7 extremely easy	6	5	4	3	2	1 extremely difficult
○	○	○	○	○	○	○

2. Most people in education whom I respect professionally think that I should promote and model digital citizenship in my future class

7 should	6	5	4	3	2	1 should not
○	○	○	○	○	○	○

3. For me to promote and model digital citizenship in my future class is

7 extremely good	6	5	4	3	2	1 extremely bad
○	○	○	○	○	○	○

4. I plan to promote and model digital citizenship in my future class

7 extremely likely	6	5	4	3	2	1 extremely unlikely
○	○	○	○	○	○	○

5. Whether or not I promote and model digital citizenship in my future class will be entirely up to me

7 strongly agree	6	5	4	3	2	1 strongly disagree
○	○	○	○	○	○	○

6. Most of the other future teachers in my class/cohort will promote and model digital citizenship in their future classrooms

7 definitely true	6	5	4	3	2	1 definitely false
○	○	○	○	○	○	○

7. For me to promote and model digital citizenship in my future class is

7 extremely worthwhile	6	5	4	3	2	1 extremely worthless
○	○	○	○	○	○	○

8. I am confident that if I wanted to I could promote and model digital citizenship in my future class

7 definitely true	6	5	4	3	2	1 definitely false
○	○	○	○	○	○	○

9. It is expected of me that I will promote and model digital citizenship in my future class

7 definitely true	6	5	4	3	2	1 definitely false
○	○	○	○	○	○	○

10. For me to promote and model digital citizenship in my future class will be

7 extremely rewarding	6	5	4	3	2	1 extremely unrewarding
○	○	○	○	○	○	○

11. I will make an effort to promote and model digital citizenship in my future class

7 I definitely will	6	5	4	3	2	1 I definitely will not
○	○	○	○	○	○	○

12. For me to promote and model digital citizenship in my future class will be

7 possible	6	5	4	3	2	1 impossible
○	○	○	○	○	○	○

13. Most people whose opinions I value would approve of my promoting and modeling digital citizenship in my future class

7 strongly agree	6	5	4	3	2	1 strongly disagree
○	○	○	○	○	○	○

14. For me to promote and model digital citizenship in my future class is

7 interesting	6	5	4	3	2	1 boring
○	○	○	○	○	○	○

15. I intend to promote and model digital citizenship in my future class

7 strongly agree	6	5	4	3	2	1 strongly disagree
○	○	○	○	○	○	○

BEHAVIORAL BELIEFS

16. If I promote and model digital citizenship in my future classroom, my students will become responsible technology users.

7 likely	6	5	4	3	2	1 unlikely
○	○	○	○	○	○	○

17. If I promote and model digital citizenship in my future classroom, my students will be better prepared for their future.

7 likely	6	5	4	3	2	1 unlikely
○	○	○	○	○	○	○

18. If I promote and model digital citizenship in my future classroom, cyberbullying will decrease.

7 likely	6	5	4	3	2	1 unlikely
○	○	○	○	○	○	○

19. If I promote and model digital citizenship in my future classroom, my students will exhibit safe online behavior (such as not giving out personal information).

7 likely	6	5	4	3	2	1 unlikely
○	○	○	○	○	○	○

20. If I promote and model digital citizenship in my future classroom, I will be able to integrate more technology into my curriculum.

7 likely	6	5	4	3	2	1 unlikely
○	○	○	○	○	○	○

NORMATIVE BELIEFS

21. School principals think that teachers should/should not promote and model digital citizenship in the classroom.

7 should	6	5	4	3	2	1 should not
○	○	○	○	○	○	○

22. Parents think that teachers should/should not promote and model digital citizenship in the classroom.

7 should	6	5	4	3	2	1 should not
○	○	○	○	○	○	○

23. My professors at ASU think that teachers should/should not promote and model digital citizenship in the classroom.

7 should	6	5	4	3	2	1 should not
○	○	○	○	○	○	○

24. Students (in my future classroom) think I should/should not promote and model digital citizenship in the classroom.

7 should	6	5	4	3	2	1 should not
○	○	○	○	○	○	○

25. Common core standards state that teachers should/should not promote and model digital citizenship in the classroom.

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

CONTROL BELIEFS

26. I am knowledgeable about copyright and fair use.

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

27. I am knowledgeable about digital footprint & social media use.

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

28. I am knowledgeable about acceptable use policies.

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

29. I am knowledgeable about fostering appropriate student technology use (e.g., cybersafety & cyberbullying).

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

30. I know about resources (lesson plans, websites, etc.) to use to help teach students about digital citizenship.

7 true	6	5	4	3	2	1 false
○	○	○	○	○	○	○

DEMOGRAPHICS

31. In which program are you enrolled?

- ○ Elementary (EED)
- ○ Special Education/Elementary Dual Cert (SPE)
- ○ Early Childhood (ECD)
- ○ Bilingual/English as a Second Language (BLE)
- ○ Secondary (SED)

32. In which course are you taking this survey?

- ○ EED 324
- ○ SED 322

33. What is your gender?

- ○ Male
- ○ Female

34. What is your age (in years)?

35. How would you describe your comfort level with technology?

7 extremely comfortable	6	5	4	3	2	1 extremely uncomfortable
○	○	○	○	○	○	○

***36. Please create a unique identifying code using the first 3 letters of your mother's first name and the last 3 numbers of your ASU ID (ex. RUT464). This information will only be used for data analysis.**

APPENDIX B

TEACHER CANDIDATE FOCUS GROUP PROTOCOL

Distribute materials	Consent Form
Moderator introduction, thank you and purpose (1 minute)	Hello. My name is LeeAnn Lindsey. I'd like to start off by thanking each of you for taking time to come today. We'll be here for about twenty to thirty minutes. The reason we're here today is to get your thoughts, as future teachers, about issues related to technology use in the classroom. I'm going to lead our discussion today. I am not here to convince you of anything or try to sway your opinion. My job is just to ask you questions and then encourage and moderate our discussion. The conversation will be recorded so that I can recall the conversation. But you will be anonymous.
Groundrules (2 minutes)	I'm going to ask a series of questions. The first question I'd like everyone to answer, but after that I'd like it to be more of a conversation. So, everyone doesn't have to answer every question. You can add comments if you'd like to expand on an idea or have thoughts that are different than what another student has said. I would like to hear from each of you some time throughout the conversation. There are no "wrong answers," just different opinions. Say what is true for you, even if you're the only one who feels that way. Don't let the group sway you. But if you do change your mind, just let me know. Each time you speak, you will first state "student one," "student 2," etc. so that when I listen back to the recording, I can keep track of who is speaking, without using your names.
Introduction of participants (2 minutes)	Before we start talking about technology, I'd like to meet each of you. Please tell me: • Please state your major and content area, for example, secondary education, science.
Specific questions (15-18 minutes)	1. In your own words, describe what "digital citizenship" means.

	If students' answers vary or are inaccurate: "Thank you for sharing those thoughts. So that we are all on the same page for the rest of the conversation, from this point on we will use the following definition of digital citizenship: the norms of appropriate, responsible behavior with regard to technology use." 2. Describe an example of a teacher behaving irresponsibly or unethically with regard to technology use. 3. How important is it for teachers to be good digital citizens? 4. Describe an example of an elementary or high school student violating these norms. 5. How important is it for elementary and secondary teachers to teach their students to be good digital citizens? 6. Do you think you will be expected to model and teach digital citizenship in the future? 7. How confident are you in your ability to model and teach digital citizenship in the future? 8. What, if anything have you learned within your teacher education courses about digital citizenship? 9. Is there anything else you'd like to say regarding digital citizenship?
Closing **(2 minutes)**	Thanks for coming today and talking about technology use and digital citizenship. Your comments have given me lots of different ways to see this issue. I thank you for your time.

APPENDIX C

INSTRUCTOR INTERVIEW PROTOCOL

Distribute materials	Consent Form
Moderator introduction, thank you and purpose (1 minute)	Hello. My name is LeeAnn Lindsey. I'd like to start off by thanking you for taking time to come today. We'll be here for about twenty to thirty minutes. The reason we're here today is to get your thoughts, as an instructor of (EED 324/SED 322). The conversation will be recorded so that I can recall the conversation.
Groundrules (1 minute)	I'm going to ask you a few questions related to teaching digital citizenship this semester, but the questions are just a starting point. Feel free to talk about things that I don't ask a direct question about. Your input will inform a study that seeks to improve the technology infusion program in Mary Lou Fulton Teachers College.
Introduction of participant (2 minutes)	To begin, please tell me a little bit about yourself: • How long have you taught at MLFTC? • What courses do you teach? Which one involves digital citizenship? • How many semesters have you taught this course? Taught digital citizenship? • Anything else that you want to add?
Specific questions (15-20 minutes)	1. What does the term "digital citizenship" mean to you? If the response is inaccurate: "Thank you for sharing your thoughts. So that we are on the same page for the rest of the conversation, from this point on we will use the following definition of digital citizenship: the norms of appropriate, responsible behavior with regard to technology use." 2. When you learned that this course had a digital citizenship component to it, how did you feel about it? 3. Now that digital citizenship instruction is complete, how do you think it went? 4. What helped you to teach digital citizenship?

	5. Were there any barriers? 6. How effective were the modules in helping students develop understanding about digital citizenship? 7. What did you do to enhance what students learned in the modules? 6. Will the teacher candidates in your class model good digital citizenship, from now on? 7. Will they teach their future students to be good digital citizens? 10. Have your own beliefs or understanding of digital citizenship changed, in any way, since you began teaching it? If so, how? 11. Is there anything else you'd like to say regarding digital citizenship?
Closing **(2 minutes)**	Thanks for coming today and talking about digital citizenship instruction in your class this semester. Your comments have given me lots of different ways to see this issue. I thank you for your time.

APPENDIX D

LETTER OF CONSENT

Preparing Teacher Candidates for 21st Century Classrooms:
A Study of Digital Citizenship

RESEARCHER
LeeAnn Lindsey, doctoral student at Arizona State University, has invited your participation in a research study. This study is under the direction of Ray Buss, professor in the Division of Educational Leadership and Innovation.

STUDY PURPOSE
The purpose of the study is to determine the extent to which an instructional intervention in the Mary Lou Fulton Teachers College impacts teacher candidates' beliefs and attitudes about digital citizenship.

DESCRIPTION OF RESEARCH STUDY
If you decide to participate, then you will join a study involving research of an instructional intervention.

If you say YES, then your participation will last for a total of approximately 90 minutes, some of which will be during class time (i.e., the dissemination of surveys and coordination of a student focus group), and some which will be at a time and location that we agree upon (i.e., an interview). You will be asked to:

1. **Schedule and allow two class observations to take place**
   The researcher will observe two partial class periods throughout the semester (September through November 2014) taught by the instructor participants, during which they are facilitating class discussions about digital citizenship. These observations dates/times should be determined no later than August 31, 2014.

2. **Recruit/Select students to participate in focus group**
   The researcher will conduct a focus group with 5-6 students from each instructor' class. The focus groups will take place, post intervention, in November 2014. The instructor will help identify and select volunteers to participate in the focus group.

3. **Schedule a time for a class survey and student focus group to take place (same class period)**
   The researcher will proctor survey 1, which will be given in class, post intervention, in November 2014. It should take students approximately 10 minutes to complete. The date/time for survey dissemination should be determined no later than August 31, 2014.

4. **Disseminate a survey to students**
   The researcher will provide instructors the link to Survey 2, which they will proctor during class one week after Survey 1. It should take students approximately 10 minutes to complete. The researcher will provide the survey link to instructors; instructors will be asked to disseminate the link to students and provide time during class for them to take it.

5. **Participate in an interview with LeeAnn Lindsey**
   The researcher will conduct an interview with each instructor. The interview will last approximately 30-45 minutes. Interviews will be conducted prior to November 27, 2014.

RISKS
There are no foreseeable risks for taking part in this study.

BENEFITS
There is no direct benefit to your for your participation. Possible benefits may include course revisions for digital citizenship content, and support for teaching digital citizenship in future semesters

CONFIDENTIALITY
All information obtained in this study is strictly confidential. The results of this research study may be used in reports, presentations, and publications, but the researcher will not identify individuals. Pseudonyms will be used to identify each participant. In order to maintain confidentiality of your records, survey results will be password protected, and other documents containing data will be stored on a password-protected computer to which LeeAnn Lindsey only has access. No one besides LeeAnn Lindsey will be able to link any responses to individual study participants. All files will be destroyed three years after the end of the project.

WITHDRAWAL PRIVILEGE
Participation in this study is completely voluntary. It is ok for you to say no. Even if you say yes now, you are free to say no later and withdraw from the study at any time without penalty or loss of support by the technology infusion coordinator.

Your decision will not affect your relationship with Arizona State University or otherwise cause a loss of benefits to which you might otherwise be entitled.

COSTS AND PAYMENTS
There is no compensation for participating in this study. However, you may receive refreshments during or after the interview session, as a token of appreciation for your time.

VOLUNTARY CONSENT
Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by: LeeAnn Lindsey, Co-Investigator at llindsey@asu.edu or 602-543-8322.

If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk; you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480-965 6788.

Your signature below indicates that you consent to participate in the above study, and be audio recorded during the interview session.

_____	_____	_____
Subject's Signature	Printed Name	Date

APPENDIX E

PERMISSION TO USE SPEAK UP SURVEY DATA

Permission to Use Speak Up Data

Organization Name	Arizona State University				
Contact:	LeeAnn Lindsey				
Mailing Address	PO Box 37100				
City	Phoenix	**State**	AZ	**Zip**	85069-4908
Email address	llindsey@asu.edu	**Phone**			
Speak Up Years	2013	**Usage**	Dissertation – lit review		
When will data be published:	2015				

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Julie Evans
Chief Executive Officer

Date Permission Granted: March 9, 2015

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