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Pennsylvania Teachers' Perceptions and Use of Social Media Communication Technologies as a Pedagogical Tool

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PENNSYLVANIA TEACHERS' PERCEPTIONS AND USE OF SOCIAL MEDIA COMMUNICATION TECHNOLOGIES AS A PEDAGOGICAL TOOL

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A number of states and organizations have begun to add cross-content technology elements to their educational standards, providing teachers opportunities to use social media communication (SMC) technology in teaching and learning. Specifically, in the Commonwealth of Pennsylvania, the PA Core Standards, which are adapted from the national Common Core Standards, require students to use technology. The standards explicitly include the use of the Internet, to publish and edit students' writing in response to feedback as well as gather, analyze, and critique digital text sources. Although empirical evidence suggests K-12 educators have positive perceptions of the use of SMC as a pedagogical tool, there is evidence to suggest actual use in educational settings is limited. This study provides empirical evidence of how teachers use SMC in teaching and learning.

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TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

CHAPTER ONE

THE PROBLEM

Background of the Problem

The dynamic of social media communication and technology use in education has been an evolving relationship. In 2008, when social media was seen as a personal tool, the discussion revolved around the appropriateness of teachers having a personal online presence (Kist, 2008). As society became more familiar with social media, funding streams made it possible for public school districts to equip classrooms with technology (Pennsylvania Department of Education, 2007). The availability of a better technological infrastructure and advancement in Internet technology brought about the concept of Web 2.0. The term Web 2.0 refers to programs and applications, which allow users to interact with information from multiple sources, creating a network with other users that delivers a rich, interactive experience (Reilly, 2007). Social media communications are Web 2.0 Internet connected applications. Advantages of teachers using technology and social media to foster 21st century skills have been a driving force in technology initiatives in education within the United States of America (Capo & Orellana, 2011; Lowther, Inan, Ross, & Strahl, 2012; Pennsylvania Department of Education, 2007; Windschitl & Sahl, 2002). At the intersection of technology initiatives and student learning are teachers. In order to implement the use of social media, technology initiatives, and 21st century teaching and learning with fidelity, teachers' beliefs and intended plans to adopt such tools into their pedagogical practices are important to understand.

Kist (2008), in a report of his practitioner inquiry, investigated pre-service teachers' attitudes towards a 2007 recommendation from the Ohio Education Association

and Ohio Department of Education recommending teachers should not use social media in their personal life. Kist (2008) found the themes that developed from speaking with his pre-service teachers. A prominent theme showed some pre-service teachers were defiant, expressing it was possible to use social media and maintain personal privacy. In the Commonwealth of Pennsylvania, the American Civil Liberties Union (ACLU) has challenged school districts over their social media policy on grounds of hindering free speech of school employees (Pennsylvania School Board Association, 2016). The Pennsylvania School Board Association cautions districts to weigh the need for limiting teachers' participation and speech through social media if other policies already address teachers' public and private speech in other mediums.

Sluder and Andrews (2010) published a study which gauged the level in which school administrators use social media, specifically Facebook, to investigate teacher candidates interviewing for a position. A total of 17 school administrators (eight assistant principals, eight building level principals, and one district official) from two different school districts were surveyed. Results showed that 33% of the school administrators do not use Facebook to screen applicants interviewing for a teaching position. Sluder and Andrews' (2010) study suggests the concern over teachers' personal use of social media affecting their professional position as a teacher was beginning to diminish.

In 2007, Pennsylvania created the Classrooms for the Future grant with the goal of developing 21st century teaching and learning (Pennsylvania Department of Education, 2007). The monies for which school districts could apply would be used to purchase technology and build a working technological infrastructure within a school building. The grant explicitly stated it was not to be used solely for computers and other technology,

but mentions a specific portion must fund teacher training. An earlier national grant for technology and telecommunication services was called E-rate (Federal Communications Commission, 2016). E-rate was created by the United States Congress in 1996 and was placed under the Federal Communications Commission. With the goal of creating an infrastructure for schools and libraries, eligible institutions would receive discounts on Internet and telecommunication access as well as internal connections within the building. Schools' and libraries' level of poverty and geographic region determined the level of discounts received. Rural and higher poverty institutions received the highest discounts of up to 90%.

With a developing infrastructure, the use of student-centered applications began to find a place in education. Technologies that were being introduced into the classroom by teachers consisted of podcasts, blogs, wikis, social bookmarking, social networking tools, social media sharing tools, collaborative writing tools, visual 3D community platforms, and social library tools. Teachers were starting to show positive perceptions and willingness to adopt such technologies into the classroom (Yuen, Yaoyuneyong, & Yuen, 2011). However, there was a gap between teachers' positive perceptions and their actual implementation of social media into their classroom. Although teachers recognized the advantages of social media technology, they were unwilling to fully implement the use as part of their teaching practice.

With infrastructure funding available, implementation lacked a clear direction. Districts did not have a clear path or model to use to implement the development of 21st century teaching and learning. Rich (2010) interviewed 11 education experts, which included university professors, individuals from technology and educational based

businesses, teachers, and educational policy-makers, and found none of the interviewees were in agreement when defining 21st century skills.

The use of technology in education followed a trend of equipping students with individual devices. The trend manifested itself as either a one-to-one initiative or a bring your own device (BYOD) policy (Parsons & Adhikari, 2016; Penuel, 2006). Such policies had pros and cons. BYOD required individual families to provide the physical Internet-connected device while the school provided the infrastructure. Even though BYOD was an opportunity for school districts to save money on physical technology, it opened the door to security concerns, connectivity issues, and equity issues in areas with poverty. One-to-one initiatives offered students an opportunity to learn on a more equitable level when the school district provides the Internet-connected device. Although network security concerns and accessibility to technology problems were mediated, vandalism and budgetary concerns hindered adoption.

Initiatives that focused on the technology, whether BYOD or one-to-one, were not finding much success. Lowther, Inan, Ross, and Strahl (2012) studied Michigan's one-to-one initiative called Freedom to Learn (FTL). Lowther et al. (2012) found FTL moved the adoption of technology into classrooms forward, but only on a moderate level. Lessons were observed to be more student-centered and interactive, even though students' state test scores did not increase.

Social media communications offer the opportunity for lessons to be more student-centered which allows for stronger student buy-in (Akbari, Baderi, Yazdi, Simons, & Pilot, 2016). As schools are encouraged to embrace and integrate social media communication technology into instructional practices (Krutka & Carpenter, 2016)

school-wide technology initiatives may fail, wasting valuable resources. Social media communications allow teachers to blend the use of technology with fostering 21st century teaching and learning. Without teachers' sincere intentions to use social media communications as part of their teaching practices, initiatives calling for the blending of 21st century skills with technology could fail, since teachers are the ones responsible to implement and adapt new strategies into classrooms (Cakir, Yukselturk, & Top, 2015).

Statement of the Problem

A review of the literature shows the majority of the empirical literature focuses on the post-secondary level, leaving a need for empirical research on high school level teaching practices (Capo & Orellana, 2011). Current empirical studies situated in the high school level focus on teachers' social media use as a personal professional development tool (Carpenter & Krutka, 2014; Davis, 2015; Owen, Fox, & Bird, 2016) or offer a stance as practitioner inquiry using case studies (Albert, 2015; Krutka & Milton, 2013).

In addition to identifying a need for empirical research on the secondary level of education, there is a need to understand to what extent the role of outside factors affect teachers' social media use in their classroom teaching practices. Factors such as teachers' perception of their school policy, school climate, and community expectations of social media use and integration are lacking. Several studies investigate teachers' attitudes (Lee, Lee, & Kim, 2015; Yuen, Yaoyuneyong, & Yuen, 2011), report on usage levels with descriptive statistics (Asterhan & Rosenberg, 2015), or survey teachers' plans to integrate social media, without examining the larger picture (Capo & Orellana, 2011; Chuang, Weng, & Huang, 2015; Lu & Yang, 2014) when studying social media communications.

This study has examined and added to the empirical body of literature that focuses on high school level teachers' intentions to use social media communications as part of their teaching practices. This study also examined factors beyond the teachers' attitudes and intentions toward social media use in education. The study reports teachers' social norms in the form of their perceptions of stakeholders' expectations, as well as teachers' perceived behavioral control in the form of their perceptions of how much control they have over the factors that hinder or enable their use of social media as a pedagogical tool.

Theoretical Framework for the Study

The theory of planned behavior (Ajzen, 1991) provided the primary theoretical framework for the study. Consisting of four constructs – attitudes toward the behavior, subjective norm, perceived behavioral control, and intention – the theory of planned behavior is designed to predict and explain the occurrence of a specific behavior.

Supporting the theory of planned behavior is a construct of technology readiness, developed by Parasuraman (2000) to understand a company's willingness to embrace new technologies. The technology readiness index (Parasuraman, 2000) determines individuals' level of technology readiness by assessing his or her perceptions of technology through four dimensions – optimism, innovativeness, discomfort, and insecurity.

Providing the foundation of the theoretical framework for this study was the Framework for 21st Century Learning (P21.org, 2009). According to the Partnership for 21st Century Skills (P21.org, 2009), The Framework for 21st Century Learning was developed to guide school leaders and practitioners to integrate 21st century skills into core academic subjects. The framework is built around what are called 21st century

student outcomes – core subject and 21st century themes, learning and innovation skills, information, media, and technology skills, and life and careers skills – which are the knowledge and skills teachers should help students master to be successful in the 21st century world (P21.org, 2009). Figure 1 provides a visual representation of the Framework for 21st Century Learning.

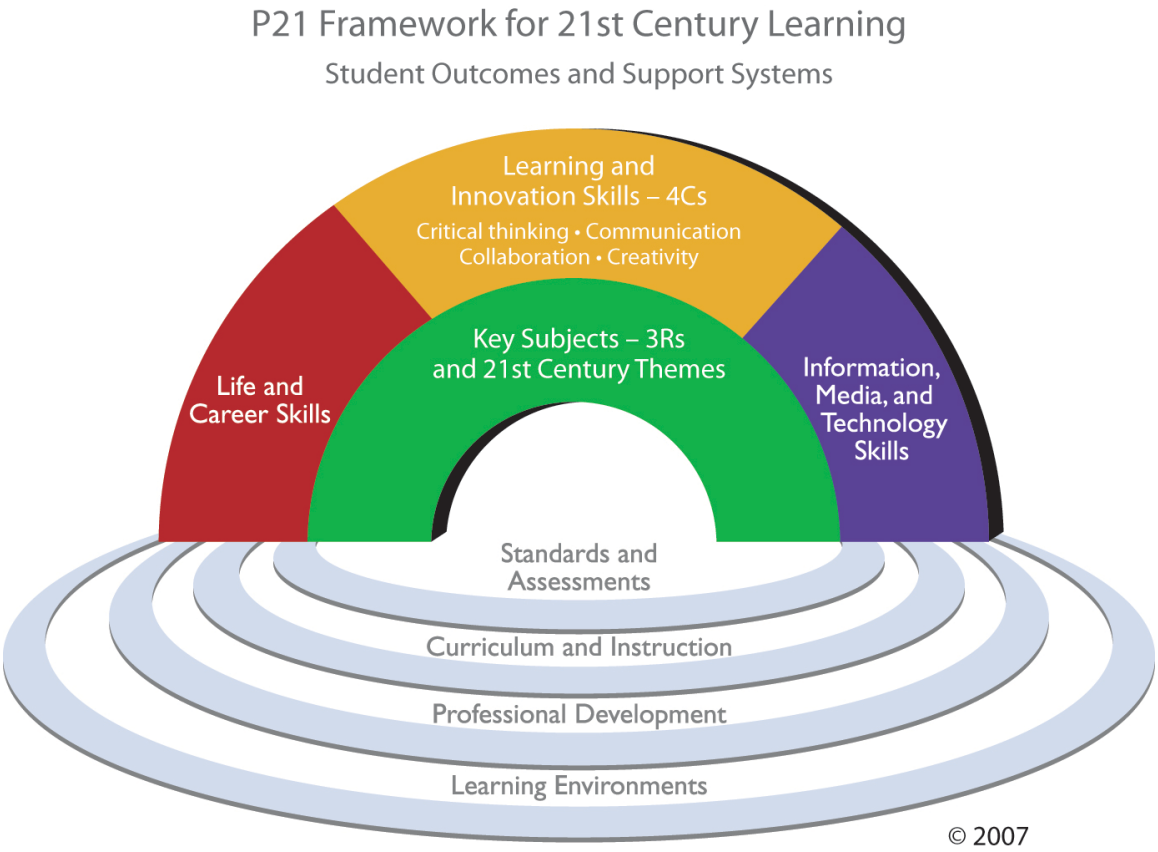

Figure 1. Framework for 21st Century Learning. Student outcomes, life and career skills, learning and innovation skills, information, media, and technology skills, key subjects, are represented in an arch above the school support systems, standards and assessments, curriculum and instruction, professional development, and learning environments. Used with permission.

Purpose of the Study

The purpose of this study was to examine, within the Commonwealth of Pennsylvania, the attitudes, subjective norms, perceived behavioral control, and intentions of current secondary teachers' use of social media communications as part of their teaching practices as well as teachers' past behavior of using social media communications as part of their teaching practices.

Significance of the Study

In an effort to prepare students for a technology driven society, school reforms have pushed technology initiatives. Technology initiatives range from micro-initiatives, such as school district level one-to-one technology plans, to broader macro-initiatives in the form of state and federal grants. One of Pennsylvania's first large grants to focus on the integration of technology with 21st skills was Classrooms for the Future (Pennsylvania Department of Education, 2007). The purpose of the grant was to foster 21st century teaching and learning. The funds were to promote 21st century teaching and learning as well as purchase technology and build infrastructure within a school building. However, a gap still remained between funding technology purchases and the development of students' 21st century skills.

Paired with the initiative to include technology in a classroom is the call for teachers to foster 21st century skills. The Partnership for 21st Century Learning defines 21st century skills as life and career skills, learning and innovation skills (critical thinking, communication, collaboration, and creativity), information, media, and technology skills, and core subject knowledge (P21.org, 2009). As teachers look for ways to incorporate 21st century skills some are recognizing advantages of using social media

communications and are beginning to leverage them as a tool to foster 21st century skills (Akbari et al., 2016; Asterhan & Rosenberg, 2015; Chuang, Weng, & Huang, 2015; Krutka & Carpenter, 2016; Lee et al., 2015; Settle et al., 2012; Soomro, Kale, & Zai, 2014; Yuen et al., 2011).

Taxpayer money is used to fund technology initiatives on the local and state levels while there is a national conversation about the need for 21st century skills within all classrooms. With such a substantial investment, of money and time, to incorporate technology and 21st century teaching and learning into a classroom, it is important to ensure successful implementation.

Policy does not directly relate to practice. Teachers are the nexus in which policy and practice converge. Without positive intentions to use social media communications, as part of their classroom pedagogy, teachers will not implement the technology initiative or the call to use the technology to foster 21st century skills into their classrooms with fidelity. Before mandating such a policy, it is important to understand teachers' attitudes towards using social media communications in their classroom (Krutka & Carpenter, 2016), identify what teachers' perceive important others expect of their use of social media communications in the classroom (Owen et al., 2016), recognize factors that teachers feel support or hinder their use of social media communications in their classroom practices (Kist, 2008; Settle et al., 2012), and what their actual intent is to use social media communications as part of their teaching practices (Akbari et al., 2016). Without such information, the investments of time and taxpayer money will be wasted.

Research Questions

As the purpose of the study was to understand teachers' attitudes, subjective norms, perceived behavioral control, and behavioral intention to use social media communications in their classroom, the following research questions will guide the study.

1. What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?
2. What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communication as a pedagogical tool?
3. What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intention to use social media communications as a pedagogical tool?
4. How do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications as a pedagogical tool?

Research Design and Methodology

This study measured 9-12 grade teachers' use of social media communications as part of their pedagogical practices in the Commonwealth of Pennsylvania using an cross-

sectional survey based on the constructs of the theory of planned behavior (TPB) (Ajzen, 1991). Consisting of six sections, the survey's first three sections collected information about the participants' teaching experience as well as past and current social media communications use in educational settings. The fourth section collected information about participants' intended future use of social media communications in educational settings. Section five has a series of questions related to constructs of the TPB –attitude toward the behavior (beliefs about the particular behavior's consequences), subjective norm (belief about the expectations and behaviors of others), and perceived behavioral control (belief about potential facilitating or inhibiting factors). The final section collected demographic information about the participants to allow the researcher to compare the sample drawn for the study against the demographic characteristics of the population. Surveys were be developed using Qualtrics. The researcher obtained site permission from 18 school districts to survey participants. The Qualtrics link was distributed to the district through the teachers' official school district email.

A multistage cluster sample strategy was be used. School districts are classified by the Pennsylvania Department of Education with urban-centric locale codes. The four main categories of the urban-centric locale codes are: city, suburb, town, and rural. A random sampling of five school districts was taken from each of the four categories.

The analysis plan for the study consisted of using descriptive statistics to describe the sample. Pearson correlation and multiple regressions will analyze relationships. Regression analysis was used to investigate the relationship between teachers' attitudes, subjective norms, perceived behavioral control, and intentions to use social media as part

of their teaching practices. Typological content analysis (Hatch, 2002) will be used to analyze the open-ended anecdotal responses provided by the participants.

Assumptions and Limitations

1. The self-reporting nature of a survey is a limitation, since self-report data may carry response bias (Smyth & Terry, 2007).
2. Respondents will be from an accessible population of current teachers within the Commonwealth of Pennsylvania who are willing to respond to the survey, potentially limiting the generalizability of the study.
3. When examining current use of social media communications participants will choose a single class in which they use the maximum amount of social media communications as a teaching tool. The focus on a single class is to provide specific and accurate information of how social media communications are used as a teaching tool. This study will only be able to report on the maximum amount of social media use for a single class for each participant.
4. The theory of planned behavior does not address the time frame between intent and behavior (Ajzen, 1991).
5. The presence of the principal or other school administration at faculty meeting may influence the teachers' perceptions of this study.
6. Explanation of anonymity of responses should ensure participants provide accurate answers and resolve fears of administration using survey responses as an evaluative tool.

Definition of Terms

Social Media Communications

For this study, the definition of social media communications is aligned with the theoretical understanding of Al-Bahrani and Patel (2015) which describes social media as "virtual communities or networks that allow participants to interact with each other, develop communities, and share information and ideas" (p. 57). For this study, the operational definition of social media communications will be defined as Internet connected technology that allows users to create content, share content, and edit or respond to others' created and shared content in a digital space.

Attitude

As theoretically defined by Ajzen (1991), attitude is "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (p. 188). For this study, the operational definition of teachers' attitudes will be defined as teachers' personal perceptions of the use of social media as a pedagogical tool in their teaching practices.

Subjective Norm

Theoretically defined by Ajzen (1991), subjective norm "refers to the perceived social pressure to perform or to not perform the behavior" (p. 188). For this study, the operational definition of teachers' subjective norms will be defined as teachers' subjective understanding of the degree to which other peers, colleagues, and school stakeholders view a teacher's use of social media as a pedagogical tool in their teaching practices.

Perceived Behavioral Control

Theoretically defined by Ajzen (1991), perceived behavioral control constitutes "people's perception of the ease or difficulty of performing the behavior" (p. 183). For this study, the operational definition of teachers' perceived behavioral control will be defined as perceived factors within the school climate that promote or hinder the use of teachers using social media as a pedagogical tool in their teaching practices.

Intentions

Theoretically defined by Ajzen (1991), intention "captures the motivational factors that influence a behavior; are indicators of how hard people are willing to try/how much effort they are planning to exert in order to perform the behavior" (p. 181). For this study, the operational definition of teachers' intentions will be defined as teachers' plans to implement the use of social media as a pedagogical tool in their teaching practices.

Behavior

Theoretically defined by Fishbein and Ajzen (2015), behavior is "the action performed, the target at which the action is directed, the context in which it is performed, and the time at which it is performed" (p. 29). For this study, the operational definition of teachers' behavior will be defined as teachers using (action element) social media (target) in K-12 education (context) during the academic school year (time).

Characteristics (Demographic Information)

Theoretically defined by Fishbein & Ajzen (2015), characteristics (demographic information) are "variables [that] could potentially influence the beliefs people hold" (p. 24). For this study, the operational definition of characteristics will include teachers'

ages, gender, race/ethnicity, college major, education level, grade level taught, and subject taught.

City School Districts

Territories inside an urbanized area and inside a principal city are classified as city school districts (Pennsylvania Department of Education, 2010).

Suburb School Districts

Territories outside a principal city and inside an urbanized area are classified as suburb school districts (Pennsylvania Department of Education, 2010).

Town School Districts

Territories inside an urban cluster that are zero to more than 35 miles from an urbanized area are classified as town school districts (Pennsylvania Department of Education, 2010).

Rural School Districts

Census-defined rural territories that are less than or equal to over 25 miles from an urbanized area and is less than or equal to more than 10 miles from an urban cluster are classified as rural school districts (Pennsylvania Department of Education, 2010).

Expected Findings

The key components to the theory of planned behavior model are behavioral intent and perceived behavioral control (Ajzen, 1991). An individual's intention will influence their ability to perform the behavior as long as the individual has control over the execution of the behavior. Behavioral intention is influenced by and individual's attitude toward the behavior, subjective norm, and their perceived behavioral control. It was expected, as an individual's positive attitude and subjective norm increase while

their negative perceived behavioral control decreases and positive behavioral control increases, intention to perform the behavior will increase.

Organization of the Remainder of the Study

Chapter Two will provide a review of the literature and theoretical framework that will be explored in this study. Chapter Three will discuss the research methodology that will be used in this study. Chapter Four will provide the results of this study while Chapter Five will discuss the implications of the results, conclusions of the study, and recommendation for future research.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

Chapter Two will provide an overview of the theoretical orientation of the study, with a focus on the theory of planned behavior, which is the primary theoretical framework for this study. Following the summary of the theoretical orientation of the study, a detailed review of the literature will explore teachers' attitudes, subjective norms, perceived behavioral control, and behavioral intentions to use social media communications as a pedagogical tool. This chapter will conclude with a review of how teachers have used social media communications as a pedagogical tool in secondary education.

Theoretical Orientation for the Study

The theoretical orientation for the study is built upon three frameworks – the theory of planned behavior (Ajzen, 1991), technology readiness index (Parasuraman, 2000), and the Framework for 21st Century Learning (P21.org, 2009). The theory of planned behavior is the primary framework as this study is going to focus on the behavior of teachers using social media communications as a teaching tool. The technology readiness index supports the primary framework by helping to describe and situate an individual's technology readiness, which is the foundation on which he or she will embrace the use of technology. The Framework for 21st Century Learning provides the foundation of the theoretical orientation of this study by connecting the study to the larger conversation of how technology should be used in 21st century teaching and learning. See Figure 2 for a visual representation of the theoretical orientation of the study.

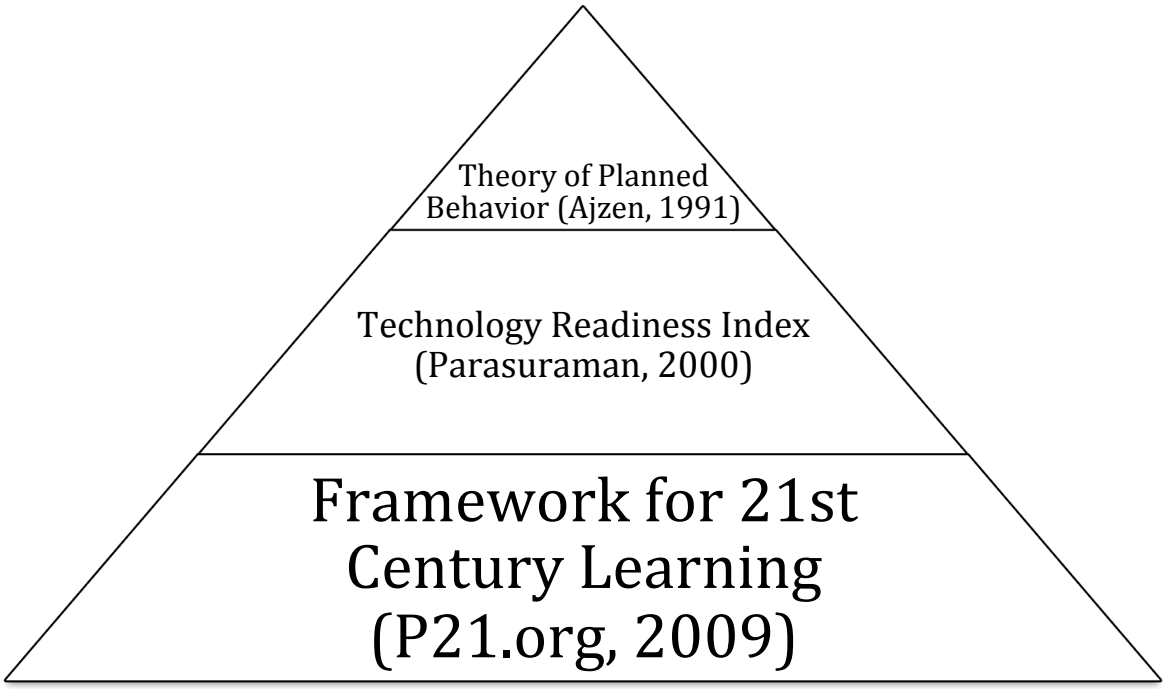

Figure 2. Theoretical orientation of the study. Represented by the theory of planned behavior, technology readiness index, and Framework for 21st Century learning.

The Theory of Planned Behavior

The theory of planned behavior has been used as a framework in multiple scholarly sources studying various behaviors. For example, the theory has been used in dissertations to study topics as diverse as individual's media habits (Lange, 2009) and unethical behaviors of business studies (Montesarchio, 2009). Within scholarly articles, the theory has provided a framework to investigate a wide range of behaviors including understanding individuals' willingness to volunteer (Brayley et al., 2015), teachers' use of inclusive educational practices (Yan & Sin, 2014), and taboo subjects such as sexual risk behaviors of college students (Turchik & Gidycz, 2012).

Ajzen (1991) developed the theory of planned behavior to predict and explain one's behavior in a well-defined situation. The creation of the theory of planned behavior

evolved from the theory of reasoned action (Fishbein & Ajzen, 2015). The theory of reasoned action was found to be incomplete because it did not take into account individuals' level of control over performing a particular behavior. With the added construct of perceived behavioral control, used as a substitute for a person's actual control, the theory of planned behavior expands on the framework of the theory of reasoned action. The goal of the theory of planned behavior is not only to predict, but also to explain human behavior.

Within the theory of planned behavior, Ajzen (1991) suggest, "behavior is a function of salient information, or beliefs, relevant to the behavior" (p. 189). If one can understand an individual's beliefs related to a specific behavior, one should be able to predict with accuracy an individual's likelihood of performing the specific behavior. The theory of planned behavior uses four constructs to determine the likelihood of an individual to perform a specific behavior. Three constructs measuring an individual's beliefs include attitude toward the behavior, subjective norm, and perceived behavioral control. The three belief constructs influence the fourth construct of intention to perform the behavior. A person's attitude is influenced by behavioral beliefs, which are an individual's subjective understanding of the given outcome of a behavior. An individual's subjective norm is influenced by their normative beliefs. Normative beliefs describe the way one thinks others expect them to act concerning the specific behavior. Perceived behavioral control is influenced by control beliefs, which are an individual's perception of factors that hinder or help them perform the behavior and how much influence the individual has on those factors.

The ability to understand an individual's intention is dependent on proper measurement of his or her attitude toward the behavior, subjective norm, and perceived behavioral control in relation to the specific behavior in question. If an individual has a positive attitude and subjective norm, as well as a strong perceived behavioral control, there should be a stronger intention to achieve a specific behavior (Ajzen, 1991). As suggested by Ajzen (1991), the stronger an individual's intention to perform a specific behavior, the higher the probability the person will attempt to perform the behavior.

The theory of planned behavior (1991) requires three criteria to accurately predict human behavior: (a) the measure of perceived behavioral control and behavioral intention must be consistent with the predicted behavior, (b) an individual's behavioral intention and perceived behavioral control should not change between measurement and behavioral observation, and (c) an individual's perception of his or her control over the behavior must be accurate. Perceived behavioral control replaces actual control, which represents an individual's opportunity and resources to perform the behavior. The predictive ability of the theory of planed behavior is increased when an individual's perception of his or her control over a specific behavior is equivalent to one's actual control.

Ajzen (1991) does not view his theory as concrete and proposes future research to include other predictors into the framework, as long as the new predictors can "capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account" (p. 199). Past behavior is an example of a predictor, which may increase the theory of planned behavior's accuracy. However, Ajzen (1991) suggests that perceived behavioral control resolves the influence past behavior has on future behavior.

Created as an extension of the theory of reasoned action, the theory of planned behavior provides a framework to predict and explain human behavior. The theory of planned behavior uses an individual's attitude toward the behavior, subjective norm, and perceived behavioral control to measure intention to perform the specific behavior. In his theory of planned behavior, Ajzen (1991) suggests behavior prediction can be achieved when a researcher understands an individual's intention to perform a specific behavior and the measurement of perceived behavioral control is accurate.

Technology Readiness Index

Parasuraman (2000) describes the construct of technology readiness as, "people's propensity to embrace and use new technology for accomplishing goals in home life and at work" (p. 308). The concept of an individual's technology readiness is a combination of his or her positive and negative feelings about technology. In a qualitative study investigating how people react to technology Mick and Fournier (1998) found eight technology paradoxes from their interviews. The paradoxes that were discovered were a) control/chaos, b) freedom/enslavement, c) new/obsolete, d) competence/incompetence, e) efficiency/inefficiency, f) fulfills/creates needs, g) assimilation/isolation, and h) engaging/disengaging. The Mick and Fournier (1998) study influenced the development of the technology readiness index by demonstrating that individuals perceptions of technology exist on a continuum between the extreme ends of the technology paradoxes (Parasuraman, 2000). In order to determine an individual's technology readiness it was important to understand their position on the continuum of the positive and negative feelings associated with technology.

Working with Rockbridge Associates, Parasuraman developed the technology readiness index to focus on drivers of technology readiness and inhibitors of technology readiness (Parasuraman, 2000). Drivers of technology readiness are divided into two areas – optimism and innovativeness. Parasuraman (2000) describes optimism as, "a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives" (p. 311). Innovativeness, the other technology readiness driver, is described by Parasuraman (2000) as, "a tendency to be a technology pioneer and thought leader" (p. 311). Inhibitors of technology readiness are divided into two areas – discomfort and insecurity. Discomfort is defined as, "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman, 2000, p. 311). Insecurity is defined as, "distrust of technology and skepticism about its ability to work properly" (Parasuraman, 2000, p. 311).

Using the four dimensions, optimism, innovativeness, discomfort, and insecurity, to provide a framework for the construction of survey questions, allows a research to assess an individual's technology readiness. A researcher can classify participants' technology readiness as high, medium, or low if survey questions are posed that requires an individual to respond on a likert scale. Parasuraman (2000) suggests the four dimensions of the technology readiness index can be good predictors of technology-related behavior. Based on Parasuraman's suggestion the technology readiness index provides strong theoretical support for the use of the theory of planned behavior (Ajzen, 1991) in the theoretical orientation of this study.

Framework for 21st Century Learning

The Framework for 21st Century Learning was developed by the Partnership for 21st Century Skills to help prepare students for success in an economy of globalization (P21.org, 2009). The members of Partnership for 21st Century Skills are organizations in technology (e.g. Adobe Systems Incorporated, Apple, Inc. Cisco Systems, Dell), education publishers (e.g. Houghton Mifflin Harcourt, McGraw-Hill, Pearson), professional organizations (e.g. American Association of School Librarians, Education Networks of America) and children's toy manufacturers (e.g. Crayola, LEGO Group, Walt Disney Company), as well as other sectors of the global market place. Although the framework was developed to facilitate student success, teachers and school administrators are encouraged to use the framework as guide to incorporate 21st century teaching and learning into a classroom.

Divided into two sections – student outcomes and 21st century support systems – the Partnership for 21st Century Skills uses the Framework for 21st Century Learning to combine content knowledge, specific skills, expertise, and literacies into a practical model for education (P21.org, 2009). Student outcomes and support systems each contain four constructs needed to facilitate 21st century student outcomes and 21st century support systems. The two sections of student outcomes and support systems will be discussed below.

The student outcomes are described, as "the knowledge, skills, and expertise students should master to succeed in work and life in the 21st century" (Partnership for 21st Century Skills, 2009, p.2). The four constructs of student outcomes are core subjects

and 21st century themes, learning and innovation skills, information, media, and technology skills, and life and career skills. Each construct contains subsections.

According to the Partnership for 21st Century Learning Skills (P21.org, 2009), core subject include: English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, and government and civics. The goal of educators should be to move beyond a mastery of core subject knowledge and integrate the core subjects with the five 21st century themes. The five 21st century themes are a) global awareness, b) financial, economic, business and entrepreneurial literacy, c) civic literacy, d) health literacy, and e) environmental literacy.

Learning and innovation skills are designed to prepare students for complex life and work environments (P21.org, 2009). To prepare students, learning and innovation skills are focused on creativity, critical thinking, and for students to use communication and collaboration. Under the subsection of creativity, educators are encouraged to promote students to think creatively, work creatively with others, and then to implement innovations based on the students creative ideas. Critical thinking is designed to help students problem solve by using inductive and deductive reasoning, use systems thinking to see a larger picture, make judgments and decisions based on their thinking to solve various real world problems. Communication and collaboration is designed to have students communicate clearly and collaborate with others to learn how various people and systems are connected.

The construct of information, media, and technology skills are included because people live in a technology-based environment and students must be able to live in the technology-based environment to be successful 21st century citizens (P21.org, 2009). To

be successful in a technology-based society students should possess information literacy, media literacy, and ICT (Information, Communications, and Technology) literacy. For student to have information literacy they must be able to access and evaluate information as well as use and manage the information they received daily. Media literacy skills will allow students to analyze the media and understand the purpose of the presented media to and identify ethical and legal issues that the influence of media can have on society. ICT literacy will ensure students apply technology effectively as a research and communication tool in a knowledge economy.

Life and career skills give students the "ability to navigate the complex life and work environments in the globally competitive information age" (Partnership for 21st Century Learning, 2009, p. 6). Life and career skills include, flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. Flexibility and adaptability allow students to adapt to change and work effectively in an unknown climate. Students also need to be flexible to incorporate feedback effectively to reach workable solutions in a global and multicultural environment. If students have initiative and self-direction they will be able to manage their goals and time to work independently to be self-directed learners. Social and cross-cultural skills are needed in a world economy to interact and work with others in diverse teams. Skills of productivity and accountability allowed students to manage projects and produce results. Leadership and responsibility skills will empower students to guide others but also be responsible to those they lead to ensure the students act responsibly with the larger global community as a focus.

The other section of the Framework for 21st Century Learning is 21st century support systems. The Partnership for 21st Century Skills suggests "when a school or district builds on this foundation, combining the entire Framework with the necessary support systems…students are more engaged in the learning process and graduate better prepared to thrive in today's global economy" (Partnership for 21st Century Skills, 2009, p. 1). The constructs of the 21st century support systems are standards and assessment, curriculum and instruction, professional development, and learning environments.

Standards should focus on students having a deep understanding within and between core subjects. Students should use real world data to develop their understanding and solve problems. According to the Partnership for 21st Century Skill (P21.org, 2009), assessment should be multimodal, incorporating standardized test results with formative and summative classroom assessments. The results should be a student portfolio that showcases students' knowledge and 21st century skills to educators and future employers.

Curriculum and Instruction should combine 21st century skills into core subjects. Technology should be integrated into the learning methods to guide students' inquiry- and problem-based learning. Learning should not happen in a closed system or a single classroom. Through the use of technology, community and global resources should be used to enhance student learning.

Professional development should provide teachers with ways they can incorporate 21st century skills, tools, and teaching into their pedagogy. Professional learning communities are encouraged by the Partnership for 21st Century Learning as a cost effective way to provide professional development to teachers (Partnership for 21st Century Learning, 2009). A focus should also be to provide teachers with the tools to

recognize students' learning styles, which will make lessons more meaningful for the students.

Learning environments should support 21st century teaching and learning. The physical space should be designed in a way that allows students to work in project-based lessons. Equitable access to technologies and resources are recommended. Finally the learning environment should allow students to access their community – local and international – in face-to-face and online spaces.

The Framework for 21st Century Learning is an interdisciplinary model that will be used as the foundation of the theoretical orientation of this study. The framework offers educators and policymakers a clear vision of how 21st century skills should be integrated into teaching and learning. Connecting beyond a single school district the framework has a global vision for the skills, knowledge, expertise, and literacies students will need to be successful in a global economy.

Teachers' Attitudes Toward Social Media Use as a Pedagogical Tool

Ajzen (1991) defines attitude as, "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (p. 188). Overall, teachers' attitudes toward social media communications use as a pedagogical tool are positive (Govender, 2012; Yuen et al., 2011). There are disagreements among the findings of different studies when assessing the attitudes to use social media in education by experience, teachers and students, and how pre-service teachers view social media communication compared to teacher-educators and in-service teachers. This section will review the overall attitudes current teachers hold about social media communication as a

pedagogical tool as well as the inconsistencies in the literature in regards to teachers' attitudes.

Attitude is an important factor when assessing teachers' use or potential use of social media communications as a teaching tool. When teachers use social media communications in their private life, it has been found they have a more positive attitude toward the use of social media in educational settings (Asterhan & Rosenberg, 2015; Ulrich & Karyonen, 2011). In a study of 174 teachers' attitudes toward social media use personally and professionally with students, Owen, Fox, and Bird (2016) found similarities between teachers' positive attitudes and positive perceptions of the potential value of social media communications. As teachers use more social media communications, their positive attitudes will increase, in turn increasing social media communications' perceived value in educational settings.

Teachers' report social media communications can be used to integrate 21st century teaching and learning (P21.org, 2009) into their teaching practices. In a qualitative study, Lee, Lee, and Kim (2015) found that middle school teachers felt social media communications made their classrooms more interactive for students. The teachers in the study expressed that social media communications allowed their students more quality opportunities to communicate and collaborate. Teachers do not only hold positive attitudes towards student-to-student communication using social media communications. Teachers also believe that social media can improve teacher-to-student communication. As Capo and Orellana (2011) found, 60% of their 137 participant sample felt that social media would improve student-to-teacher interactions. Teachers show positive attitudes

toward social media communications as an educational tool to establish a collaborative classroom culture that incorporates elements of 21st century teaching and learning.

Although teachers show positive attitudes about the use of social media as a pedagogical tool, different studies find that teachers' attitudes are not consistent across all teaching levels. When comparing teachers to students, pre-service teachers to teacher-educators and pre-service teachers to current teachers, as well as teachers with different levels of experience, attitudes differ. There is, however, a disagreement within the literature on each of these areas. Studies have offered conflicting findings, which will be discussed below.

Piotrowski (2015) conducted a bibliometric analysis of 662 dissertations investigating social media communications. The findings from the majority of the studies, which focused on social media communications in educational settings, concluded that students were more positive about the use of social media than teachers. When examining social media communications in educational settings, the majority of the dissertations focused on the college or university level, however, there were dissertations with a K-12 focus within the sample. Similar to Piotrowski's (2015) findings, scholarly articles primarily focus on the college and university level when comparing teachers and students attitudes. There is a difference in findings when comparing scholarly articles. Akbari, Naderi, Yazdi, Simons, and Pilot (2016) studied the responses of 95 university teachers and 209 university students and found that students had more positive attitudes than teachers in regard to social media communications use in the classroom. Verzosa Hurley and Kimme Hea (2014) conducted a case study of university students publishing a classroom project, Do-It-Yourself instructional video,

through social media communications in a public forum. Findings show that before social media communications was introduced and used formally in the classroom setting, students' attitudes toward social media communications use in education were negative compared to the teacher's attitude. Upon completion of the course, students' attitudes had improved, however, Verzosa Hurley and Kimme Hea (2014) offer a conflicting perspective from Piotrowski (2015) and Akbari et al. (2016).

Pre-service teachers are future teachers and teacher-educators shape future teachers. Soomro, Kale, and Zai (2014) compared pre-service teachers' attitudes with teacher-educators' attitudes of using social media communications, specifically Facebook, in learning. It was found that pre-service teachers and teacher-educators did not share similar attitudes toward using Facebook. Pre-service teachers showed positive attitudes while teacher-educators showed negative attitudes toward using Facebook in an educational setting. Soomro, Kale, and Zai's (2014) findings support the findings of Piotrowski (2015) and Akbari et al. (2016) showing the subgroups of pre-service teachers mirror the larger population of postsecondary students.

Cakir, Yukseltruk, and Top (2015) investigated the attitudes of 516 pre-service teachers and 317 in-service teachers to understand if differences existed. Findings showed that both groups of teachers held positive attitudes of social media communications in learning environments. Pre-service teachers were found to have a more positive attitude and a higher level of perceived usefulness than in-service teachers. Cakir, Yukseltruk, and Top's (2015) findings suggest positive attitudes toward using social media communications in an educational setting should decrease as the teacher becomes more experienced, regardless of teachers' professional status.

Although more positive attitudes seem to favor pre-service teachers when compared to in-service teachers or teacher-educators, looking at the relationship between a teacher's experience and attitude towards social media communications in education does not provide a single outcome. Yuen, Yaoyuneyong, and Yuen (2011) compared the responses of 368 teachers (95 elementary, 142 secondary, 83 college/university, 46 other) at the Creating Futures Through Technology Conference. Using a one-way analysis of variance, it was found that teaching level (elementary, secondary, college/university) or amount of teaching experience had no effect on teachers' attitudes of social media communications as a pedagogical tool. Shu-Fen, Chu-Liang, and De-Chih (2015) studied the technology readiness of 478 elementary school teachers. The results showed that teachers with five or fewer years of experience had more optimistic attitudes than teachers with six or more years of experience. Both the Yuen et al. (2011) and the Shu-Fen et al. (2015) studies may not provide a comprehensive representation of current teachers' attitudes toward social media communications in education when comparing experience. Shu-Fen et al. (2015) used convenience sampling, potentially underrepresenting less experienced teachers with negative attitudes, and Yuen et al. (2011) drew their sample from participants at a technology conference, which could potentially limit the sample to people who already possess a positive attitude towards technology in any format.

The review of the literature has also shown there may not be a consensus on attitudes when comparing the attitudes of teachers to their students or teachers with more experience to teachers with less experience. What is consistent in the literature is that overall, teachers hold positive attitudes toward the use of social media communications

as a pedagogical tool. The findings show pre-service teachers hold more positive attitudes than in-service teachers and teacher-educators. While pre-service teachers' attitudes were more positive than both the in-service teachers and teacher-educator attitudes, in-service teachers' attitudes were positive whereas teacher-educator attitudes were negative.

Teachers' Subjective Norms of Social Media Use as a Pedagogical Tool

Ajzen (1991) defines subjective norms as the "perceived social pressure to perform or to not perform the behavior" (p. 188). Krutka and Carpenter (2016) note that educational stakeholders, such as state education departments and professional organizations, have added technology components to their standards. In a study, which surveyed 317 current technology teachers, Cakir, Yukselturk, and Top (2015) found that teachers feel pressure to implement social media technologies into their pedagogical practices. In Pennsylvania, the social pressure for teachers by educational stakeholders is represented by the actions of the Pennsylvania Department of Education (PDE). This section will focus on the PDE's actions of incorporating standards that encourage the use of social media communications in classrooms.

On March 1, 2014 the PA Core Standards were made effective when the State Board published Chapter Four in the Pennsylvania Bulletin (pdesas.org, 2016). The PA Core Standards were written for six subject areas: (a) English language arts grades 6-12, (b) mathematics grades PreK-12, (c) reading in science and technical subjects grades 6-12, (d) writing in science and technical subjects grades 6-12, (e) reading in history and social studies grades 6-12, and (f) writing in history and social studies grades 6-12. English language arts, writing in science and technical subjects, reading in history and social studies, and writing in history and social studies include standards that require

students to use technology in the classroom (Pennsylvania Department of Education, 2014a, 2014b, 2014c, 2014d).

The technology standards for all grades in the English language arts standards are social in nature. The technology standards are under the subheading, "Technology and Publication" and labeled as standard 1.4 (Pennsylvania Department of Education, 2014a). In grades six through eight, students are to use technology to, "interact and collaborate with others" when they write for class assignments (Pennsylvania Department of Education, 2014a, p. 25). Grades nine and ten are to take "advantage of technology's capacity to link to other information and to display information flexibly and dynamically" (Pennsylvania Department of Education, 2014a, p. 25) which is an inherent aspect of social media communications. The higher-level grades of 11 and 12 are to use their writing to interact with feedback, which are to come from "new arguments and information" (Pennsylvania Department of Education, 2014a, p. 25). Each English language arts grade level is required to use technology to publish student writing in a forum that allows others to interact, collaborate, and provide feedback, which is social in nature.

The technology standards for all grades in the writing in science and technical subjects and writing in history and social studies are also social in nature. The technology standards are under the subheading "Production and Distribution of Writing" and are labeled as standards 3.6 for writing in science and technical subjects and 8.6 for writing in history and social studies (Pennsylvania Department of Education, 2014b, 2014d). Both sets of subject standards use similar language as the English language arts

Technology and Publication standards and focus on technology's ability to share information and connect with new perspectives to provide feedback and new arguments.

The technology standards for all grades in the reading in history and social studies are not as explicit in the social use of technology for publication, collaboration, and providing feedback. Under the subheading of, "Integration of Knowledge and Ideas" and labeled as standard 8.5 (Pennsylvania Department of Education, 2014c), teachers are given an opportunity to use social media to have students meet the required standards. In the reading in history and social studies standards, students are required to interact with print and digital text. The interactions are not passive, most notably at grades 11 and 12; students are required to "evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information" (Pennsylvania Department of Education, 2014c, p. 5). The corroboration or challenge to a different author's digital text could be the feedback the previous writing standards were seeking. While not explicitly stating the challenge or corroboration should be done with technology, it would be difficult to provide a challenge or corroboration to digital text without the use of social media communication technologies.

According to Cakir et al., (2015) teachers have a social pressure to use social media communications in their classroom. Understanding the perceived social pressure from colleagues and peers through a review of the literature is difficult because of the lack of literature. The perceived social pressure from education stakeholders to use social media communication in a classroom setting is stated in the PA Core standards that were implemented in 2014 by the PDE. English language arts, writing in science and technical subjects, writing in history and social studies explicitly address, while reading in history

and social studies implicitly address, how teachers should use social media communications as a pedagogical tool.

Teachers' Perceived Behavioral Control of Social Media Use as a Pedagogical Tool

Ajzen (1991) defines perceived behavioral control as, "people's perception of the ease or difficulty of performing the behavior" (p. 183). From a review of the literature the themes of internal and external factors that limit teachers use of social media communications were identified. Teachers encounter internal and external factors, which can be perceived as barriers to the implementation of social media communications as part of a pedagogical tool. The theme of external factors can be categorized into two subthemes – abstract and concrete. Abstract external factors are time commitment and the classroom management aspect of controlling the digital content. Concrete external factors are school district policies and technical problems. External factors have an impact on the internal factor, which is teachers' perceived usefulness of social media communication as a pedagogical tool (Capo & Orellana, 2011). This section will focus on the external factor and internal factor themes that have been identified to affect teachers' perception of the ease or difficulty of using social media communications in their classrooms.

School district policies have an impact on how teachers view the use of social media in an educational setting. Some policies are directly related to how any Internet connected technology is used while others are not as direct. Some school districts have policies explicitly restricting students' use of social media. Carpenter and Krutka (2014), when surveying 685 K-12 teachers, found 34% of the districts prohibited social media sites for only students, 15% prohibited social media sites for teachers and students, and 39% allowed teachers and students to access social media sites. Indirectly, school policies

can impact how teachers use social media when funding streams do not support technology initiatives (Capo & Orellana, 2011). A lack of financial support could result in outdated and incompatible equipment that causes more technical problems than teachable moments.

The Digital Divide, in which students do not have access to the Internet or computers outside of school, is a large technical problem that teachers face when planning lessons that use social media communications as a pedagogical tool (Albert, 2015). If a district does not provide Internet connected devices, students may not have access to lesson content shared on social media communications. Technical problems are not limited to outside educational settings. Within a school, problems exist that can prevent successful use of social media communications in a classroom setting such as network connections can be unreliable (Highfield & Papic, 2015; Hordemann & Chao, 2012), technical problems related to the Internet connected device (Abulibdeh, 2013), and limitations of the internet browser software (Hordemann & Chao, 2012). Teachers must work within the parameters of their environment. School policies and technical problems are classified under the theme concrete external factors that teachers must reconcile before they can incorporate social media communications as a pedagogical tool.

Abstract external factors that affect teachers' perceived ease of use of social media communications are the control over digital content and time requirements to use social media as a pedagogical tool. Concerns that teachers have about controlling digital content have three sections: technology use, privacy, and emotional posting. Technology use describes how students access the digital content. Students can access social media communications sites through any Internet-connected device such as a computer, tablet,

or mobile phone. Al-Bahrani and Patel (2015) found that a major concern was the overuse of Internet connected devices in class. While teachers may incorporate social media communications into the class lecture, teachers were concerned that students would continue the use of their Internet connected device and not be engaged in the lecture. Teacher privacy is centered on the protection of their personal life. In order to establish a clear boundary between their private and professional lives, teachers have created separate professional teacher profiles on social media communication networks to interact with students (Asterhan & Rosenberg, 2015). Privacy is not only a concern for teachers, but also for students. Churcher, Downs, and Tewksbury (2014) found that some students shared concerns about the interaction between their social and school activities in a digital space.

The final concern over controlling the digital content is in the form of discussions starting as emotional postings and then manifesting themselves into incidences of cyber bullying. Through qualitative methods Levy, Journell, He, and Towns (2015) investigated one high school government teacher's use of a blog to engage students in political discussion. While the blogging offered opportunities for students to comment on one another's blog posts, the teacher did not actively encourage students to post to avoid heated exchanges. The teacher worried that the heated exchanges could evolve into incidences of cyber bullying. Cyber bullying is a legitimate concern, just as any issue that may harm students. Vanderhoven, Schellens, and Valcke (2016) in a mixed methods study on decreasing risky behavior on social media communication networks, found that parent involvement, especially for boys, changed students' intentions to engage in poor behaviors online. As with many student interventions, incorporating their parents can be

effective. No matter the level of parent involvement, the teacher has the duty to guide all discussions, face-to-face or in the digital space, to stay on topic and provide an environment for students to learn (Churcher, Downs, & Tewksbury, 2014).

Teachers experience the barrier of a lack of time in and out of the classroom when implementing technology initiatives. When studying 1222 secondary school teachers' technology adoption, Govender (2012) found that 45% of the teachers felt there was insufficient time in class to use Internet connected technology. With limited class time to work with students, teachers must choose a pedagogical approach they are confident to use. Govender suggests the lack of technology acceptance could be influenced by the lack of confidence on the part of the teachers.

The lack of time outside of class can develop because of school district initiatives competing for teachers' planning and preparation time. In a case study of a single secondary social studies teacher's use of a Facebook group to encourage students to complete their homework Mourlam (2013) found that the teacher struggled to find time to use the Facebook group. The teacher reported that since the school district had a policy where teachers were required to post their assignments on the district lesson plan website the teacher had to enter all assignments online twice, once on the district lesson plan website and another on the Facebook group. The act of posting assignments twice eventually caused the teacher to neglect the Facebook group and focus on the district lesson plan website. When interviewing the students it was found that 67% wanted more interaction on the Facebook group and 40% disliked the limited amount the teacher used the Facebook group. With limited time teachers must choose where they will focus their efforts. Often teachers will focus their efforts in the direction of a district initiative,

especially as principals provide resources for those who are moving the initiative forward (Frank, Penuel, & Krause, 2015).

A teacher's perceived usefulness of social media communications is related to their experience with, and knowledge of, social media communications in their personal life. Teaching level and years of teaching experience has been found to have no significant effect on teachers' perceived usefulness of social media (Yuen et al., 2011); however, teachers who use social media communications in their personal life and have higher technology skills viewed social media communications and computer technology to be more useful in a classroom (Asterhan & Rosenberg, 2015; Lowther et al., 2012). The technology skills and experience with social media communications use relates to Govender's (2012) suggestion that a lack of confidence with technology can lead to a lack of technology adoption within classroom teaching.

Maor (2003) investigated the role of a teacher in an online learning community. In the qualitative study it was found that a teacher embodies four roles in an online community – pedagogical, social, managerial, and technical. If a student encountered a problem, the teacher was required to assume the technical role and assist the student. From Maor's study it was suggested that professional development should be offered to help teachers develop the needed skills to teach in an online setting. Teachers' lack of knowledge (Mourlam, 2013) and lack of training (Capo & Orellana, 2011) has been investigated and found to be a factor in how easy or difficult teachers view the act of using social media communications as a pedagogical tool. Without training or experience to increase a teacher's knowledge and familiarity with social media communications it

will be difficult for teachers to perceive social media communications as a useful tool in their pedagogical practice.

Teachers experience many factors, internal and external, that shape the way they view the ease or difficulty of using social media as a pedagogical tool. From a review of the literature, the external factors identified are school district policies, technical problems, controlling digital content, and time. The internal factors that could affect the perceived ease or difficulty of use are teachers' perceived usefulness and lack of knowledge concerning social media communications.

Teachers' Behavioral Intentions of Social Media Use as a Pedagogical Tool

Ajzen (1991) defines behavioral intentions as a concept that "captures the motivational factors that influence a behavior; are indicators of how hard people are willing to try/how much effort they are planning to exert in order to perform the behavior" (p. 181). The literature shows teachers experience factors that positively influence, as well as factors that have little to no effect on behavioral intention to use social media communications as a pedagogical tool. This section will review factors that have a positive effect and little to no effect on behavioral intentions, as well as the relationship between behavioral intention and teachers' actual use of social media communications in educational settings.

Three main factors were found to have a positive influence on behavioral intention to use social media communication in educational settings – performance expectancy, social influences, and optimism and innovativeness. Performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh, Morris, Davis, & Davis, 2003,

p. 447). Performance expectancy was found to account for 49.6% of the variance in behavioral intention (de Oca & Nister, 2014). Social influence is defined as, "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451). Investigating individuals' intentions to use social media communication, Lu and Yang (2014) found that social characteristics influence intentions and suggested when educators capitalize on social characteristics of social media communications students will have a learning environment that should improve their participation and learning performance. Optimism is defined as, "a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives" and innovativeness is defined as, "a tendency to be a technology pioneer and thought leader" (Parasuraman, 2000, p. 311). When studying elementary teachers' intention to use Facebook as a classroom management tool, Shu-Fen, Chu-Liang, De-Chih (2015) found optimism and innovativeness had the most influence on intention over discomfort and insecurity.

When investigating intention to use social media communications, effort expectancy has not been found to have an effect on behavioral intentions to use social media communications in an educational setting. Effort expectancy is defined as, "the degree of ease associated with the use of the system" (Venkatesh et al., 2003, p. 450). In relation to social media communications use, effort expectancy is teachers' perceived ease of use of social media technology.

Using the unified theory of acceptance and use of technology (Venkatesh, et al., 2003) and the theory of planned behavior (Ajzen, 1991), Hanson, West, Neiger, Thackeray, Barnes, and McIntyre (2011) studied the factors that influence social media

communications technology acceptance among health educators. When controlled for age and work experience, it was found that ease of use was not associated with behavioral intention to use social media. When investigating how age and ease of use affected behavioral intention, findings also showed all age groups had a significant association except health educators ages 18-29, where no association was found.

The direct link between one's behavioral intention to use social media communications as a pedagogical tool and their actual use of social media communications in an educational setting is not a direct link. Ulrich and Karvonen (2011) investigated the link between intention to use and actual use of social media communications in online courses. Using a structural equation model on the responses of 285 community college instructors from North Carolina, results showed there was not a relationship between the instructor's intention and actual use. Studies using correlational methods have also found no significant relationship between behavioral intention to use social media communications in an educational setting and actual use (de Oca & Nistor, 2014).

The empirical evidence results from studying educators' behavioral intention to use social media communication has revealed influencing factors as well as factors which may not affect behavioral intention at all. The factors that positively influence behavioral intention to use social media communications as a pedagogical tool are performance expectancy, social influence, and optimism and innovativeness. Performance expectancy has been cited most frequently in the literature. Effort expectancy, or perceived ease of use, has been cited as having no association with behavioral intentions to use social media communications in educational settings. Finally, the empirical evidence has

shown, within educational settings, intention to use social media communications as a pedagogical tool, does not directly relate to actual use of social media communications.

Teachers' Use of Social Media as a Pedagogical Tool

Fishbein and Ajzen (2015) define behavior as, "the action performed, the target at which the action is directed, the context in which it is performed, and the time at which it is performed" (p. 29). This review will focus on teachers using social media in K-12 education during the academic school year. Empirical evidence will be presented to provide an overview of social media communications use, as well as how teachers use social media communications as a pedagogical tool.

Although it may be minimal teachers are using a variety of social media communication platforms. Capo and Orellana (2011) found the majority of teachers did not use social media communications as a pedagogical tool in the Miami-Dade county Public Schools. Of the 137 valid responses, 9.6% used social bookmarking, 17.5% used blogs, 18.2% used audio/video conferencing, 23.4% used social networking, and 40.9% used wikis. Focusing specifically on the micro blogging platform of Twitter, Carpenter and Krutka (2014) investigated how teachers were using social media. The findings show teachers use Twitter to communicate with students (23%) and communicate with parents (18%) as well as a pedagogical tool for in-class (17%) and out-of-class (16%) activities. English teachers were found to use Twitter more for in-class activities.

Lee, Lee, and Kim (2015) identified four areas that teachers use social media communications as a pedagogical tool – classroom management, student guidance, establishing a communicative classroom atmosphere, and developing a collaborative atmosphere for students. The findings can be used as a framework to classify how other

teachers use social media communications as a pedagogical tool. Empirical evidence of each category will be discussed below.

As a classroom management tool social media communications has been used to communicate with students about important class business. Teachers create Facebook groups to help remind students when homework is due (Mourlam, 2013). In Israel, teachers went against a Ministry of Education's ban on unapproved social media communication platforms to use Facebook as a tool in their classroom (Asterhan & Reosenberg, 2015). Teachers reported they did not follow the policy because Facebook was easier to use for teachers and students compared to platforms approved by the Israeli Ministry of Education.

Social media communications has also been used to provide student guidance. As a way to offer one-to-one help in foreign language classes, teachers have used the private chat functions of social media communication platforms to communicate with students (Asterhan & Rosenberg, 2015). The teachers reported using the private chat function to help lower achieving students practice their foreign language writing skills in an environment that allowed teachers to offer guidance without the risk of public embarrassment. Levy, Journell, He, and Towns (2015) studied the political engagement of high school students participating in a political blog activity. The blog activity gave the teacher many opportunities to guide students through their political ideas with an emphasis on "using reliable evidence and sources to support their arguments" (p. 67). Through the guidance of the teacher requiring valid supporting facts it was found that students in the blog classes developed a greater internal political efficacy as well as improved self-efficacy.

Teachers have used social media communications in their classrooms to increase communication. Teachers, who incorporate social media communications into their classes feel that communication does not only improve between students but also between teachers and students (Carpenter & Krutka, 2014). The communication process has been used in closed forums, which only classroom participants have access (Asterhan & Rosenberg, 2015) or in open forums where students blog to a large public audience (Krutka & Milton, 2013).

When students communicate well they are able to actively collaborate. Social media communications can provide opportunities for student collaborative work with project based learning (Windschitl & Sahl, 2002). More opportunities are given to students to participate in self-regulated learning when teachers use social media communications as a pedagogical tool (Matzat & Vrieling, 2016). Krutka and Milton (2013) reported how Milton used Twitter to teach his social studies students about enlightenment philosophers. In small groups students were assigned a specific philosopher, created Twitter accounts, and were required to write blog posts under the identity of the philosopher. Initially students did not produce high quality blog posts. The teacher had to remind students their blog posts were public and available for anyone to read. After this announcement it was found that many students revised their blog posts. In order to provide a rich learning experience the teacher reached out to colleagues in the school as well as other social studies teachers on Twitter to read and comment on the students' blog posts. Through the interactive network of Twitter, students were asked questions from other users outside of the class and students had to respond in the character of their philosopher. Questions were posted from local Twitter users and other

places within the United States (Illinois, Kansas, California) and internationally (Canada and Australia). Using Twitter, students had to work in collaborative groups to publish their knowledge of enlightenment philosophers to a worldwide audience.

Krutka and Milton (2013) reported students benefited from the immediate feedback and students were able to further analyze their experience in face-to-face discussions with the teacher. After the assignment was completed, one student continued to use the Twitter account to post through the perspective of their philosopher suggesting the assignment was a very meaningful experience. Krutka and Milton (2013) suggest social media communications as a pedagogical tool can create "democratic, participatory, and student-centered educational experiences while teaching digital citizenship and social media literacies" (p. 28).

As shown through a review of the literature, teachers do use social media communications as a pedagogical tool. However, the teachers who use social media communications are in the minority and those who use it for in-class activities are predominantly English teachers. Wikis are the most common social media communications tool used by teachers followed by social networking. Teachers' use of social media communications can be classified into the four categories of classroom management, student guidance, establishing a communicative classroom atmosphere, and developing a collaborative atmosphere for students.

Summary

Chapter Two provided a summary of the theoretical orientation of the study. A detailed review of the literature related to teachers' attitudes, subjective norms, perceived behavioral control, intention, and use of social media communications as a pedagogical

tool followed. Chapter Three will present the methodology used to answer the research questions and test the hypotheses for this study about the relationship among teachers' attitudes, subjective norms, perceived behavioral control, and their behavioral intentions to use social media communications as a pedagogical tool.

CHAPTER THREE

METHODOLOGY

Overview of the Chapter

This chapter will review the purpose of the study and the research questions that guided this study. The research design and a detailed description of the sampling strategy will be discussed. The setting of the study, materials, and procedures are presented followed by the data analysis.

Purpose of the Study and Research Questions

The purpose of this study was to examine, within the Commonwealth of Pennsylvania, the attitudes, subjective norms, perceived behavioral control, and intentions of current 9-12 grade secondary teachers' use of social media communications as part of their teaching practices as well as teachers' past behavior using social media communications as a pedagogical tool. The following research questions guided the study.

1. What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?
2. What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communication as a pedagogical tool?
3. What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media

communications as a pedagogical tool and their future intention to use social media communications as a pedagogical tool?

4. How do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications as a pedagogical tool?

Research Design

This study measured teachers' use, intended future use, and perceptions of social media communications as part of their pedagogical practices in the Commonwealth of Pennsylvania. The design is cross-sectional utilizing online surveys.

In order to create a sample that is representative of 9-12 grade public school teachers in the Commonwealth of Pennsylvania, a multi-stage cluster sampling strategy was used. Multi-stage cluster sampling has limitations and delimitations that align with the feasibility of this study. Kalton (1983) notes that although cluster sampling leads to a loss in precision when compared to simple random sampling it is useful when attempting to sample a large population. Strata, which are, " the classification of the population into subpopulations" should be internally similar, such as grouping school districts by their urban and rural classifications (Kalton, 1983, p. 19). After the population was divided into strata, the researcher treated the subpopulations as clusters, and only sampled up to five schools from each subpopulation to survey. To ensure rigor, the subpopulation selected to survey should represent the subpopulations unselected (Kalton, 1983), which

was done when the school districts were divided into their clusters using the urban centric locale codes.

The Pennsylvania Department of Education (PDE) classifies school districts with urban-centric locale codes. The four main categories of the urban-centric locale codes are: city (schools inside an principal city or urbanized area), suburb (schools outside a principal city and inside an urbanized area), town (schools inside an urban cluster), and rural (schools census-defined as rural). In accordance with the steps of multistage cluster sampling, a random sample of school districts was taken from each of the four categories. A total of 18 schools agreed to participate in the study, three city, five suburb, five town, and five rural.

The researcher obtained site permission from each school district to survey the teachers. Each school administrator decided how the survey would be distributed to the faculty. Four school administrators requested to send an anonymous survey link themselves and 14 school administrators requested that their faculty be contacted through the Qualtrics survey program.

Consisting of six sections, the survey's first, second, and third sections collected information about participants teaching experience past social media communications use in educational settings and current use of social media communications use as part of their teaching practices. The fourth section addressed teachers' intended future use of social media communication as part of their teaching practices. The fifth section had a series of questions related to three of Ajzen's (1991) constructs of the theory of planned behavior – attitude toward the behavior (beliefs about the particular behavior's consequences), subjective norm (belief about the expectations and behaviors of others),

and perceived behavioral control (belief about potential facilitating or inhibiting factors). The final section of the survey collected demographic information about each participant.

The analysis plan for the study consisted of using descriptive statistics to describe the sample. T-tests and analysis of variance were used to compare the means of each group. A regression model was used to assess the relationship between teacher characteristics, past use and teachers' attitudes, subjective norms, perceived behavioral control, and intentions to use social media communications as part of their teaching practices.

Target Population and Participant Selection

The target population for this study consisted of public high school teachers from the Commonwealth of Pennsylvania, who teach any subject to students in grades 9-12. Public high school teachers were selected because all public schools within the Commonwealth of Pennsylvania are required to follow the PA Core Standards. The Pennsylvania School Code in Chapter Four, requires high stakes testing in the form of the Keystone Exams, which are aligned with the PA Core Standards (Pennsylvania Board of Education, 2014). According to the Pennsylvania School Board Association (Pennsylvania School Board Association [PSBA], 2014) PA Core is, "not a curriculum or a prescribed set of activities" ("How do the PA Core Standards affect learning at the district level," para. 1). Although the curricular decisions on how the students will meet the PA Core Standards remain at the district level, the PSBA (2014) recommends that districts should provide updated textbook and instructional materials as well as training and time for teachers to adopt innovative instructional methods aligned with the PA Core Standards.

Within the Commonwealth of Pennsylvania, the PDE, or any organization responsible for the education of students, are referred to as Local Education Agencies (LEAs), which include: charter schools, career and technical centers, intermediate units, public school districts, state juvenile correctional institutes, and special program jointure (Pennsylvania Department of Education, 2010). The most recent data available from PDE's website identifies 712 LEAs; of which 497 are public school districts (2010). The PDE classifies school districts into categories called urban-centric locale codes (Pennsylvania Department of Education, 2010). The four primary urban-centric local codes are: city, suburb, town, and rural.

The following will detail the steps taken in the multistage cluster sample to determine which schools will be used in this study. Once all non-public school LEAs were removed the school districts were separated into one of four clusters determined by a school district's urban-centric locale code. The 497 public school districts were distributed into four unequal clusters: city with 17 school districts, suburb with 206 school districts, town with 100 school districts, and rural with 174 school districts.

The districts were chosen randomly using the RANDBETWEEN function of Microsoft Excel. The goal was to have five school districts from each of the unequal clusters for a total of 20 total school districts. A total of 18 schools agreed to participate in the study. After the districts agreed to participate in the study the researcher assigned a pseudonym for each of the school districts and schools. City school districts chosen at random were: (a) Southview School District, (b) Willow City School District, (c) and Westside School District. Suburb school districts chosen at random were: (a) Bear River Area School District, (b) Anglewood Area School District, (c) Oceanside School District,

(d) Marble Hill Area School District, and (e) Maple Hills Area School District. Town school districts chosen at random were: (a) Grandview School District, (b) Timber Creek Area School District, (c) Little Valley School District, (d) Elk Creek Area School District, and (e) Springfield School District. Rural school districts chosen at random were (a) Palm Valley Area School District, (b) Central State School District, (c) Woodside Area School District, (d) Wildwood Area School District, and (e) Highland School District. See Figure 3 for a visual display of the sampling method.

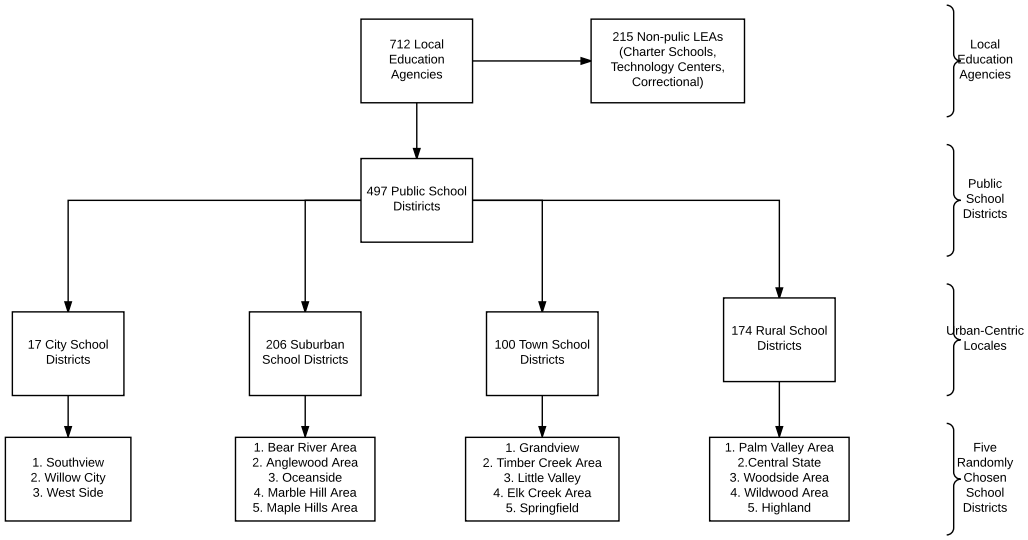

Figure 3. School district flow chart outlining sampling strategy. Rectangles represent different outcomes and arrows represent the direction of the sampling process.

The next stage of the sampling strategy was used to select which school building would be approached to survey the teachers. All school buildings within the selected school districts where grades 9-12 are taught were listed. City school districts had a total of 8 school buildings (Southview 4, Willow City 2, Westside 2). Suburb, town, and rural school districts each had a total of five school buildings, one for each school district within the cluster.

To select the school building within each district one building was chosen at random in the Southview, Willow City and Westside school districts. The following school buildings were the study sites for the city public school districts: Coral Springs High School from Southview, East Shore High School from Willow City, and Westside High School from Westside. See Figure 4 for a visual representation of the sampling of the city school buildings.

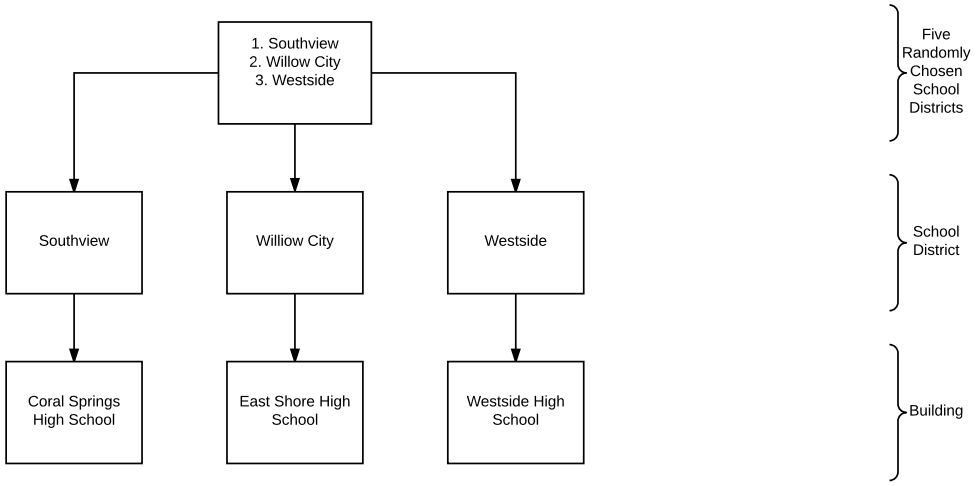

Figure 4. City school building flow chart following cluster sampling process. Rectangles represent different outcomes and arrows represent the direction of the sampling process.

The following process was used to select the suburb school buildings. The first step was to determine how many buildings house grades 9-12. Bear River Area, Anglewood Area, Oceanside, Marble Hill Area, and Maple Hills Area each have one building that house grades 9-12. Random sampling was not used for the five suburb school districts because each district had one building that house grades 9-12. The following school buildings will be the study sites for the suburb public school districts: Riverview High School from Bear River Area, Crossroads High School from Anglewood

Area, Seal Coast High School from Oceanside, Desert Winds High School from Marble Hill Area, and Harrinton Senior High School from Maple Hills Area. See Figure 5 for a visual representation of the sampling of the suburban school buildings.

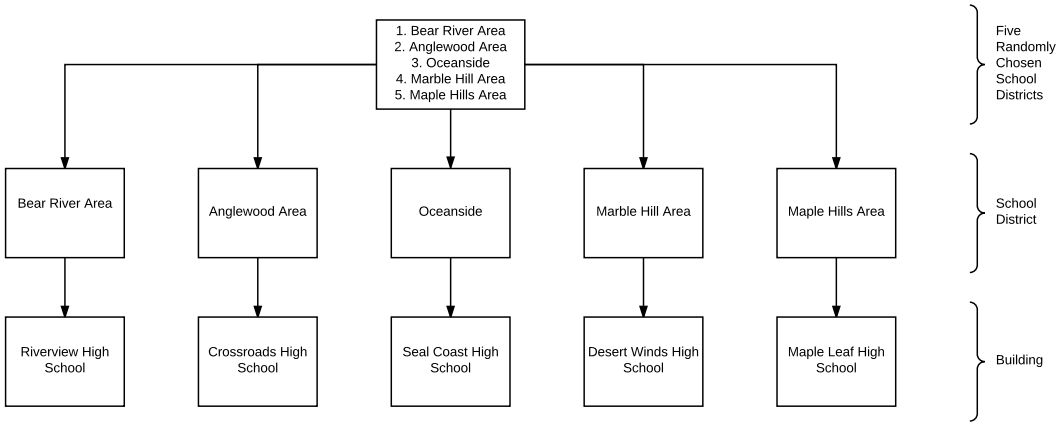

Figure 5. Suburb school building flow chart following cluster sampling process. Rectangles represent different outcomes or considerations and arrows represent the direction of the sampling process.

The following process was used to select town school buildings. The first step was to determine how many school buildings house grades 9-12. Grandview, Timber Creek Area, Little Valley, Elk Creek Area Township, and Springfield each have one building housing grades 9-12. Random sampling was not used for the five town school districts because each had one building that house grades 9-12. The following school buildings were the study sites for the town public school districts: Meadow Ridge High School from Grandview, Whitewater High School from Timber Creek Area, Silver Valley High School from Little Valley, Lakeside Junior/Senior High School from Elk Creek Area Township, and Spring Gardens High School from Springfield. See Figure 6 for a visual representation of the sampling of the town school building.

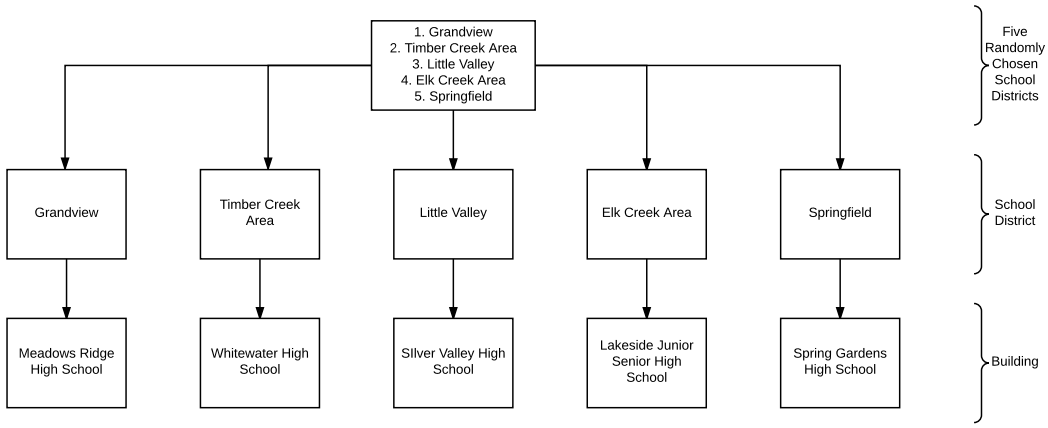

Figure 6. Town school building flow chart following cluster sampling process. Rectangles represent different outcomes and arrows represent the direction of the sampling process.

The following process was used to select rural school buildings. The first step was to determine how many school buildings house grades 9-12. Palm Valley Area, Central State, Woodside Area, Wildwood Area, and Highland each have one building that house grades 9-12. Random sampling was not used for the five rural school districts because each had one building that house grades 9-12. The following school buildings were the study sites for the town public school districts: Palm Valley Area Senior High School from Palm Valley Area, Central Junior/Senior High School from Central State, Woodside Middle School/High School from Woodside Area, Einstein School from Wildwood Area, and Redwood High School from Highland. See Figure 7 for a visual representation of the sampling of the rural school buildings.

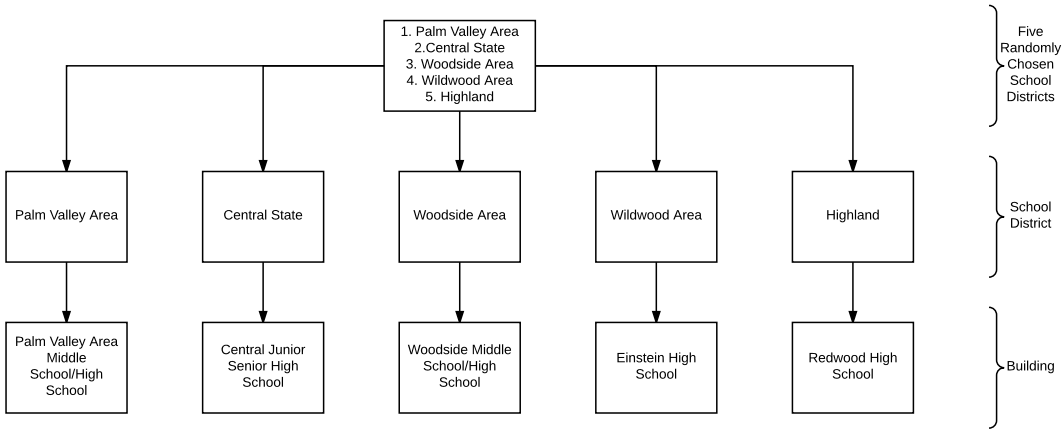

Figure 7. Rural school building flow chart following cluster sampling process. Rectangles represent different outcomes and arrows represent the direction of the sampling process.

Setting

As previously described in the target population and participant selection section of this dissertation, teachers were surveyed from 18 randomly selected secondary schools in the Commonwealth of Pennsylvania. The total sample size was 1,129 teachers in the Commonwealth of Pennsylvania (312 city school district teachers, 371 suburban school district teachers, 209 town school district teachers, 237 rural school district teachers). Teachers were surveyed using Qualtrics, a survey link was sent to teachers' official school district emails. The survey was disseminated to teachers' emails either through the high school office or from the researcher directly, from an email list provided by the school district. Each school principal was able to choose the method of survey distribution with which they were comfortable. Teachers were able complete the survey from any location, including school property or private residences. The research sent

reminder emails to the teachers that were contact directly by the research after two weeks.

Materials

As a quantitative study, the data were gathered using a single survey. The survey primarily collected quantitative data in a likert-scale format, but also provided open-ended questions where participants were encouraged to use anecdotal responses. The open-ended anecdotal responses are used to cross-reference the quantitative likert-scale responses as a way to check the consistency of responses, as this is a self-reporting survey.

This study used a 51 item six-part survey, organized as follows (a) Section 1: *Teaching Experience*, is used to describe the sample; (b) Section 2: *Past Use of Social Media Communications as a Teaching Tool*, collected information about how the participants have used social media communications in educational settings in the past; (c) Section 3: *Current Use of Social Media Communications as a Teaching* Tool, collected information about how the participants currently use social media communications in teaching and learning; (d) Section 4: *Future Use of Social Media Communications as a Teaching Tool*, captured public school teachers' intentions to use social media communications as a teaching tool in the next academic school year; (e) Section 5: *Perceptions of Social Media Communications as a Teaching Tool*, asked participants to respond to a series of questions to measure their attitude, subjective norm, and perceived behavioral control to use social media communications as part of the teaching practices; (f) Section 6: *Teacher Demographic Characteristics*, was used to further describe the sample and explore the influence of demographic characteristics on

participants' responses. The following is a detailed description of the question format in each part of the survey instrument.

Section 1: *Teaching Experience* section of the survey consists of five questions where the participants reported, which school they currently teach, how many years he or she has taught at the current school and in total in public education, if they are aware of a school board policy that addresses using social media communications as a teaching tool, and what grade level and subject area they have taught.

Section 2: *Past Use of Social Media Communications as a Teaching Tool* consists of one multi-part question. The participant is presented with a list of 33 social media communication tools (e.g. Blogs, Google Classrooms, LibraryThing, Podcasts, Twitter) as well as an option to choose "other" and provide a tool not on the list. The participants selected yes or no to indicate if he or she has ever used the listed social media communications as a teaching tool in the past. The participants were presented this list to not only collect which social media communication tools have been used in the past, but also to inform participants the range of technologies that fall under the definition of social media communications.

Section 3: *Current Use of Social Media Communications as a Teaching Tool* includes 12 questions. The first two questions required the participants to list the subjects, classes, grade level, and number of sections he or she currently teaches this academic year. A final column was provided for the participants to indicate if he or she uses social media communications as a teaching tool for each class and section. The following question asked the participants to list the class from the previous question in which he or she most frequently uses social media communications as a teaching tool. The researcher

has chosen to focus on the class in which the participant most frequently uses social media communications to be able to describe the maximum usage across the sample. This allowed the data to be consistent across the sample by having participants focus on the same frequency of use, even if actual use between participants may have varied. The following eight questions are designed to determine how the participants currently use social media communications in the class he or she most frequently uses social media communications. The questions organized 27 social media communication tools from Section 2, into seven categories and provided an open ended category to choose "other" for participants to report about a tool not on the list. The categories are as follows: a) Classroom Management SMC Tools, b) Discussion Tools & Message Boards, c) Photo/Video Sharing, d) Social Bookmarking, e) Social Networking, f) Video Conferencing, g) Virtual Reality, and h) other. Participants indicated the frequency in which he or she uses the listed social media communication (Never, Sometimes, About half the time, Most of the time, Always) under three separate columns entitled, Teacher Lecture, In-Class Assignments, and Out-of-Class Assignments. In the Qualtrics survey the questions were organized in a side-by-side format for ideal presentation and easy of use for the participants. The final two questions of the *Current Use of Social Media Communications as a Teaching Tool* section will be open-ended questions where participants will report the best and worst ways in which social media communications can be used as a teaching tool.

Section 4: *Future Use of Social Media Communications as a Teaching Tool* includes 10 questions that focused on the participants' intended future use of social media communications as a teaching tool. The first two questions asks participants to respond

using a likert-scale from 1-5 (1 Extremely unlikely, 5 Extremely likely) how likely they planed and expected to use social media communications as a teaching tool next academic year. The following eight questions were designed in a similar format to Section 3: *Current Use of Social Media Communications as a Teaching Tool* with seven sections organized into categories (i.e. Classroom Management SMC Tools, Discussion Tools & Message Boards, Photo/Video Sharing, Social Bookmarking, Social Networking, Video Conferencing, Virtual Reality) and a question for participants to select "other" to report the intended use of a social media communication tool not on the list. The questions were presented in a side-by-side format with three columns (i.e. Teacher Lecture, In-Class Assignments, Out-of-Class Assignments) for participants to select how likely (Extremely unlikely, Somewhat unlikely, Neither likely nor unlikely, Somewhat likely, Extremely likely) they intend to use each of the listed social media communication tools in the next academic year.

Section 5: *Perceptions of Social Media Communications as a Teaching Tool* includes 16 questions. The first 14 questions of the perception part were based on the constructs of the theory of planned behavior – attitudes, subjective norms, and perceived behavioral control. The first six questions were designed to survey the attitudes of the participants in regards to social media communications as a teaching tool. The scale items were created using information in the existing literature and the conceptual underpinnings of the technology readiness index (Parasuraman, 2000). The construct of subjective norms were measured with four statements designed to understand participants' views of how important others expect them to use social media communications as a teaching tool. Participants were asked to use a five-point scale from strongly disagree to strongly agree

to answer each statement. Perceived behavioral control was measured using four statements designed to understand participants' views of how much control he or she perceives they have over the use of social media communications as a teaching tool. Participants were asked to use a five-point scale from strongly disagree to strongly agree to answer each statement. The final two questions were open-ended anecdotal responses where participants described what encourages and discourages him or her to use social media communications as a teaching tool.

Section 6: *Teacher Characteristics* included four questions that collected demographic information about participants' gender, age, race/ethnicity, and highest level of education. The information about the teachers' demographic characteristics allowed the researcher to better describe the sample.

Survey Reliability

To ensure the reliability of the qualitative findings from the open-ended questions the Technology Readiness Index (Parasuraman, 2000) informed the construction of the questions. Similar to the Technology Readiness Index, the questions are built in pairs to highlight extreme ends of paradoxes teachers may feel about the use of social media communications in educational settings. The researcher recognizes the use of the extreme ends of paradoxes in the open-ended qualitative response can influence the way a teacher may respond, depending upon if the teacher is answering the open-ended question focusing on the positive or negative end of the paradox.

To ensure reliability of the quantitative findings, the survey used previously validated statements to guide the questions specific to the constructs of attitude, subjective norm, perceived behavioral control, and intention. When previously validated

statements were insufficient to measure a specific construct the researcher incorporated statements that are from empirical studies that served as foundational to the theoretical orientation of this dissertation study. In addition to being guided by previously validated statements, the researcher followed the recommended protocol for constructing a questionnaire that uses the theory of planned behavior as its theoretical orientation outlined by Ajzen and Fishbein (2015). The below is an explanation of how the previously validated items were incorporated into the survey instrument.

Teacher attitude towards the use of SMC in the classroom was evaluated using six items on a five-point likert-scale with the most negative attitude rated as one and the most positive attitude rated as five. The first three statements used to measure attitude were validated by Lange (2009) in his study to understand individual's habitual use of the social media communication tool YouTube. Lange (2009) found that having individuals rate YouTube on a likert-scale form using the bipolar statements of Good/Bad, Important/Unimportant, and Useful/Useless obtained a Cronbach alpha reliability of .70. The second three items measuring attitude originated in the eight central paradoxes of technology products by Mick & Fournier (1998) and were used to develop survey questions to evaluate technology readiness by Parasuraman (2000). The following three items were chosen to be included as they were theoretical aspects that were not already accounted for Lange's study: Hard/Easy, Disengaging/Engaging, and Inefficient/Efficient.

Teacher subjective norms were assessed by four items on a five-point disagree-agree likert-scale with a score of one indicating low normative support for social media communications and a score of five indicating high normative support for social media

communications. The survey items measuring subjective norms were guided by multiple studies. Teo (2012) examined pre-service teachers intention to use technology by adapting previously validated items from Ajzen (1991) and Davis et al. (1989). However, he did not revalidate his adapted questions. Two of Teo's statements were adapted to evaluate subjective norms regarding social media communications as a teaching tool. Specifically, they assess people whose opinions are valued by the teachers and people who are important to the teachers. Two additional statements were adapted from Lange (2009). He found the statements "Most friends approve" and "Most family approve" regarding the use of YouTube obtained a Cronbach alpha of .90 (Lange, 2009, p. 83). These statements were adapted by replacing "friends" with "colleagues" and "family" with "stakeholders." More generally, multiple studies have demonstrated a high internal consistency of .71 to .90 when focusing on the approval important others (Brayley, Obst, White, Lewis, Warburton & Spencer, 2015; Turchik & Gidycz, 2012; Yan & Sin, 2014).

Behavioral Control was assessed by four statements on a five-point disagree-agree likert-scale with a score of one indicating low behavioral control regarding the use of social media communication as a teaching tool and a score of five indicating high behavioral control regarding the use of social media communications as a teaching tool. The studies by Montesarchio (2009) and Lange (2009) guided the item development. Montesarchio (2009), in a study of ethical business practices used the statements, "If I wanted I could easily void the ticket sales" and "For me to void the tickets sales is easy" (p. 96) in her questionnaire obtained a Cronbach alpha of .86. These statements were adapted to address the use of social media communications as a teaching tool. The final two statements measuring perceived behavioral control were adapted from Lange (2009).

His statements, “Able to find a way to use when not allowed” and “Able to find a way to get around blocks” (p. 83) obtained an alpha reliability of .65. To mitigate potential concerns of participants viewing this study as a monitoring tool by the administration, the questions were rewritten with a more positive tone. The statement that referred to performing the behavior when not allowed was changed to “I am able to find creative ways to incorporate social media communications into my teaching practices, regardless of the level of administrative support and infrastructure reliability.” The statement that refers to getting around blocks was change to “The infrastructure of my school’s digital network does not hinder the use of social media communications as part of my teaching practices.”

Teachers’ intentions to use social media communications as a teaching tool were also assessed by two initial general statements and seven specific statements. Montesarchio (2009) used the statements “I plan to void the ticket sales” and “I expect to void the ticket sales” (p. 96) in her questionnaire and obtained a Cronbach alpha reliability of .81. These statements were adapted to evaluate the intended use social media communications as a teaching tool. The remaining seven statements measured intended use of specific social media communication tools and mirrored the statements evaluating current use of specific social media communication tools.

The protocol for the survey development followed the recommendations by Ajzen and Fishbein (2015). In addition to adhering to the survey development protocol, the researcher used previously validated statements from other studies as well as statements from empirical findings from studies that are foundational to the theoretical orientation of

the dissertation study. Table 1 lists the constructs and corresponding statements of the survey instrument.

Table 1

List of Constructs and Corresponding Items

Construct		Item
Attitude (adapted from Lange, (2009); Mick & Fournier (1998))	A1	Bad/Good
	A2	Unimportant/Important
	A3	Useless/Useful
	A4	Hard/Easy
	A5	Disengaging/Engaging
	A6	Inefficient/Efficient
Subjective Norm (adapted from Ajzen (1991); Davis et al. (1989); Lange (2009); Teo (2012))	SN1	Most people who are important to me would approve of me using social media communications as a teaching tool.
	SN2	Peoples whose opinions I value will support me using social media communications as a teaching tool.
	SN3	Most colleagues in my school approve of my use of social media communications in my teaching practices.
	SN4	Most education stakeholders in my school district approve of the use of social media communications in teaching practices.

Perceived Behavioral Control (adapted from Lange, 2009; Montesarchio (2009))	PBC1	If I wanted to I could easily use social media communications as a teaching tool.
	PBC2	My use of social media communications as part of my teaching practices is up to me.
	PBC3	The infrastructure of my school's digital network does not hinder the use of social media communications as part of my teaching practices.
	PBC4	I am able to find creative ways to incorporate social media communications into my teaching practices, regardless of the level of administrative support and infrastructure reliability.
Behavioral Intention to use (adapted from Montesarchio (2009))	BI1	I plan to use social media communications as a teaching tool next academic year.
	BI2	I expect to use social media communications as a teaching tool next academic year.

The analysis of the pilot provided further information about the validity of the survey. Alpha reliability (Lavarkas, 2011) was used to investigate the strength of the scale items used on the survey. The scales developed to measure teachers' attitudes toward the use of social media communication technologies as a teaching tool used a series of five-point bi-polar scales. The scale items consisted of bad/good,

unimportant/important, useless/useful, hard/easy, disengaging/engaging, and inefficient/efficient. The scale developed to measure teachers' subjective norms toward the use of social media communication technologies as a teaching tool used a series of five-point likert-scales which were ranked "strongly disagree" as one through "strongly agree" as five. The scale developed to measure teachers' perceived behavioral control toward the use of social media communication technologies as a teaching tool used a series of five-point likert-scales which were ranked "strong disagree as one through "strongly agree" as five. The scale developed to measure teachers' general intentions to use social media communication technologies as a teaching tool in the next academic year used a series of five-point likert-scales which were ranked "extremely unlikely" as one through "extremely likely" as five.

The scale that measured the attitudes of teachers using social media communication technologies as a teaching tool was the first constructed to be investigated first. Teacher attitudes received an alpha reliability score of $\alpha = .88$. All six items were positively related to the scale; therefore removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggest a Cronbach Alpha score grater than .80 is considered "good" (p.231).

The scale that measured teachers' subjective norms toward the used of social media communication technologies as a teaching tool was the second construct to be investigated. Teachers' subjective norms received an alpha reliability score of $\alpha = .86$. All four items were positively related to the scale; therefore removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggest a Cronbach Alpha score grater than .80 is considered "good" (p.231).

The scale that measured teachers' perceived behavioral control of using social media communication technologies as a teaching toll was the third construct to be investigated. Teachers' perceived behavioral control received an alpha reliability score of $\alpha = .73$. All four items were positively related to the scale; therefore removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggest a Cronbach Alpha score grater than .70 is considered "acceptable" (p.231).

The scale that measured teachers' future intentions to use social media communication technologies as a teaching tool was the final construct to be investigated. Teachers' future intentions received an alpha reliability score of $\alpha = .97$. Both of the items were positively related to the scale; therefore removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggest a Cronbach Alpha score grater than .90 is considered "excellent" (p.231).

The analysis of the pilot survey allowed the researcher to test the reliability of the scale items measuring the specific constructs of the theory of planned behavior (Ajzen, 1991). Using alpha reliability it was found that all of the items were positively related to each of the associated constructs being measured. The results of the alpha reliability meant that none of the items were dropped and that the survey was reliable in the form it was piloted; therefore no changes were made from the pilot survey to create the actual survey instrument used in this study.

Data Triangulation

To answer the four research questions that guided this study, multiple parts of the survey were used to ensure data triangulation. To answer research question one, what are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral

control regarding the use of social media communications as a pedagogical tool, data from sections two and five were analyzed. Research question two, what is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communications as a pedagogical tool, were answered by analyzing data from sections three and five. To answer research question three, what is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intention to use social media communications as a pedagogical tool, data from sections four and five were analyzed. Research question four, how do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications as a pedagogical tool, was answered by analyzing data from sections one, three, four, five, and six. See table 2 for a visual representation of the data collection matrix.

The researcher also used extant data and the qualitative data from the open-ended survey questions to help situate teachers' responses. The researcher reviewed the online policy manuals of each district participating in the study for the school districts' policy on the use of social media communication technologies in the classroom. The findings developed from the review the school districts' policy as well as the responses from the open-ended survey questions are used in Chapter Five of this study to help explain the

quantitative results that were discovered through answering the research questions of this study.

Table 2

Data Collection Matrix

Research Questions	Survey Sections					
	1	2	3	4	5	6
#1: What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?		X			X	
#2: What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communication as a pedagogical tool?			X		X	
#3: What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intention to use social media communications as a pedagogical tool?				X	X	
#4: How do teacher characteristics and current use of social	X		X	X	X	X

media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications as a pedagogical tool?

Procedures

The following section will describe the procedures used to collect data and ensure ethical treatment and protection of all participants. The process of survey creation and distribution will be discussed in sequence.

Following IRB approval the researcher sought site permission from a district not selected in the sampling process to pilot the survey instrument with 20 public school teachers that teach students in grades 9-12. At the conclusion of the pilot test the researcher performed an alpha reliability analysis to determine the reliability of the survey instrument. The researcher did not revise the survey instrument as all of the items positively related to the associated construct of measurement in the theory of planned behavior (Ajzen, 1991).

Using an original sample of 20 schools the researcher contacted the selected school principals through email to receive site permission. From the original sample of 20 schools, seven schools agreed to participant in the study – two city, one suburb, one town, and three rural. A random resample without replacement was conducted and yielded an additional four schools that were willing to participate. After the first resample a total of 11 schools, two city, two suburb, three town, and four rural, had agreed to

participate. A second random resample without replacement was conduct and yielded an additional three schools that were willing to participate. After the second resample a total of 14 schools, two city, three suburb, four town, and five rural, had agreed to participate. A third random resample without replacement was conducted and yielded an additional four schools that were willing to participate. After the third resample a total of 18 schools, three city, five suburb, five town, and five rural, had agreed to participate. A fourth random resample without replacement was conducted, only on city school districts since it was the only strata that did not have the desired representation of five school districts. The final resample did not yield any school districts that were willing to participate. At that time no further resampling was conducted since all city schools had been contacted.

After site permission and IRB approval was secured, the researcher communicated with the school principals to arrange a way in which each principal would prefer the survey link be distributed to the teachers. Of the 18 participating schools, four of the principals preferred to distribute the survey links from the principal's office and 14 preferred that the faculty received the survey link through a Qualtrics email.

Teachers completed the surveys at their convenience. Before a participating teacher completed the survey instrument, the teacher was presented with an electronic informed consent letter requesting their participation. Once a teacher agreed to the consent letter, the survey instrument was presented to the teacher. If the teacher decided not to participate and disagreed with the informed consent, they were thanked for their time and were not presented with the survey. In those schools where the principal preferred to have the teachers contacted through a Quatrics email, the researcher sent a

follow up email to those who did not respond to the survey two weeks after the initial request of participation. For the schools where principals decided to distribute the link themselves, the researcher requested the school send a follow up email two weeks after the initial request of participation.

Two weeks after the final follow-up email, the researcher closed the survey and imported the data into STATA 14 to perform data analysis. A copy of the survey data is kept in the researcher's home on a portable flash drive in a locked file cabinet. The researcher will destroy the data three years after the conclusion and defense of the dissertation study.

Data Analysis

Research question one stated, what are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool? Because research question one was descriptive in nature and did not investigate a relationship, inferential statistics were not used. The variables used in the analysis to answer research questions one were past use, attitudes, subjective norms, and perceived behavioral control. The variable of past use is an index and will be treated as a ratio level of measurement and the variables attitudes, subjective norms, and perceived behavioral control are scale scores and were treated as interval levels of measurement. To answer research question one frequency distribution, measures of central tendency, and variability were used.

Research question two stated, what is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social

media communications as a pedagogical tool? Because research question two investigated a relationship, inferential statistics were used. The variables used in the analysis to answer research question two were current use, attitudes, subjective norms, and perceived behavioral control. The variables current use, attitudes, subjective norms, and perceived behavioral control are scale scores and were treated as interval levels of measurement. To answer research question two a regression analysis was used. Figure 8 displays the path diagram that represents the relationship analyzed to answer research question two.

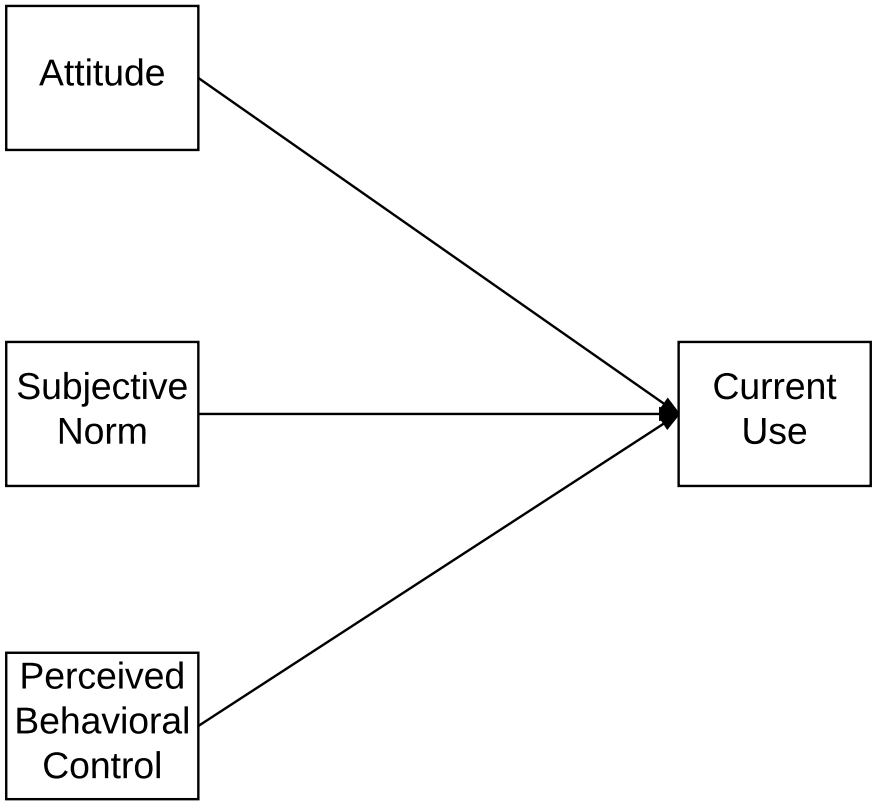

Figure 8. Current use path diagram. Rectangles represent variables and arrows represent the relationship of one variable to another.

Research question three stated, what is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intention to use social media communications as a pedagogical tool? Because research question three investigated a relationship, inferential statistics were used. The variables used in the analysis to answer research question three were intended use, attitudes, subjective norms, and perceived behavioral control. The variables intended use, attitudes, subjective norms, and perceived behavioral control are scale scores and were treated as interval levels of measurement. To answer research question three a regression analysis was used. Figure 9 displays the path diagram that represents the relationship analyzed to answer research question three.

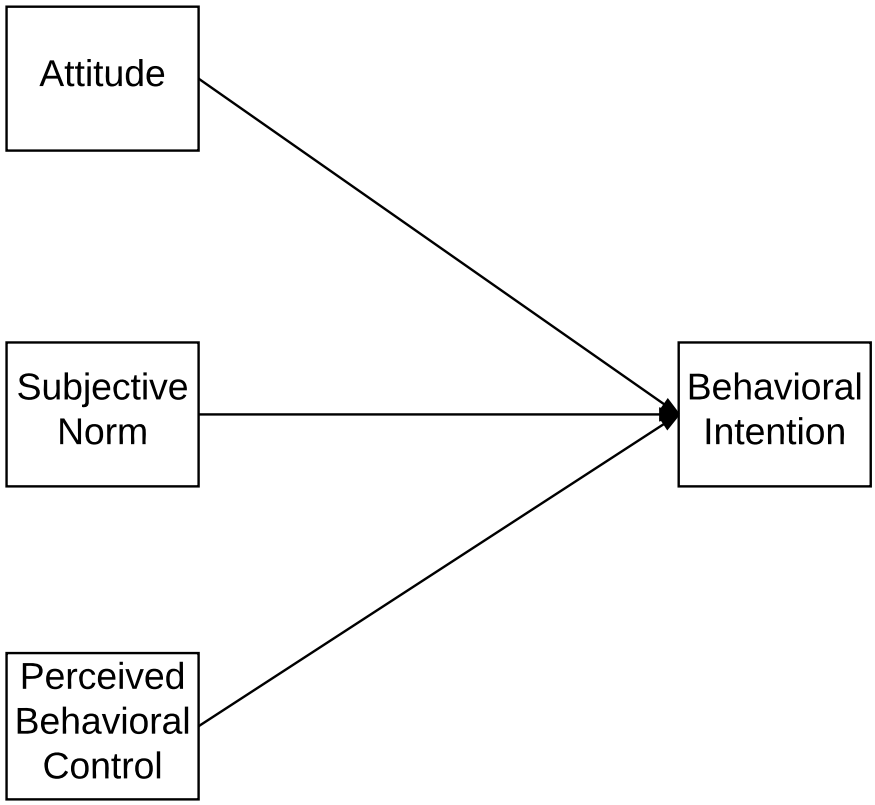

Figure 9. Intended use path diagram. Rectangles represent variables and arrows represent the relationship of one variable to another.

Research question four stated, how do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control, and their future intentions to use social media communications as a pedagogical tool? Because research question four investigated a relationship, inferential statistics were used. The variables used in the analysis to answer research question four were intended use, attitudes, subjective norms, perceived behavioral control, subject area, age, gender, and current use. The variables intended use, current use, attitudes, subjective norms, and perceived

behavioral control are scale scores and were treated as interval levels of measurement. The variable age was treated as a ratio level of measurement because teacher reported their age in years on the survey. It is important to note that the variable age is not intended to represent teaching experiences, only the age of the teacher at the time of the survey. The variables gender and subject area were treated as dichotomous nominal levels of measurement. Subject area was treated as a dichotomous nominal level of measurement because teachers reported subject area will be classified into two categories; the categories will be tested and not tested. The teachers who are teaching math, science, and English Language arts will be labeled as tested subject teachers, and teacher who teach other subjects will be labeled as not tested subject teachers. To answer research question four a regression analysis was used. Figure 10 displays the path diagram that represents the relationship analyzed to answer research question four. The data were analyzed using STATA 14.

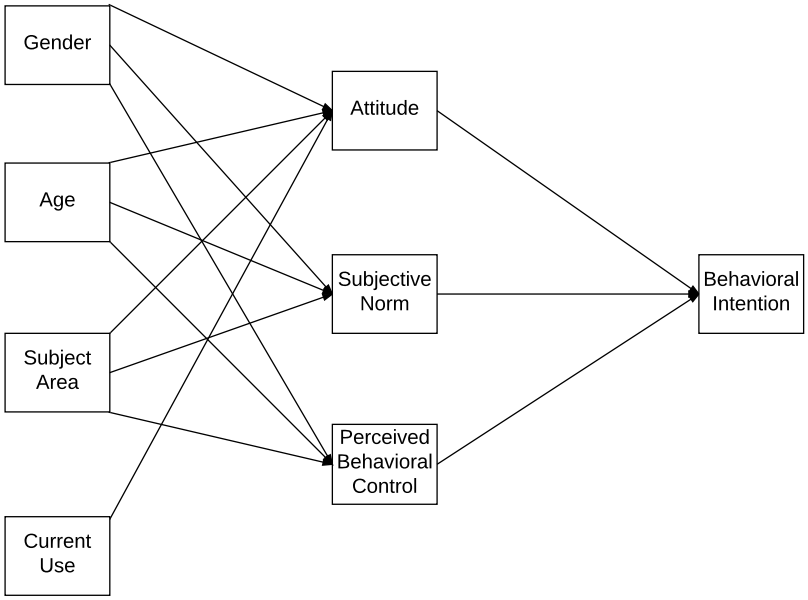

Figure 10. SMC path diagram. Rectangles represent variables and arrows represent the direct effects of one variable on another.

Summary

Chapter three has discussed in detail the quantitative methods proposed for this research study. The research questions were presented. The process for selecting the teacher participants were described and explained in detail for each of the four urban-centric locales – urban, suburb, town, and rural. The survey instrument was described as well as the procedure used to contact participating school districts and administer the survey instrument to the teachers. Finally, the data analysis procedures, explaining the level of measurement for each variable as well as the statistical procedure used was described. Chapter four will present the quantitative results of the data analysis.

CHAPTER FOUR

RESEARCH FINDINGS

Introduction

Chapter Four presents the results related to the research questions from this study about Pennsylvania teachers' perceptions and use of social media communication technologies as a pedagogical tool. The chapter begins with a detailed description of the sample. Following the description of the sample, a brief summary of the results is presented. The summary of results section presents each research question with a corresponding summary of the answer. Details of the analysis and results are described, including the detailed steps of hypothesis testing as well as regression diagnostics used.

Description of the Sample

Surveys were distributed to 18 different secondary schools within the Commonwealth of Pennsylvania. Each of the four urban-centric locale codes were represented in this study. Each locale code was represented by five schools, except for the city schools, which were represented by three schools. The schools in the sample contained 1,129 teachers who taught grades 9-12. On average, teachers had 13.79 years of experience, and 97.93% were ranked highly qualified by the Pennsylvania Department of Education. The majority of the schools (n = 13) housed grades 9-12, while the remaining schools housed grades 8-12 (n = 2), grades 7-12 (n = 2), or grades 6-12 (n = 1). The schools in the sample served a total of 16,101 students. The demographic characteristics of the students taught at the sampled schools were as follows: 3.27% were classified as gifted, 1.30% dropped out, 82.67% of the students identified as White, 44.53% of the students were classified as low-income, 2.23% of the students were

English language learners, 15.05% were enrolled in special education programs, and 49.73% of the students were female.

Of the 1,129 teachers sampled, 226 responded to the invitation to take the survey. From the 226 responses, only 125 surveys were complete enough to be considered valid. The response rate of the valid surveys was 11.07%. All valid surveys were used in the analysis.

Although only 55.31% of the total responses were used for analysis, 125 responses was above the minimum needed for the most complex regression model. Tabachnick and Fidell (2007) provide a formula for calculating a minimum sample size to test regressions, $N \geq 50 + 8(IV)$, where N is the number of valid responses and IV is the number of independent predictor variables (p. 123). The most complex regression model used in this study has seven independent predictor variables. Using the formula provided by Tabachnick and Fidell (2007) with the seven independent predictor variables, the researcher needed $50 + (8)(7) = 106$ valid responses to test the regression.

Tabachnick and Fidell (2007) also provide a formula for calculating the minimum sample to test individual predictors, $N \geq 104 + IV$, where N is the number of valid responses and IV is the number of independent predictor variables (p. 123). The most complex regression model used in this study has seven independent predictor variables. Using the formula provided by Tabachnick and Fidell (2007) with the seven independent predictor variables, the researcher needed $104 + 7 = 111$ valid responses to test individual predictors in the regression model.

From the valid responses, participants described their gender as male (39.20%) or female (60.80%). The ethnicities of the participants were White (97.60%), Black or

African American (0.80%), Hispanic (0.80%), and more than one race (0.80%). The mean age was 40.33 years old with a standard deviation of 9.16.

All four of the urban centric locale codes were represented by the participants. The most represented local code was rural (44.80%), followed by suburban (20.00%), town (17.60%), and city (16.80%). The remaining teachers did not report their locale code (0.80%). The sample had been teaching in public education for a mean of 15.55 years with a standard deviation of 8.30. The mean number of years the sample had been teaching at their current schools was 11.90 years with a standard deviation of 8.22. All subjects were recoded into categories based on whether they taught tested subjects—math, science, or English language arts—or non-tested subjects such as a foreign language, music, or art. The majority of the sample taught non-tested subjects (55.20%).

Survey Instrument Reliability

Alpha reliability (Lavarkas, 2011) was used to investigate the strength of the scale items used on the survey. The first scale items measured teachers' attitudes toward the use of social media communication technologies as a teaching tool. The second scale items measured teachers' subjective norms toward the use of social media communication technologies as a teaching tool. The third scale items measured teachers' perceived behavioral control toward the use of social media communication technologies as a teaching tool. The final scale items measured teachers' intended use of social media communication technologies as a teaching tool.

The scale that measured teachers' attitudes toward the use of social media communication technologies as a teaching tool was analyzed first. Teachers' attitudes received an alpha reliability score of $\alpha = .90$. All six items were positively related to the

scale; therefore, removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggested that an alpha reliability score of $\alpha = .90$ is considered excellent.

The scale that measured teachers' subjective norms toward the use of social media communication technologies as a teaching tool was analyzed second. Teachers' subjective norms received an alpha reliability score of $\alpha = .88$. All four items were positively related to the scale; therefore, removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggested that an alpha reliability score of $\alpha = .88$ is considered good.

The scale that measured teachers' perceived behavioral control toward the use of social media communication technologies as a teaching tool was analyzed third. Teachers' perceived behavioral control received an alpha reliability score of $\alpha = .75$. All four items were positively related to the scale; therefore removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggested that an alpha reliability score of $\alpha = .75$ is considered acceptable.

The scale that measured teachers' intended use of social media communication technologies as a teaching tool was the last construct to be analyzed. Teachers' intended use received an alpha reliability score of $\alpha = .97$. All items were positively related to the scale; therefore, removing a specific item did not increase the alpha reliability score. George and Mallery (2003) suggested that an alpha reliability score of $\alpha = .97$ is considered excellent.

Summary of the Results

This section will provide a brief summary of the results. Each research question will be stated, followed by the results of the analysis. Research question one was answered using descriptive statistics, and research questions, two, three, and four were answered using regression modeling.

Research question one asked, "What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?" The researcher found that teachers' past use was low, teachers' attitudes were moderately positive, teachers' subjective norms were moderately encouraging, and teachers' perceived behavioral control was moderately positive. Overall, teachers' perceptions of using social media communications as a pedagogical tool were moderately positive.

Research question two asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communications as a pedagogical tool?" Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool significantly predicted current use scores [$\beta_{attitudes} = 0.43$, $t(121) = 4.75$, $p < .0001$; $\beta_{subjectivenorms} = -0.05$, $t(121) = -0.46$, $p = .645$; $\beta_{pbc} = 0.19$, $t(121) = 1.92$, $p = .058$]. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in current scores [$R^2 = .25$, $F(3, 121) = 13.51$, $p < .00001$].

Controlling for attitudes and subjective norms, there was no difference in teachers' perceived behavioral control score and their current use of social media communications as a pedagogical tool. Controlling for attitudes and perceived behavioral control, there was no difference in teachers' subjective norms scores and their current use of social media communications as a pedagogical tool. Controlling subjective norms and perceived behavioral control, for every additional point in attitudes score there was a 0.06 point increase in current use of social media communications as a pedagogical tool. Controlling for subjective norms and perceived behavioral control, for every standard deviation increase in attitudes score, there was a 0.43 standard deviation increase in current use of social media communications as a pedagogical tool.

Research question three asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intentions to use social media communications as a pedagogical tool?" Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool significantly predicted intended use scores [$\beta_{attitudes} = .30$, $t(121) = 3.08$, $p = .003$; $\beta_{subjectivenorms} = –0.06$, $t(121) = –0.54$, $p = .592$; $\beta_{pbc} = .09$, $t(121) = 0.86$, $p = 0.393$]. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended scores [$R^2 = .10$, $F(3, 121) = 4.57$, $p = .0045$].

Controlling for attitudes and subjective norms, there was no difference in teachers' perceived behavioral control scores and their intended use of social media communications as a pedagogical tool. Controlling for attitudes and perceived behavioral

control, there was no difference in teachers' subjective norms score and their intended use of social media communications as a pedagogical tool. Controlling for subjective norms and perceived behavioral control, for every additional point in attitudes score, there was a 0.20 point increase in intended use of social media communications as a pedagogical tool. Controlling for subjective norms and perceived behavioral control, for every standard deviation increase in attitudes score there was a 0.30 point standard deviation increase in intended use of social media communications as a pedagogical tool.

Research question four asked, "How do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications a pedagogical tool?" Teachers' ages, gender, subject area taught, attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool, and current use of social media communications as a pedagogical tool significantly predict intended scores [$\beta_{age} = 0.10$, $t(117) = 1.20$, $p = .232$; $\beta_{female} = 0.19$, $t(117) = 2.38$, $p = .019$; $\beta_{tested} = –0.03$, $t(117) = –0.39$, $p = .699$; $\beta_{attitudes} = 0.13$, $t(117) = 1.33$, $p = .187$; $\beta_{subjectivenorms} = –0.07$, $t(117) = –0.65$, $p = .514$; $\beta_{pbc} = 0.02$, $t(117) = 0.15$, $p = .879$; $\beta_{currentuse} = 0.39$, $t(117) = 4.25$, $p < .0001$]. Teachers' ages, gender, subject area taught, attitudes, subjective norms, perceived behavioral control toward the use of social media communications as a pedagogical tool, and current use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended use scores [$R^2 = .2531$, $F(7, 117) = 5.67$, $p < .00001$].

Controlling for age, gender, subject area taught, current use, attitudes and subjective norms, there was no relationship between perceived behavioral control score and intended use of social media communications as a pedagogical tool. Controlling for age, gender, subject area, current use, attitudes, and perceived behavioral control, there was no relationship between subjective norms score and intended use of social media communications as a pedagogical tool. Controlling for age, gender, subject area, current use, subjective norms, and perceived behavioral control, there was no relationship between attitude scores and intended use of social media communications as a pedagogical tool. Controlling for age, gender, subject area, attitudes, subjective norms, and perceived behavioral control, for every additional point in current use score there was a 1.99 point increase in intended use of social media communications as a pedagogical tool. Controlling for gender, subject area, current use, attitudes, subjective norms, and perceived behavioral control, there was no relationship between teachers' age and intended use of social media communications as a pedagogical tool. Controlling for age, subject area, current use, attitudes, subjective norms, and perceived behavioral control, the mean intended use score was 0.23 points higher for women than for men. Controlling for age, gender, current use, attitudes, subjective norms, and perceived behavioral control, there was no relationship between subject area taught and intended use of social media communications as a pedagogical tool.

Controlling for age, gender, subject area, attitudes, subjective norms, and perceived behavioral control, for every standard deviation increase in current use score there was a 0.39 point standard deviation increase in intended use of social media communications as a pedagogical tool. Controlling for age, subject area, current use,

attitudes, subjective norms, and perceived behavioral control, the relationship between gender and intended use was weak.

Details of the Analysis and Results

The following section will describe in detail the statistical procedures used to analyze the data. Each research questions will be stated, followed by the specific procedures used in the hypothesis testing. Research question one was answered using descriptive statistics and research questions two, three, and four were answered with regression modeling.

Research Question One

Research question one asked, "What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?" The variable for past use was an index and treated as a ratio level of measurement. The variables for attitudes, subjective norms, and perceived behavioral control were scale scores and treated as interval levels of measurement.

When detailed descriptive statistical procedures were applied to the variable of past use, the results were as follows: The mean was 6.36, the mode was six, and the median was six. The range was 24 with a minimum observation of zero and a maximum observation of 23. The lower quartile ends at three and the upper quartile begin at eight. The standard deviation was 4.10, the variance was 16.78, the skewness was 1.18, and the kurtosis was 5.14. Figure 11 displays the histogram of the variable past use.

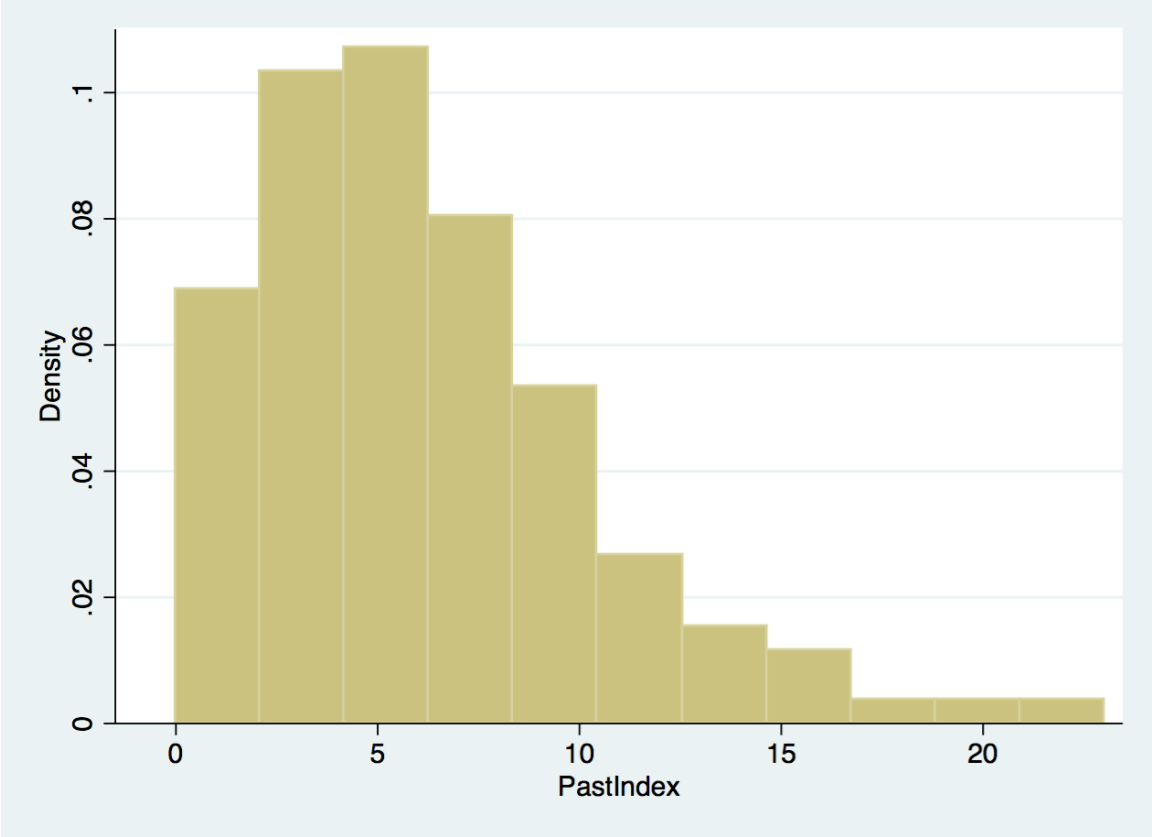

Figure 11. Past use histogram. Histogram of teachers' past use of social media communications as a teaching tool.

When detailed descriptive statistical procedures were applied to the variable of attitudes the results were as follows: The mean was 3.56, the mode was 3.67, and the median was 3.5. The range was five with a minimum observation of one and the maximum observation of five. The lower quartile ended at three and the upper quartile began at 4.17. The standard deviation was 0.86, the variance was 0.75, the skewness was –0.25, and the kurtosis was 3.08. Figure 12 displays the histogram of the variable attitudes.

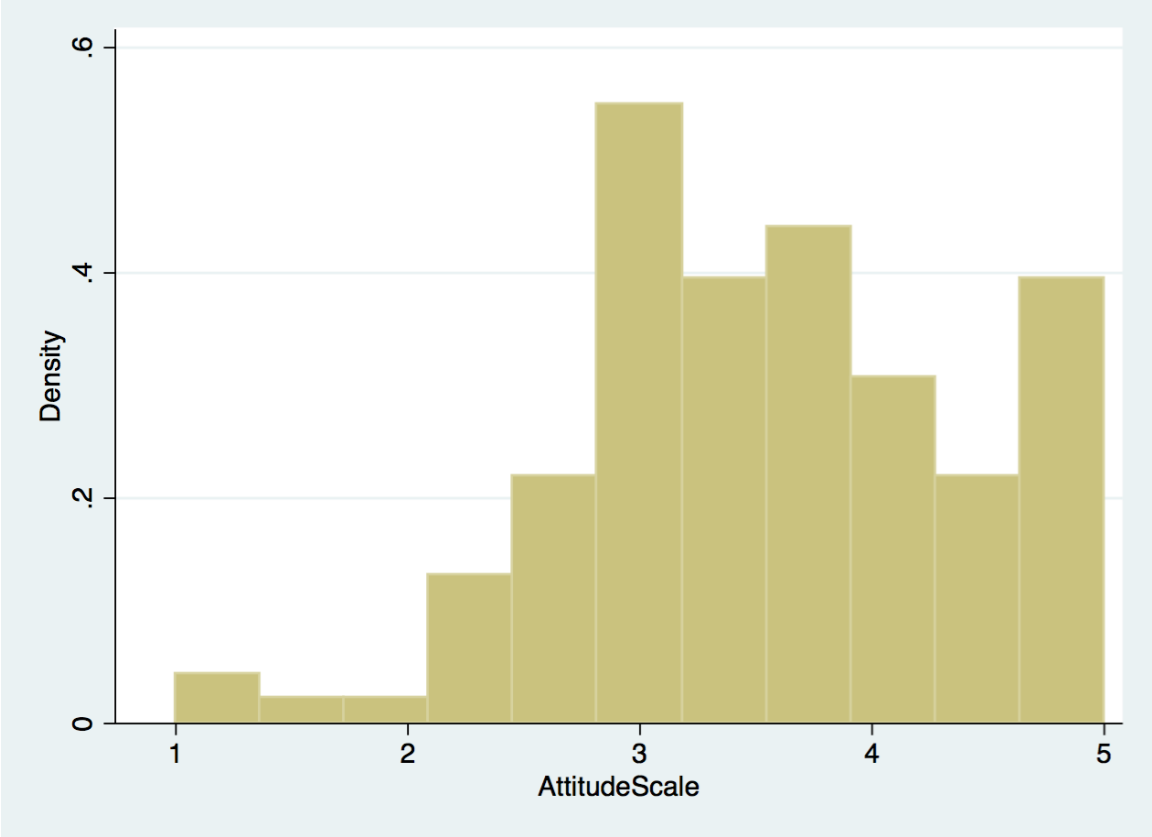

Figure 12. Attitudes histogram. Histogram of teachers' attitudes towards the use of social media communications as a teaching tool.

When detailed descriptive statistical procedures were applied to the variable of subjective norms, the results were as follows. . The mean was 3.78, the mode was four, and the median was four. The range was five with a minimum observation of one and a maximum observation of five. The lower quartile ended at 3.25 and the upper quartile began at 4.5. The standard deviation was 0.86, the variance was 0.74, the skewness was –0.54, and the kurtosis was 3.10. Figure 13 displays the histogram of the variable subjective norms.

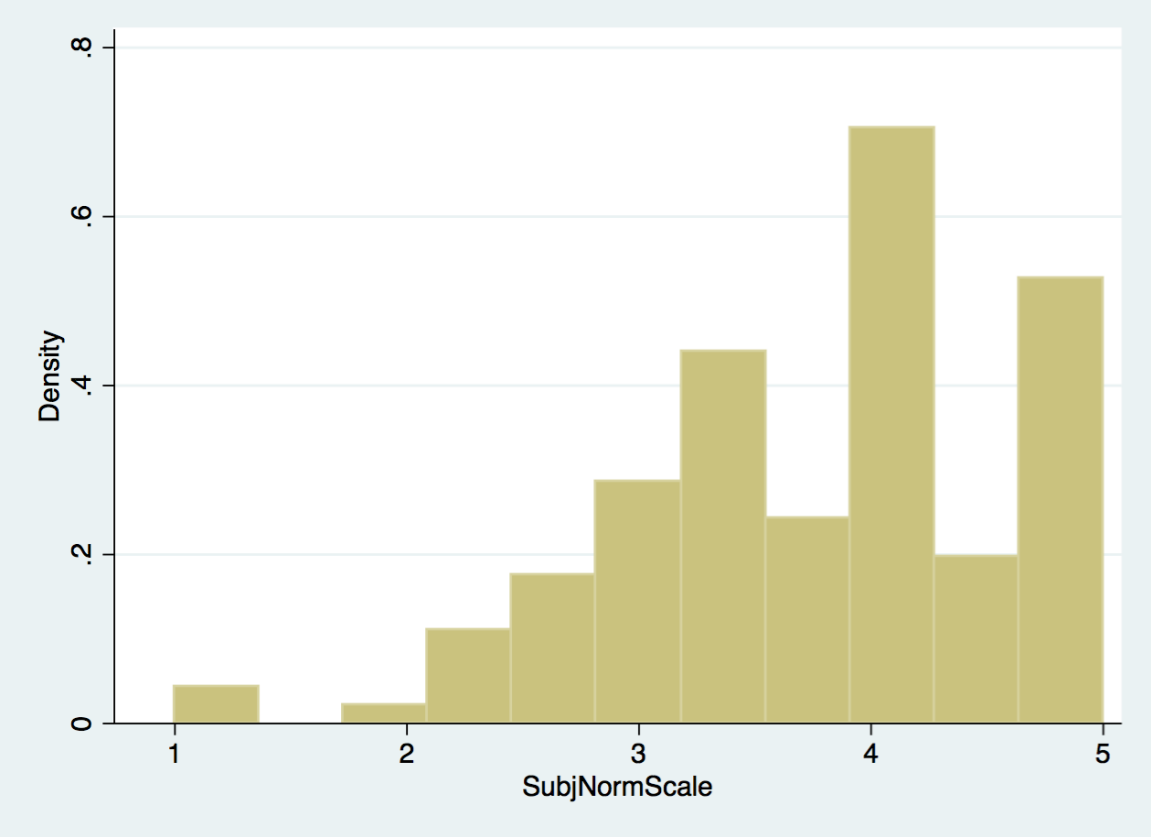

Figure 13. Subjective norms histogram. Histogram of teachers' subjective norms towards the use of social media communications as a teaching tool.

When detailed descriptive statistical procedures were applied to the variable of perceived behavioral control, the results were as follows. The mean was 3.40, the mode was 3.25, and the median was 3.50. The range was five with a minimum observation of one and a maximum observation of five. The lower quartile ended at three and the upper quartile began at four. The standard deviation was 0.92, the variance was 0.84, the skewness was –0.19, and the kurtosis was 2.77. Figure 14 displays the histogram of the variable perceived behavioral control.

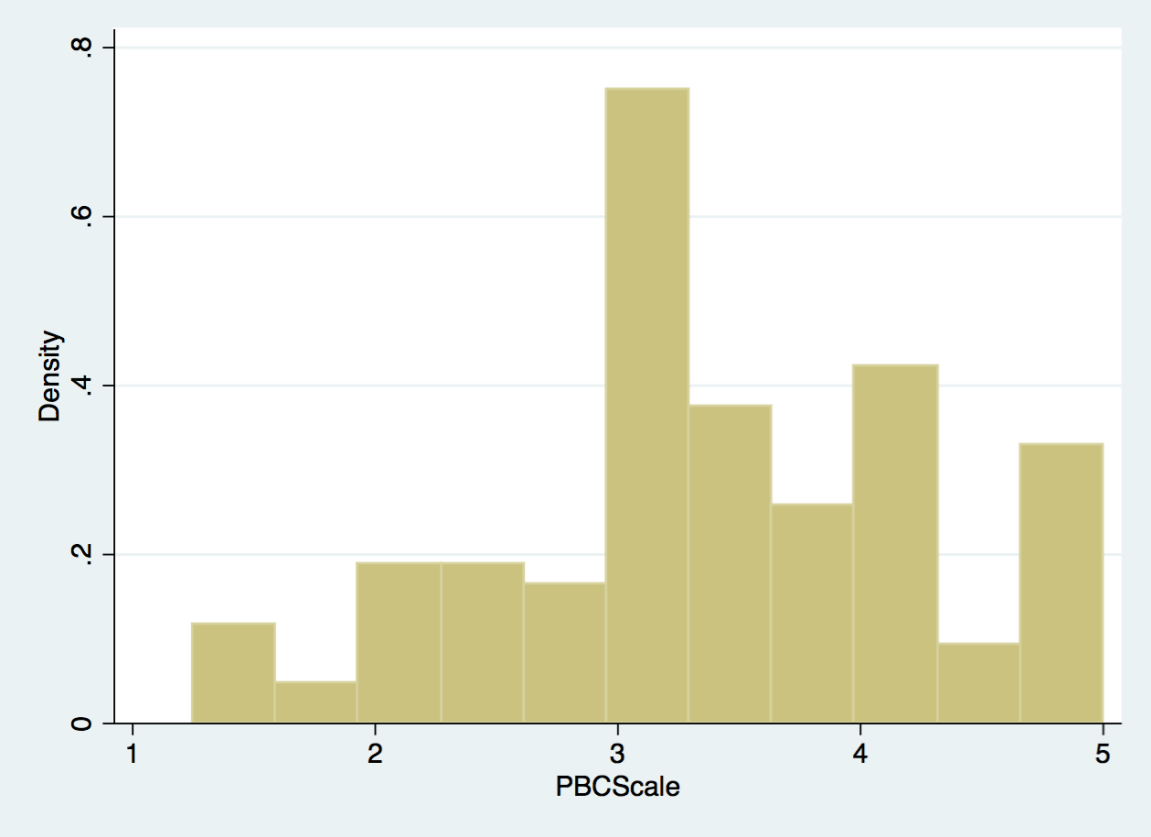

Figure 14. Perceived behavioral control histogram. Histogram of teachers' perceived behavioral control towards the use of social media communications as a teaching tool.

Research Question Two

Research question two asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communications as a pedagogical tool?" The variables for current use, attitudes, subjective norms, and perceived behavioral control are scale scores and were treated as interval levels of measurement. Below, the procedures used in the regression analysis of the relationship between attitudes, subjective norms, and perceived behavioral and current use of social media communications, including the steps taken to ensure the assumptions of linear regression were not violated, are described.

The first step in the regression analysis was to run detailed descriptive statistics for each of the variables. Since research question one results provided the detailed descriptive statistics for attitudes, subjective norms, and perceived behavioral control, the variable for current use was analyzed. When detailed descriptive statistical procedures were applied to the variable of current use the results were as follows: The mean was 1.14, the mode was 1.02, and the median was 1.11. The range was 1.58 with a minimum observation of one and a maximum observation of 1.58. The lower quartile ended at 1.05 and the upper quartile began at 1.20. The standard deviation was 0.11, the variance was 0.01, the skewness was 1.30, and the kurtosis was 5.12. Figure 15 displays the histogram of the variable current use.

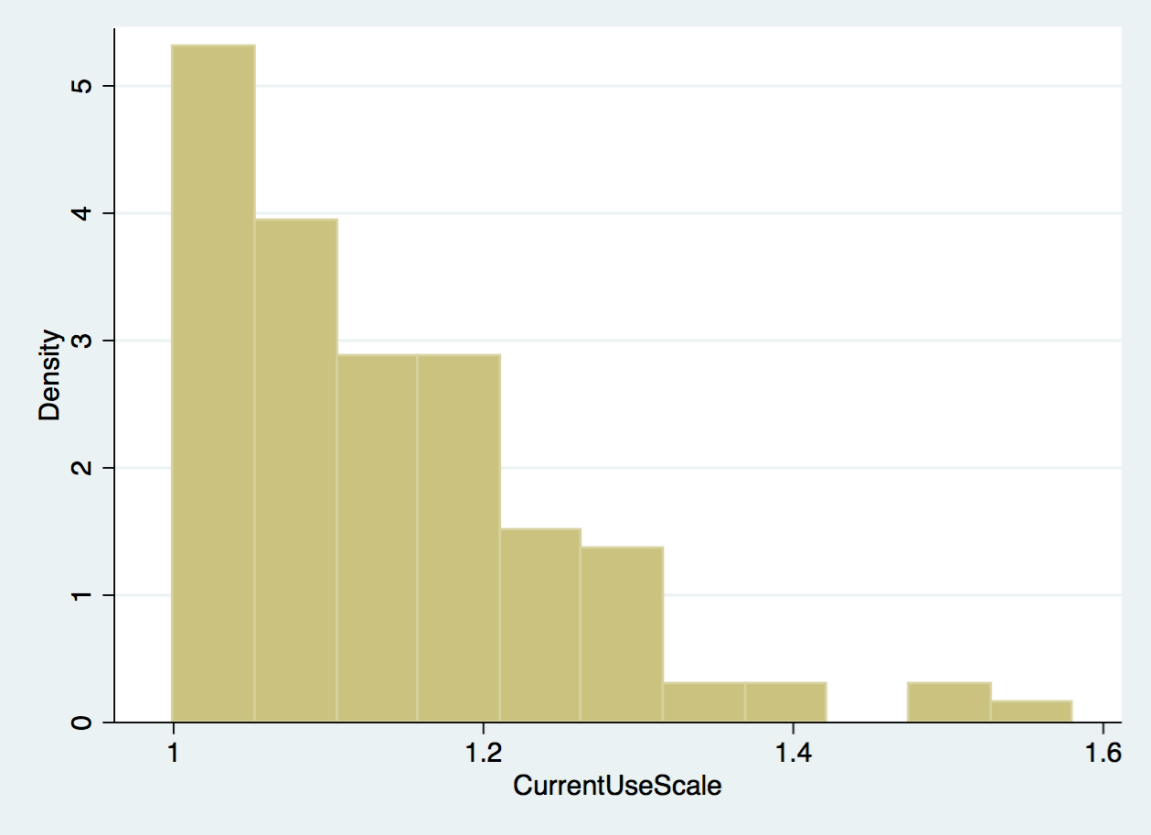

Figure 15. Current use histogram. Histogram of teachers' current use of social media communications as a teaching tool

The next step in the regression analysis was to generate preliminary scatter plots that show the bivariate relationship between each of the X variables (attitudes, subjective norms, perceived behavioral control) and the Y variable (current use). The relationships were examined to assess if there appeared to be a linear relationship. After examining the preliminary scatter plots, the researcher determined the relationships appeared to be linear. Figure 16 displays the scatter plot for the relationship between attitudes and current use. Figure 17 displays the scatter plot for the relationship between subjective norms and current use. Figure 18 displays the scatter plot for the relationship between perceived behavioral control and current use.

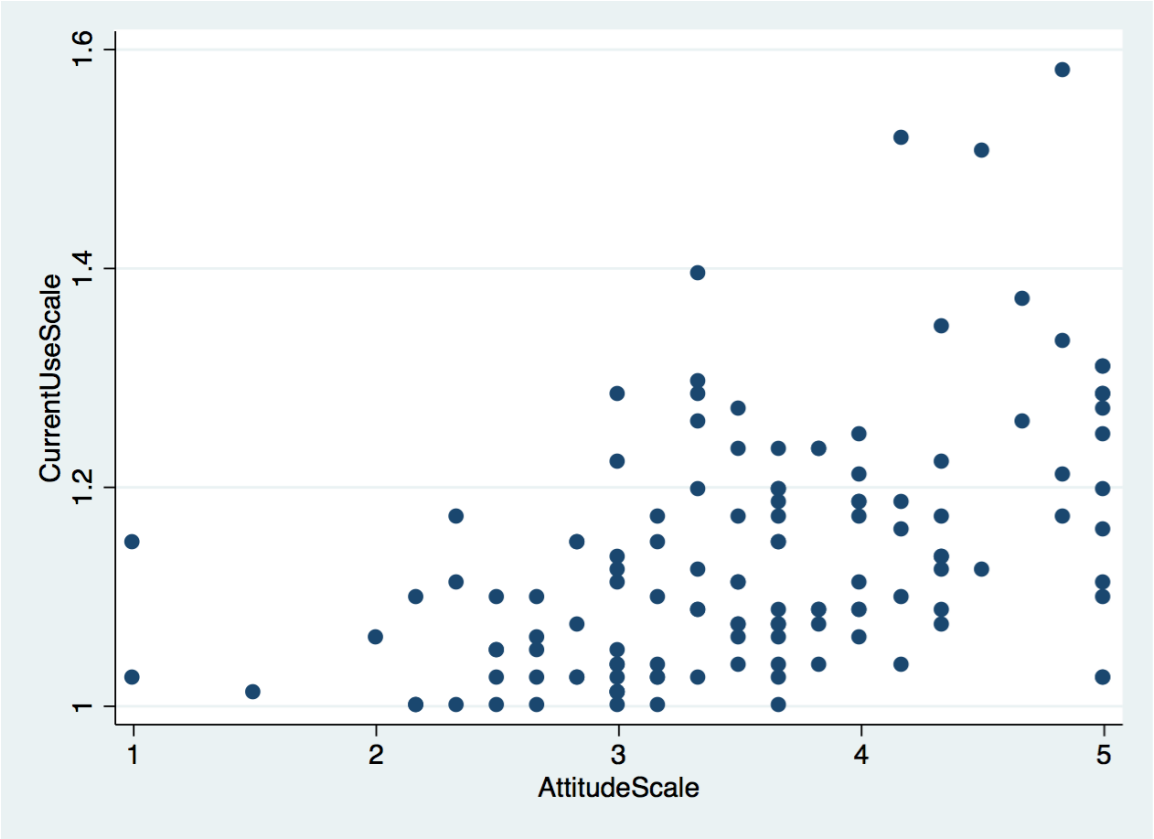

Figure 16. Attitudes and current use scatter plot. Scatter plot of teachers' current use of social media communications as a teaching tool by teachers' attitudes toward the use of social media as a teaching tool.

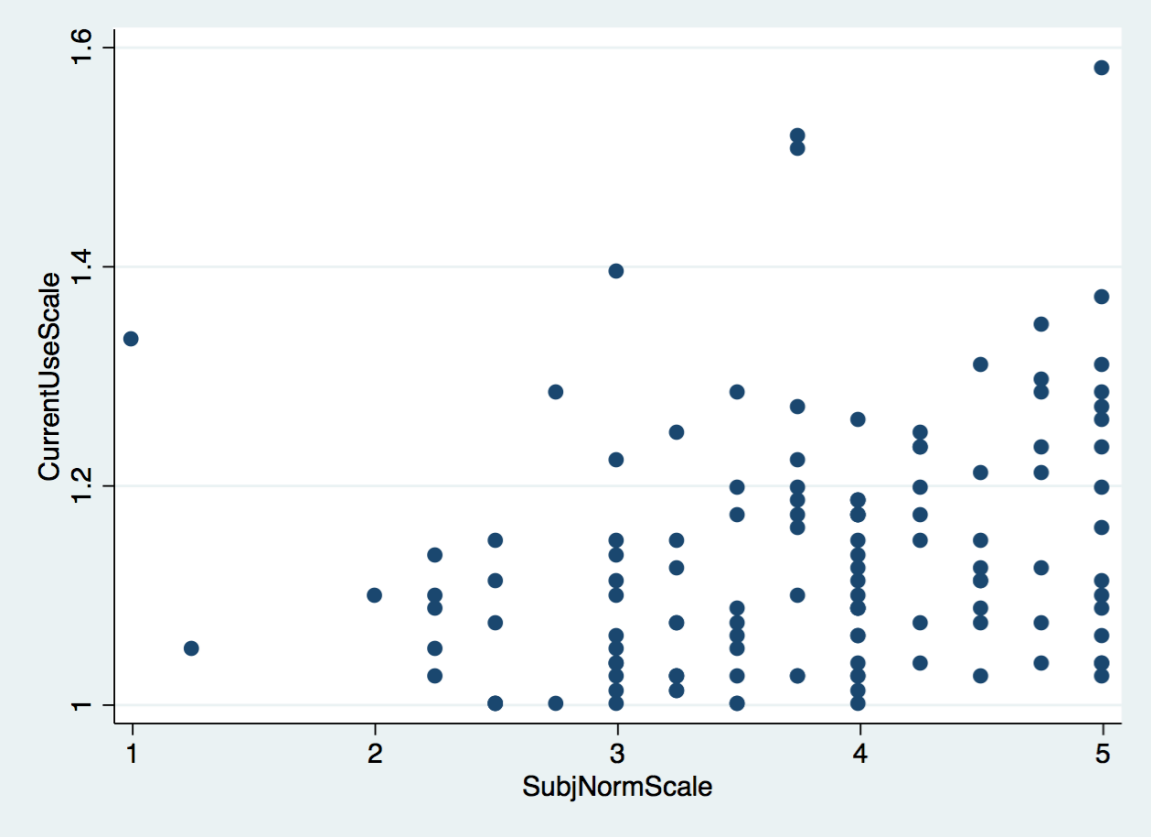

Figure 17. Subjective norms and current use scatter plot. Scatter plot of teachers' current use of social media communications as a teaching tool by teachers' subjective norms toward the use of social media as a teaching tool.

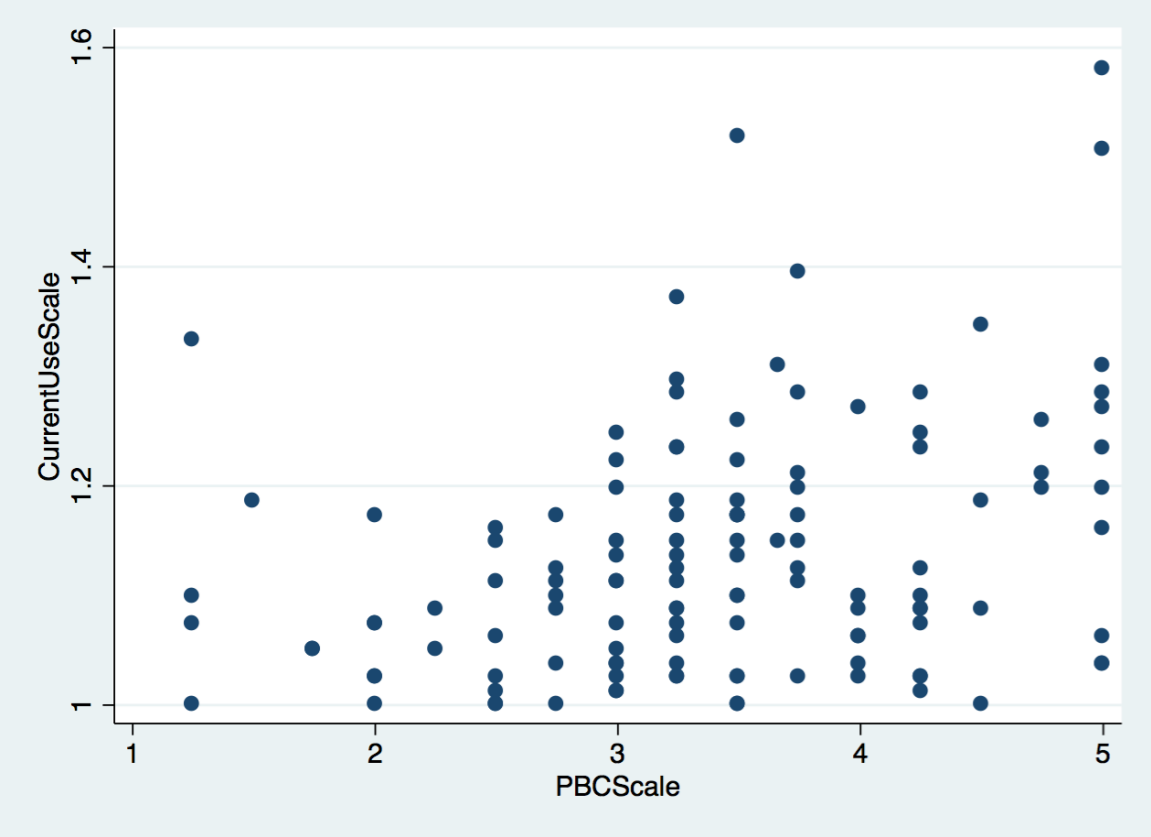

Figure 18. Perceived behavioral control and current use scatter plot. Scatter plot of teachers' current use of social media communications as a teaching tool by teachers' perceived behavioral control toward the use of social media as a teaching tool.

The next step was to assess the bivariate relationships among the variables. Each X variable was tested individually to understand the variable's relationship to the Y variable. Bivariate regression was used to test the relationships. Below are the hypothesis testing procedures for each of the relationships examined.

The first relationship examined was between attitudes and current use. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes toward the

use of social media communications as a pedagogical tool significantly predicted current use scores [$\beta_{attitudes} = 0.48$, $t(123) = 6.00$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in current use scores [$R^2 = .23$, $F(1, 123) = 36.00$, $p < .0001$].

There was a moderate positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and current use. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool, there was a 0.48 point standard deviation increase in current use.

The second relationship examined was between subjective norms and current use. The null hypothesis used was H_o: $\beta_{subjectivenorms} = 0$, and the alternative hypothesis used was H_a: $\beta_{subjectivenorms} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis, there is evidence for the alternative hypothesis. Teachers' subjective norms toward the use of social media communications as a pedagogical tool significantly predicted current use scores [$\beta_{subjectivenorms} = 0.26$, $t(123) = 3.00$, $p = .003$]. Teachers' subjective norms toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in current use scores [$R^2 = .07$, $F(1, 123) = 9.01$, $p = .0033$].

There was a weak positive relationship between teachers' subjective norms towards using social media communication as a pedagogical tool and current use. For every standard deviation increase in teachers' subjective norms toward using social

media communications as a pedagogical tool, there was a 0.26 point standard deviation increase in current use.

The final relationship examined was between perceived behavioral control and current use. The null hypothesis used was H_o: $\beta_{pbc} = 0$, and the alternative hypothesis used was H_a: $\beta_{pbc} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis, there is evidence for the alternative hypothesis. Teachers' perceived behavioral toward the use of social media communications as a pedagogical tool significantly predicted current use scores [$\beta_{pbc} = 0.32$, $t(123) = 3.74$, $p < .0001$]. Teachers' perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in current use scores [$R^2 = .10$, $F(1, 123) = 13.96$, $p = .0003$].

There was a moderately weak positive relationship between teachers' perceived behavior towards using social media communication as a pedagogical tool and current use. For every standard deviation increase in teachers' perceived behavioral control toward using social media communications as a pedagogical tool, there was a 0.32 point standard deviation increase in current use.

The next step was to examine the relationships among the X variables (attitudes, subjective norms, perceived behavioral control). This was done to detect any evidence of collinearity. Table 3 shows statistical tests used to investigate collinearity.

Table 3

Statistical Procedures Used to Investigate Collinearity Among X Variables in Research Question Two

X Variables	X Variables		
	Attitudes	Subjective Norms	Perceived Behavioral Control
Attitudes			
Subjective Norms	Bivariate Regression		
Perceived Behavioral Control	Bivariate Regression	Bivariate Regression	

The first relationship examined was between attitudes and subjective norms. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes toward the use of social media communications as a pedagogical tool significantly predicted subjective norm scores [$\beta_{attitudes} = 0.47$, $t(123) = 5.92$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in subjective norm scores [$R^2 = .22$, $F(1, 123) = 35.06$, $p < .00001$].

There was a moderate positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and subjective norms towards using social media communications as a pedagogical tool. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool, there was a 0.47 standard deviation increase in subjective norms towards using social media communications as a pedagogical tool.

The second relationship examined was between attitudes and perceived behavioral control. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes toward the use of social media communications as a pedagogical tool significantly predict perceived behavioral control scores [$\beta_{attitudes} = 0.37$, $t(123) = 4.48$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in perceived behavioral control scores [$R^2 = .14$, $F(1, 123) = 20.03$, $p < .00001$].

There was a moderately weak positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and perceived behavioral control towards using social media communications as a pedagogical tool. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool, there was a 0.37 point standard deviation increase in perceived behavioral control towards using social media communications as a pedagogical tool.

The final relationship examined was between subjective norms and perceived behavioral control. The null hypothesis used was H_o: $\beta_{subjectivenorms} = 0$, and the alternative hypothesis used was H_a: $\beta_{subjectivenorms} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' subjective norms toward the use of social media communications as a pedagogical tool significantly predicted perceived behavioral control scores [$\beta_{subjectivenorms} = 0.57$, $t(123) = 7.76$, $p < .0001$]. Teachers' subjective norms toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in perceived behavioral control scores [$R^2 = .33$, $F(1, 123) = 60.19$, $p < .00001$].

There was a moderate positive relationship between teachers' subjective norms towards using social media communication as a pedagogical tool and perceived behavioral control towards the use of social media communications as a pedagogical tool. For every standard deviation increase in teachers' subjective norms toward using social media communications as a pedagogical tool, there was a 0.57 point standard deviation increase in perceived behavioral control towards the use of social media communications as a pedagogical tool.

In summary, the relationship between attitude and subjective norm was moderately positive. The relationship between attitude and perceived behavioral control was moderately weakly positive. The relationship between subjective norms and perceived behavioral control was moderately positive. Because the relationships were not strong, there was no evidence of collinearity.

The next step was to investigate whether the assumptions of normality of the residuals were violated in the regression model using the residual from the regression (Lewis-Beck, 1980). This was done using a skewness/kurtosis test for normality, a scatter plot of the residuals, and a normal probability plot (P-P) of the regression. The skewness/kurtosis test for normality assesses whether there is a difference between a normal distribution and the distribution of the residuals. The results of the skewness/kurtosis test for normality revealed the skewness was 0.0000 and the kurtosis was 0.0052 with a *p*-value less than .0001. With the level of significance set at $\alpha = .05$, the decision was to fail to reject the null hypothesis; thus, there was evidence for the null hypothesis. Therefore the distribution of the residuals from the regression model was significantly different than a normal distribution. A residual scatter plot was created to detect outliers. An examination of the residual scatter plot revealed that the residuals were scattered randomly. Figure 19 displays the residual scatter plot for the current use regression model.

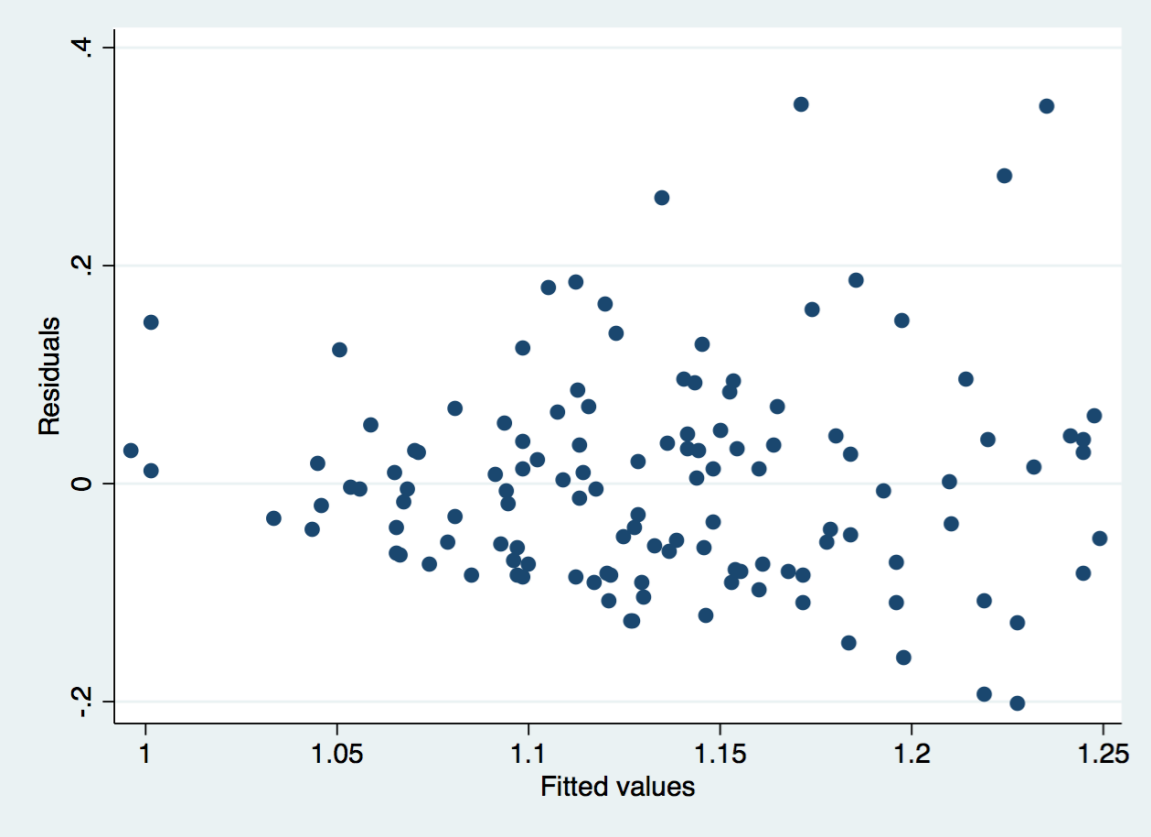

Figure 19. Current use regression model residuals scatter plot. Scatter plot of the residuals of the regression of teachers' current use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool.

The final test used the normality P-P of the regression. Through an investigation of the P-P plot, it was detected that the dots primarily did line up along the diagonal line; therefore, the residuals were normally distributed. Figure 20 displays the P-P plot for the current use regression model.

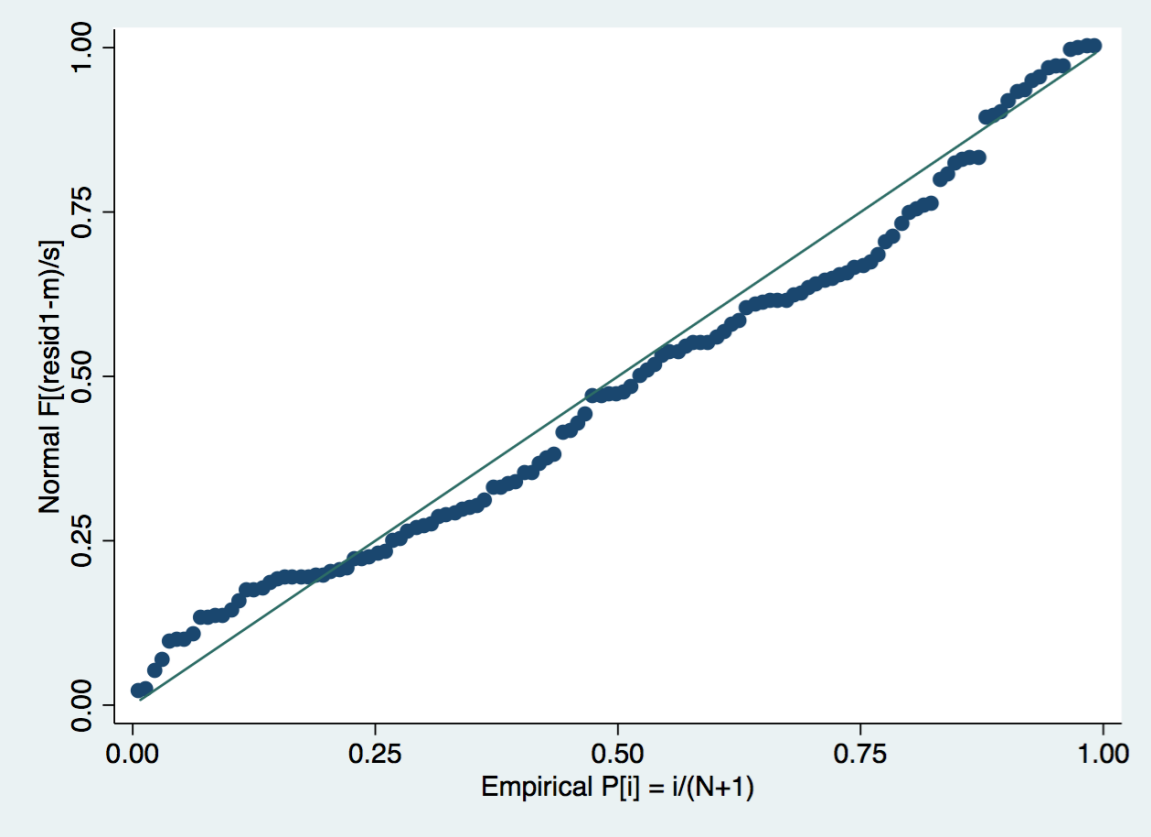

Figure 20. Current use normal probability plot. Normal probability plot, "P-P plot" of the residuals of the regression of teachers' current use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool.

Using the skewness/kurtosis tests for normality, a residual scatter plot of the current use regression model and the normal P-P of the current use regression model showed that the current use regression model primarily did not violate the assumptions of normality of the residuals. Although the current use regression model failed the skewness/kurtosis test for normality, the residual scatter plot was distributed randomly and the normal P-P plot of the residuals did not curve extensively from the diagonal line.

The next step was to detect and diagnose issues of multicollinearity. A collinearity diagnostic was performed on the regression model to detect multicollinearity.

The variance inflation factor (VIF) scores were between 1.31 and 1.68 and were below the recommended limit score of 5.00 (Rogerson, 2001). Because the VIF scores were below the recommended limit score of 5.00, there were no issues of multicollinearity.

The final step of the regression analysis used to answer research questions two was to run the full regression model investigating the relationship between attitudes, subjective norms, perceived behavioral control towards the use of social media communications as a pedagogical tool, and current use of social media communications as a pedagogical tool. The null hypothesis used was H_o: $\beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc}$, and the alternative hypothesis used was H_a: Not ($\beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc}$). The multivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The decision was to reject the null hypothesis; therefore, there is evidence for the alternative hypothesis. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool significantly predicted current use scores [$\beta_{attitudes} = 0.43$, $t(121) = 4.75$, $p < .0001$; $\beta_{subjectivenorms} = –0.05$, $t(121) = –0.46$, $p = .645$; $\beta_{pbc} = 0.19$, $t(121) = 1.92$, $p = .058$]. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in current scores [$R^2 = .25$, $F(3, 121) = 13.51$, $p < .00001$].

Controlling for attitudes and subjective norms, there was no difference in teachers' perceived behavioral control scores and their current use of social media communications as a pedagogical tool. Controlling for attitudes and perceived behavioral control, there was no difference in teachers' subjective norms score and their current use of social media communications as a pedagogical tool. Controlling for subjective norms

and perceived behavioral control, for every additional point in attitudes score there was a 0.06 point increase in current use of social media communications as a pedagogical tool.

Controlling for attitudes and subjective norms, there was no difference in teachers' perceived behavioral control scores' standard deviation and their current use of social media communications as a pedagogical tool's standard deviation. Controlling attitudes and perceived behavioral control, there was no difference in teachers' subjective norm scores' standard deviation and their current use of social media communications as a pedagogical tool's standard deviation. Controlling for subjective norms and perceived behavioral control, for every standard deviation increase in attitudes score there was a 0.43 point standard deviation increase in current use of social media communications as a pedagogical tool.

Research Question Three

Research question three asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intentions to use social media communications as a pedagogical tool?" The variables for intended use, attitudes, subjective norms, and perceived behavioral control are scale scores and were treated as interval levels of measurement. The section below describes the procedures used in the regression analysis of the relationship between attitudes, subjective norms, and perceived behavioral and intended use of social media communications, including the steps taken to ensure the assumptions of linear regression were not violated.

The first step in the regression analysis was to run detailed descriptive statistics for each of the variables. Since research question one results provided the detailed

descriptive statistics for attitudes, subjective norms, and perceived behavioral control, the variable for intended use was analyzed. When detailed descriptive statistical procedures were applied to the variable of intended use, the results were as follows: The mean was 1.54, the mode was 1.00, and the median was 1.41. The range was 3.61, with a minimum observation of 1.00 and a maximum observation of 3.61. The lower quartile ended as 1.10 and the upper quartile began at 1.69. The standard deviation was 0.57, the variance was 0.33, the skewness was 1.46, and the kurtosis was 4.70. Figure 21 displays the histogram of the variable intended use.

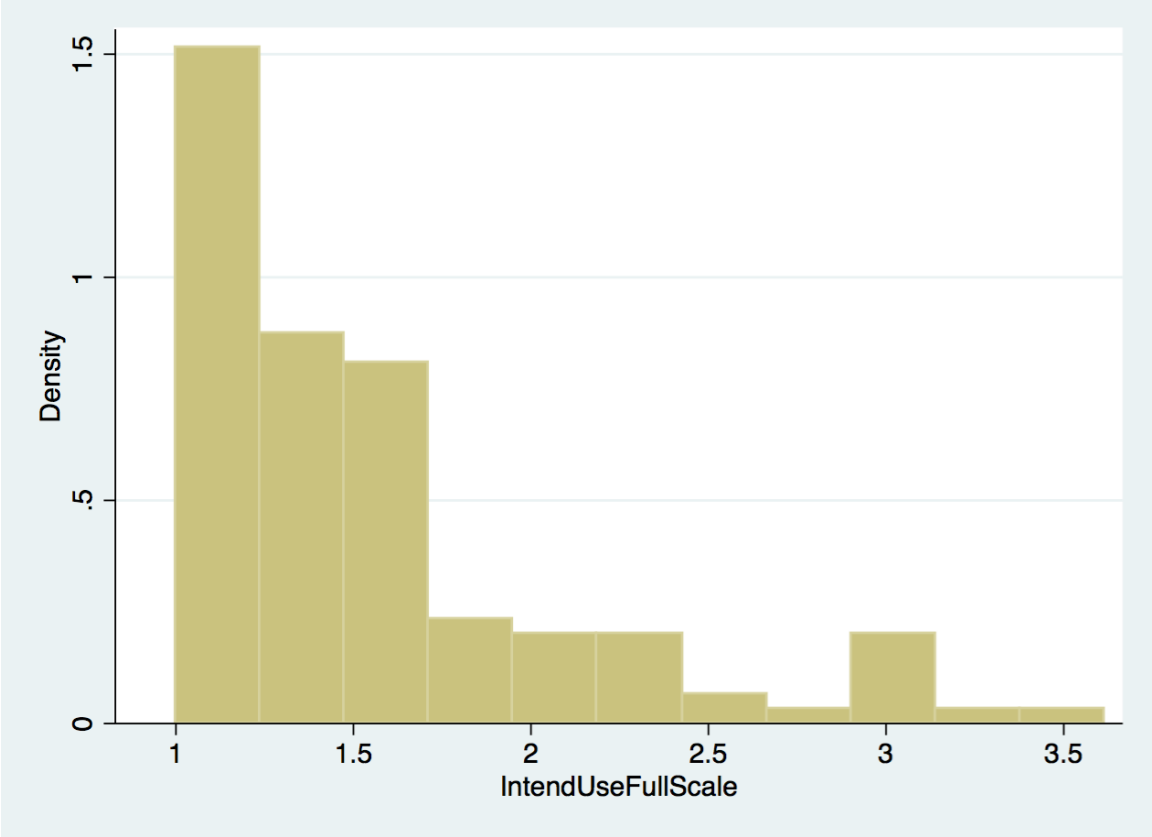

Figure 21. Intended use histogram. Histogram of teachers' intended use of social media communications as a teaching tool.

The next step in the regression analysis was to generate preliminary scatter plots that showed the bivariate relationship between each of the X variables (attitudes,

subjective norms, perceived behavioral control) and the Y variable (intended use). The relationships were examined to assess if there appeared to be a linear relationship. After examining the preliminary scatter plots, the researcher determined the relationships appeared to be positive linear. Figure 22 displays the scatter plot for the relationship between attitudes and intended use. Figure 23 displays the scatter plot for the relationship between subjective norms and intended use. Figure 24 displays the scatter plot for the relationship between perceived behavioral control and intended use.

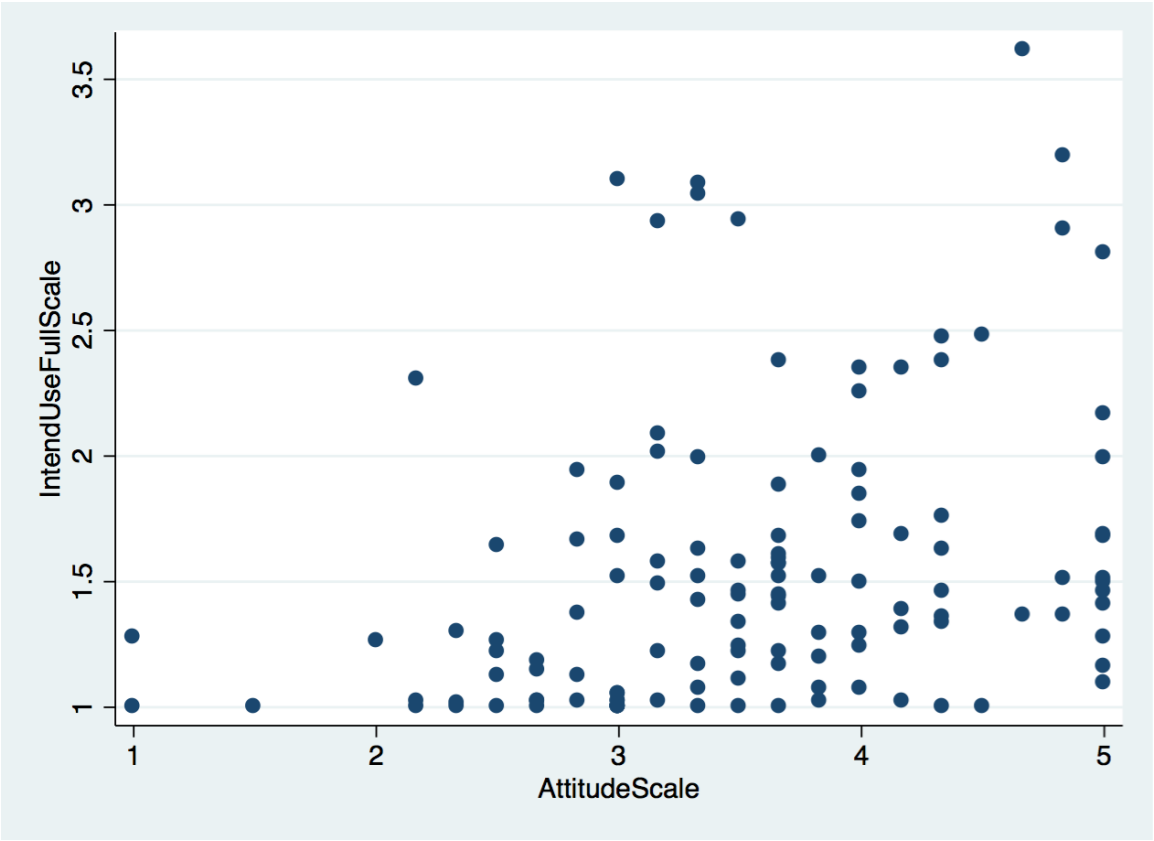

Figure 22. Attitudes and intended use scatter plot. Scatter plot of teachers' intended use of social media communications as a teaching tool by teachers' attitudes toward the use of social media as a teaching tool.

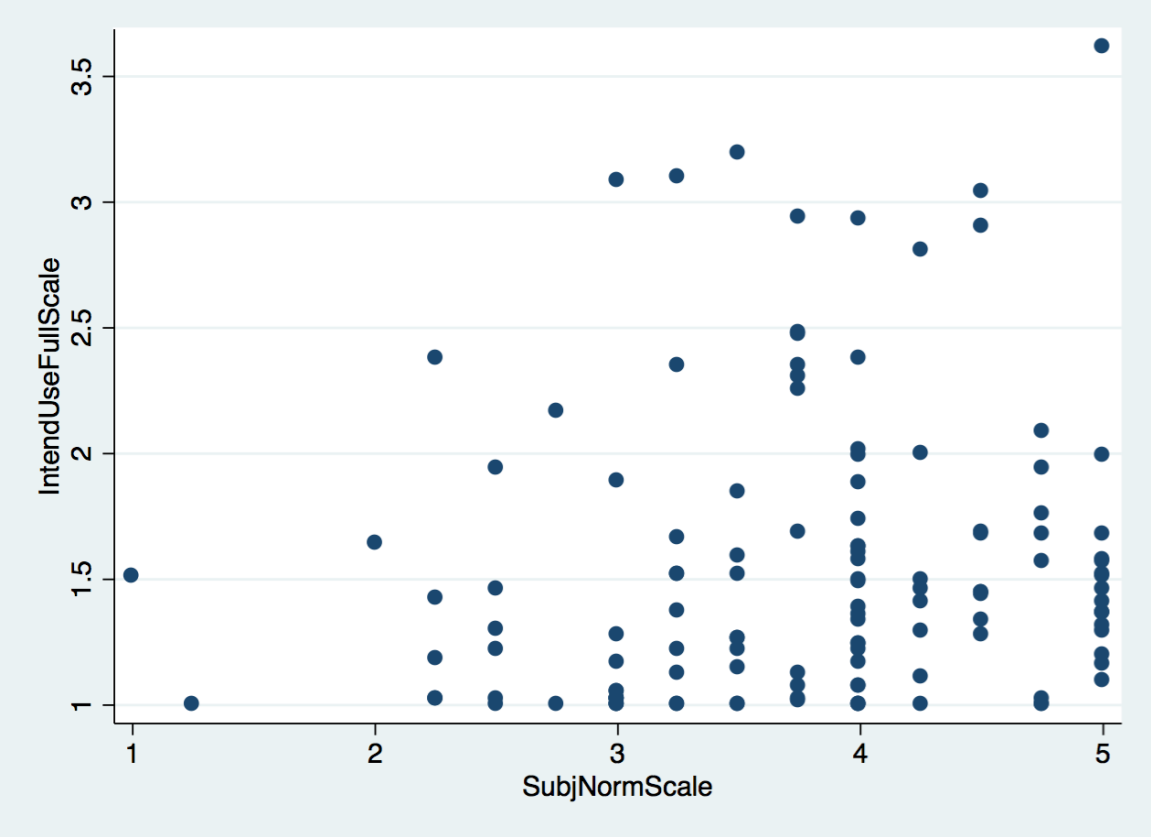

Figure 23. Subjective norms and intended use scatter plot. Scatter plot of teachers' intended use of social media communications as a teaching tool by teachers' subjective norms toward the use of social media as a teaching tool.

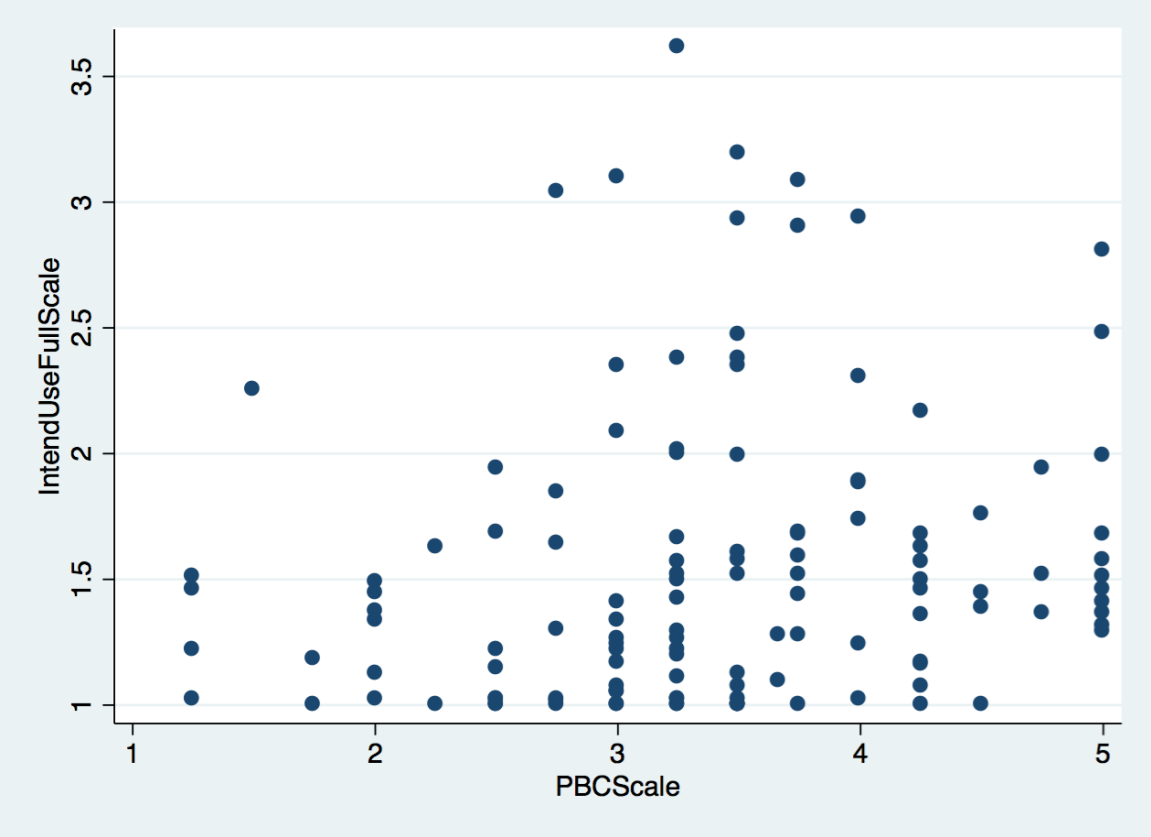

Figure 24. Perceived behavioral control and intended use scatter plot. Scatter plot of teachers' intended use of social media communications as a teaching tool by teachers' subjective norms toward the use of social media as a teaching tool.

The next step was to assess the bivariate relationships among the variables. Each X variable was tested individually to understand the variable's relationship to the Y variable. Bivariate regression was used to test the relationships. Below are the hypothesis testing procedures for each of the relationships examined.

The first relationship examined was between attitudes and intended use. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The decision was to reject the null hypothesis, there is evidence for the alternative hypothesis. Teachers' attitudes toward the use of

social media communications as a pedagogical tool significantly predicted intended use scores [$\beta_{attitudes} = .31$, $t(123) = 3.62$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended use scores [$R^2 = .10$, $F(1, 123) = 13.09$, $p = .0004$].

There was a moderately weak positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and intended use. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool, there was a 0.31 point standard deviation increase in intended use.

The second relationship examined was between subjective norms and intended use. The null hypothesis used was H_o: $\beta_{subjectivenorms} = 0$, and the alternative hypothesis used was H_a: $\beta_{subjectivenorms} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis, there is evidence for the null hypothesis. Teachers' subjective norms toward the use of social media communications as a pedagogical tool did not significantly predict intended use scores [$\beta_{subjectivenorms} = 0.13$, $t(123) = 1.52$, $p = .132$]. Teachers' subjective norms toward the use of social media communications as a pedagogical tool also did not significantly explain a proportion of variance in intended use scores [$R^2 = .02$, $F(1, 123) = 2.30$, $p = .1318$]. There was no relationship between teachers' subjective norms towards using social media communication as a pedagogical tool and intended use.

The final relationship examined was between perceived behavioral control and intended use. The null hypothesis used was H_o: $\beta_{pbc} = 0$, and the alternative hypothesis

used was H_a: $\beta_{pbc} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis, there is evidence for the null hypothesis. Teachers' perceived behavioral toward the use of social media communications as a pedagogical tool did not significantly predict intended use scores [$\beta_{pbc} = 0.17$, $t(123) = 1.92$, $p = .57$]. Teachers' perceived behavioral control toward the use of social media communications as a pedagogical tool also did not significantly explain a proportion of variance in intended use scores [$R^2 = .03$, $F(1, 123) = 3.69$, $p = .0572$]. There was no relationship between teachers' perceived behavioral towards using social media communication as a pedagogical tool and intended use.

The next step was to examine the relationships among the X variables (attitudes, subjective norms, perceived behavioral control). This was done to detect any evidence of collinearity. Table 4 shows statistical tests used to investigate collinearity.

Table 4

Statistical Procedures Used to Investigate Collinearity Among X Variables in Research Question Three

X Variables	X Variables		
	Attitudes	Subjective Norms	Perceived Behavioral Control
Attitudes			
Subjective Norms	Bivariate Regression		
Perceived Behavioral Control	Bivariate Regression	Bivariate Regression	

The first relationship examined was between attitudes and subjective norms. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis, there is evidence for the alternative hypothesis. Teachers' attitudes toward the use of social media communications as a pedagogical tool significantly predicted subjective norm scores [$\beta_{attitudes} = 0.47$, $t(123) = 5.92$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in subjective norm scores [$R^2 = .22$, $F(1, 123) = 35.06$, $p < .00001$].

There was a moderately positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and subjective norms towards using social media communications as a pedagogical tool. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool, there was a 0.47 point standard deviation increase in subjective norms towards using social media communications as a pedagogical tool.

The second relationship examined was between attitudes and perceived behavioral control. The null hypothesis used was H_o: $\beta_{attitudes} = 0$, and the alternative hypothesis used was H_a: $\beta_{attitudes} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes toward the use of social media communications as a pedagogical tool significantly predicted perceived behavioral control scores [$\beta_{attitudes} = 0.37$, $t(123) = 4.48$, $p < .0001$]. Teachers' attitudes toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in perceived behavioral control scores [$R^2 = .14$, $F(1, 123) = 20.03$, $p < .00001$].

There was a moderately weak positive relationship between teachers' attitudes towards using social media communication as a pedagogical tool and perceived behavioral control towards using social media communications as a pedagogical tool. For every standard deviation increase in teachers' attitudes toward using social media communications as a pedagogical tool there was a 0.37 point standard deviation increase in perceived behavioral control towards using social media communications as a pedagogical tool.

The final relationship examined was between subjective norms and perceived behavioral control. The null hypothesis used was H_o: $\beta_{subjectivenorms} = 0$, and the alternative hypothesis used was H_a: $\beta_{subjectivenorms} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' subjective norms toward the use of social media communications as a pedagogical tool significantly predicted perceived behavioral control scores [$\beta_{subjectivenorms} = 0.57$, $t(123) = 7.76$, $p < .0001$]. Teachers' subjective norms toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in perceived behavioral control scores [$R^2 = .33$, $F(1, 123) = 60.19$, $p < .00001$].

There was a moderate positive relationship between teachers' subjective norms towards using social media communication as a pedagogical tool and perceived behavioral control towards the use of social media communications as a pedagogical tool. For every standard deviation increase in teachers' subjective norms toward using social media communications as a pedagogical tool, there was a 0.57 standard deviation increase in perceived behavioral control towards the use of social media communications as a pedagogical tool.

In summary, the relationship between attitude and subjective norm was moderately positive. The relationship between attitude and perceived behavioral control was moderately weakly positive. The relationship between subjective norms and perceived behavioral control was moderately positive. Because the relationships were not strong, there was no evidence of collinearity.

The next step was to investigate if the assumptions of normality of the residuals were violated in the regression model using the residual from the regression (Lewis-Beck, 1980). This was done using a skewness/kurtosis test for normality, a scatter plot of the residuals, and Normal P-P of the regression. The skewness/kurtosis test for normality tested the null hypothesis that there was no difference between a normal distribution and the distribution of the residuals. The results of the skewness/kurtosis test for normality revealed the skewness was 0.0000, and the kurtosis was 0.0029 with a *p*-value of $p < .00001$. With the level of significance set at $\alpha = .05$, the rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Therefore, the distribution of the residuals from the regression model was significantly different than a normal distribution. A residual scatter plot was created to detect outliers. An examination of the residual scatter plot revealed that the residuals were scattered randomly. Figure 25 displays the residual scatter plot for the intended use regression model.

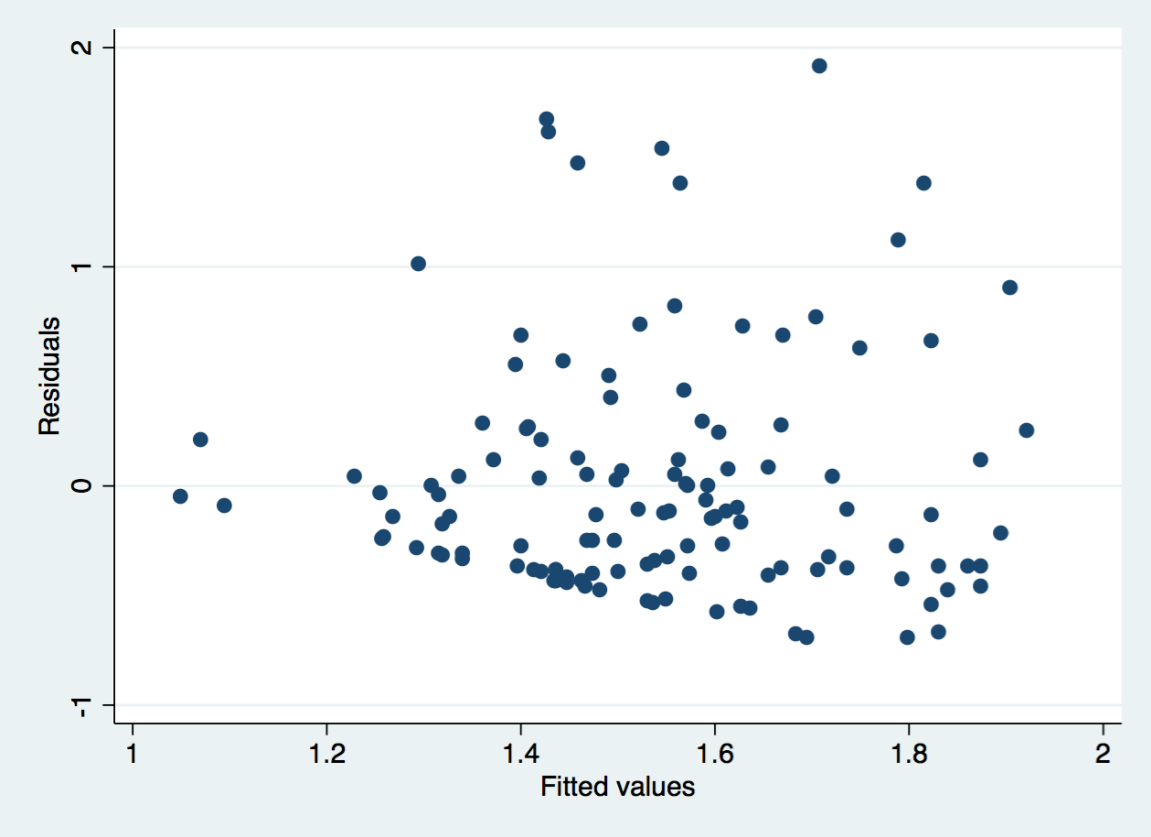

Figure 25. Intended use regression model residuals scatter plot. Scatter plot of the residuals of the regression of teachers' intended use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool.

The final test for used the normality P-P of the regression. Through an investigation of the P-P plot, it was detected that the dots primarily did not stray extremely from the diagonal line; therefore, the residuals were primarily normally distributed. Figure 26 displays the P-P plot for the intended use regression model.

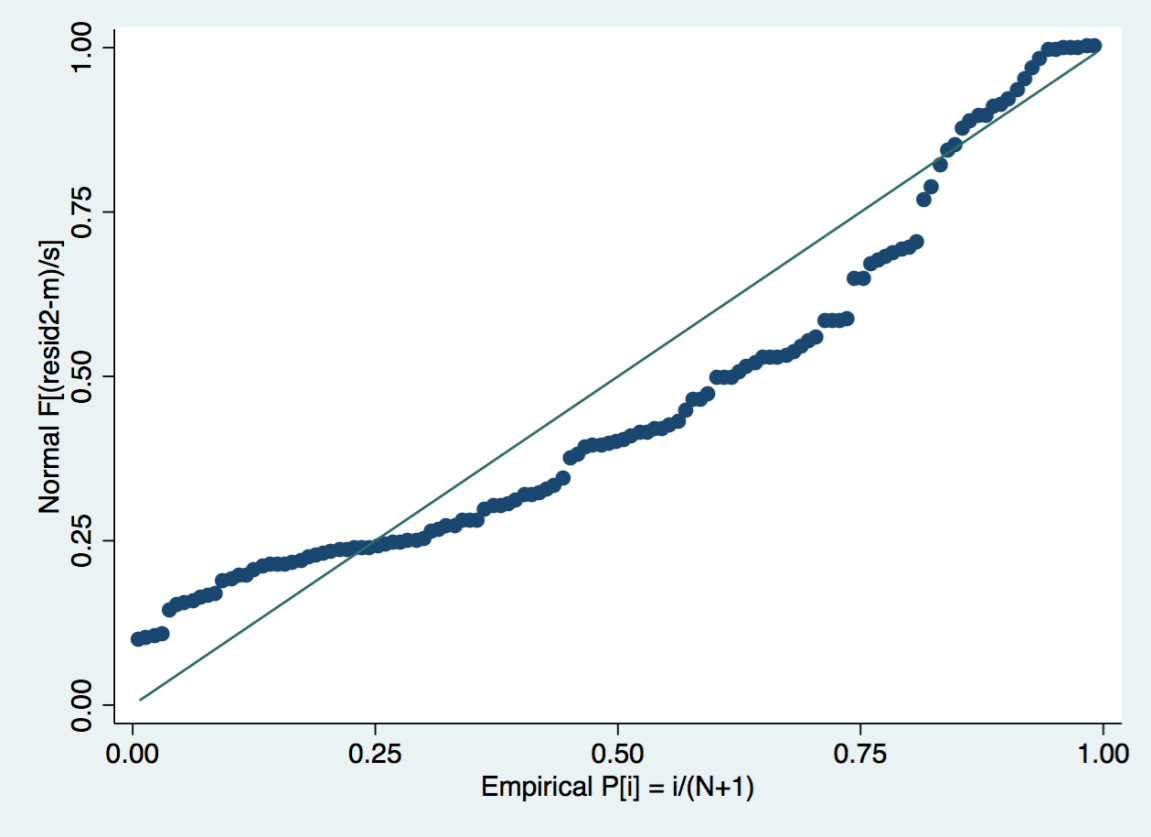

Figure 26. Intended use normal probability plot. Normal probability plot, "P-P plot" of the residuals of the regression of teachers' intended use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool.

Using the skewness/kurtosis tests for normality, a residual scatter plot of the intended use regression model, and the normality P-P of the intended use regression model showed that the intended use regression model did not extremely violate the assumptions of normality of the residuals. Although the intended use regression model failed the skewness/kurtosis test for normality, the residual scatter plot was distributed randomly and the normal P-P plot" of the residuals did not extremely curve from the diagonal line.

The next step was to detect and diagnosis issues of multicollinearity. A collinearity diagnostic was performed on the regression model to detect multicollinearity. The VIF scores were between 1.31 and 1.68, which were below the recommended limit score of 5.00 (Rogerson, 2001). Because the VIF scores were below the recommended limit score of 5.00, there were no issues of multicollinearity.

The final step of the regression analysis used to answer research questions three was to run the full regression model investigating the relationship between attitudes, subjective norms, perceived behavioral control towards the use of social media communications as a pedagogical tool, and intended use of social media communications as a pedagogical tool. The null hypothesis that was used was H_o: $\beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc}$, and the alternative hypothesis that was used was H_a: Not ($\beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc}$). The multivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool significantly predicted intended use scores [$\beta_{attitudes} = 0.30$, $t(121) = 3.08$, $p = .003$; $\beta_{subjectivenorms} = –0.06$, $t(121) = –0.54$, $p = .592$; $\beta_{pbc} = 0.09$, $t(121) = 0.86$, $p = .393$]. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended scores, $R^2 = .10$, $F(1, 121) = 4.57$, $p = .0045$.

Controlling for attitudes and subjective norms, there is no difference in teachers' perceived behavioral control score and their intended use of social media

communications as a pedagogical tool. Controlling attitudes and perceived behavioral control, there was no difference in teachers' subjective norms score and their intended use of social media communications as a pedagogical tool. Controlling subjective norms and perceived behavioral control, for every additional point in attitudes score there was a 0.20 point increase in intended use of social media communications as a pedagogical tool.

Controlling attitudes and subjective norms, there was no difference in teachers' perceived behavioral control scores' standard deviation and the standard deviation of their intended use of social media communications as a pedagogical tool. Controlling attitudes and perceived behavioral control, there was no difference in teachers' subjective norm scores' standard deviation and the standard deviation of their intended use of social media communications as a pedagogical tool standard deviation. Controlling subjective norms and perceived behavioral control, for every standard deviation increase in attitudes score there was a 0.30 point increase in the standard deviation of intended use of social media communications as a pedagogical tool.

Research Question Four

Research question four asked, "How do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between grade 9–12 teachers' attitudes, subjective norms, perceived behavioral control and their future intentions to use social media communications a pedagogical tool?" The variable for age was stated in years and was treated as a ratio level of measurement. The variables for current use, intended use, attitudes, subjective norms, and perceived behavioral control were scale scores and were treated as interval levels of measurement. The variables for

gender and subject area were categorical variables and were treated as dichotomous nominal levels of measurement. To answer research question four, a nested regression analysis was used to compare the regression model for intended use of social media communications as a pedagogical tool used in research question three and the intended use regression model with the added predictors of gender, subject area, and current use. The researcher describes the procedures used in the nested regression analysis of the relationship between attitudes, subjective norms, perceived behavioral, current use, gender, and subject area and intended use of social media communications as a pedagogical tool, including the steps taken to ensure the assumptions of linear regression were not violated.

The first step in the regression analysis was to run detailed descriptive statistical analysis for each of the variables. Since research question one results provided the detailed descriptive statistics for attitudes, subjective norms, and perceived behavioral control, research question two results provided the detailed descriptive statistics for current use, and research question three results provided the detailed descriptive statistics for intended use, the variables for gender and subject area, and age were analyzed. When detailed descriptive statistical procedures were applied to the variable of age, the results were as follows: The mean age was 40.33 years, the mode was 37 years, and the median was 38 years. The range was 36 years, with a minimum observation of 26 years and a maximum observation of 61 years. The lower quartile ended at 33 and the upper quartile began at 47. The standard deviation was 9.16, the variance was 83.98, the skewness was 0.42, and the kurtosis was 2.20. Figure 27 displays the histogram of the variable age.

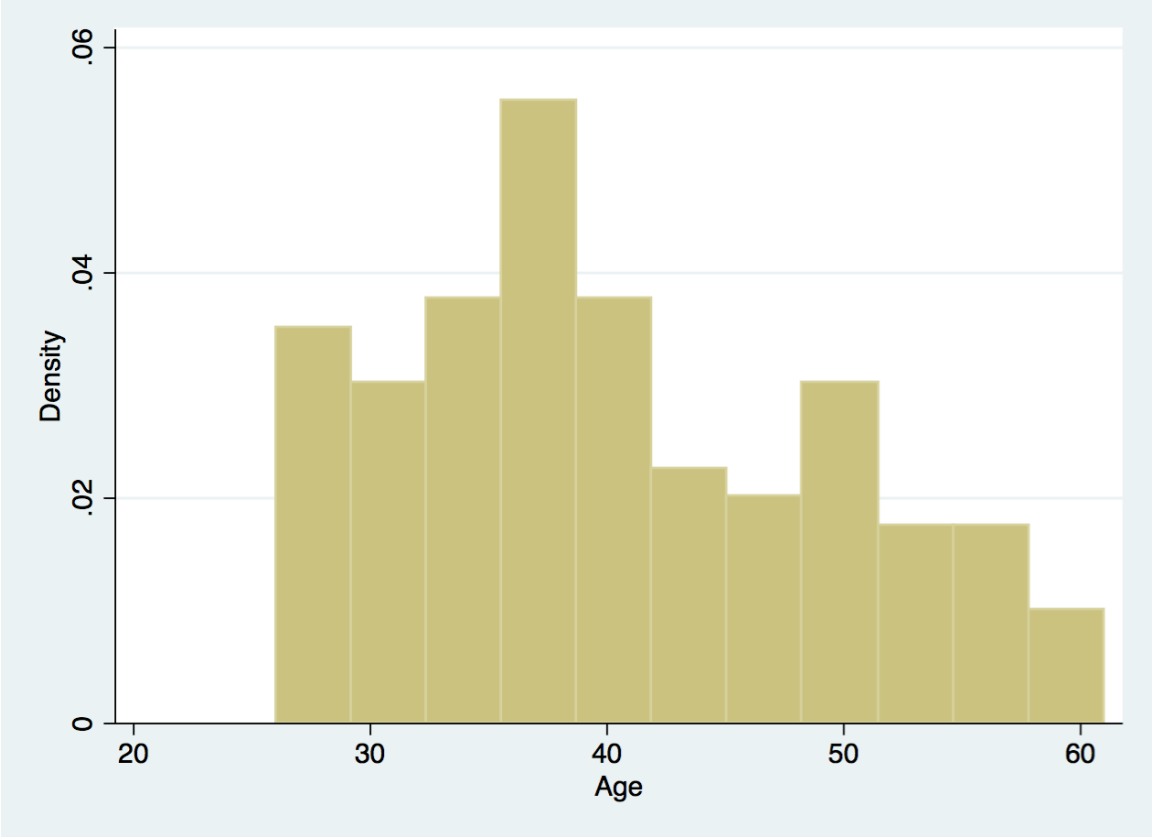

Figure 27. Age histogram. Histogram of teachers' age.

Subject area was recoded to create a dichotomous nominal level of measurement. The recoding of the variable subject area organized all subjects into one of two categories – tested subjects and non-tested subjects. Teachers who taught classes in math, science, or English language arts were classified as teaching in tested subject areas while teachers that did not teach classes in math, science, or English language arts were classified as teaching in non-tested areas. Because gender and subject area are dichotomous nominal levels of measurements providing detailed descriptive statics such as means and standard deviations was not appropriate in this area. The appropriate statistics for dichotomous nominal levels of measurement are frequency distributions and percentages. A frequency distribution showed the mode of subject area was non-tested subjects, which was 55.20%

of the valid sample. A frequency distribution showed the mode of gender was female, which was 60.80% of the valid sample.

The next step in the regression analysis was to generate preliminary scatter plots that showed the bivariate relationship between each of the X variables (attitudes, subjective norms, perceived behavioral control, current use, age) and the Y variable (intended use). Creating a scatter plot to explore the relationships between gender and intended use and subject area and intended use would not be appropriate because the X variables of gender and subject area were dichotomous nominal levels of measurement and the relationships between the X variables and Y variable were not going to be linear since the analysis focused on the mean differences. The relationships were examined to assess if they appeared to be linear. After examining the preliminary scatter plots, the researcher determined that the relationships appeared to be positively linear. Because the analysis used in research question three already examined the scatter plots of attitudes, subjective norms, and perceived behavioral control, only the scatter plots examining the relationship between current use and intended use and age and intended use are displayed. Figure 28 displays the scatter plot for the relationship between current use and intended use. Figure 29 displays the scatter plot for the relationship between age and intended use.

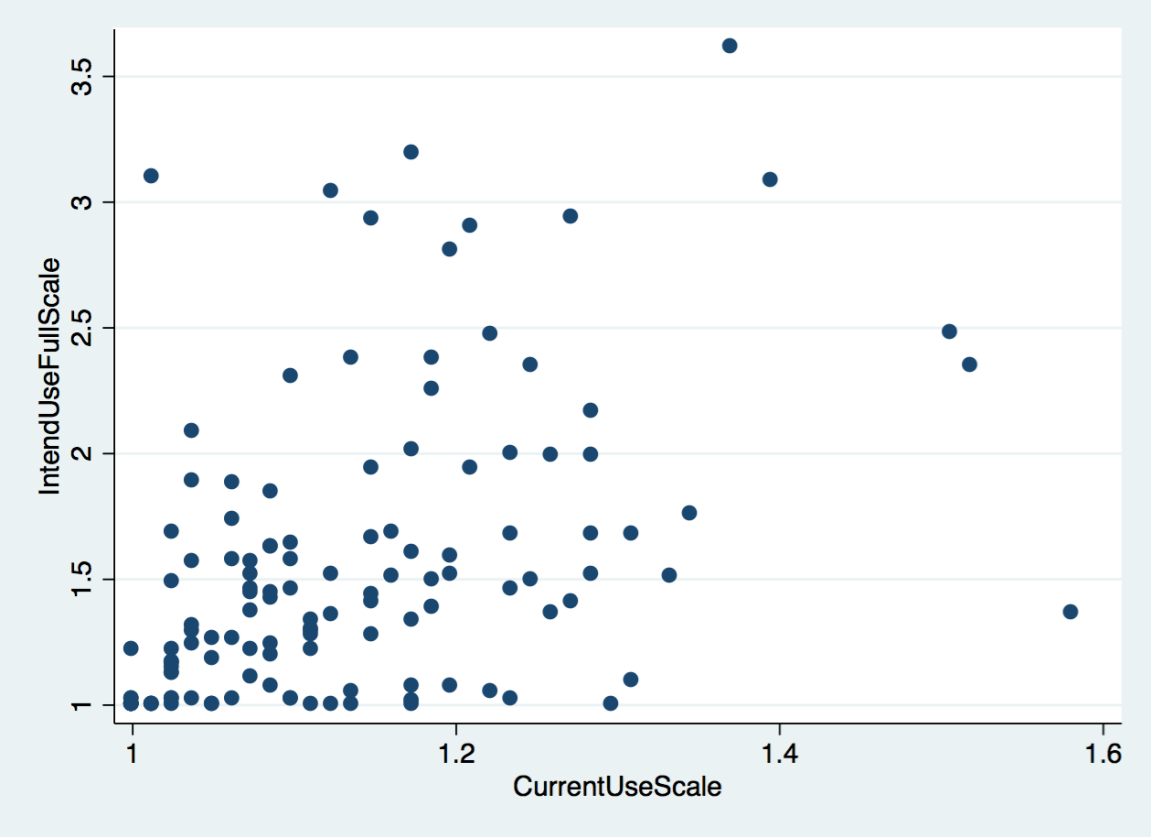

Figure 28. Current use and intended use scatter plot. Scatter plot of teachers' intended use of social media communications as a teaching tool by teachers' current use of social media as a teaching tool.

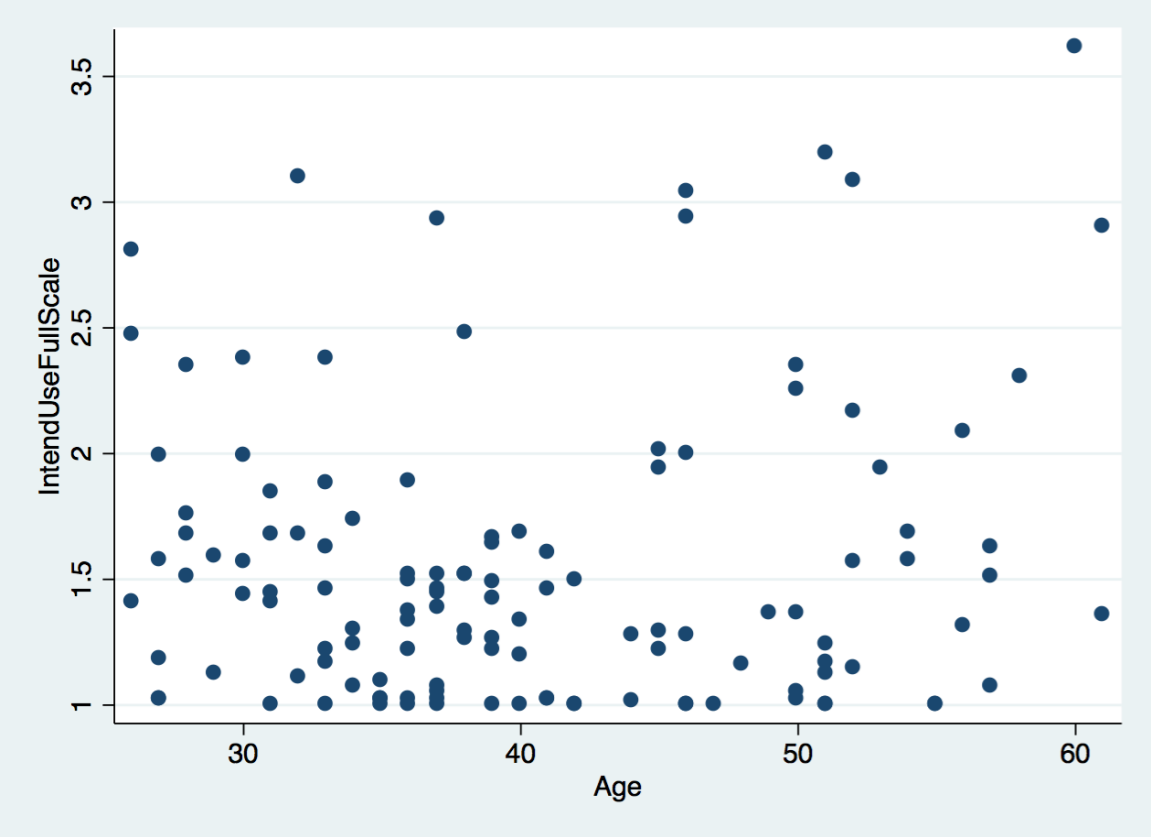

Figure 29. Age and intended use scatter plot. Scatter plot of teachers' intended use of social media communications as a teaching tool by teachers' age.

The next step was to assess the bivariate relationships among the variables. Each X variable was tested individually to understand the variable's relationship to the Y variable. Bivariate regression was used to test the relationships. Because research question three examined the relationships between the X variables of attitudes, subjective norms, and perceived behavioral control with the Y variable of intended use, only the relationships between the X variables of age, current use, and subject area with the Y variable intended will be discussed. Below are the hypothesis testing procedures for each of the relationships examined.

The first relationship examined was between age and intended use. The null hypothesis used was H_o: $\beta_{age} = 0$, and the alternative hypothesis used was H_a: $\beta_{age} \neq 0$.

The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' age did not significantly predict intended use of social media communications as a pedagogical tool [$\beta = 0.10$, $t(123) = 1.13$, $p = .261$]. Teachers' age also did not significantly explain a proportion of variance in intended use of social media communications as a pedagogical tool [$R^2 = .01$, $F(1, 123) = 1.27$, $p = .2613$]. There was no relationship between teachers' age and intended use of social media communications as a pedagogical tool.

The second relationship examined was between subject area and intended use. The null hypothesis used was H_o: $\beta_{subjectarea} = 0$, and the alternative hypothesis used was H_a: $\beta_{subjectarea} \neq 0$. The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis, we have evidence for the null hypothesis. Teachers' subject area was not significantly related to intended use of social media communications as a pedagogical tool [$\beta = –0.05$, $t(123) = –0.59$, $p = .55$]. Teachers' subject area also did not explain a proportion of variance in intended use of social media communications as a pedagogical tool [$R^2 = .003$, $F(1, 123) = 0.35$, $p = .56$].

There was no relationship between teachers' subject area and intended use of social media communications as a pedagogical tool. The mean intended use score for tested subject teachers was the same as non-tested subject teachers.

The third relationship examined was between gender and intended use. The null hypothesis used was H_o: $\beta_{gender} = 0$, and the alternative hypothesis used was H_a: $\beta_{gender} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of

significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' gender was significantly related to intended use of social media communications as a pedagogical tool [$\beta = 0.18$, $t(123) = 2.02$, $p = .045$]. Teachers' gender also explained a significant proportion of variance in intended use of social media communications as a pedagogical tool [$R^2 = .03$, $F(1, 123) = 4.09$, $p = .0453$].

There was a weak relationship between teachers' gender and intended use of social media communications as a pedagogical tool. The mean intended use score for women is 0.21 points higher than for men. The mean intended use score for men was 1.42.

The final relationship examined was between current use and intended use. The null hypothesis used was H_o: $\beta_{currentuse} = 0$, and the alternative hypothesis used was H_a: $\beta_{currentuse} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' current use of social media communications as a pedagogical tool significantly predicted intended use scores [$\beta = 0.44$, $t(123) = 5.39$, $p < .0001$]. Teachers' current use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended use scores [$R^2 = .19$, $F(1, 123) = 29.06$, $p < .00001$].

There was a moderate positive relationship between teachers' current use of social media communication as a pedagogical tool and intended use. For every standard deviation increase in teachers' current use of social media communications as a pedagogical tool there was a 0.44 standard deviation increase in intended use.

The next step was to examine the relationships among the X variables (attitudes, subjective norms, perceived behavioral control, current use, subject area, gender, age). This was done to detect any evidence of collinearity. Table ___ shows statistical tests used to investigate collinearity.

Table 5

Statistical Procedures Used to Investigate Collinearity Among X Variables in Research Question Four

X variables	X variables					
	Attitudes	Subjective Norms	Perceived Behavioral Control	Current Use	Age	Subject Area
Subjective Norms	Bivariate Regression					
Perceived Behavioral Control	Bivariate Regression	Bivariate Regression				
Current Use	Bivariate Regression	Bivariate Regression	Bivariate Regression			
Age	Bivariate Regression	Bivariate Regression	Bivariate Regression	Bivariate Regression		
Subject Area	Bivariate Regression	Bivariate Regression	Bivariate Regression	Bivariate Regression	Bivariate Regression	
Gender	Bivariate Regression	Bivariate Regression	Bivariate Regression	Bivariate Regression	Bivariate Regression	X^2

Because the bivariate relationships among the X variables of attitudes, subjective norms, and perceived behavioral control were examined in research question three, they

will be omitted. Only the relationships of the X variables of age, subject area, and gender among the other X variables will be discussed below. Fifteen relationships were investigated to examine collinearity. Bivariate regression and X^2 tests were used to examine the bivariate relationships among the X variables.

The first relationship examined was between attitudes and age. The null hypothesis used was H_o: $\beta_{age} = 0$, and the alternative hypothesis used was H_a: $\beta_{age} \neq 0$. The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' age did not significantly predict attitudes toward the use of social media communications as a pedagogical tool [$\beta_{age} = 0.01$, $t(123) = 0.14$, $p = .891$]. Teachers' ages also did not significantly explain a proportion of variance in attitudes toward the use of social media communications as a pedagogical tool [$R^2 = .0002$, $F(1,123) = 0.02$, $p = .891$]. There was no relationship between teachers' age and attitudes towards using social media communications as a pedagogical tool.

The second relationship examined was between subject area and attitudes. The null hypothesis used was H_o: $\beta_{tested} = 0$, and the alternative hypothesis used was H_a: $\beta_{tested} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' subject area did not significantly predict attitudes toward the use of social media communications as a pedagogical tool [$\beta_{tested} = –0.17$, $t(123) = –1.95$, $p = .053$]. Teachers' subject area also did not significantly explain a proportion of variance in attitudes toward the use of social

media communications as a pedagogical tool [$R^2 = .03$, $F(1, 123) = 3.81$, $p = .0534$]. There was no relationship between teachers' subject area and attitudes towards using social media communications as a pedagogical tool.

The third relationship examined was between gender and attitudes. The null hypothesis used was H_o: $\beta_{female} = 0$, and the alternative hypothesis used was H_a: $\beta_{female} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' gender did not significantly predict attitudes toward the use of social media communications as a pedagogical tool [$\beta_{female} = 0.05$, $t(123) = 0.53$, $p = .597$]. Teachers' gender also did not significantly explain a proportion of variance in attitudes toward the use of social media communications as a pedagogical tool [$R^2 = .0023$, $F(1, 123) = 0.28$, $p = .5973$]. There was no relationship between teachers' gender and attitudes towards using social media communications as a pedagogical tool.

The fourth relationship examined was between subjective norms and age. The null hypothesis used was H_o: $\beta_{age} = 0$, and the alternative hypothesis used was H_a: $\beta_{age} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' age did not significantly predict subjective norms toward the use of social media communications as a pedagogical tool [$\beta_{age} = –0.39$, $t(123) = –0.43$, $p = .667$]. Teachers' ages also did not significantly explain a proportion of variance in subjective norms toward the use of social media communications as a pedagogical tool [$R^2 = .0015$, $F(1, 123) = 0.19$, $p = .6671$].

There was no relationship between teachers' age and subjective norms towards using social media communications as a pedagogical tool.

The fifth relationship examined was between subject area and subjective norms. The null hypothesis used was H_o: $\beta_{tested} = 0$, and the alternative hypothesis used was H_a: $\beta_{tested} \neq 0$. The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' subject area significantly predicted subjective norms toward the use of social media communications as a pedagogical tool [$\beta_{tested} = –0.18$, $t(123) = –2.08$, $p = .039$]. Teachers' subject area also explained a significant proportion of variance in subjective norms toward the use of social media communications as a pedagogical tool [$R^2 = .0341$, $F(1, 123) = 4.34$, $p = .0392$].

There was a weak relationship between teachers' subject area and subjective norms towards using social media communications as a pedagogical tool. The mean subjective norms towards using social media communications as a pedagogical tool was 0.32 points lower for those instructing in tested subject areas than for those working in non-tested subject areas. The mean subjective norms score towards using social media communications as a pedagogical tool for non-tested subject areas was 3.92.

The sixth relationship examined was between gender and subjective norms. The null hypothesis used was H_o: $\beta_{female} = 0$, and the alternative hypothesis used was H_a: $\beta_{female} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' gender did

not significantly predict subjective norms toward the use of social media communications as a pedagogical tool [$\beta_{female} = 0.14$, $t(123) = 1.58$, $p = .116$]. Teachers' gender also did not significantly explain a proportion of variance in subjective norms toward the use of social media communications as a pedagogical tool [$R^2 = .02$, $F(1, 123) = 2.50$, $p = .1161$]. There was no relationship between teachers' gender and subjective norms towards using social media communications as a pedagogical tool.

The seventh relationship examined was between perceived behavioral control and age. The null hypothesis used was H_o: $\beta_{age} = 0$, and the alternative hypothesis used was H_a: $\beta_{age} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' age did not significantly predict perceived behavioral control toward the use of social media communications as a pedagogical tool [$\beta_{age} = –0.069$, $t(123) = –0.77$, $p = .443$]. Teachers' ages also did not significantly explain a proportion of variance in perceived behavioral control toward the use of social media communications as a pedagogical tool [$R^2 = .0048$, $F(1, 123) = 0.59$, $p = .443$]. There was no relationship between teachers' age and perceived behavioral control towards using social media communications as a pedagogical tool.

The eighth relationship examined was between subject area and perceived behavioral control. The null hypothesis used was H_o: $\beta_{tested} = 0$, and the alternative hypothesis used was H_a: $\beta_{tested} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis.

Teachers' subject area significantly predicted perceived behavioral control toward the use of social media communications as a pedagogical tool [$\beta_{tested} = -0.18$, $t(123) = -2.01$, $p = .047$]. Teachers' subject area also explained a significant proportion of variance in perceived behavioral control toward the use of social media communications as a pedagogical tool [$R^2 = .0318$, $F(1, 123) = 4.04$, $p = .0465$].

There was a weak relationship between teachers' subject area and perceived behavioral control towards using social media communications as a pedagogical tool. . The mean perceived behavioral control towards using social media communications as a pedagogical tool score was 0.37 lower for those instructing in tested subject areas than for those teaching in non-tested subject areas. The mean perceived behavioral control score towards using social media communications as a pedagogical tool for non-tested subject areas was 3.55.

The ninth relationship examined was between gender and perceived behavioral control. The null hypothesis used was H_o: $\beta_{female} = 0$, and the alternative hypothesis used was H_a: $\beta_{female} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' gender did not significantly predict perceived behavioral control toward the use of social media communications as a pedagogical tool [$\beta_{female} = 0.10$, $t(123) = 1.15$, $p = .254$]. Teachers' gender also did not significantly explain a proportion of variance in perceived behavioral control toward the use of social media communications as a pedagogical tool [$R^2 = .0106$, $F(1, 123) = 1.31$, $p = .2541$]. There was no relationship between teachers'

gender and perceived behavioral control towards using social media communications as a pedagogical tool.

The tenth relationship examined was between current use and age. The null hypothesis used was H_o: $\beta_{age} = 0$, and the alternative hypothesis used was H_a: $\beta_{age} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' age did not significantly predict current use of social media communications as a pedagogical tool [$\beta_{age} = –0.013$, $t(123) = –0.15$, $p = .885$]. Teachers' ages also did not significantly explain a proportion of variance in current use of social media communications as a pedagogical tool [$R^2 = .0002$, $F(1, 123) = 0.02$, $p = .8847$]. There was no relationship between teachers' age and current use of social media communications as a pedagogical tool.

The eleventh relationship examined was between subject area and current use. The null hypothesis used was H_o: $\beta_{tested} = 0$, and the alternative hypothesis used was H_a: $\beta_{tested} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' subject area did not significantly predict current use of social media communications as a pedagogical tool [$\beta_{tested} = –0.079$, $t(123) = –0.88$, $p = .382$]. Teachers' subject area also did not significantly explain a proportion of variance in current use of social media communications as a pedagogical tool [$R^2 = .0062$, $F(1, 123) = 0.77$, $p = .3818$]. There was no relationship between teachers' subject area and current use of social media communications as a pedagogical tool.

The twelfth relationship examined was between gender and current use. The null hypothesis used was H_o: $\beta_{female} = 0$, and the alternative hypothesis used was H_a: $\beta_{female} \neq 0$. The bivariate regression procedure is a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. Teachers' gender did not significantly predict current use of social media communications as a pedagogical tool [$\beta_{female} = –0.042$, $t(123) = –0.47$, $p = .638$]. Teachers' gender also did not significantly explain a proportion of variance in current use of social media communications as a pedagogical tool [$R^2 = .0018$, $F(1, 123) = 0.22$, $p = .6377$]. There was no relationship between teachers' gender and current use of social media communications as a pedagogical tool.

The thirteenth relationship examined was between subject area and age. The null hypothesis used was H_o: $\beta_{tested} = 0$, and the alternative hypothesis used was H_a: $\beta_{tested} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' subject area was significantly related to teachers' age [$\beta_{tested} = 0.18$, $t(123) = 1.98$, $p = .05$]. Teachers' subject area also explained a significant proportion of variance in teachers' age [$R^2 = .031$, $F(1, 123) = 3.91$, $p = .05$].

There was a weak relationship between teachers' subject area of instruction and age. The mean age of teachers was 3.22 years higher for those instructing in tested subject areas than for those teaching in non-tested subject areas. The mean age of teachers teaching in non-tested subject areas was 38.88 years.

The fourteenth relationship examined was between gender and age. The null hypothesis used was H_o: $\beta_{female} = 0$, and the alternative hypothesis used was H_a: $\beta_{female} \neq 0$. The bivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' gender was not significantly related teachers' age, $\beta_{female} = 0.056$, $t(123) = 0.62$, $p = .537$. Teachers' gender also did not significantly explain a proportion of the variance in teachers' age [$R^2 = .0031$, $F(1, 123) = 0.38$, $p = .5366$]. There was no relationship between teachers' gender and age.

The fifteenth relationship examined was between subject area and gender. The null hypothesis use was H_o: $X^2 \leq 0$, and the alternative hypothesis used was H_a: $X^2 > 0$. The chi-squared procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = 0.05$. The rejection decision was to fail to reject the null hypothesis; there is evidence for the null hypothesis. The teachers that taught tested subjects did not differ by gender, $X^2(1, N=125) = .123$, $p = .726$. There was no relationship between subject area and gender.

In summary, using the results from research question three we know the relationship between attitude and subjective norm is moderately positive. The relationship between attitude and perceived behavioral control was moderately weakly positive. The relationship between subjective norms and perceived behavioral control was moderately positive.

Further examining the results of the fifteen remaining relationships which were considered for collinearity, the relationship between attitude and age was not significantly

related. The relationship between attitude and subject area was not significantly related. The relationship between attitude and gender was not significantly related. The relationship between subjective norms and age was not significantly related. The relationship between subjective norms and subject area was weak. The relationship between subjective norms and gender was not significantly related. The relationship between perceived behavioral control and age was not significantly related. The relationship between perceived behavioral control and subject area was weak. The relationship between perceived behavioral control and gender was not significantly related. The relationship between current use and age was not significantly related. The relationship between current use and subject area was not significantly related. The relationship between current use and gender was not significantly related. The relationship between age and subject area was weak. The relationship between age and gender was not significantly related. The relationship between subject area and gender was not significantly related. Because the relationships were either not significantly related or were not strongly related, there is no evidence of collinearity.

The next step was to investigate if the assumption of normality of the residuals was violated in the regression model using the residual from the regression (Lewis-Beck, 1980). This step was done using a skewness/kurtosis test for normality, a scatter plot of the residuals, and normal P-P of the regression. The skewness/kurtosis test for normality tested the null hypothesis that there was no difference between a normal distribution and the distribution of the residuals. The results of the skewness/kurtosis test for normality revealed that the skewness was 0.0000 and the kurtosis was 0.0057 with a *p*-value less than .00001. With the level of significance set at $\alpha = .05$, the rejection decision was reject

the null hypothesis; there is evidence for alternative hypothesis. Therefore, the distribution of the residuals from the regression model was significantly different than a normal distribution. A residual scatter plot was created to detect outliers. An examination of the residual scatter plot revealed that the residuals were scattered randomly. Figure 30 displays the residual scatter plot for the expanded intended use regression model.

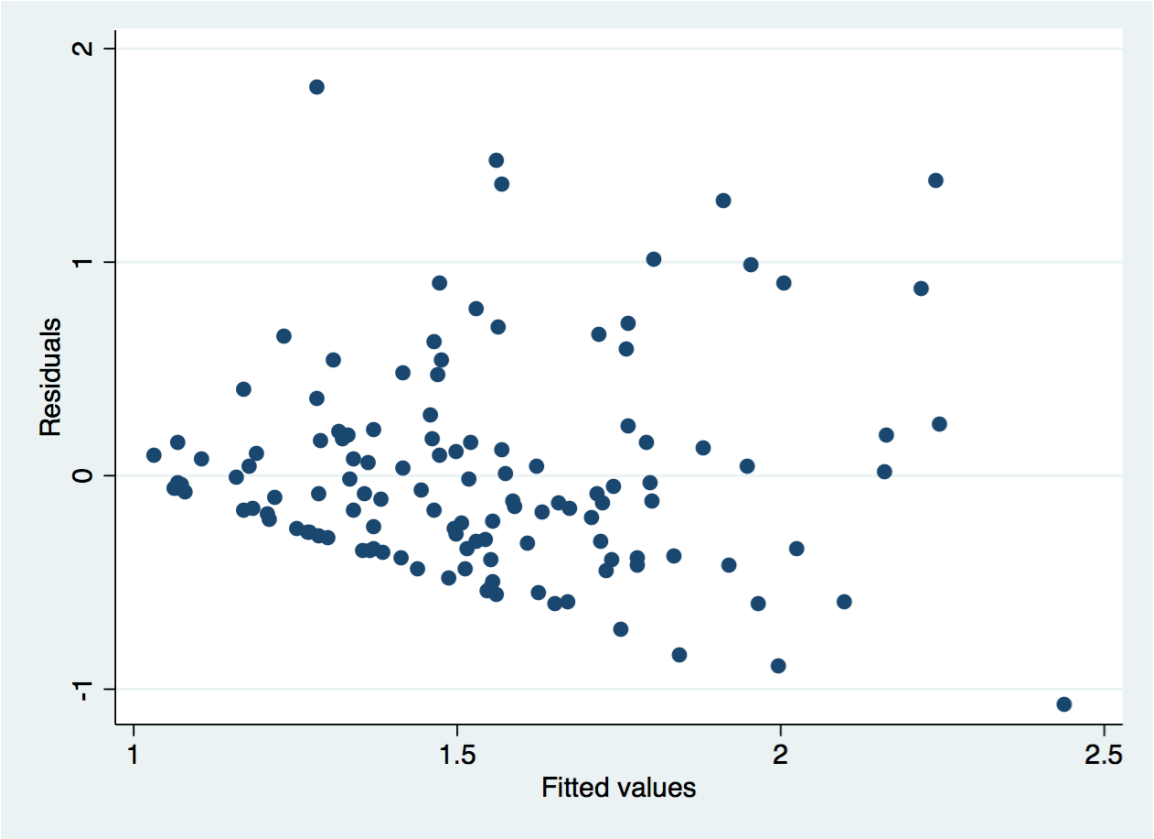

Figure 30. Extended intended use regression model residuals scatter plot. Scatter plot of the residuals of the regression of teachers' intended use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool and teachers' current use of social media communications as a teaching tool, subject area, age, and gender.

The final test used the normality P-P of the regression. Through an investigation of the normality P-P, it was detected that the dots primarily did not stray extremely from

the diagonal line; therefore, the residuals are primarily normally distributed. Figure 31 displays the P-P plot for the expanded intended use regression model.

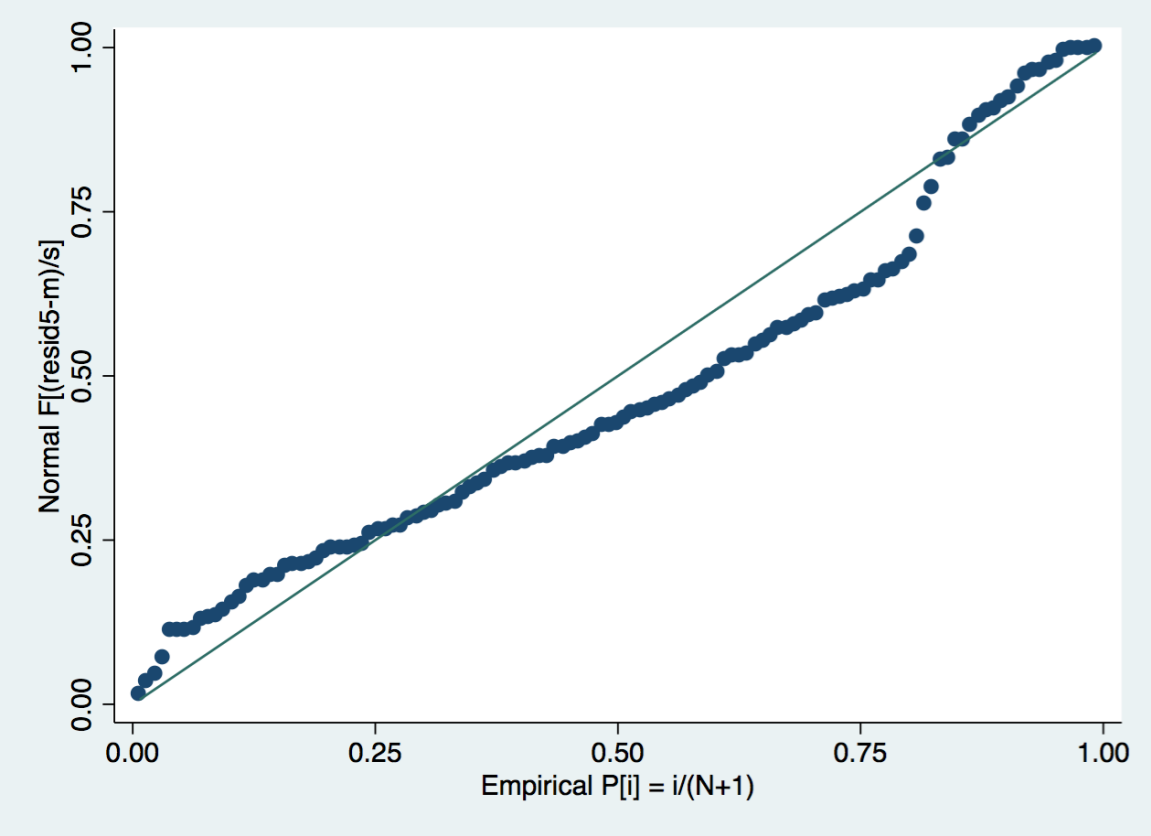

Figure 31. Extended intended use normal probability plot. Normal probability plot, "P-P plot" of the residuals of the regression of teachers' intended use of social media communications as a teaching tool by teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media as a teaching tool and teachers' current use of social media communications as a teaching tool, subject area, age, and gender.

Using the skewness/kurtosis tests for normality, a residual scatter plot of the full regression model with all seven independent variables, and the normality P-P of the full regression model with all seven independent variables has shown that the full regression model with all seven independent variables does not extremely violate the assumptions of normality.

The next step was to detect and diagnosis issues of multicollinearity. A collinearity diagnostic was performed on the regression model to detect multicollinearity. The VIF scores were between 1.04 and 1.71, which were below the recommended limit score of 5.00 (Rogerson, 2001). Because the VIF scores were below the recommended limit score of 5.00, there were no issues of multicollinearity.

The final step of the regression analysis used to answer research question four was to run the full nested regression model investigating the relationship between age, gender, subject area, attitudes, subjective norms, perceived behavioral control towards the use of social media communications as a pedagogical tool, current use of social media communications as a pedagogical tool and intended use of social media communications as a pedagogical tool. The null hypothesis that was used was H_o: $\beta_{age} = \beta_{female} = \beta_{tested} = \beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc} = \beta_{currentuse}$, and the alternative hypothesis that was used was H_a: Not ($\beta_{age} = \beta_{female} = \beta_{tested} = \beta_{attitudes} = \beta_{subjectivenorms} = \beta_{pbc} = \beta_{currentuse}$). The multivariate regression procedure was a one-tailed, non-directional test. The level of significance for this test was set at $\alpha = .05$.

The first part of the nested model examined the relationship between attitudes, subjective norms, perceived behavioral control towards the use of social media communications as a pedagogical tool and intended use of social media communications as a pedagogical tool, which was similar to research question three. Examining this part of the nested model, the rejection decision was to reject the null hypothesis; there is evidence for the alternative hypothesis. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool significantly predicted intended use scores [$\beta_{attitudes} = 0.30$, $t(121) = 3.08$,

$p = .003$; $\beta_{subjectivenorms} = -0.06$, $t(121) = -0.54$, $p = .592$; $\beta_{pbc} = 0.09$, $t(121) = 0.86$, $p = .393$]. Teachers' attitudes, subjective norms, and perceived behavioral control toward the use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended scores, [$R^2 = .1018$, $F(3, 121) = 4.57$, $p = .0045$].

Controlling attitudes and subjective norms, there was no relationship between perceived behavioral control score and intended use of social media communications as a pedagogical tool. Controlling attitudes and perceived behavioral control, there is no relationship between subjective norms score and intended use of social media communications as a pedagogical tool. Controlling subjective norms and perceived behavioral control, for every additional point in attitudes score there was a 0.20 point increase in intended use of social media communications as a pedagogical tool. Controlling subjective norms and perceived behavioral control, for every standard deviation increase in attitudes score there is a 0.30 standard deviation increase in intended use of social media communications as a pedagogical tool.

To understand how the introduction of the variables of age, gender, subject area, and current use affected the relationship between attitudes, subjective norms, and perceived behavioral control towards the use of social media communications as a pedagogical tool and intended use of social media communications as a pedagogical tool the second part of the nested model was examined. Examining this part of the model the rejection decision was to reject the null hypothesis, we have evidence for the alternative hypothesis. Teachers' age, gender, subject area, attitudes, subjective norms, perceived behavioral control toward the use of social media communications as a pedagogical tool, and current use of social media communications as a pedagogical tool significantly

predicted intended scores [$\beta_{age} = 0.10$, $t(117) = 1.20$, $p = .232$; $\beta_{female} = 0.19$, $t(117) = 2.38$, $p = .019$; $\beta_{tested} = –0.03$, $t(117) = –0.39$, $p = .699$; $\beta_{attitudes} = 0.13$, $t(117) = 1.33$, $p = .187$; $\beta_{subjectivenorms} = –0.07$, $t(117) = –0.65$, $p = .514$; $\beta_{pbc} = 0.02$, $t(117) = 0.15$, $p = .879$; $\beta_{currentuse} = 0.39$, $t(117) = 4.25$, $p < .0001$]. Teachers' age, gender, subject area, attitudes, subjective norms, perceived behavioral control toward the use of social media communications as a pedagogical tool, and current use of social media communications as a pedagogical tool also explained a significant proportion of variance in intended use scores [$R^2 = .2531$, $F(7, 117) = 5.67$, $p < .00001$].

Controlling age, gender, subject area, current use, attitudes, and subjective norms, there was no relationship between perceived behavioral control score and intended use of social media communications as a pedagogical tool. Controlling age, gender, subject area, current use, attitudes, and perceived behavioral control, there was no relationship between subjective norms score and intended use of social media communications as a pedagogical tool. Controlling for age, gender, subject area, current use, subjective norms, and perceived behavioral control, there was no relationship between attitude score and intended use of social media communications as a pedagogical tool. Controlling for age, gender, subject area, attitudes, subjective norms, and perceived behavioral control, for every additional point in current use score, there was a 1.99 point increase in intended use of social media communications as a pedagogical tool. Controlling for gender, subject area, current use, attitudes, subjective norms, and perceived behavioral control, there was no relationship between teachers' age and intended use of social media communications as a pedagogical tool. Controlling for age, subject area, current use, attitudes, subjective norms, and perceived behavioral control, the mean intended use score was 0.23 points

higher for women than for men. Controlling age, gender, current use, attitudes, subjective norms, and perceived behavioral control, there was no relationship between subject area and intended use of social media communications as a pedagogical tool.

Controlling age, gender, subject area, attitudes, subjective norms, and perceived behavioral control, for every standard deviation increase in current use score there a 0.39 point increase in standard deviation in intended use of social media communications as a pedagogical tool. Controlling for age, subject area, current use, attitudes, subjective norms, and perceived behavioral control, the relationship between gender and intended use was weak. Table 6 displays the comparison of both linear regression models.

Table 6

Linear Regression Predicting Intended Use of Social Media Communications as a Pedagogical Tool

	Model 1				Model 2			
	Unstandardized Coefficient	std. error	t	Standardized Coefficient	Unstandardized Coefficient	std. error	t	Standardized Coefficient
Attitudes	0.202	0.066	3.08 **	0.304	0.089	0.067	1.33	0.133
Subjective Norms	-0.040	0.075	-0.54	-0.060	-0.046	0.070	-0.65	-0.068
Perceived Behavioral Control	0.057	0.067	0.86	0.091	0.010	0.063	0.15	0.015
Current Use					1.99	0.469	4.25 ***	0.394
Age					0.006	0.005	1.20	0.098
Gender								
Women					0.227	0.095	2.38 *	0.193

Men (reference group)								
Subject Area								
Tested					-0.037	0.096	-0.39	-0.032
Non-tested (reference group)								
Intercept	0.780	0.257	3.03	**	-1.264	0.526	-2.40	*
R^2	0.1018				0.2531			
Adjusted R^2	0.0795				0.2085			
Model fit		$F_{3, 121}$ =	4.57	**		$F_{7, 117}$ =	5.67	***
Model Comparison						$F_{4, 117}$ =	5.93	***

Notes: *** p-value ≤ 0.001; ** p-value ≤ 0.01; * p-value ≤ 0.05

Conclusion

Chapter four presented the results related to each of the research questions from this study about Pennsylvania teachers' perceptions and uses of social media communication technologies as a pedagogical tool. The chapter described, in detail, the sample of teachers analyzed in this study. A brief summary of the results was presented followed by the details of the analysis for each research question, which described the steps of hypothesis testing and the regression diagnostics used to ensure reliability of the results.

CHAPTER FIVE

IMPLICATIONS, DISCUSSION, RECOMMENDATIONS

Introduction

Chapter Five presents the implications, discussion, and recommendations from this study about Pennsylvanian teachers' perceptions and use of social media communication technologies as a pedagogical tool. The purpose of this study was to examine, within the Commonwealth of Pennsylvania, the attitudes, subjective norms, perceived behavioral control, and intentions of current secondary teachers' use of social media communications as part of their teaching practices as well as teachers' past behavior of using social media communications as part of their teaching practices.

The chapter will begin with an interpretation of the quantitative findings situated with the qualitative findings from the open-ended questions from the survey instrument. Following the interpretation of the findings, the researcher will discuss the findings as they relate to the Classrooms for the Future grant, 21st century teaching and learning, and how this study has provided empirical results related to secondary teachers' perceptions and use of social media communications as a teaching tool, which is an area that has few published studies. The chapter will conclude with recommendations for practice, recommendations for future research, and an acknowledgement of the limitations of this study.

Summary and Interpretation of the Findings

Research question one asked, "What are 9-12 grade teachers' past use, attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool?" The study indicated that teachers' past use is

low. Teachers have not used a variety of social media communications in their teaching practices. Teachers' attitudes toward the use of social media communications as a teaching tool are moderately positive; they feel the use of social media communications, as a teaching tool, is more positive than negative. Teachers' subjective norms are moderately positive; they feel important others (Ajzen, 1991; Venkatesh, Morris, Davis, & Davis, 2003) use and encourage the use of social media communications more than the important others do not use or discourage the use. Teachers' perceived behavioral control is also moderately positive; they feel they are more in control of the use of social media communications than they feel they do not have control over the use.

The open-ended qualitative responses on the survey provide a deeper understanding of the teachers' attitudes, subjective norms, and perceived behavioral control. There were four open ended qualitative responses on the survey. Two questions focused on positive aspects of social media communications as a teaching tool, and two questions focused on negative aspects of social media communications as a teaching tool. Typological analysis (Hatch, 2002) was used to interpret the qualitative responses of the teachers.

The first open-ended question posed to teachers was, "What are the best ways in which social media communications can be used as a teaching tool?" The categories used in the typological analysis for this question were teacher-centered, student-centered, stakeholders, neutral, and other. The most prominent category was student-centered. Further investigation of the student-centered category revealed that two main themes emerged. The first theme was student engagement. One teacher described the student engagement with social media communications as:

> "Social media communications can be a technique to motivate students to apply basic skills to a variety of situations. These modes of teaching offer platforms to display skills in a way that is interesting and applicable to students' young lives."

The second theme was based in the learning and innovation skills – critical thinking, communication, collaboration, and creativity, of the P21 framework (P21.org, 2009). Of the four learning in innovative skills cited in the teachers' responses, communication and collaboration were the most dominate themes. One of the teachers provided the following statement that captures the learning and innovation skills theme well, "The best way to use [social media communications] would be through a forum in which students would be able to ask questions to each other and the teacher. Posting work for peer evaluation might be a good option, also."

The second open-ended question posed to teachers was, "What are the worst ways in which social media communications can be used as a teaching tool?" The categories used in the typological analysis for this question were teacher-centered, student-centered, stakeholders, neutral, misconduct, and other. Originally, the misconduct category was not used, but after further examination of the themes, the research found it was important to add the misconduct category. Across all categories the most predominate theme was monitoring the use of social media communications. One teacher described the worst way to use social media communications as a teaching tool as, "allowing students to 'chat' and post whatever without rules or monitoring." The other strong theme was encompassed under the misconduct category, which focused on inappropriate relations between teachers and students. Although many of the responses included the concept of

not crossing boundaries, one teacher's response drew a distinct line when they wrote, "I think any use that is not on a professional level and used on a personal level is a misuse of social media in a classroom setting."

The third open-ended question posed to teachers was, "What encourages your use of social media communications as a teaching tool?" The categories used in the typological analysis for this question were teacher-centered, student-centered, stakeholders, neutral, and other. The most prominent category was student-centered. Three main themes emerged within the student-centered category. The first theme, similar to the first open-ended question was student engagement. One teacher not only addressed the student engagement, but also provided their perception of why the students are engaged when they stated, "Students are more engaged with class material. They are able to work on things at their pace. It allows for education to be more individualized to meet the needs of students." The second and third themes were based on the student outcomes of the P21 framework (P21.org, 2009). Similar to the first open-ended question, the learning and innovation skills outcome was present as a theme. In addition to the themes of the first question, the third question also had themes that related to the student outcome of information, media, and technology skills. Two teachers provided responses that showed their view of why teaching with social media communications supports the information, media, and technology skills student outcome of the P21 framework. The first teacher stated, "Teaching with technology teaches to today's youth, they are brought up in the generation of technology so I feel this is a helpful tool that most students know how to use effectively." The second teacher stated:

> "Its how and what students are using on a daily basis. Why not use their technology to teach? If we don't use the technology, education will be left behind. Expose and teach students how to be responsible on social networks. They have the knowledge on how it all works (much more than I do) but not the maturity to see consequences for posting certain things."

The final open-ended question posed to teachers was, "What discourages your use of social media communications as a teaching tool?" The categories used in the typological analysis for this question were teacher-centered, student-centered, stakeholders, neutral, misconduct, tool/network, and other. The most prominent category was tool/network. The dominant themes in this category focused on the lack of technology available, problems with the devices, or problems with the school's Internet network. One teacher discussed the lack of technology not only in the school building, but also for students at home when they stated they were discouraged by the "lack of technology and infrastructure, [and] lack of student access to technology at home." Another teacher described the problems with the devices as, "the technology in my school district is very outdated. Furthermore, students are banned from using cell phones for any purpose." The final theme of problems with the school's Internet network was the most prominent. One teacher wrote, "I'm discouraged in the use of social media communications when the infrastructure of the network at our building does not provide enough Wi-Fi for the students."

Although teachers' attitudes, subjective norms, and perceived behavioral control were moderately positive, past use does not seem to be well embraced. An overwhelming majority (97.6%) has never used half of the listed social media communication

technologies in any part of their teaching. Using the open-ended qualitative responses of the teachers to help situate the quantitative responses from the teachers helps to understand why attitudes, subjective norms, and perceived behavioral control are moderately positive, but past use is very low. The factors that encourage and promote the use of social media communications as a teaching tool are very student-centered and align with student outcomes of the P21 framework. However, lack of access to technology, technical problems with the devices, and limitations of schools' Internet network prevent the actual use of social media communications as a teaching tool from being implemented.

The findings of this study support previous research that has examined teachers' attitudes, subjective norms, and perceived behavioral control towards the use of social media communications as a pedagogical tool. The quantitative findings about teachers' attitudes support the findings that overall teachers' attitudes are positive (Govender, 2012; Yuen, Yaoyuneyong, & Yuen, 2011). The qualitative findings showed that teachers feel the use of social media communications create opportunities for students to communicate and collaborate, which support the findings of Lee, Lee, and Kim (2015).

On the topic of subjective norms, Cakir, Yukselturk, and Top (2015) reported that teachers feel a social pressure to use social media communications in their classroom, which was supported by the findings of this study. Teachers in this study reported their subjective norms as moderately positive. This means teachers feel important others, such as peers, colleagues, and stakeholders, either use or encourage the use of social media communications as a teaching tool.

Carpenter and Krutka (2014) found that teacher access to social media communication sites was restricted in many school districts. The quantitative findings of this present study show that although perceived behavioral control was moderately positive, it was the lowest of the three constructs. These findings show that even though teachers feel they have the majority of the control over the use of social media as a teaching tool, the amount of control the teachers feel they have is only slightly higher than the lack of control they have. The lack of control was expressed further in the qualitative findings when teachers reported that the school network was a predominant obstacle that discouraged the use of social media as a teaching tool.

Research question two asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, and perceived behavioral control regarding the use of social media communications as a pedagogical tool and their current use of social media communication as a pedagogical tool?" Teachers' attitudes, subjective norms, and perceived behavioral control, as described in the summary of results of research question one, are moderately positive. However, current use of social media communications as a pedagogical tool is low. Teachers do not currently use a variety of social media communications as pedagogical tools.

Similar to past use, current use is low. Although perceptions towards the use of social media communications as a pedagogical tool are moderately positive, teachers do not use social media communications as a pedagogical tool. It is important to note that even though the regression model examining current use can explain 25.09% of the variance in the current use of social media communications as a pedagogical tool, when controlling each of the independent variables the only significant relationship was

between attitude and current use. However, independently, each of the predictor variables are significantly related to teachers' current use of social media communications as a pedagogical tool.

The findings of this study support previous research that has examined teachers' current use of social media communications as a pedagogical tool. Capo and Orellana (2011) found the majority of teachers did not use a social media communications as a pedagogical tool, which aligns with the findings of this study. Current use of social media as a pedagogical tool was very low. With a possible scale range of 1-5, the observed responses only ranged from 1-1.58, with an average current use score of 1.14. When examining the qualitative findings, specifically when teachers reported what discouraged their use of social media communications as a teaching tool, the teacher-centered category focused heavily on the themes of lack of time, lack of confidence, and lack of knowledge. One teacher's statement summarized all three themes when they wrote, "Too many other duties that take away my ability to research and get comfortable with [social media communication] tools." Other studies have found that teachers' lack of time, lack of confidence, and lack of knowledge hinders the use of social media communications as a teaching tool (Capo & Orellana, 2011; Govender, 2012; Maor, 2003; Mourlam, 2013). The lack of perceived behavioral control, discussed earlier, combined with the lack of time, lack of confidence, and lack of knowledge could be what leads to such a low current use of social media communications as a teaching tool.

Research question three asked, "What is the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control regarding the use of social media communications as a pedagogical tool and their future intention to use social

media communications as a pedagogical tool?" Teachers' attitudes, subjective norms, and perceived behavioral control, as described in the summary of results of research question one, are moderately positive. However, intended use of social media communications as a pedagogical tool is low. Teachers do not intend to use a variety of social media communications as pedagogical tools.

Similar to past use and current use, intended use is low. Although perceptions are moderately positive, teachers do not intend to use social media communications as part of their teaching practices. It is important to note that even though the regression model examining intended use could explain 10.18% of the variance in intended use, when controlling each of the independent variables, the only significant relationship is between attitudes and intended use. The significance of each relationship between the predictor variables and the dependent variable, when controlling for the predictor variables, is not a surprise. Independently, only attitude was significantly related to intended use, and subjective norms and perceived behavioral control were not significantly related to intended use of social media communications as a pedagogical tool.

The findings of this study provide similar and different findings from previous research that has examined teachers' intended use of social media communications as a pedagogical tool. The findings that are similar are related to the connection between positive beliefs or attitudes and behavioral intentions. In their study, de Oca and Nister (2014) found that positive beliefs could account for 49.6% of the variance in behavioral intention; however, in this current study, attitude alone was only able to explain 9.62% of the variance in intended use of social media communications as a teaching tool. Although

there was a significant relationship, the relationship was not able to explain the same level of variance as previous studies.

The findings that differ from previous studies are the relationship between social influences, or "the degree to which important others believe he or she should use the new system" (Venkatesh, Morris, Davis, & Davis, 2003, p. 451) or subjective norms, which also focuses on the views of important others, and behavioral intention and optimism, as defined by Parasuraman (2000) or perceived behavioral control and behavioral intentions. Parasuraman (2000) defines optimism as "the view that technology offers increased control" (p. 311), the increased control relates to teachers perceived behavioral control. Although Shu-Fen, Chu-Liang, and De-Chich (2015) found that the view of increased control was related to behavioral intention, the findings from this study suggest there is no relationship between control and behavioral intention. There is no relationship in the full regression model when controlling attitudes and subjective norms or when regressing behavioral intention on to perceived behavioral control individually. Lu and Yang (2014) found that social characteristics influence intentions. However, the findings from this current study suggest there is no relationship between subjective norms and behavioral intention. There is no relationship in the full regression model when controlling attitudes and perceived behavioral control or when behavioral intention is regressed on to subjective norms individually.

Research question four asked, "How do teacher characteristics and current use of social media communications as a pedagogical tool affect the relationship between 9-12 grade teachers' attitudes, subjective norms, perceived behavioral control, and their future intentions to use social media communications as a pedagogical tool?" Teachers'

attitudes, subjective norms, and perceived behavioral control, as described in the summary of results of research question one, are moderately positive. Teachers' current use, as described in the summary of results of research question two, are low. Teachers' intended use, as described in the summary of results of research question three, are low. The average age of teachers is forty years old. The majority of teachers were female and taught non-tested subject, meaning most teachers did not teach subjects of math, science, or English language arts.

Adding the variables of age, gender, current use, and subject area made notable changes to the regression model. The most notable change was an increase in the explained variance. The first regression model, only using the constructs of the theory of planned behavior (Ajzen, 1991) attitude, subjective norm, and perceived behavioral control as the independent variables, had an explained variance of 10.18%, and the addition of age, gender, current use, and subject area increased the explained variance to 25.31%. The second notable change occurred when comparing the *p*-value of each regression model. The basic model, only using the constructs of the theory of planned behavior (Ajzen, 1991) attitude, subjective norms, and perceived behavioral control as the independent variables, have a *p*-value of $p = .0045$ and the addition of age, gender, current use, and subject area has a *p*-value of $p < .00001$. The last notable change was found when examining which variables had a significant relationship to intended use, when controlling the other independent variables. In the original model, only using the constructs of the theory of planned behavior (Ajzen, 1991) attitude, subjective norm, and perceived behavioral control as the independent variables, when controlling each of the independent variables, only the relationship between attitude and intended use was

significant. When adding the variables of age, gender, current use, and subject area, and controlling each of the predictor variables, the relationships between gender and intended use as well as current use and intended use were the only significant relationships.

The findings from research question four relate directly to the understanding of the theoretical orientation of this study. The primary theory used to guide this study was the theory of planned behavior (Ajzen, 1991). In his original publication describing the theory of planned behavior, Ajzen (1991) encouraged future research to include other predictor variables into the framework, as long as the new variables could "capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account" (p.199). Research question four attempted to add four new variables: age, gender, subject area, and current use, to the current variables of attitude, subjective norms, and perceived behavioral control. The addition of the four variables to the framework more than doubled the proportion of explained variance in behavioral intention. By adding the variables of age, gender, subject area, and current use, the explained variance in intention went from 10.18% to 25.31%. The results of this study suggest the addition of age, gender, subject area, and current use should be included in the theory of planned behavior framework when examining teachers' use of social media communications as a pedagogical tool.

The results of research question four also offer evidence that differs from earlier findings. When Ulrich and Karvonen (2011) investigated the link between actual use and intention to use social media communications as a pedagogical tool, they found there was no relationship between the instructors' intentions and actual use. In a similar study de Oca and Nistor (2014) found there was no significant relationship between actual use and

intention to use social media communications as a pedagogical tool. The results from this current study suggest there is a significant relationship between actual or current use and intention to use social media communications as a pedagogical tool. The complete regression model, with the predictor variables of attitudes, subjective norms, perceived behavioral control, age, gender, subject area, and current use, as described earlier, was able to significantly explain 25.31% of the variance in behavioral intention. Further, when controlling attitudes, subjective norms, perceived behavioral control, age, gender, and subject area, current use of social media communications as a pedagogical tool was significantly related to intention to use social media communications as a pedagogical tool.

Discussion

The discussion will focus on results related to the Classrooms for the Future grant, the incorporation of 21st century teaching and learning, and lack of empirical research on secondary teachers' use of social media as a teaching tool. When the Classrooms for the Future grant was initiated, the goal was to develop 21st century teaching and learning within the Commonwealth of Pennsylvania (Pennsylvania Department of Education, 2007). School districts could use the monies from the grant to purchase technology and build a working technological infrastructure for the school district. Money was also available to train teachers how to integrate 21st century teaching and learning into the classroom.

The results of this study suggest that the Classrooms for the Future grant, while ambitious, did not fully achieve its intended goal. Although the grant allocated money for a technological infrastructure, teachers reported the network within their schools was the

primary factor that discouraged their use of social media communications. The other common reason teachers were discouraged to use social media communications as part of their teaching practices was because of a lack of knowledge, lack of confidence, and lack of time. Although there was money available for teacher training, many teachers still feel they are not adequately prepared to teach using social media communications. The results of teachers' attitudes, subjective norm, and perceived behavioral control suggest that teachers are willing to move forward; however, they must overcome the unreliability of the schools' network and develop more confidence and knowledge while finding time in their schedules to make the change.

Although the results suggest that the Classrooms for the Future grant fell short of its intended goal, teachers do see the advantages of using social media communications to integrate the learning and innovation skills from the P21 framework for 21st century learning (P21.org, 2009). The learning and innovation skills, which are critical thinking, communication, collaboration, and creativity, were explicitly stated by teachers when they were asked what encourages their use of social media communications as a teaching tool and what is the best way to use social media communications as a teaching tool. The results suggest that teachers are aware that social media communications as a teaching tool can be leveraged to easily incorporate 21st century skills.

There is a disconnect between teachers' perceptions of the use of social media as a teaching tool and the actual and intended use of social media communication as a teaching tool. The results of this study suggest that policy does not directly relate to practice. Money and policy was provided to schools in order to develop 21st century teaching and learning, and although teachers recognize the advantages of social media to

achieve the integration of 21st century teaching and learning into public schools, this integration has not been well embraced.

This study offers a glimpse into the secondary public school setting in regards to the use of social media communications as a teaching tool. Previous studies that examined the secondary level in public education have either only focused on teachers' social media use as a professional development tool (Carpenter & Krutka, 2014; Davis, 2015; Owen, Fox, & Bird, 2016) or were case studies of a single school district (Loether, Inan, Ross, & Strahl, 2012) or a single classroom (Krutka & Milton, 2013; Mourlam, 2013). This study, which has looked at a statewide system, quantitatively shows the low level of current use and intended use supported with the qualitative responses that indicate the schools' level of technology and/or the infrastructure of the schools' network is what discourages teachers' use of social media communication as a teaching tool.

Within any organization or system, change is a multistage and often slow process (Salerno & Brock, 2008). The Classroom for the Future grant had a goal of complete change within the Pennsylvania public school systems to have 21st century teaching and learning across the state. Although the findings of this study suggest the grant fell short of its goal, it is important to note the findings suggest the goal did not fall short because of the teachers. The teachers' perceptions are positive, and they are encouraged to use social media communications as a teaching tool because it allows them to integrate the 21st century learning and innovation skills into their classrooms. According to the findings of this study, the area in which the Classrooms for the Future grant struggled the most was to allow schools to purchase technology and build an infrastructure that would be able to keep up with the ever-changing advancements in technology. No matter which metric is

used to evaluate the effects of the Classrooms for the Future grant, the grant was successful in moving the classrooms of Pennsylvania closer toward 21st century teaching and learning. The grant may not have had the flexibility, or foresight to complete the intended goal, but the study shows teachers within the Commonwealth of Pennsylvania have positive perceptions of using social media communication and are encouraged to do so in order to integrate 21st century skills into their classrooms for the benefits of the students.

Recommendations

This section will discuss the researcher's recommendations based on the findings of this study. The recommendations section will first discuss recommendations for practice in the public school settings. Following the recommendations for practice in the public school setting, the researcher will discuss the recommendations for future research.

Recommendations for Practice

The recommendations for practice will focus on school district policy, administrative support, and teachers' actions. As part of the post hoc qualitative analysis, the researcher searched through the publicly available school board policy manuals of each school district that agreed to participate in the study. Of the 18 school districts that agreed to participate in the study, 12 had a policy that addressed the use of social media communications in educational settings. Nine of the 12 policies stated it was the role of the district to educate students about proper social media use. Although 10 of the 12 policies allowed the use of social media communications in educational settings, seven of the policies required teachers to get permission from an administrator before establishing

a social media site. The remaining three policies outlined the regulations that would govern the use of a social media site as an educational tool.

Forward thinking policies, such as the ones that encourage teachers to teach proper social media communications use and allow teachers to use social media communications as a teaching tool, are very positive. Although there are examples of policies that outline the acceptable use of social media communications, there are school boards that have not created a policy to address the use in educational settings or have banned the use of social media communications entirely. The connectivity of the global society is increasing each year, and without access the students in Pennsylvania public schools could be left behind and will not be competitive in the global market. It is recommended that school boards continually review their policies on social media and the acceptable use of the technology within their district to ensure that their polices support 21st century teaching and learning, and allow teachers to educate and prepare students for the global market they will compete in to find jobs.

Many of the school board policies that allowed the use of social media required prior administrative permission before a teacher could establish a social media site. This policy is not inherently poor compared to policies that allow teachers to create a site without administrative permission, as long as they follow the published policy guidelines. The potential weakness of the added step of obtaining permission from an administrator could be contingent on the individual administrator's perceptions of the use of social media as a teaching tool and the available time the individual administrator has to respond to the request of a teacher to establish a social media site for instruction. In order to ensure student progress in the classroom, school districts that require the permission of

an administrator should consider if this step is necessary. If the school board and administration feel the step is needed to ensure a safe environment for students and teachers, it is recommended that the administration create and communicate a simple and clear procedure for teachers to follow in order to be allowed to incorporate social media communications into their teaching practices.

An additional recommendation directed toward the administrative team of school districts is to evaluate the stability and accessibility of their school Internet network. As discussed earlier, teachers feel that the lack of stability and accessibility of the school Internet network is a major factor that discourages their use of social media communications as a teaching tool. It is recommended that administrators should establish a budget item to maintain and improve the Internet network of the school on a regular basis. As technology changes, so will the demands on the Internet network of the school. To ensure that educational time is not lost due to a lack of stability and accessibility when teachers are using social media communications as a teaching tool, the functionality of the Internet network of the school should be a priority.

In the open-ended responses of the survey instrument, teachers reported their lack of time, lack of knowledge, and lack of confidence in using social media communications as a teaching tool was a prominent reason they were discouraged to use social media communications as a teaching tool. Although teachers feel their time, knowledge, and confidence hinders their use, they have positive perceptions of the use of social media communications as a teaching tool. Teachers also have reported that they are encouraged to use social media communications as a teaching tool because of the level of student

engagement and the ability to incorporate the 21st century learning and innovation skills of critical thinking, communication, collaboration, and creativity into their instruction.

In order to move the level of current use and intended use more in line with the perceptions, it is recommended that teachers become active learners and users of social media communications. To combat the lack of knowledge teachers feel, they should seek out professional development opportunities to increase their understanding of how social media communications can be effectively used as a pedagogical tool. On a statewide level, similar to the Classrooms for the Future grant, funding should be set aside for professional development opportunities and to help establish teacher teams to support training and use. To ensure teachers have adequate time, they should use the summer months to create activities and lessons that use social media communications as a pedagogical tool. Using the summer months will allow teachers to learn at a pace with which they are comfortable with the goal of the created lessons and activities being completed by the start of the school year. As teachers increase their knowledge of how social media communications can be used as an effective teaching tool through professional development and use the summer months to create the lessons and activities, their confidence should increase as they prepare for the upcoming school year.

In addition to building confidence through active learning and lesson creation using social media communications as a teaching tool, teachers should be sure they are aware of their own school district's policy on the use of social media communications in educational settings. When asked if they were aware of a district policy that addresses teachers' use of social media communication technologies as a teaching tool, 41.13% reported they were unsure. Being unsure if one's school district has a policy about the use

of social media communications as a teaching tool could also be a reason why teachers do not feel confident.

Not only should teachers be aware of their specific school policy about using social media communications, but also teachers should actively discuss their plans to use social media communications with their administrative team in faculty meetings and with their colleagues in their own building. When open and honest discussions about the use of social media communications as a teaching tool can happen between teachers and administrators as well as teachers and their peers, teacher should feel more confident in the expectations within their own building. As stated earlier in this study, teachers are the nexus of policy and practice; without teachers actively working to incorporate social media communications as part of their teaching practices, Pennsylvania students will fall short of the goal of experiencing 21st century teaching and learning. Teachers should take this responsibility and help continue to move teaching practices forward for the benefit of the students.

The recommendations for practice focused on the areas of school board policy, administrative support, as well as teacher training and teachers' actions. School boards should ensure their policies that address the use of social media communications are clear and do not hinder the integration of 21st century teaching and learning, while maintaining a safe environment for students. Administrators within the school district should support the use of social media communications as a teaching tool in order to integrate 21st century teaching and learning into the classes. It is also recommended that the administrative team devote sufficient resources to ensure the reliability and accessibility of the Internet network within the school district to protect against lost instructional time,

when teachers are using social media communications as a teaching tool. Finally, it is recommended that teachers become active advocates and users of social media communications as teaching tools. With a portion of their professional development, especially in the summer months, dedicated to learning effective ways to incorporate social media communications into their teaching practices, teachers can overcome their lack of knowledge and lack of time to use social media communications in their teaching practices. Teachers should ensure they are knowledgeable about their school's specific policy related to the use of social media as a teaching tool, and they should have open and honest discussions with their administration and colleagues to build support in order to overcome their lack of confidence when using social media communications as a teaching tool. Without teachers' sincere efforts to integrate social media communications into their classroom pedagogy, the initiative to increase 21st century teaching and learning could fail.

Recommendations for Future Research

Recommendations for future research will focus on principals' and other building administrators' perceptions of social media communications as a teaching tool, teachers' perceptions and use of specific teaching tools, and stakeholders perceptions of and acceptance of social media communications as a teaching tool. Although teachers play an important part in turning policy into practice, school principals and school administrators are also an important part in the public education system. Principals and school administrators interpret the policy written by the board and create procedures to uphold the policies. Within the qualitative findings of this study, teachers alternately reported their administration as an encouraging or discouraging factor to use social media

communications as a teaching tool. It would be a valuable addition to the body of research if future research investigated principals' and school administrators' perceptions and level of support of teachers who use social media communications as a teaching tool. Findings from such a study could help to better understand why teachers view administrators as a positive and a negative aspect of using social media as a teaching tool.

This study looked at social media communications from a very broad definition in respect to the specific social media communications tool and how it was used in the teaching and learning in the secondary school setting within the Commonwealth of Pennsylvania. Future research should investigate how specific types of social media communication tools are used, as well as how they are used in the teaching and learning process. Such research would be able to move the larger scope of this study into a more specific area, to better understand which type of social media communication tool best fits different modes of instruction. Further, this study could be replicated in other levels by surveying teachers of elementary students and middle school students.

Finally, future research should investigate school district stakeholders' perceptions and acceptance of teachers using social media communications as a teaching tool. This study only investigated the view of the stakeholder through the subjective understanding of the teachers, captured in the subjective norms scale. Although the subjective norms scale is how the teachers perceive the views of their stakeholders, it would be valuable to have research that actually investigated the perceptions and acceptance of the stakeholders. The results from such a study could be used to compare the subjective norms teachers perceive to the actual norms expressed by the stakeholders.

The recommendations for future research focused on the areas of principals' and school administrators' perceptions of the use of social media communications, teachers' perceptions and use of specific social media communications, and stakeholders' perceptions and acceptance of social media communications as a teaching tool. Understanding principals' and school administrators' perceptions can allow researchers the ability to better understand why principals' and school administrators are seen as a positive and a negative reason to use social media communications as teaching tools. Results from teachers' perceptions and use of specific social media communication tools can provide a more detailed understanding of which social media communication tools best support different modes of instruction. The findings of stakeholders' perceptions and acceptance of teachers using social media communications as a teaching tool can be used to balance the subjective perceptions that teachers have reported in this study.

Limitations

The limitations section will focus on three primary limitations of the study that were realized through the data collection process of this study. These limitations are important because they help give perspective to the findings and ensure their generalizability is sufficient and not over generalized. The three limitations are the number of schools that participated, the distribution of the urban central locale code responses, and the response rate.

The first limitation that should be addressed is that although the researcher had a goal of 20 school districts composed of five city, five suburban, five town, and five rural districts, only 18 schools agreed to participate. Of the 18 schools, 3 were city, five were suburban, five were town, and five were rural. Within the Commonwealth of

Pennsylvania there are only 17 school districts that are classified as city school districts. The researcher had contacted each of the 17 school districts during the sample procedures; however, only three agreed to participate. The voice of the city schoolteacher is not as strong as the researcher had intended when the study was being designed.

The second limitation is also related to how well the sampling process captured the voices of teachers across the Commonwealth of Pennsylvania. According to the Urban-centric Locale Code report (Pennsylvania Department of Education, 2010), the school districts in Pennsylvania are urban (3.42%), suburban (41.45%), town (20.12%), and rural (35.01%). The actual sample used to conduct the study had urban school districts (16.94%), suburban school districts (20.16%), town school districts (17.74%), and rural school districts (45.16%). In comparison to the population of actual school districts, urban school districts and rural school districts are overrepresented in this study, and suburban and town school districts are underrepresented in this study.

The final limitation addresses the analytic sample size. Of the 1129 teachers that were contacted to participate in the study, 226 responded to the survey invitation, and 125 of the surveys could be used as the analytic sample. The researcher believes the high percentage of unusable surveys stems from survey fatigue by the participants. Although a larger analytic sample size is more desirable, it was already stated in Chapter Four that the analytic sample size of 125 was sufficient for the most complex regression model, which had seven independent variables (Tbachnick & Fidell, 2007). Further, an investigation of the effect size, $\omega^2 = .21$, was used in a post hoc power analysis and revealed an effect size of .21 could be detected at $p = .05$, a one-tailed at a power of .97. Although the analytic sample size is smaller than desired, the results of the power

analysis using the GPower program (Faul, Erdfelder, Lang, & Bucherner, 2007), and the formula for a minimal sample size (Tbachnick & Fidell, 2007) revealed that the findings are generalizable to a larger population of Pennsylvania secondary school teachers.

The limitations discussed in this section are important to situate the study and understand how the results represent the larger population. These limitations are the product of the data collection process and were unavoidable during the process of the study. Although the limitations of number of schools that participated, the distribution of the urban centric locale code responses, and the response rate were not ideal, they do not limit the findings of the study severely; therefore, the findings are generalizable to the larger population of public secondary school teachers in the Commonwealth of Pennsylvania.

Conclusion

The purpose of this study was to understand teachers' perceptions and use of social media communication technologies as a pedagogical tool. However, the underlying context was to also take a retrospective look at the Classroom for the Future grant to understand how well the goal of integrating 21st century teaching and learning was achieved. The qualitative results show that the grant fell short of its goal to create a reliability infrastructure that supports 21st century teaching and learning. Based on the results of this study, the grant money allocated for technology has not integrated a high level of use of social media communication technologies as teaching tools. Although the use is low, teachers have reported positive perceptions. Further, the qualitative findings help situate the quantitative findings.

The quantitative findings show teachers do have positive perceptions, and the qualitative findings show that the ability to incorporate the 21st century learning and innovation skills of critical thinking, communication, collaboration, and creativity encourage teachers' use of social media communications as a teaching tool. The qualitative findings also suggest that once teachers feel more knowledgeable and confident as well as work in an environment with an Internet network that is reliable and accessible, they will be less discouraged to use social media communications as teaching tools. However, teachers should also be actively working towards increasing their own knowledge, and confidence to support the integration of social media communications as a teaching tool to achieve 21st century teaching and learning.

Although this study has noted that the Classrooms for the Future grant fell short of its intended goal, this study does not suggest the grant was ill-advised or a waste of resources. On the contrary, this study suggests that the Classrooms for the Future grant was a worthwhile and important first step in changing the schools in the Commonwealth of Pennsylvania to produce graduates that are competitive on a global level. It is important that the Commonwealth of Pennsylvania should continue its efforts to ensure students receive 21st century teaching and learning.

Teachers are the change agents on the ground level of any educational initiative. The results of the study suggest teachers are more positive about integrating the use of social media communications. They are encouraged to use social media communication technologies to integrate 21st century teaching and learning. The teachers need the continued support of their school administration, community stakeholders, and the

legislators of the Commonwealth of Pennsylvania to see the goal of the Classroom for the Future grant achieved.

References

Abulibdeh, E. S. (2013). Using social media (blog) in the classroom: Reflecting lecturer's pedagogical approach and students (in-service teachers) intrinsic motivation. *Turkish Online Journal of Distance Education, 14*(4), 83-98.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Akbari, E., Naderi, A., Yazdi, M., H., Simons, R., & Pilot, A. (2016). Attitude of teachers and students towards formal learning through online social networks. *Journal of Interactive Learning Research, 27*(2), 101-123.

Al-Bahrani, A., & Patel, D. (2015). Incorporating Twitter, Instagram, and Facebook in economics classrooms. *Journal of Economic Education, 46*(1), 56-67.

Albert, D. J. (2015). Social media in music education. *Music Educators Journal, 102*(2), 31-38. doi:10.1177/0027432115606976

Asterhan, C. C., & Rosenberg, H. (2015). The promise, reality and dilemmas of secondary school teacher-student interactions in Facebook: The teacher perspective. *Computer & Education, 85,* 134-148.

Brayley, N., Obst, P. L., White, K. M., Lewis, I. M., Warburton, J., & Spencer, N. M. (2015). Examining the predictive value of combining the theory of planned behaviour and the volunteer functions inventory. *Australian Journal of Psychology, 67*(3), 149-156. doi:10.1111/ajpy.12078

Cakir, R., Yukselturk, E., & Top, E. (2015). Pre-service and in-service teachers' perceptions about using web 2.0 in education. *Participatory Educational Research 2*(2), 70-83. doi:10.17275/per.15.10.2.2

Capo, B. H., & Orellana, A. (2011). Web 2.0 technologies for classroom instruction: High school teachers' perceptions and adoption factors. *Quarterly Review of Distance Education, 12*(4), 235-253.

Carpenter, J. P., & Krutka, D. G. (2014). How and why educators use twitter: A survey of the field. *Journal of Research on Technology in Education, 46*(4), 414-434.

Chuang, H., Weng, C., & Huang, F. (2015). A structure equation model among factors of teachers' technology integration practice and their TPCK. *Computers & Education, 86*, 182-191. doi: 10.1016/j.compedu.2015.03.016

Churcher, K. A., Downs, E., & Tewksbury, D. (2014). "Friending" Vygotsky: A social constructivist pedagogy of knowledge building through classroom social media use. *Journal of Effective Teaching, 14*(1), 33-50.

Davis, K. (2015). Teachers' perceptions of Twitter for professional development. *Disability and Rehabilitation: An International Multidisciplinary Journal, 37*(17), 1551-1558. doi:10.3109/09638288.2015.1052576

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982-1003.

de Oca, A. M., & Nistor, N. (2014). Non-significant intention-behavior effects in educational technology acceptance: A case of competing cognitive scripts?. *Computers in Human Behavior, 34*, 333-338.

Federal Communications Commission. (2016). *FAQs on E-Rate Program for Schools and Libraries.* Retrieved from https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-e-rate

Fishbein, M., & Ajzen, I. (2015). *Predicting and changing behavior: The reason action approach.* New York, NY: Routledge.

Faul, R., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175-191.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference.* (4th ed.). Boston: Allyn & Bacon.

Govender, D. W. (2012). A model to predict educators' attitudes towards technology and thus technology adoption. *Africa Education Review, 9*(3), 548-568. doi:10.1080/18146627.2012.741101

Hanson, C., West, J., Neiger, B., Thackeray, R., Barnes, M., & McIntyre, E. (2011). Use and acceptance of social media among health educators. *American Journal of Health Education, 42*(4), 197-204.

Hatch, J. A. (2002). *Doing Qualitative research in educational settings.* Albany, NY: State University of New York.

Highfield, K., & Papic, M. (2015). Riding the wave of social networking in the context of pre-service teacher education. *Contemporary Issues in Technology and Teacher Education (CITE Journal), 15*(3), 422-436.

Hordemann, G., & Chao, J. (2012). Design and implementation challenges to an interactive social media based learning environment. *Interdisciplinary Journal of Information, Knowledge & Management. 7*, 91-107.

Kalton, G. (1983). *Introduction to survey sampling.* Newbury Park, CA: Sage.

Kist, W. (2008). I gave up MySpace for lent: New teachers and social networking sites. *Journal of Adolescent & Adult Literacy, 52*(3), 245-247.

Krutka, D. G., & Carpenter, J. P. (2016). Why social media must have a place in schools. *Kappa Delta Pi, 52*, 6-10. doi:10.1080/00228958.2016.1123048

Krutka, D., & Milton, M. K. (2013). The enlightenment meets twitter: Using social media in the school studies classroom. *Ohio Social Studies Review, 50*(2), 22-29.

Lang, R. (2009). *Understanding media habits: the role of habit in the Theory of Planned Behavior.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3364002)

Lee, J., Lee, Y., & Kim, M. H. (2015). Perceptions of teachers and students towards educational application of SNS and its educational effects in middle school class. *Turkish Online Journal of Educational Technology, 14*(4), 124-134.

Levy, B. L., Journell, W., He, Y., & Towns, B. (2015). Students blogging about politics: A study of students' political engagement and a teacher's pedagogy during a semester-long political blog assignment. *Computers & Education, 88,* 64-71. doi:10.1016/j.compedy.2015.04010

Lewis-Beck. M. S. (1980). *Applied regression: An introduction.* Newbury Park, CA: Sage.

Lowther, D. L., Inan, F. A., Ross, S. M., & Strahl, J. D. (2012). Do one-to-one initiatives bridge the way to 21st century knowledge and skill?. *Journal of Educational Computing Research, 46*(1), 1-30.

Lu, H., & Yang, W. (2014). Toward an understanding of the behavioral intention to use a social networking site: An extension of task-technology fit to social-technology fit. *Computers in Human Behavior, 34*, 323-332. doi:10.1016/j.chb.2013.10020

Maor, D. (2003). Teacher's role in developing interaction and reflection in an online learning community. *Educational Media International, 40*(1/2), 127-137.

Matzat, U., & Vrieling, E. (2016). Self-regulated learning and social media – a 'natural alliance'? Evidence on students' self-regulation of learning, social media use, and student-teacher relationship. *Learning, Media & Technology, 41*(1), 73-99. doi:10.1080/17439884.2015.1064953

Mick, D. G., & Fournier, S. (1998). Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. *Journal of Consumer Research, 25*(2), 123-143. doi: 10.1086/209531

Montesarchio, C. E. (2009) *Factors influencing the unethical behavioral intention of college business students: Theory of Planned Behavior* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3349139)

Mourlam, D. (2013). Social media and education: Perceptions and need for support. *Journal on School Educational Technology, 9*(3), 23-28.

O'Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications and Strategies, 65*, 17-37.

Owen, N., Fox, A., & Bird, T. (2016). The development of a small-scale survey instrument of UK teachers to study professional use (and non-use) of and attitudes to social media. *International Journal of Research & Method in Education, 39*(2), 170-193. doi:10.1080/1743727X.2015.1041491

P21.org (2009). *Framework for 21st Century Learning.* Retrieved from www.p21.org

Parasuraman, A. (2000). Technology Readiness Index (TRI): A multiple scale to measure readiness to embrace new technologies. *Journal of Service Research, 2*(4), 307-320.

Parsons, D. D., & Adhikari, J. J. (2016). Bring your own device to secondary school: the perceptions of teachers, students, and parents. *Electronic Journal of E-Learning, 14*(1), 66-79.

Partnership for 21st Century Skills (2009). *P21 Framework Definitions.* Retrieved from www.p21.org

Pdesas.org (2016). *PA Core standards implementation.* Pennsylvania Department of Education. Retrieved from https://www.pdesas.org/Standard/PACore

Pennsylvania Board of Education. (2014). *Pennsylvania Public School Code* (PDE Publication No. Title 22). Retrieved from http://www.pacode.com/secure/data/022/022toc.html

Pennsylvania Department of Education. (2014a). *Academic Standard for English Language Arts.* Pennsylvania Department of Education. Retrieved from http://static.pdesas.org/content/documents/PA%20Core%20Standards%20ELA%206-12%20March%202014.pdf

Pennsylvania Department of Education. (2014b). *Academic Standard for Writing in Science and Technical Subjects.* Pennsylvania Department of Education. Retrieved from http://static.pdesas.org/content/documents/PA%20Core%20Standards%20for%20Writing%20in%20Science%20and%20Technical%20Subjects%20March%202014.pdf

Pennsylvania Department of Education. (2014c). *Academic Standards for Reading in History and Social Studies.* Pennsylvania Department of Education. Retrieved from http://static.pdesas.org/content/documents/PA%20Core%20%20Reading%20in%20History%20and%20Social%20Studies%20March%202014.pdf

Pennsylvania Department of Education. (2014d). *Academic Standards for Writing in History and Social Studies.* Pennsylvania Department of Education. Retrieved from http://static.pdesas.org/content/documents/PA%20Core%20Standards%20for%20Writing%20in%20History%20and%20Social%20Studies%20March%202014.pdf

Pennsylvania Department of Education. (2010). *Urban Centric and Metro Centric Locale Codes* Retrieved from www.education.pa.gov

Pennsylvania Department of Education. (2007). *PA Statewide System of School Support.* Retrieved from www.education.pa.gov

Pennsylvania School Board Association (2016). *Policy Samples*. Retrieved from http://65.61.24.229/districts_policies/p/000/samples-subject-index.asp

Pennsylvania School Board Association (2014). *FAQ on PA Core Standards and Chapter 4*. Retrieved from https://www.psba.org/2014/09/faq-pa-core-standards-chapter-4/

Penuel, W. R. (2006). Implementation and effects of one-to-one computing initiatives: A research synthesis. *Journal of Research on Technology in Education, 38*(3), 329-348.

Piotrowski, C. (2015). Emerging research on social media use in education: A study of dissertations. *Research in Higher Education Journal, 27*, 1-12.

Rich, E. (2010, October). How do you define 21st-century learning: One question. Eleven answers. *Education Week, 4*(1), 32-35. Retrieved from http://www.edweek.org/tsb/articles/2010/10/12/01panel.h04.html

Rogerson, P. A. (2001). More on regression. In *Statistical methods for geography* (pp. 125-153). : SAGE Publications Ltd doi: 10.4135/9781849209953.n7

Salerno, A., & Brock, L. (2008). *The change cycle: How people can survive and thrive in organizational change.* San Francisco, CA: Berrett-Koehler.

Saris, W. E. (1999). Structural Equation Modelling. In H. Ader, G. Mellenbergh (Eds.), *Research methodology in the social, behavioural & life sciences* (pp. 220-239). London, UK: Sage.

Settle, Q., Telg, R., Baker, L. M., Irani, T., Rhoades, E., & Rutherford, T. (2012). Social media in education: The relationship between past use and current perceptions. *Journal of Agricultural Education, 53*(3), 137-153.

Shu-Fen, L., Chu-Liang, L., & De-Chih, L. (2015). The relationship between elementary school teachers' technology readiness and intention to use social media platforms for classroom management. *International Journal of Organizational Innovation, 8*(1), 48-63.

Sluder, J. B., & Andrews, A. K. (2010). The effects of Facebook on hiring teachers. *Journal of Technology Integration in the Classroom, 2*(1), 75-82.

Smyth, J., & Terry, C. P. (2007). Self-report. In N. Salkind (Ed.0, *Encyclopedia of Measurement and Statistics* (pp. 877-878). Thousand Oaks, CA: Sage.

Soomro, K. A., Kale, U., & Zai, S. Y. (2014). Pre-service teachers' and teacher educators' experiences and attitudes toward using social networking sites for collaborative learning. *Educational Media International, 51*(4), 278-294. doi:10.1080/09523987.2014.977003

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson.

Teo, T. (2012). Examining the intention to use technology among pre-service teachers: An integration of the technology acceptance model and the theory of planned behavior. *Interactive Learning Environments, 20*(1), 3-18.

Turchik, J. A., & Gidycz, C. A. (2012). Prediction of sexual risk behaviors in college students using the Theory of Planned Behavior: A prospective analysis. *Journal of Social & Clinical Psychology, 31*(1), 1-27. doi:10.1521/jscp.2012.31.1.1

Ulrich, J., & Karvonen, M. (2011). Faculty instructional attitudes, interests, and intention: Predictors of Web 2.0 use in online courses. *Internet & Higher Education, 14*(4), 207-216. doi:10.1016/j.iheduc.2011.07.001

Vanderhoven, E., Schellens, T., & Valcke, M. (2016). Decreasing risky behavior on social network sites: The impact of parental involvement in secondary education interventions. *Journal of Primary Prevention, 37*(3), 247-261. doi:http://dx.doi.org/10.1007/s10935-016-0420-0

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Verzosa Hurley, E., & Kimme Hea, A. C. (2014). The rhetoric of reach: Preparing students for technical communication in the age of social media. *Technical Communication Quarterly, 23*(1), 55-68. doi:10.1080/10572252.2014.850854

Windschitl, M., & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal, 39*(1), 165. Retrieved from http://navigator-iup.passhe.edu/login?url=http://search.proquest.com/docview/200442602?accountid=11652

Yan, Z., & Sin, K. (2014). Inclusive education: Teachers' intentions and behaviour analysed from the viewpoint of the Theory of Planned Behavior. *International Journal of Inclusive Education, 18*(1), 72-85. doi:10.1080/13603116.2012.757811

Yuen, S. C., Yaoyuneyong, G., & Yuen, P. K. (2011). Perceptions, interest, and use: Teachers and web 2.0 tools in education. *International Journal of Technology in Teaching & Learning, 7*(2), 109-123.

Appendix A

Survey Instrument

Block 1: Consent

A Study of Teachers' Use of Social Media Communications in the Teaching Practices

Purpose:
The purpose of this study is to examine secondary teachers' past, current and future use of social media communication as part of their teaching practices. In addition, the study aims to understand teachers' perceptions of the utility and challenges associated with the use of social media communications as a teaching tool.

Procedures:
If you choose to participate, you will be asked about your past, current, and future use of social media communications in your teaching practice, as well as your attitudes and the general norms in your school regarding the use social media communications as a teaching tool. Upon completion of the questionnaire, you will be asked if you would like to be entered into a random drawing for an Amazon.com gift card. If you are interested, you can follow the link to a separate online survey to enter your email address, which will not be linked to your survey responses.

Risk and Benefits:
There is no anticipated risk of harm from participating in this study. The anticipated benefit of your participation is contributing to improved knowledge about how teachers use and intend to use social media communications as a part of their teaching practices. It also has the potential to inform technology planning committees on the barriers to effective use of social media communications in teaching practices.

Cost and Payments:
There are no costs to you. You will not be paid for your participation.

Anonymity:
Your survey answers will be collected through Qualtrics and stored in a password protected electronic format. Qualtrics does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous to both the researcher and the district administration. No one will be able to identify you or your responses.

Right to Participate or Withdraw from Participation:
Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason. Exiting the survey will not adversely affect your relationship with the investigators or your current school district of employment.

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: 724-357-7730).

Contact:
If you have questions at any time about the study or the procedures, you may contact the Principal Investigator, Brett C. Tozer, via email at b.c.tozer@iup.edu

Electronic Consent:
Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that:

- **You have read the above information**
- **You voluntarily agree to participate**
- **You are 18 years of age or older**

Agree

Disagree

Block 2: Content

This study is aimed at better understanding the ways teachers use social media communication technologies as part of their teaching practices. You will be asked a series of questions about your teaching experience, past and current educational use of social media

communications, as well as your future plans for incorporating social media communication technologies into your teaching practices. You will also be asked to share your perceptions of the use of social media communications as a teaching tool. Please feel free to answer honestly, as your responses will be kept anonymous and confidential.

Social Media Communication: Internet connected technology that allows users to create content, share content, and edit or respond to others' created and shared content in a digital space.

SECTION 1: Teaching Experience

What is the name of the high school at which you currently teach?

How many years have you been teaching at your current school?

How many years have you been teaching in public education?

Are you aware if your School Board has a policy that addresses teachers' use of social media communication technologies as a teaching tool?

- Yes
- No
- Not Sure

Please indicate all of the subjects and grade level(s) you have taught during your public teaching career.

	9th Grade	10th Grade	11th Grade	12th Grade
Agricultural Sciences				
Art				
Business, Computer, and Information Technology				
English Language Arts				
Family & Consumer Science				
Foreign Language				
Health/Physical Education				
Library Sciences				
Mathematics				
Music				
Safety/Driver Education				
Science				
Social Studies				
Special Education				
Technology				
Vocational Instruction				
Other (Specify)				

SECTION 2: Past Use of Social Media Communications as a Teaching Tool

Educators use a vast array of social media communication (SMC) tools. Below are listed the major SMC tools used in education. From the list below, please indicate which SMC tools you have EVER used in your teaching practices?

	Yes	No
Backchannelchat.com		
Blogs		
Del.icio.us		
Diigo		
Edmodo		
Facebook		
FaceTime		
Flickr		
Google Classrooms		
Google Docs		
GooglePlus+		
Instagram		
Internet Forums		
LibraryThing		
LinkedIn		
Ning		
Pintrest		
Podcasts		
Quizbox		
Rich Site Summary (RSS) Feeds		
Second Life		
Skype		
SlideShare		
SnapChat		
Todaysmeet.com		
Twitter		
Virtual Learning Environments (VLE)		
Wikis		
Wikipedia		
WordPress.com		
Yik-Yak		
YouTube		
Zoho		
Other (Specify)		

SECTION 3: Current Use of Social Media Communications as a Teaching Tool

Please list the classes that you are currently teaching (specify subject/class, grade level and number of

sections) and indicate whether you use social media communications (SMC) as a teaching tool in that class.

	Grade Level	Number of Sections	SMC Use Y/N
Class 1 (Specify Subject)			
Class 2 (Specify Subject)			
Class 3 (Specify Subject)			
Class 4 (Specify Subject)			
Class 5 (Specify Subject)			
Class 6 (Specify Subject)			
Class 7 (Specify Subject)			
Class 8 (Specify Subject)			
Class 9 (Specify Subject)			
Class 10 (Specify Subject)			

From the above list, in which class do you most frequently use social media communications (SMC) as a teaching tool?

The following questions are about how you use different types of social media communication (SMC) tools in your teaching practices. When answering the following questions, please consider the class you are currently teaching in which you use the most SMC as a teaching tool (as identified in the previous question).

Classroom Management SMC Tools: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Google Classrooms			
Google Docs			
Quizbox			
SlideShare			
Zoho			

Discussion Tools & Message Boards: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
BackChannelChat.com			
Internet Forums			
TodaysMeet			

Photo/Video Sharing: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Flickr			
Instagram			
SnapChat			
YouTube			

Social Bookmarking: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Del.icio.us			
Diigo			
LibraryThing			
Pintrest			

Social Networking: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Edmodo			
Facebook			
GooglePlus+			
LinkedIn			
Ning			
Twitter			
Yik Yak			

Video Conferencing: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
FaceTime			
Skype			

Virtual Reality: Please indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Second Life			
Virtual Learning Environments			

Are there any other SMC tools you use in this class?

Yes

No

Other SMC tools: Please specify the other SMC tools you use in the classroom and indicate how often you use the following social media communication as a teaching tool for your lectures, in-class assignments, and out-of-class assignments.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Other (Specify)			
Other (Specify)			
Other (Specify)			

What are the best ways in which social media communications can be used as a teaching tool?

What are the worst ways in which social media communications can be used as a teaching tool?

SECTION 4: Future Use of Social Media Communications as a Teaching Tool

I plan to use social media communications as a teaching tool next academic year.

Extremely unlikely Somewhat unlikely Neither likely nor unlikely Somewhat likely Extremely likely

I expect to use social media communications as a teaching tool next academic year.

Extremely unlikely Somewhat unlikely Neither likely nor unlikely Somewhat likely Extremely likely

The following questions are about your intentions to use social media communication (SMC) tools in your teaching practices next academic school year.

Classroom Management SMC Tools: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Google Classrooms			
Google Docs			
Quizbox			
SlideShare			
Zoho			

Discussion Tools & Message Boards: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
BackChannelChat.com			
Internet Forums			
TodaysMeet			

Photo/Video Sharing: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Flickr			
Instagram			
SnapChat			
YouTube			

Social Bookmarking: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Del.icio.us			
Diigo			
LibraryThing			
Pintrest			

Social Networking: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year

	Teacher Lectures	In-Class Assignments	Out-of-Class Assignments
Edmodo			
Facebook			
GooglePlus+			
LinkedIn			
Ning			
Twitter			
Yik Yak			

Video Conferencing: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lecture	In-Class Assignments	Out-of-Class Assignments
FaceTime			
Skype			

Virtual Reality: Please indicate how likely you are to use the following social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lecture	In-Class Assignments	Out-of-Class Assignments
Second Life			
Virtual Learning Environments			

Are there any other SMC tools you intend to use next academic year?

- Yes
- No

Please specify and indicate how likely you are to use the specified social media communication tools in your lectures, in-class assignments, and out-of-class assignments in the next academic school year.

	Teacher Lecture	In-Class Assignments	Out-of-Class Assignments
Other (Specify)			
Other (Specify)			
Other (Specify)			

SECTION 5: Perceptions of Social Media Communications as a Teaching Tool **Perceptions of Social Media Communications as a Teaching Tool**

Using social media communications as part of my teaching practice is:

	1	2	3	4	5	
Bad						Good
Unimportant						Important
Useless						Useful
Hard						Easy
Disengaging						Engaging
Inefficient						Efficient

Please indicate how much you disagree or agree with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1. Most people who are important to me would approve of me using social media communications as a teaching tool					
2. People whose opinions I value will support me using social media communications as a teaching tool.					
3. Most colleagues in my school approve of my use of social media communications in my teaching practices.					
4. Most education stakeholders in my school district approve the use of social media communications in teaching practices.					

Please indicate how much you disagree or agree with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1. If I wanted to I could easily use social media communications as a teaching tool.					
2. My use of social media communications as part of my teaching practices is up to me.					
3. The infrastructure of my school's digital network does not hinder the use of social media communications as part of my teaching practices.					
4. I am able to find creative ways to incorporate social media communication teaching tools, regardless of the level of administrative support and infrastructure reliability.					

What encourages your use of social media communications as a teaching tool?

What discourages your use of social media communications as a teaching tool?

SECTION 6: Teacher Characteristics

Please select your gender

- Male
- Female

What is your age?

What is your Race/Ethnicity?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander
- Other (Specify)

What is your highest level of education?

- Four-year College Degree
- Graduate Credits/Level II Certificate
- Masters Degree
- Post-Masters Graduate Credits
- Doctorate Degree

Appendix B

Permission to use Framework for 21st Century Learning Image

Hi Brett,

Thank you for your inquiry. Our materials and educator resources are free for educational purposes. We are happy to grant you permission to use P21 materials, as long as no P21 materials and references are used to imply P21 endorsement. Please see our full terms of use here: http://www.p21.org/our-work/use-of-p21-content

Could you please provide us with the title of your dissertation for our records?

Additionally, I have attached a high-res photo of our framework in color. We do not produce the image in black and white and ask that you do not make any modifications, per copyright.

Please let me know if you have any questions.

Mia Medina

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