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A PROGRAMMATIC PROFILE OF THE USES, SKILLS, AND BELIEFS OF PRESERVICE TEACHER EDUCATION STUDENTS AND THEIR INSTRUCTORS REGARDING ONLINE TECHNOLOGIES

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A PROGRAMMATIC PROFILE OF THE USES, SKILLS, AND BELIEFS OF PRESERVICE TEACHER EDUCATION STUDENTS AND THEIR INSTRUCTORS REGARDING ONLINE TECHNOLOGIES

By

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ABSTRACT

A PROGRAMMATIC PROFILE OF THE USES, SKILLS, AND BELIEFS OF PRESERVICE TEACHER EDUCATION STUDENTS AND THEIR INSTRUCTORS REGARDING ONLINE TECHNOLOGIES

By

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This study investigated the online activities of preservice teachers and their instructors at a large Midwestern university's teacher preparation program. The study had three primary purposes: to create a descriptive report of the online activities preservice teachers engage in, the frequency with which they engage in them, their self-reported skill level in these activities, and their beliefs about the usefulness of these activities for teaching; to contextualize the preservice teachers' online activities relative to the online activities of American teens and young adults in general; and to compare preservice teachers and teacher preparation program instructors in regards to their online activities, their usefulness ratings of these activities for K-12 teaching, and instructors' estimates of preservice teachers' use of online technologies.

Using survey data, this study offers a detailed report of the online activities of 879 preservice teachers and 81 instructors. Five key findings emerged from the analyses. First, preservice teachers' engagement with online activities was not consistent across social communication, web publishing, and audio/visual activities. Almost all preservice teachers used social communication technologies. About three quarters to half engaged in audio/visual technologies, and about a quarter worked on web publishing activities. Second, preservice teachers' self-reported skill level for online activities was positively correlated with their perceived usefulness ratings of activities in their own teaching.

However, the preservice teachers' skill levels for various online activities were also negatively correlated with the instructors' perceived usefulness ratings of these activities. Third, compared to Americans the same age or younger, a greater percentage of preservice teachers used social communication technologies, whereas for activities involving web publishing and audio/visual technologies, the preservice teachers displayed percentages similar to or below those of other individuals. Surprisingly, preservice teachers and instructors reported similar usage of web publishing and audio/visual technologies with instructors being the more likely users. Fourth, the data also showed preservice teachers were less likely to see specific technological activities as useful in their own teaching compared to the instructors' perceptions of these activities for K-12 teaching.

The fifth key finding was that instructors were not confident in their estimations of preservice teachers' online activities. This lack of confidence appeared warranted given the consistent overestimation of preservice teachers' current use of online technologies. Because national and state standards call for K-12 teachers to model the technologies addressed in this survey and to facilitate their students' personal use of these technologies, teacher preparation programs need to collect accurate and comprehensive data about their students' technology preparation. This study provides a blueprint for programs to systematically inquire about their preservice teachers' technological preparedness. Programmatic research of this kind provides individual instructors with reliable, up-to-date information that can be used to shape instruction and provides the collective faculty programmatic data to reflect on areas for improvement and cite as evidence of progress in accreditation reports.

To my father, Steve Freidhoff, who instilled in me a passion for technology and education. You are missed.

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CHAPTER ONE

INTRODUCTION

This study was born out of ignorance. As a graduate student at a large Midwestern university where the study took place, I worked as a teaching assistant for a new course developed by faculty and graduate students to meet a perceived need in the college of education, that of enhancing preservice teachers' ability to integrate new technology into their instruction. The perception of need grew from both internal and external sources. Within the college, some instructors expressed concern regarding the limited technological skills with which preservice teachers graduated the program. Externally, reports such as the most recent National Education Technology Plan (U.S. Department of Education & Office of Educational Technology, 2004, p. 3) have recognized that "[o]ver the next decade, the United States will face ever increasing competition in the global economy" and that "this competition will involve the mastery and application of new technologies in virtually every field of human endeavor" (p. 6). The plan called for increased teacher training regarding the use of new technologies as one of its seven major action steps. Yet despite this declaration and the significant investments made in educational technologies, the report concluded, as have others (see for instance Cuban, 2001), that "we have not realized the promise in education" (p. 10).

Given the external pressures and instructor concerns, a new elective course for preservice teachers (PSTs) was added to the schedule of course offerings for the college in the spring of 2006. Simply speaking, the course was designed with certain assumptions in mind about the preservice teacher population. First, given the mass

media's portrayal of Millennials, the course designers believed that most of the preservice teachers were heavy users of new technologies in their personal lives. Second, because it was believed that they integrate new technologies in their personal lives to learn, socialize, and interact with ideas and people, it was also believed that many preservice teachers would be interested in learning how to repurpose these new technologies for use with K-12 students. Third, those preservice teachers with a passion for using technology in their personal lives would be the most likely candidates for enrolling in an elective course designed to augment the required technological curriculum of the teacher preparation program.

By the fall 2007 semester, seven sections of this elective course had been offered. With each new group of students, however, the instructors for this course became less and less confident in the above assumptions about the student population. Rather than recruiting the technologically passionate and proficient, many students enrolling in the course tended to be technologically inexperienced. Despite national studies describing heavy personal use of technologies by this generation of students (e.g., Lenhart, Arafeh, Smith, & Macgill, 2008, April 24; Lenhart, Madden, Macgill, & Smith, 2007, December 19), the majority of students enrolling in the course reported little to no knowledge of the technologies featured and even fewer engaged in activities with these technologies of their own volition.

The team designing the course began to wonder whether their initial assumptions were accurate. Turning to the current literature for help, it was apparent that the research found had two significant holes regarding the technological activities of preservice teacher populations. First, no large-scale descriptive studies were located that described

the technological attributes of undergraduates who pursue teaching certification. Though such work would need continual updating given the deictic nature of new technologies (Leu, 2000), creating a comprehensive and current profile of preservice teachers is a requisite step for establishing a baseline on preservice teachers' technological characteristics and for measuring growth in this area over time. Second, although other studies, such as the Pew Internet and American Life studies (http://www.pewinternet.org/), have described the online activities of American youth and young adults generally, it is not clear how subgroups from these populations—such as preservice teachers—might vary from the larger population norms. Not only was the research base incomplete regarding the online characteristics of preservice teachers, but it also failed to address the extent to which research such as the technological investigations of Millennials could be generalized to Millennial preservice teachers.

As a result, the team was concerned that the a priori assumptions were inaccurate and that the previously published data about the technological activities of Millennials in general might be misleading if applied to preservice teacher populations. Quite simply, the team concluded that large-scale data focusing on the online activities of preservice teachers in the program was needed.

Purpose of the Study

This study, then, had three primary purposes. The first was to collect data from as many preservice teachers in the college's teacher preparation program as possible to create a rich, descriptive report about the online activities they engage in, the frequency with which they engage in them, their self-reported skill level in these activities, and their beliefs about the perceived usefulness of these activities for teaching. The second

purpose was to contextualize the preservice teachers' online activities relative to the online activities of American youth and young adults in general. The third purpose of the study was to compare preservice teachers and teacher preparation program instructors in regards to their online activities, their usefulness ratings of these activities for K-12 teaching, and instructors' estimates of preservice teachers' use of online technologies.

Significance of the Study

Teacher education programs are responsible for developing a teaching workforce that can meet the demands of the 21st century. Standards composed by national and state organizations alike require all teachers to model a diverse repertoire of digital technologies in their teaching and for all students to apply these technologies for innovative purposes in both their academic and personal lives. However, defining standards for technology integration is not enough; accumulating evidence that progress is being made toward reaching these lofty goals is central to the reform process. More attention must be paid to the systematic assessment of preservice teachers' proficiencies and activities with online technologies. This study provides current and detailed data regarding the online activities of preservice teachers and documents how the PSTs' activities differ from other populations and instructors' estimates of their use. While the degree to which these results generalize to other preservice teacher populations is unknown, the approach used in the study can still inform practice at other institutions. The study models a process for gathering evidence that moves away from the non-systematic, anecdotal experiences of instructors which the study found to be unreliable to a more formal, comprehensive measure that can inform teacher educators about the current state of preservice teachers' technological preparedness.

Research Questions

This study investigated the following questions:

R1: What percentage of preservice teachers engage in specific online activities? How frequently do they engage in these activities? How skilled do they believe they are at these activities? How useful do they believe these activities will be in their teaching?

R2: How do the online activities of preservice teachers compare with prior studies that have reported on the online activities of American teens and young adults?

R3: How do preservice teachers and teacher preparation program instructors compare in regards to their online activity, their usefulness ratings of these activities for K-12 teaching, and instructors' estimates of preservice teachers' online activity.

CHAPTER TWO

REVIEW OF LITERATURE

In the current age of accountability, teacher preparation programs must provide programmatic data to credentialing organizations like the National Council for Accreditation of Teacher Education (NCATE) or the Teacher Education Accreditation Council (TEAC) that attest to their successes and improvements in preparing preservice teachers. TEAC, the credentialing organization used by the program studied, defines program improvement as a continual process, led by the research of faculty, and carried out using "the minimum resources necessary to reach timely decisions" (Teacher Education Accreditation Council, n.d.-b). TEAC suggests that teacher preparation programs give "special attention" to technology integration and underscores this position by requiring "evidence that the program's graduates acquire the basic productivity tools of the profession" (Teacher Education Accreditation Council, n.d.-a).

Though TEAC remains vague about what the "basic productivity tools of the profession" include, other organizations like the International Society for Technology in Education (ISTE) and the Michigan Department of Education have developed more specific standards that address technological issues. In 2008, ISTE released an updated version of its National Educational Technology Standards (NETS-T) and Performance Indicators for Teachers. According to the organization's website, (http://www.iste.org/), the NETS were constructed to help students, teachers, and administrators "measure proficiency and set aspirational goals for the knowledge, skills, and attitudes needed to

succeed in today's Digital Age" (International Society for Technology in Education (ISTE), 2008a).

According to its standards for teachers, ISTE believes effective teachers must model and apply new technologies in the classroom. For instance, NETS-T standard 3d, Model Digital-Age Work and Learning, specifies that teachers "model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning" (International Society for Technology in Education (ISTE), 2008b). NETS-T standard 3c "teachers communicate relevant information and ideas . . . using a *variety* of digital-age media and formats" (International Society for Technology in Education (ISTE), 2008b, emphasis added) makes clear that teachers' technological proficiency cannot be limited to a handful of digital tools and media, but rather must span a wide range of technological activities. In part, teachers are expected to possess such a breadth of knowledge and skill because their students will be held accountable for these same outcomes. In their technology standards for students, ISTE stressed that K-12 students "interact, collaborate, and publish . . . employing a variety of media and formats" (International Society for Technology in Education (ISTE), 2007).

ISTE is not the only organization making similar claims about what teachers and students need to know and be able to do with new technologies. The state of Michigan's Educational Technology Standards & Expectations specify that by the end of fifth grade each student will "use *basic* telecommunication tools (e.g., WebQuests, IM, blogs, chatrooms, web conferencing)" and "use a variety of media and formats to create and edit . . . web pages" (Michigan Department of Education, 2005, emphasis added). For high

school students, the technological basics expand to podcasting and webcasting as well as editing and sharing audio and video. Michigan has also become the first state in the country to require students to take at least one online credit in order to graduate from high school.

Clearly, today's technological standards represent a new conceptualization of basic technological proficiencies for teachers and students. For elementary and secondary teachers alike, "basic" has grown to include social communication technologies like instant messaging, web publishing technologies such as web design and blogging, and audio/visual technologies like web conferencing and multimedia production.

While the recently revised standards present a clear picture of the technologies students and teachers are expected to use, what is unclear is the degree to which teacher preparation programs are developing preservice teachers who possess the technological pedagogical content knowledge (TPACK) (Koehler & Mishra, 2008; Mishra & Koehler, 2006) needed to satisfy these lofty requirements. Though the standards themselves may set an unrealistic expectation for all teachers to obtain, it is hard to argue that teacher education programs should not be steadily increasing the percentages of preservice teachers who meet these standards. In order to document such progress sufficiently for internal program development and external credentialing, teacher preparation programs must collect systematic data on preservice teachers both as they enter and throughout their time in the program.

In the absence of such programmatic data, this literature review assembled current estimates of the online activities of American youth and young adults by looking at large-

scale survey data collected in recent years. In doing so, the review serves two purposes. First, the review acts as a descriptive backdrop that details American youth and young adults' current engagement with online activities. In a sense, this data provides a best guess as to the technological characteristics with which preservice teachers might enter teacher preparation programs. Second, this backdrop provides a setting in which to interpret the data collected on preservice teachers' engagement with online activities. Though technology standards like those from ISTE or the Michigan Department of Education represent absolute standards for evaluating teachers, comparing the preservice teacher data results with those from the literature review provides a relative measure of progress for PSTs.

Scope of the Review

I employed five strategies for locating possible literature for inclusion in this review: searching of electronic databases, searching of Google Scholar, browsing known report repositories, scouring references pages for other potential resources, and soliciting recommendations from other experts. The electronic databases consulted included ERIC, PsycINFO, Education Abstracts, and WilsonSelect. A parallel search was also conducted using Google Scholar (http://www.scholar.google.com/). In addition to these searches, I browsed websites of known organizations, such as the Pew Internet & American Life Project (http://www.pewinternet.org/) for relevant reports. Finally, I examined the articles cited in some of the reports identified by the prior strategies and I consulted colleagues about potential literature for inclusion in the review.

Four criteria were used to determine inclusion: recent date of publication, age-range of participants, nation of investigation, and large-scale survey methodology. First,

due to the fact that new technologies change rapidly (Leu, 2000), the scope of this literature review was narrowed to data published since 2004. Since primary interest was placed on determining present levels of technology use in the general population, only data from the most recent studies published since 2004 were used. Thus, this review should not be considered an exhaustive review of relevant literature since 2004, but rather reflects what might be considered the field's best approximations of current use based on available data. Second, studies were included that investigated the online activities of individuals who were 30 years old or younger. This age range was selected to allow the preservice teacher data to be compared to that of their aged peers and individuals the ages of K-12 students. Third, the review was limited to literature reporting on Americans since the assumed audience is researchers and teacher educators in the United States, and the preservice teachers were from an American university. Fourth, because the primary purpose of this review was to generalize to the American youth and young adult population, large-scale studies using survey methodologies were chosen. The majority of the studies shared in the review used randomization in the selection of study participants.

In sum, the four inclusion criteria were

1. The literature must have been published between 2004 and 2008 with the most recent reports being included.
2. It must report on participants 30 years old or less.
3. The studies must have been conducted within the United States.
4. The data must have been collected via surveys or polling from large samples.

Using these guidelines, the review draws on data from 16 sources, though four in particular were the most informative. The National School Boards Association's (2007,

July) study of 1,277 nine to 17-year-olds yielded rich data on younger Americans. The Pew Internet & American Life project (http://www.pewinternet.org/) had a variety of relevant reports, mainly on teens 12-17 years of age. Among these, Lenhart et al. (2008, April 24) and Lenhart et al. (2007, December 19) were the most useful. Finally, for undergraduate students, the EDUCAUSE Center for Applied Research produced two reports that contributed several estimates (Salaway, Caruso, & Nelson, 2007, 2008).

Online Characteristics of Teens and Young Adults

Internet Access and Activity

Internet access for Americans is becoming more and more ubiquitous. According to survey data collected by the Pew Internet and American Life project, 71% of all American adults age 18 and older were Internet users as of March 2007 (Horrigan & Smith, 2007, July 3). The statistics for college students specifically, were even higher with projections of 95% of students online (eMarketer, 2007, July). High-speed Internet connections are also on the rise with Horrigan declaring that 70% of 18-29 year-olds reported having broadband access at their home (2008, July 2, p. 3).

The online statistics for those under 18 also follow these rising trends. A study conducted in 2004 by the Henry J. Kaiser Family Foundation Association estimated 80% of youth ages 15-18 lived in homes with Internet access (Roberts, Foehr, & Rideout, 2005, March, p. 11). At the end of 2004, though, another study estimated that 92% of 15 to 18-year-olds were online (Lenhart, Madden, & Hitlin, 2005, July 27, p. 1). By the fall of 2006, 95% of youth ages 12-17 were reported to be online (Lenhart, 2007, January 7, p. 8). Not only did these access levels appear to remain consistent in Lenhart et al.'s

recent report (Lenhart et al., 2008, April 24), but they also found that 71% of online 15 to 17-year-olds were accessing the Internet on a daily basis.

As daily usage has become commonplace, so too has the creation and consumption of online media by teens and young adults. As of fall 2006, 64% of online 12 to 17-year-olds met the "hallmarks" of an online content creator according to Pew Internet Project[1] (Lenhart et al., 2007, December 19, p. 2) though figures tended to vary according to gender and age. Girls were more likely to be content creators compared to boys, and older teens (15 to 17-year-olds) engaged in these activities at greater rates than younger teens ages 12-14 (Lenhart et al., 2007, December 19, p. 4). Some of the self-created content youth create came from the remixing of content they found online. Twenty-six percent of online 12 to 17-year-olds reported being involved in creating new content this way (Lenhart et al., 2007, December 19, p. 3). One of the most popular ways teens and young adults shared content was through social networking sites.

Social Networking Sites

Social networking sites are websites that allow users to create personal profiles and to build relationship with other users. Facebook (http://www.facebook.com/) and MySpace (http://www.myspace.com/) rank among the most popular current sites. In a survey of conducted in April 2007 of 1,280 youth and young adults ages 13-24, 62% replied that they had used a social networking site (Associated Press & MTV, 2007, p. 61). A more recent survey from the fall of 2007 reported 58% of all 12 to 17-year-olds maintained social networking profiles with 86% of girls 15-17 years of age maintaining

[1] The Pew Internet Project identifies five activities as "hallmarks of online creation." They include: "create or work on a blog; create or work on a personal webpage; create or work on a webpage for school, a friend, or an organization; share original content such as artwork, photos, stories, or videos online; or remix content found online into a new creation (Lenhart et al., 2007, December 19, p. 2).

profiles (Lenhart et al., 2008, April 24, p. 25). Finally, a survey conducted by the EDUCAUSE Center for Applied Research in the spring of 2008 estimated that 93% of university freshman and seniors were using online social networks (Salaway et al., 2008, p. 83).

Youth and young adults frequently spend their time on social networking sites updating their profiles and posting messages to other users. A survey conducted by the National School Boards Association found that 12% of 9 to 17-year-olds updated their profiles daily with 25% updating their profiles at least once a week (National School Boards Association, 2007, July, p. 2). Posting messages to another user's profile seemed to be a slightly more frequent activity. Thirty-one percent of 13 to 24-year-olds admitted to posting messages to an acquaintance's profile in the last 24 hours (Associated Press & MTV, 2007, p. 65) and 21% of 9 to 17-year-olds said they posted messages every day (National School Boards Association, 2007, July, p. 1). Eighty-four percent of 12 to 17-year-olds who used social networks posted messages to a friend's page or wall (Lenhart et al., 2007, December 19, p. 6). The same percentage (83%) added comments on pictures their friends posted to social networking sites (Lenhart et al., 2008, April 24, p. 26).

Texting and Instant Messaging

Though teens and young adults used social networking sites to keep in touch, texting and instant messaging (IM) were also popular modes of communication. Based on data collected in the fall of 2007, Lenhart et al. (2008, April 24) placed the overall percentage of 12 to 17-year-olds owning cell phones at 71% led by 81% of older teens ages 15-17 (p. 8). Thirty-six percent of all teens ages 12-17 used their cell phones to

send text messages on a daily basis (Lenhart et al., 2008, April 24, p. 22). This was about the same percentage that talked on their cell phones on a daily basis (35%), and it was more than twice that of those who sent email daily (16%) (Lenhart et al., 2008, April 24, p. 22). Similar to social network trends, older teens—especially girls—were the most likely to be sending text messages on a daily basis. Half of all teens 15-17 years of age sent text messages daily compared to 22% for teens 12-14 years of age (Lenhart et al., 2008, April 24, p. 23). From a gendered perspective, 44% of teen girls were sending text messages daily opposed to 28% of teen boys (Lenhart et al., 2008, April 24, p. 23). These gender differences were also evident for college age adults (18-24) where 89% of females were found to have sent a text message in the past week compared to 67% of males the same age (Youth Trends, 2007).

Though not quite as popular as texting, about one in three teens (29%) said they sent instant messages daily with older teens and females the most likely to do so (Lenhart et al., 2008, April 24, p. 22). About half of girls 12 to 17-years-old who used instant messaging sent at least one message daily compared to 45% for boys the same age (Lenhart et al., 2005, July 27, p. 16). Furthermore, it appeared that when teens engaged in instant messaging activities, they frequently held multiple conversations at once. Forty-five percent of 12 to 17-year-olds who IM reported holding multiple conversations daily or almost daily (Lenhart et al., 2005, July 27, p. 22).

The instant messaging rates were higher for university students than they were for teens. The EDUCAUSE (2008) study found 74% of freshman and seniors used instant messaging (Salaway et al., 2008, p. 47).

Web Pages, Blogs, and Wikis

Besides social communication technologies such as social networking sites, texting, and instant messaging, American youth and young adults were creating and consuming content through web-publishing technologies such as web pages, blogs and wikis. The percentage of online teens who created or updated web pages has held fairly constant in the past several years with recent estimates indicating about 27% currently work on web pages of their own (Lenhart et al., 2007, December 19, p. 7). Slightly more online teens, however, were using their web skills to help others build pages. As of the fall 2006, Lenhart et al. found 33% of online teens were creating or working on web pages for someone other than themselves with girls outpacing boys on these activities (p. 8). These teen use statistics on web design were similar to those from a report on higher education that estimated 29% of freshman and seniors are engaged in creating web pages (Salaway et al., 2007, p. 42).

About the same percentage of teens were blogging as were designing web pages. Blogs, short for weblogs, are websites that often focus on a particular topic or person, include postings in reverse chronological order, and allow other readers to comment on posts. Two studies released within the last year placed the percentages of online 12 to 17-year-olds who blog at about 28% (Lenhart et al., 2008, April 24; Lenhart et al., 2007, December 19). Girls were more likely to be blogging, especially older girls. Forty-one percent of girls ages 15-17 blogged—a little more than twice the percentage of boys the same age who blogged (Lenhart et al., 2008, April 24, p. 25). As with web design, university students reported to be blogging at about the same rates. Salaway et al. (2007) figured 28% of undergraduate freshman and seniors also blogged (p. 42).

Reading blogs was a more popular activity than blogging itself. Just under half of 12 to 17-year-olds read blogs or online journals (Lenhart et al., 2007, December 19, p. 11). At the risk of sounding redundant, older girls once again represented the largest group of readers with 64% of online 15 to 17-year-old girls reading other peoples' blogs (Lenhart et al., 2007, December 19, p. 11). In contrast, 52% of boys the same age read blogs (Lenhart et al., 2007, December 19, p. 11).

One final note about blogging is that it appears to be related with social network use. Almost half of teen social network users (42%) also blogged and 70% of teen social network users read blogs (Lenhart et al., 2007, December 19, p. 6).

Although information regarding the percentages of youth and young adults is prevalent, the literature regarding wiki usage is scant. Among the literature reviewed, only the EDUCAUSE study conducted by Salaway et al. (2007) estimated the number of wiki users for a given population. In their report, Salaway et al. found 42% of university freshman and seniors access or use wikis with the median frequency of use being weekly (p. 42). In their 2008 report, Salaway et al. found that 38% of undergraduate freshman and seniors were contributing content to wikis with most doing so once a month (p. 47).

Videos

As Internet speeds have gotten progressively faster, the growth of video media has expanded. In a survey of American adult Internet users, young adults age 18-29 were the heaviest consumers of online video with 76% claiming to watch or download videos and 31% saying they engaged in this behavior the day before the survey (Madden, 2007, July 25, p. 3). Unlike blogging, no gender differences were observed. Rather, the speed

of the Internet connection was linked to online video viewing and downloading habits with high-speed users outpacing users with dial-up.

As with the other online activities, youth and young adults not only consumed video content, but they also created it. Madden (2007, July 25) placed the percentage of young adult Internet users (18-29) who uploaded video at 15% (p. 3). For younger users (9-17), the National School Boards Association calculated 22% have uploaded videos, with 9% uploading original video content on a weekly basis (National School Boards Association, 2007, July, p. 2).

The practices of those who consume and create online videos had a strong social component to it, at least for the young adult population. Young adults were more likely to report watching video with others (73%) and to watch video in places other than home or work (41%) (Madden, 2007, July 25, pp. 6 & 4 respectively). In addition, 18 to 29-year-olds tended to share links to videos of interest with others. Sixty-seven percent of video viewers within this age bracket sent video links to others with 42% doing so at least a couple of times each month (Madden, 2007, July 25, pp. 7 and 6, respectively).

Music and Podcasts

Older online teens were also reported to be prolific consumers of music and audio. On average, 57% of 15 to 17-year-olds said they download music (Lenhart & Madden, 2005, November 2, p. 11), although this varies with males, this time, outpacing females (63% to 51%) (p. 10). In addition to gender differences, the speed of the Internet connection was an important factor. Older teens with high-speed Internet connections reported even higher percentages of music downloading (67% for males compared to 58% for females) (Lenhart & Madden, 2005, November 2, p. 10).

Though downloading music was a popular online activity, downloading podcasts appeared less so. In a survey of online adults conducted in spring of 2008, Madden and Jones (2008, August 28) found that only 27% of online 18 to 29-year-olds had downloaded a podcast (p. 3). Like music downloading generally, more adult men have downloaded a podcast (22%) than adult women (16%) (Madden & Jones, 2008, August 28, p. 3).

American youth and young adults also upload their own audio content to the web. A study of online 9 to 17-year-olds suggested that 29% of online youth uploaded audio, music or podcasts (National School Boards Association, 2007, July, p. 2).

Not only do online youth download and upload music and audio, but they also appear to do so quite frequently. A study of online 9 to 17-year-olds indicated that roughly 1 in 3 (32%) download music or audio uploaded by other users at least once a week (National School Boards Association, 2007, July, p. 2). This study also found that, at least once a week, 12% of youth upload music or podcasts that they themselves create (p. 2).

Artwork and Photography

Artwork and photos, created by others or by themselves, appear to be a popular media choice to share online. A National School Boards Association study published in July 2007 found that almost half (49%) of school-aged students 9-17 have uploaded artwork or photos (p. 2). This study reported that close to a quarter of the students surveyed (24%) responded that they posted artwork or photos authored by other users on a weekly basis, with only a slightly lower percentage (22%) posting their own photos or artwork on a similar basis (p. 2).

Conclusion

In addition to the specific statistics cited above, there are five broader conclusions regarding literature pertaining to the online activities of American youth and young adults:

1. Relatively current information exists regarding the percentages of American youth and young adults who engage in specific online activities. The Pew Internet and American Life Project (http://www.pewinternet.org/) provided the richest sources of reports on these topics for American youth and young adults. For data specific to undergraduate students, the EDUCAUSE Center for Applied Research (http://www.educause.edu/ecar/) produces a yearly report about the information technology use of university students.
2. Individuals ages 12-17 were the most likely to be surveyed regarding their online activities. Few studies reported data on younger children or older adults. Extrapolating trends to these two groups may not be warranted.
3. Reports regarding the online activities of individuals tend to base their statistics on the number of online users or the number of online users actually engaging in the activity. Readers of these reports must take care to evaluate how the statistics were calculated and to which groups they apply.
4. On a similar note, some statistics were generated from questions that ask whether an individual has ever done the activity whereas others inquire about whether the individual currently does the activity. Again, readers need to be clear about the questions behind the statistics cited and understand the limitations about conclusions capable of being drawn from them.

5. At least for the teen population, the heaviest users both in terms of percentages doing a specific activity and the frequency with which they do it seems to be related to both age and gender. Older teens tend to be the heaviest users with older teen females outpacing everyone else.

This literature review has shown that quite a bit is known about the online activities of American youth and young adults in general. On the other hand, what is not known is how the population of young men and women who choose to enter teacher education programs compare on similar measures.

CHAPTER THREE

RESEARCH DESIGN AND METHODS

Study's Context

The preservice teachers (PSTs) studied were formally enrolled in at least one teacher preparation course at a large Midwestern university in the United States during the 2007-2008 academic year. The teacher preparation program, itself, typically consists of a nine-course sequence with students entering the program at the beginning of their junior year. Though the title and numbering of the courses may differ depending on whether the preservice teacher is seeking elementary or secondary certification, course sequences are similar. Most preservice teachers enroll in a content-area literacy course during the fall or spring semester of their junior year. As seniors, they enroll in a paired-course sequence, taking one course in the fall semester and the other in the spring. These 400-level courses focus on teaching and learning in specific subject matter areas.

After graduating with their bachelors' degrees, the preservice teachers return to the university as post-baccalaureate students to complete a yearlong internship. During the internship year, they spend time both in the field teaching and at the university taking a trio of paired-courses that focus on the internship, professional practices, and instruction in their subject matter. The specific numbering of these courses is shown in Table 3.1 below.

Table 3.1. ***Teacher Preparation Program Course Sequence***

Elementary			Secondary		
	Fall	Spring	Fall	Spring	
Junior	TE 301 or TE 301		TE 302 or TE 302		Junior
Senior	TE 401	TE 402	TE 407	TE 408	Senior
Internship	TE 501 TE 801 TE 802	TE 502 TE 803 TE 804	TE 501 TE 801 TE 802	TE 502 TE 803 TE 804	Internship

Research Questions

This research study was designed to collect systematic data about the online activities of the preservice teachers enrolled in the teacher preparation program for three specific purposes. The first purpose was to construct a descriptive report of the online activities of preservice teachers formally enrolled in teacher preparation program courses. The second was to compare the data from the report with large-scale survey results conducted on American youth and young adults in order to understand how the preservice teachers compared technologically relative to their peers and those they might be teaching. Finally, the study sought to compare how preservice teachers compared technological to their teacher preparation program instructors and how PSTs' self-reported activities differed from instructors' estimates of PSTs' online activity. More formally, the research questions posed were:

R1: What percentage of preservice teachers engage in specific online activities? How frequently do they engage in these activities? How skilled do they believe they are at these activities? How useful do they believe these activities will be in their teaching?

R2: How do the online activities of preservice teachers compare with prior studies that have reported on the online activities of American teens and young adults?

R3: How do preservice teachers and teacher preparation program instructors compare in regards to their online activity, their usefulness ratings of these activities for K-12 teaching, and instructors' estimates of preservice teachers' online activity.

Study Populations

To pursue these questions, I surveyed two populations within the teacher preparation program: preservice teachers and course instructors. The preservice teacher population consisted of students at the university who enrolled in at least one course in the teacher preparation program during the fall 2007-spring 2008 academic year. For the sake of this study, students were considered enrolled if

a) they received a grade in a teacher preparation program course during the fall 2007 semester, or
b) they were enrolled in a teacher preparation program course during the spring 2008 semester after January 18th. This date represented the end of the second week of classes for the spring semester.

I worked with the college's student affairs office to generate a list of students who satisfied these criteria. The lists from the student affairs office identified 1,466 students as fulfilling the study's entrance requirements.

The other population of interest for the study encompassed all university instructors who were listed as official instructors for at least one course in the teacher

preparation program during the fall 2007-spring 2008 academic year. I compiled a list of these instructors by referencing the online schedule of courses maintained by the university and as well as consulting with departmental secretaries to fill in any missing names and to verify the accuracy and completeness of the list.

Instruments

I designed two web-based survey instruments using SurveyMonkey (http://www.surveymonkey.com/) to investigate the preservice teacher and instructor populations.

Preservice Teacher Survey

The Preservice Teacher Survey was comprised of 39 sets of related questions consisting of a total of 136 individual questions and was designed using SurveyMonkey (http://www.surveymonkey.com/) (See Appendix A for the complete survey). Generally speaking, the survey was constructed into four major sections shaped around the following tasks:

1. First, the preservice teachers were asked about their online lives including whether they engaged in specific online activities ("Yes, Currently Do," "No, But Have in Past," or "No, Never Have") and how often they did these activities ("Daily," "Couple days a week," "Once a week," "Less than once a week," or "Never or not anymore"). The preservice teachers were asked to calculate their estimates by considering all the times they go online (for school, work, entertainment, etc).
2. Second, PSTs were asked to self-assess their skill level of specific online activities as "Poor," "Fair," "Good," "Very Good," or "Never Done."

3. Third, the preservice teachers were asked their thoughts about how useful specific online activities would be in their teaching ("Not Useful," "Slightly Useful," "Useful," "Very Useful," or "Uncertain") as well as a few questions designed to reveal factors that might have influenced these perceptions.
4. Finally, the survey asked PSTs to answer a few demographic questions including age, gender, level in program, and teaching major.

Because one of the intended purposes of the study was to compare the preservice teacher data with the data synthesized in the literature review, the choice and wording of questions was heavily influenced by the questionnaires used in those prior studies. In many cases, wording was similar, though in the case of one question, number 25, the question was included verbatim from *The ECAR Study of Undergraduate Students and Information Technology* (Salaway et al., 2007) with permission from EDUCAUSE.

Additionally, survey design was influenced by consultation with five faculty members in the teacher preparation program. In these interviews, faculty members reviewed a draft of the survey and were asked about questions they would like to see added, as well as questions they felt might not yield useful data for them. The instrument was then redesigned to reflect faculty input. For example, the section on self-assessment reflected faculty interest in having data not only on whether preservice teachers engaged in specific online activities, but also having data that provided a more nuanced look at how well they used these technologies.

The Preservice Teacher Survey was piloted in December of 2007 with eight undergraduate students. The primary purposes for the pilot study were to receive feedback as to the length of time the survey would take for participants to complete, the

problems, if any, they had in understanding questions, and the degree of difficulty respondents had in constructing answers for questions. See Appendix C for more information about the pilot study.

Instructor Survey

The teacher preparation program Instructor Survey was similar in design to the Preservice Teacher Survey though on a smaller scale. The Instructor Survey had 28 question sets representing a total of 72 individual questions (See Appendix B). Like the Preservice Teacher Survey, instructors were asked questions about the online activities they engaged in (and how often), how skilled they felt they were at those activities, and how useful they perceived those activities to be for K-12 teaching.

In addition, instructors were asked to estimate the percentage of PSTs who reported engaging in specific online activities on the Preservice Teacher Survey. Rather than allowing instructors to have an "uncertain" category, instructors were encouraged to give their best guesses and were subsequently asked to report on their confidence in each estimate ("Not Confident At All," "Slightly Confident," "Confident," or "Very Confident). These estimates allowed for testing instructor perceptions against the actual results of the Preservice Teacher Survey.

The Instructor Survey was also piloted in December of 2007 with 22 instructors. As with the Preservice Teacher Survey, the primary purposes were to receive feedback as to the length of time the survey would take participants to complete, the problems, if any, they had in understanding questions, and the degree of difficulty respondents had in constructing answers for questions. Again, consult Appendix C for more information about the pilot studies.

Study Methods

Preservice Teacher Survey

Distribution of the Preservice Teacher Surveys occurred through SurveyMonkey's email invitation collector using a four-contact strategy that lasted approximately two months. First, the names of the 1,466 PSTs and their email addresses were entered into SurveyMonkey's (http://surveymonkey.com/) email invitation collector to take advantage of two particular affordances. One advantage of using the email invitation collector provided through SurveyMonkey compared to sending a mass email containing a link to the Preservice Teacher Survey was that the collector sent a separate email to each preservice teacher using a personalized heading (e.g., "Dear John," "Dear Wendy,") rather than a generic "Dear Student," heading. Personalization of contacts has been shown to increase response rates (Dillman, 2007). The second affordance of the email collector had to do with the tracking of respondents. SurveyMonkey's email invitation collector allowed for tracking respondents by sending each email address a unique link to access the survey. This individualized link approach made it possible to track which preservice teachers had responded to the survey and which had not[2]. Furthermore, this feature allowed follow-up contacts to be sent to the entire survey population or to specific sub-groups such as non-respondents. This facilitated the four-contact strategy without unnecessarily bothering those who had previously completed their surveys.

Multiple Contact Strategy. According to Dillman (2007), multiple contacts have shown the greatest impact for improving survey response rates. Capitalizing on this research, the Preservice Teacher Survey was disseminated using a four-contact approach:

[2] It should be noted that while SurveyMonkey was used to track who responded to the surveys, individual survey results themselves did not include any personally-identifying information so that the anonymity of preservice teachers' results were maintained.

1. A prenotice email was sent first to alert all preservice teachers that they would be receiving the Preservice Teacher Survey in the coming days and explained why the survey was important (See Appendix D).
2. Four days after the prenotice email, the initial survey was sent to 1,463 preservice teachers[3]. This email reminded them about the prenotice email sent earlier and provided them with their unique link to the survey (See Appendix E).
3. One week after the initial survey, the third contact, a thank-you/reminder email, was made to all who had not opted-out of the survey. This email thanked them for their participation in the study, and expressed hope that if they have not yet completed the surveys, to please do so soon (See Appendix F).
4. Ten days after the thank-you/reminder contact, only those preservice teachers who have not yet completed their survey received a final follow-up email. This email alerted recipients that the study was coming to a close, that many of their peers had already submitted their results, and that their unique results were important to getting an accurate picture of all PSTs. It also resupplied a link to the survey in case they had deleted previous contacts (See Appendix G).

Table 3.2. ***Multiple Contact Strategy for Preservice Teacher Survey***

Preservice Teacher Survey Strategy			
Date	**Contact Type**	**Sent To**	**Responses**
Wednesday, January 30th	Prenotice	All (n=1,463)	NA
Sunday, February 3rd	Initial Survey	All (n=1,463)	658
Sunday, February 10th	Thank You	All (n=1,460)[1]	224
Sunday, February 20th	Last Request	Non-respondents (n= 584)	139

[1] - Three PSTs opted out of survey by this stage so they were not contacted.

[3] Email contacts for three PSTs were returned citing "mailbox full." This represents the discrepancy between the 1,466 on the original list and the 1,463 who received the initial survey.

The four-contact strategy yielded responses from 1,021 of the 1,463 preservice teachers (70%). Of the 1,021 preservice teachers who submitted results, 929 of them (91%) completed the entire survey—clicked "Done" on the final page—although this does not necessarily mean that all 929 PSTs answered every single question in the survey. About 64% of those who responded did so after the initial survey contact whereas the subsequent two contacts (thank-you/reminder and last request) yielded 22% and 14% of the respondents, respectively. Just under 30% of preservice teachers (n = 424) did not respond to any of the contacts, and 18 PSTs responded by opting out of the survey.

Instructor Survey

The procedures for distributing the instructor surveys followed the same pattern and timelines as the Preservice Teacher Survey with the exception of the last request contact (See Appendices H-L for contacts). In the last request contact, instructors were provided the option of submitting their surveys online through SurveyMonkey or filling out a paper-based survey that was left in their campus mailboxes. Four instructors returned paper surveys.

Table 3.3. ***Multiple Contact Strategy for Instructor Survey***

Instructor Survey Strategy			
Date	**Contact Type**	**Sent To**	**Responses**
Wednesday, January 30th	Prenotice	All (n=100)	NA
Sunday, February 3rd	Initial Survey	All (n=100)	53
Sunday, February 10th	Thank You	All (n=100)	20
Sunday, February 20th	Last Request	Non-respondents (n= 27)	11

The four-contact strategy yielded responses from 84 instructors (84%). Of the 84 instructors who submitted results, 81 of them (96%) completed the entire survey—

clicked "Done" on the final page—though, again, this does not necessarily mean they answered every question in the survey. Sixteen instructors did not respond at any of the contacts though none chose to opt out. Of the 84 respondents, 63% of them responded to the initial survey, 24% to the thank-you/reminder contact and 13% to the last request. These percentages are consistent with response patterns observed in the Preservice Teacher Survey. In examining the data more closely, however, three instructor surveys were not included in the analyses in chapter six because it appeared these instructors did not meet the selection requirements of teaching one of the teacher preparation courses[4].

Analyses of the Preservice Teacher Survey Data

The analysis of the Preservice Teachers Survey Data presented in chapter four was limited to respondents whose ages ranged between 20 to 25 years ($n = 879$, $\bar{x} = 21.6$). This age range was selected for three reasons. First, it represented an age category consistent with Millennial literature that places the birth year of Millennials in the early 1980s (D. Oblinger, 2003, July/August; D. G. Oblinger & Oblinger, 2005). Second, 95% of survey respondents who answered the question about their age were between the ages of 20 and 25 years meaning that this age range encompassed most preservice teachers. Third, prior literature suggested that age was often associated with technology use. Thus, knowing the age of each preservice teacher was considered important for assessment purposes because it allowed for controlling for age differences among PSTs.

The characteristics of the preservice teachers in the study closely matched the known characteristics of all preservice teachers in the college's teacher preparation program. According to the college's student affairs office, 78% of the preservice

[4] In at least one of the three cases, the survey link was forwarded to another individual in the College to complete.

teachers enrolled during the fall 2007 and spring 2008 semester—the same group who received survey invitations—were female. Similarly, 81% of all respondents to the Preservice Teacher Survey and 82% of 20-25 year-old respondents to the survey were female. The proportion of elementary and secondary survey respondents ages 20-25 (56% to 44% respectively) also mirrored the population proportions of roughly 55% elementary to 45% secondary preservice teachers. Finally, the proportions of PSTs who were juniors, seniors, and interns approached the levels in the population. For preservice teachers ages 20-25, juniors and seniors each accounted for about 35% of the respondents with interns contributing 30% of the data. In the population, about 33% were juniors, 37% were seniors and 30% were interns.

Basic data cleaning methods were undertaken prior to analysis. Some survey questions were computed into new dichotomous variables. For example, survey questions that asked whether preservice teachers currently used specific technologies contained three response categories: "Yes, Currently Do; No, but have in Past; and No, Never Have. These responses were used to compute pairs of new variables that coded for whether a preservice teacher had ever used the particular technology (no/yes) and whether they currently use it (no/yes).

SPSS cross-tabs were assessed for related variables to ensure the plausibility of responses. In cases where conflicting data occurred, data was recoded as missing using an erroneous data label. An example of such an event would be for a PST who responded in one question that she never uses a particular technology, but then in a subsequent question answered that she uses the same technology on a daily basis.

In addition to reporting on descriptive statistics on variables of interest for the Preservice Teacher Survey data, chapter four also reports findings from logistic regression analysis. Logistic regression (LR) was used to evaluate whether five predictor variables were associated with use variables (no/yes). Logistic regression was selected over multiple regression or ANOVA because the dichotomous nature of the dependent variables does not satisfy multiple regression's or ANOVA's assumptions that the errors are normally distributed. Logistic regression does not have the same error structure assumption; therefore, its use was a better fit.

The five predictor variables utilized in the LR analyses were either continuous, as in the case of AGE, or categorical. Dummy variables were constructed from the four categorical predictors to represent the different response categories. Table 3.4 summarizes all five predictor variables used to test association with the dependent variables.

Table 3.4. ***Predictor Variables for Preservice Teacher Survey***

Name	Label	Groupings
AGE	Age in years	20 – 25
FEMALE	Female (dummy)	Male = 0, Female = 1
YEARPROG	Level in Program (dummy)	Junior, Senior, Intern
GRDLVL4	Level PST desires to teach (dummy)	P – 2nd, 3rd – 5th, 6th – 8th, and 9th -12th
SCIMJMN	Sciences and Math major/minors (dummy) (See Appendix M for category make up).	No Sciences and Math, Some Sciences and Math, Only Sciences and Math

The discussion of results in chapter four is grouped into three headings: Social Communication Technologies, Web Publishing Technologies, and Audio/Visual Technologies. These headings represent conceptual and empirical considerations.

Conceptually, the social communication technologies are comprised of technologies typically used to facilitate communication between acquaintances and family members, such as social network sites, text messaging and instant messaging. The discussion of web publishing technologies focuses on preservice teachers' use of web pages, blogs and wikis. Finally, the audio/visual technologies encompass the use of Internet video, music and audio, as well artwork and photos.

Empirically, evaluation of the correlation matrices and computation of reliability estimates suggest the variables grouped under each heading are appropriate. The correlation matrix revealed that variables within headings were more highly correlated with each other than variables from other headings (See Appendix N). Additionally, Cronbach's alpha estimates suggest that the variation between variables of the same category were similar (greater than .7).

Table 3.5. ***Reliability Estimates for Technology Headings***

Category	Use	Frequency	Use & Frequency
Social Communication	7 items $\alpha = .714$	7 items $\alpha = .780$	14 items $\alpha = .813$
Web Publishing	6 items $\alpha = .771$	6 items $\alpha = .791$	12 items $\alpha = .860$
Audio/Visual Media	9 items $\alpha = .745$	9 items $\alpha = .825$	18 items $\alpha = .872$

To investigate whether the technology headings were sufficiently dissimilar—that is, that they warranted being treated under three separate headings as opposed to one—construct variables were created by summing the use variables together for each heading and dividing by the number of variables summed. Reliability calculations based on the construct variables revealed Cronbach's alpha to be .405 with inter-item correlations in

the .1 to .2 range. These values, coupled with the conceptual reasons above, validate the decision to cluster technologies into three separate headings.

CHAPTER FOUR

DESCRIPTIVE ANALYSIS OF PRESERVICE TEACHER SURVEY DATA

Demographics of Preservice Teacher Survey Respondents

Using the four-contact strategy described above, 1,463 preservice teachers (PSTs) received emails to participate in the Preservice Teacher Survey of which about 70% (n = 1,021) completed all or part of the survey. Although the age of survey participants ranged from 19-54, data for this chapter examined only those preservice teachers whose ages ranged between 20 to 25 years (n = 879, $\bar{x} = 21.6$, See Figure 4.1 below for a more precise age breakdown).

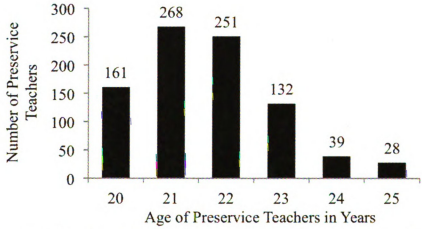

Figure 4.1. ***Age Breakdown for Preservice Teacher Survey Respondents Ages 20-25***

As would be expected given the gender differences in the teaching field, more females responded to the survey than males. Of the 879 respondents analyzed in this chapter, 721 (82%) were female. Likewise, the data reflect a higher number of responses from PSTs who wanted to teach at the elementary level (56%) compared to the secondary level (See Appendix O for further grade-level breakdown) as well as those who desire to teach in suburban settings (67% vs. 23% and 11% for urban and rural, respectively).

The number of preservice teacher respondents was fairly consistent across the three levels in the teacher preparation program. Juniors and seniors each accounted for 35% of the respondents, with interns contributing 30% of the data. Choice of major or minor, on the other hand, indicated a higher proportion of non-science and non-math PSTs. Roughly three out of every four preservice teachers (73%) did not have a major or minor in the sciences or mathematics (See Appendix M for classification scheme). Only 13% had either a major or a minor in the sciences or mathematics, leaving 14% who had only majors or minors that fell into the sciences or math categories.

Finally, given that the preservice teachers completed the surveys online, it is not surprising that all respondents indicated they use the Internet. Use of the Internet was found to be almost always a daily activity with 99% of PSTs saying they access the Internet on a daily basis. Over the span of a typical week, these preservice teachers spend an average of 16 hours online[5].

Social Communication Technologies

Use and Frequency of Use

The three most popular activities among preservice teachers in terms of the proportion currently engaging in them represented technologies best categorized under the heading of social communication. These technologies possess the characteristics of facilitating communication between friends and family members and tended to be technologies that were predominantly used only in PSTs' personal lives. They included using social networking sites like Facebook and MySpace, text messaging, and instant messaging (IM) (See Figure 4.2 below).

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[5] The 95% confidence interval for the number of hours spent online in a typical week was (15.41, 16.83), SD = 10.74, and the median was 15 hours.

Engagement with social networking sites was ubiquitous among preservice teachers ages 20-25 with 95% reporting current use. Over half (64%) said they used social networking sites like Facebook or MySpace on a daily basis, and just over 95% used them at least once a week. Though the percentage of PSTs who sent and received text messages (86% and 90% respectively) was less than those who used social networking sites, the frequency of use was similar to that of social network users. A little fewer than 70% of PSTs who sent text messages did so on a daily basis and roughly 96% sent at least one text message a week. This frequency pattern held relatively true for current IM users as well (55% daily use, 89% weekly use).

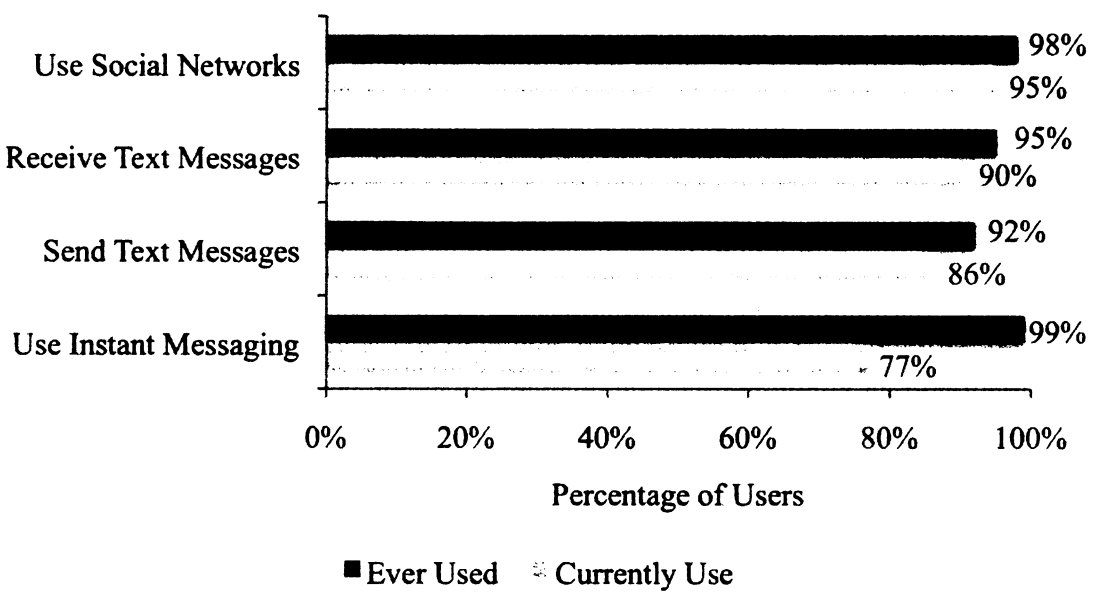

Figure 4.2. ***Percentages of Preservice Teachers Who Use Social Communication Technologies***

Looking across the three social communication technologies surveyed, it is clear that the majority of PSTs are currently using each of them. A little more than two-thirds of preservice teachers (66%) said they were currently using social network sites, instant messaging, and sending text messages whereas just six percent said they only used one of

the three. If PSTs were only using two of the three technologies, the most likely combination was social networking sites and text messaging which outpaced the pairing of social networking sites and instant messaging by a two-to-one margin.

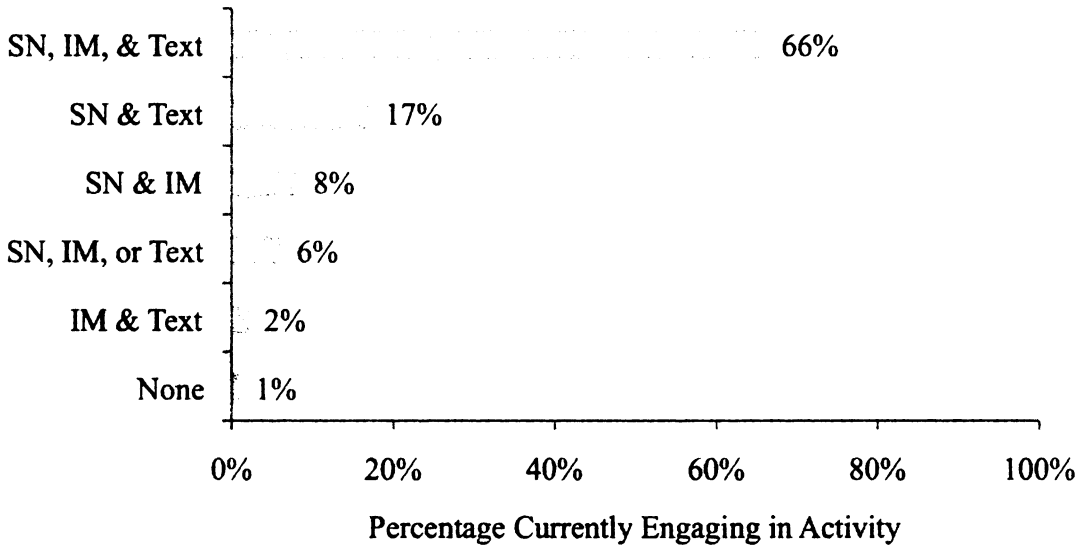

Figure 4.3. ***Preservice Teachers' Use of Social Communication Technologies in Various Combinations***

Though the reasons for which preservice teachers used texting was not investigated as part of the survey, data was collected regarding the purposes for which PSTs used social networking sites and instant messaging. Clearly, PSTs used social networking sites and instant messaging almost exclusively for personal or recreational purposes. Ninety-seven percent of current social network users and 94% of current IM users said they used these technologies only for personal or recreational purposes. Furthermore, not only were PSTs failing to use these technologies as part of their current university coursework or field placements, but they also seemed to perceive them as not relevant to K-12 teaching. Only 12% of preservice teachers thought creating or updating a social networking profile would be useful or very useful in their teaching—the lowest

of any activity assessed in the survey—even though over 90% of PSTs claimed their skill level was "good" or "very good" at this activity—the highest of any activity assessed.

Overall, the general conclusion is that while most PSTs used social communication technologies and used them rather frequently and competently, this usage rarely extended beyond personal or recreational purposes and into their coursework or field placement experiences.

Factors Associated with Activities

Given the popularity of social networking sites, text messaging, and instant messaging, it is not surprising that, for the most part, age, gender, level in the teacher preparation program, the grade level PSTs desire to teach, and their major/minors were not associated with whether PSTs used these specific technologies. None of these five variables were found to be associated with using social networking sites, and only two different variables (one for each activity) were found to be associated with texting and instant messaging. Female preservice teachers were significantly more likely to send text messages than male PSTs when controlling for the other predictor variables (Wald = 11.68, $p = .001$, BIC[6] = 5.06). The odds of sending text messages for female PSTs were 2.46 times that of male PSTs. This difference translated into an increased probability of .08 for female preservice teacher at the mean of the dependent variable (.86).

On the other hand, a preservice teacher's age was the only significant predictor of instant messaging use (Wald = 10.88, $p = .001$, BIC = 4.27). A one-year increase in age reduced the odds that a PST currently uses instant messaging by a multiple of .72 or the

[6] BIC stands for Bayesian information criterion. The BIC is used as a way of determining the strength of significance for larger sample sizes. Raftery (1995) provides the following "grades of evidence" for assessing whether the variable should be included in the model: < 0, little to no evidence; 0-2 weak, 2-6 positive; 6-10 strong; and >10 very strong (p. 139).

equivalent of 28% per year. Thus, as age increases one year, the predicted probability that a preservice teacher currently uses instant messaging decreases by about .06 at the mean of the dependent variable (.77).

Web Publishing Technologies

A second set of related technologies that preservice teachers were surveyed about included traditional web pages, blogs, and wikis. At least when it comes to viewing content from these forms, over 50% of preservice teachers have some experience with each.

Use and Frequency of Use

Sixty-one percent of preservice teachers have created or updated a web page at some time in their lives, but only 25% currently work on building web pages. Likewise, PSTs reported similar proportions for blogging. Fifty-seven percent of preservice teachers have ever created or updated a blog though less than half that (26%) do so currently. As expected, a higher proportion of preservice teachers read blogs than created or updated them. About three out of every four (73%) PSTs have ever read a blog with a little under forty percent (38%) saying they currently read them. However, about 90% of the preservice teachers who currently blog also said they were reading other blogs. Not surprisingly, this mirrored preservice teachers' commenting patterns on blogs where only 28% of all PSTs said they currently leave comments on blogs while 79% of the current bloggers said they did.

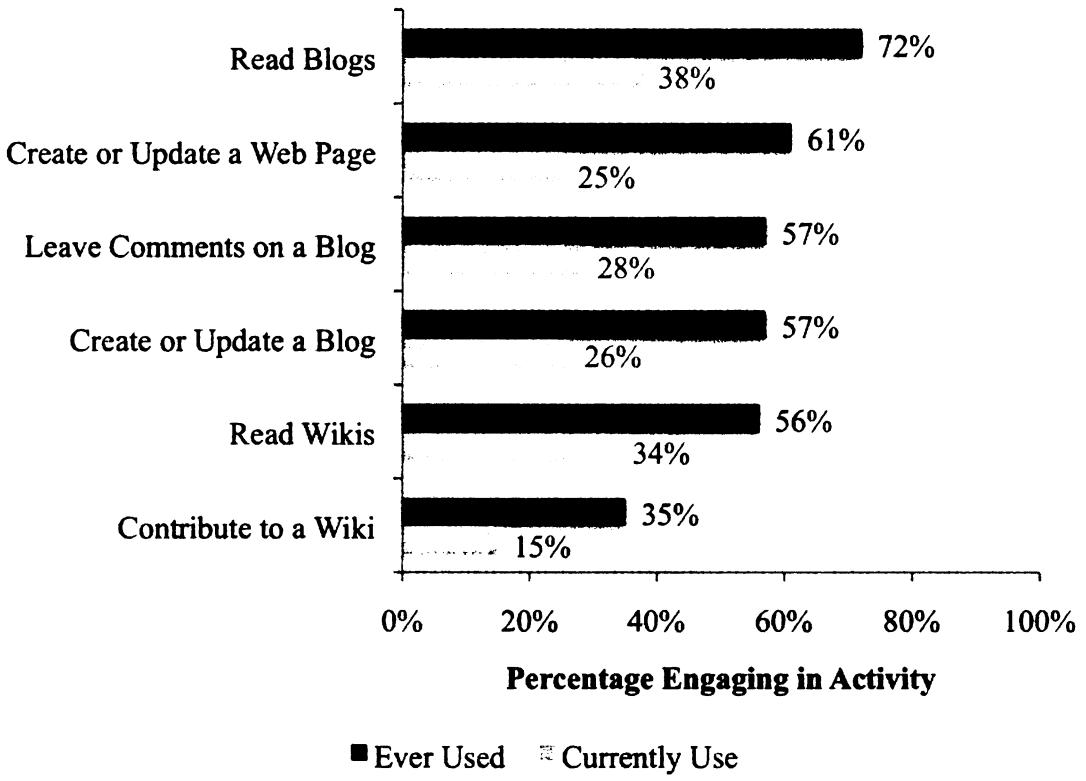

Figure 4.4. ***Percentages of Preservice Teachers Who Use Web Publishing Technologies***

A noticeable trend from web pages and blogs was that typically only about half of the preservice teachers who have ever engaged in a particular activity using these technologies were current users, and this trend continued with PSTs' use of wikis. Fifty-six percent of preservice teachers had read a wiki before, yet just 34% claimed to read them now. Less than half (43%) of PSTs who currently read wikis contributed to them. However, when all PSTs were considered, the percentage contributing to wikis dropped to 15%.

Perhaps this drop of one half from ever to current use is most apparent though when the three technologies are considered collectively. Figure 4.5 (below) depicts the percentages of PSTs who said they created or updated web pages or blogs or contributed to wikis. Whereas two out of three PSTs currently used each of the social

communication technologies—social networking sites, instant messaging, and text messaging—over half of the preservice teachers (58%) were not currently using any of the web publishing technologies to produce new content. Furthermore, of those who currently used any of these three technologies, about half of them (26% of all PSTs) report using only one.

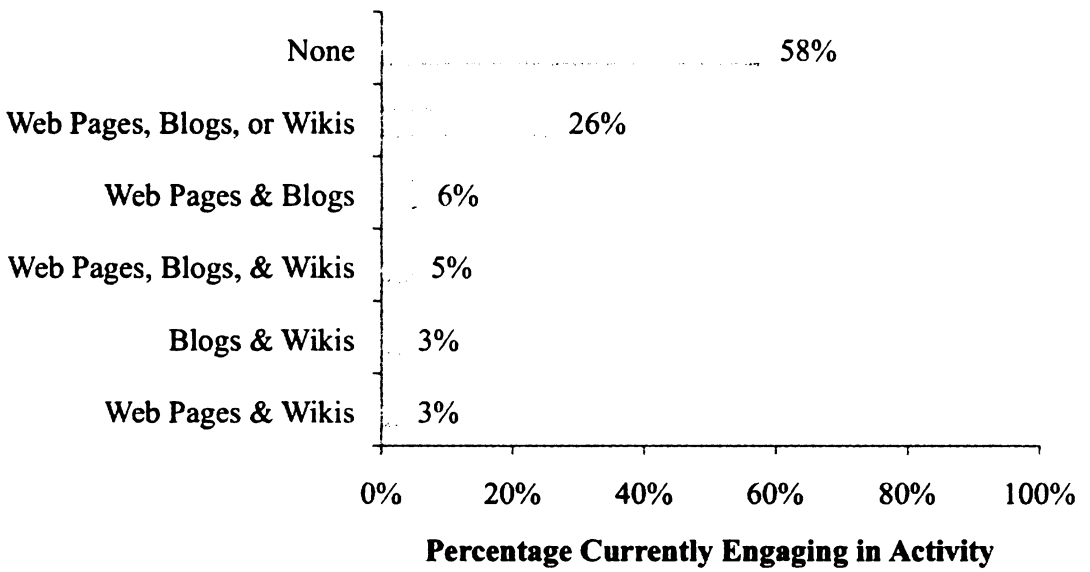

Figure 4.5. ***Preservice Teachers Who Create or Update Web Pages, Blogs, or Wikis in Various Combinations***

Not only were the proportions of preservice teachers who currently engaged in activities involving web pages, blogs, and wikis less than those for the social communication technologies mentioned above, but the frequencies with which the PSTs engaged in these activities also lagged behind. With social networking sites, texting and instant messaging, the modal response category for current users was "daily" for all three technologies. In contrast, none of the activities involving web publishing technologies yielded a "daily" mode. Rather the modal categories for the web publishing activities

tended to fall in the "once a week" category, perhaps reflecting the fact that work on web pages was usually done in larger chunks.

Table 4.1. ***Frequencies of Web Publishing Activities for Preservice Teachers Who Currently Engage in the Activities***

Activity	Less than once a week	Once a week	Couple days a week	Daily
Create/Update Web page	45%*	32%	17%	7%
Create/Update Blog	20%	53%*	24%	4%
Read Blogs	20%	33%*	30%	17%
Comment on Blogs	30%	43%*	20%	7%
Read Wikis	28%	28%	34%*	11%
Contribute to Wikis	23%	36%*	32%	9%

* represents modal category

At least for the blogging activities, a potential explanation of the modal frequency shift from "daily" to "once a week" may be due to the purposes for which the preservice teachers were using these technologies. Unlike with social networking activities, texting, and instant messaging where the overwhelming majority of current users engaged in those activities exclusively for personal or recreational use, just one in five (19%) preservice teachers who blogged said they did it only for personal or recreational reasons. In fact, a third (36%) of the preservice teachers who currently blog reported that the only reason they blogged was because it was required as part of their coursework. This may help explain why the blogging activities tended to have "once a week" modal frequencies. Interestingly, 35% of preservice teachers who blogged said they were using blogs for their own field placements and teaching.

The story for wikis read the same with 25% of preservice teachers who read or contribute to wikis doing this solely as a leisure activity and an additional 25% using them only because they were required to as part of their coursework. Like blogging, 34%

of preservice teachers who currently read or contributed to wikis said they were using them in their field placements and teaching.

Usefulness and Skill Level

Overall, most preservice teachers were optimistic about the applicability of web pages, blogs, and wikis for use in K-12 settings. Almost four out of every five (78%) PSTs thought creating or updating their own web pages would be useful or very useful to their teaching, and almost half (47%) thought the same thing about blogs. Wikis were not perceived as useful as blogs and web pages, but 35% still believed they would be useful or very useful in their own teaching. Of the three technologies, preservice teachers were most uncertain about the usefulness of wikis in their teaching with 24% choosing the "uncertain" category compared to only 8% for blogs and 2% for web pages.

Preservice teachers' opinions about the applicability of web publishing activities for the K-12 classroom were found to be associated with their skill levels for these activities. Ordinal regression using the five predictor variables as controls and the PSTs' self-reported skill level for each activity indicated that preservice teachers' skills with web pages, blogs, and wikis were very strongly associated with their usefulness ratings for these activities (See Appendices P-R). As Figure 4.6 shows, the more skilled preservice teachers were for a web publishing activity, the more likely they viewed the activity as potentially being very useful in their teaching.

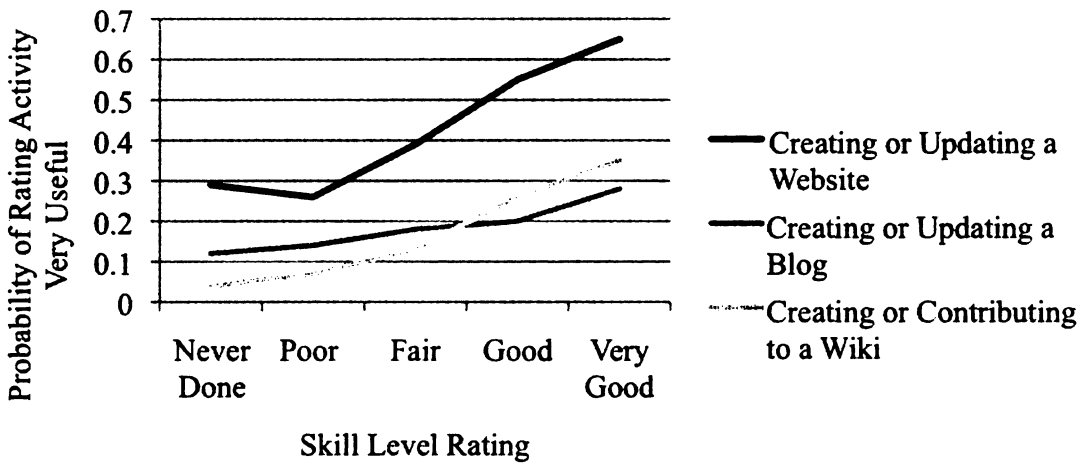

Figure 4.6. ***Relationship Between Preservice Teachers' Skill Level for Web Publishing Activities and Their Usefulness Ratings***

Given this relationship, it is important to note that less than half of the preservice teachers felt they were "good" or "very good" at the web publishing activities surveyed. The preservice teachers felt they were most skilled at creating or updating blogs with 45% claiming to be good or very good at this activity. Only 32% and 26% of preservice teachers placed their skill level in these categories for creating or updating a web page and wiki respectively.

Factors Associated with Activities

For the most part, age and gender were not related to preservice teachers' use of web publishing technologies. Gender was only found to be weakly related to the web pages variable. Female preservice teachers were slightly more likely to be currently working on web pages than males PSTs were after controlling for the other predictor variables (AOR = 2.09; p = .008; BIC = .43).

Preservice teachers' major and minors produced mixed results. Preservice teachers who did not have a major or minor in the sciences or mathematics were more likely to be blogging (AOR = 2.71; p = .004; BIC = 1.8) and contributing to wikis (AOR

= 5.80; p = .001; BIC = 4.3) than those PSTs who only had majors or minors within the sciences and math categories. Conversely, the math and sciences only preservice teachers were more likely to be creating or updating web pages compared to either the no sciences/math PSTs (AOR = 2.42; p < .001; BIC = 5.7) or the some sciences and math PSTs (AOR = 1.96; p = .036; BIC = n.s.). No major/minor differences were present for whether preservice teachers read or contributed to blogs or read wikis.

While the grade level a preservice teacher desired to teach was not associated with use of web pages or wikis, the trend across the blogging models was that elementary PSTs were more likely to be engaging in blogging activities than high school PSTs. The blogging odds for preservice teachers who wanted to teach grades preschool through second were three times that of their high school counterparts (AOR = 2.99; p < .001; BIC = 10.4). Preservice teachers interested in teaching grades third through fifth were even more likely to be blogging (AOR = 3.492; p < .001; BIC = 14.6) when compared to high school PSTs. Elementary preservice teachers were also significantly more likely to be reading and commenting on blogs than the high school PSTs.

The most consistent factor associated with web pages, blogs, and wikis was taking senior-level coursework in the teacher preparation program. Across all six logistic regression models (creating/updating web pages, creating/updating blogs, read blogs, comment on blogs, read wikis, contribute to wikis) seniors in the teacher preparation program were found to be significantly more likely (both according to p-values and BIC values) to be currently engaging in each activity than their colleagues in other years of the program. For example, the odds of a preservice teacher currently creating or updating a blog was 9.2 times higher for PSTs who were taking only senior-level coursework

compared to those taking only junior-level coursework, and 5.3 times higher when it came to contributing to wikis.

Some of this difference can be attributed specifically to senior-level coursework itself. Chi-square tests of association showed that the reasons preservice teachers use blogs and wikis was associated with their level in the teacher preparation program ($\chi^2 = 149.71$, df = 6, $p < .001$; and $\chi^2 = 66.55$, df = 6, $p < .001$, respectively). Analysis of the standardized residual counts suggested that too many seniors were using blogs and wikis only because they were required as part of coursework than otherwise would be expected if there was no association (5.7 for creating/updating blogs, 3.2 for reading or contributing to wikis). Because there is a technology-intense course that senior-level preservice teachers can take, analysis was also run excluding those who had taken that course. The results were consistent; even without these preservice teachers, senior-level coursework effects existed.

Audio/Visual Technologies

The final set of related technologies that preservice teachers were surveyed about included audio and visual technologies. Technologies in this category included Internet video, music, podcasts, photos and artwork.

Use and Frequency of Use

More preservice teachers watched or downloaded video from the Internet than downloaded music. Almost all the preservice teachers have watched video from the Internet (94%) with 3 out of 4 (71%) claiming to currently do so. In fact, about one in five watched Internet video daily with 77% watching once a week or more. Like video, most preservice teachers have some experience downloading music, but only 61% said

they currently download it. The frequency of downloading music also lagged behind that of video with less than 10% of PSTs downloading on a daily basis and 55% doing so once a week or more. Less than half of preservice teachers had ever downloaded a podcast and fewer than one in six currently download them.

Interestingly, it appeared the percentage of preservice teachers currently uploading art or photos to the Internet was about the same as those currently downloading music. Though a less frequent occurrence compared to downloading music, 59% of preservice teachers said they currently uploaded art or photos to the web. This perhaps reflects one of the ways they used social networking sites where uploading images to accounts like Facebook is part of the norm.

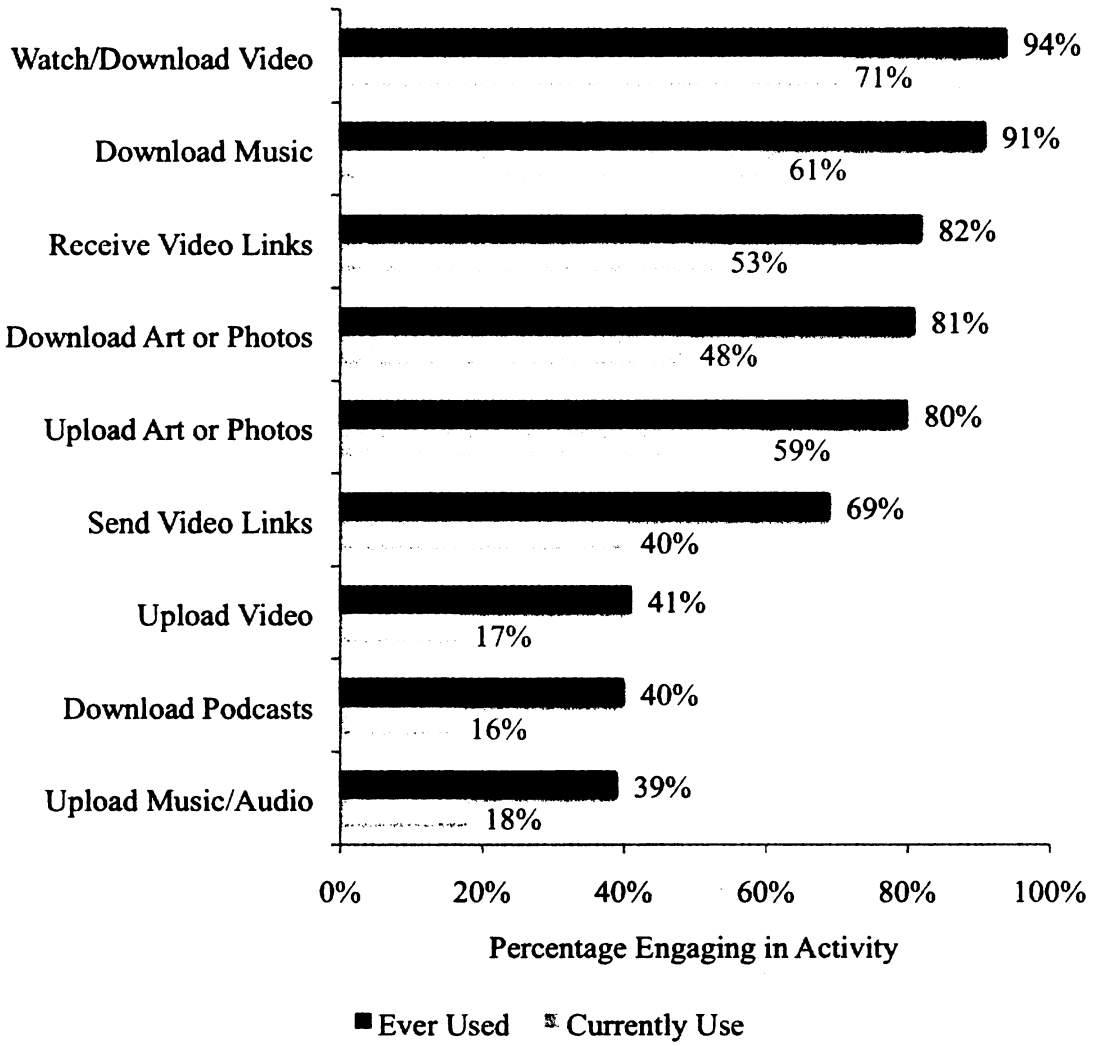

Figure 4.7. ***Percentages of Preservice Teachers Who Use Audio/Visual Technologies***

As Figure 4.7 (above) indicates, the preservice teachers were more likely to be consumers of video, music, and art/photos rather than creators of these media forms. Figure 4.8 below shows the forms of media the preservice teachers were currently uploading to the Internet. As with the web publishing technologies, less than 10% of preservice teachers were currently uploading all three media types (8%) and around 80% were only uploading one or none of them. In contrast to the web publishing technologies however, preservice teachers were more likely to be uploading one of the three media forms (45%) than none of them (35%).

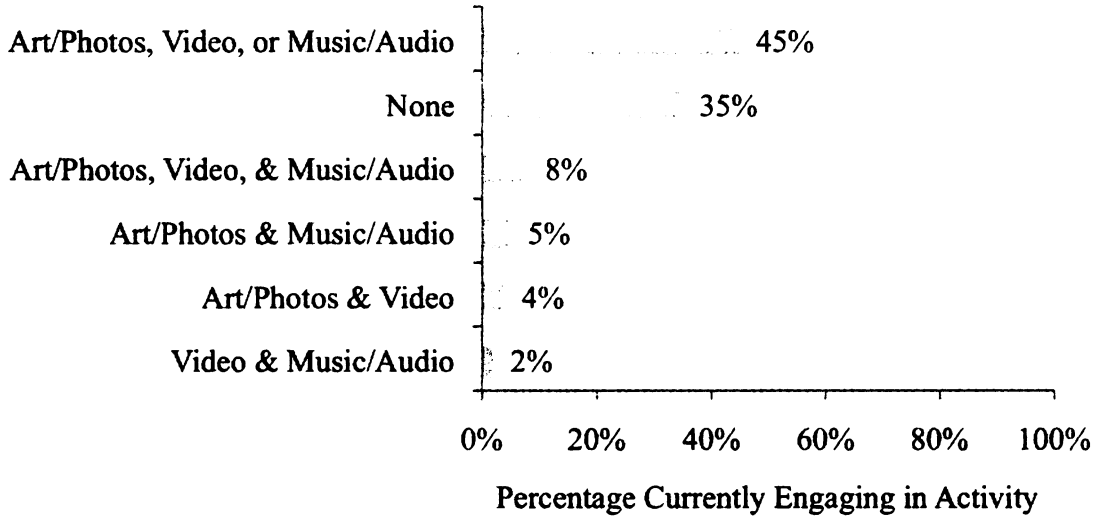

Figure 4.8. ***Preservice Teachers Uploading Various Combinations of Media Content***

Usefulness and Skill Level

Generally speaking, preservice teachers were optimistic about using these technologies in their classrooms. Sixty-four percent of preservice teachers thought uploading or downloading video would be potentially very useful or useful in their teaching. About half of preservice teachers said the same things about editing video (52%), editing and uploading images (51% and 49%, respectively) and downloading music (48%). This optimism, in contrast to the web publishing technologies, appeared to be supported by confidence in the PSTs' skill levels with these activities. Just over 80% of preservice teachers felt their skill level was "very good" or "good" at downloading music, and around 60% placed their skills in the same two categories when asked about uploading and editing images and uploading/downloading video. The one exception to this pattern was video editing where despite the optimism, only 20% considered their skill levels to be "very good" or "good" and 34% had never tried it.

Factors Associated with Activities

When it came to predicting use of the audio/visual technologies surveyed,

knowledge of a preservice teacher's age or year in the teacher preparation program was of no substantive value. After controlling for difference on the other four predictor variables, age was only found to be statistically significant for downloading music (Wald = 5.83; df = 1; p = .016) however the BIC was found to be less than zero indicating that there was not sufficient evidence to include AGE in the model. Likewise, the only model in which year in the teacher preparation program was associated with use was for downloading podcasts. Here as well, although seniors were more likely than juniors and interns to be current downloaders of podcasts (AOR = 1.86; p = .027), the BIC was less than zero implying that the statistical significance is of little practical importance.

At least for the video activities, the grade level a preservice teacher desired to teach did seem to be associated with use. Generally speaking, lower percentages of elementary PSTs reported currently engaging in video activities compared to their high school colleagues – especially for the third to fifth grade PSTs. The odds that preservice teachers in the third to fifth grade grouping were currently watching or downloading video content from the Internet was about half that of the 9^{th} -12^{th} grade PSTs (AOR = .52; p = .007; BIC = .68). Similarly, preservice teachers wanting to teach grades third through fifth were also significantly less likely than the high school PSTs to send video link to others (AOR = .46; p = .001; BIC = 4.95) or to receive video links from others (AOR = .43; p < .001; BIC = 7.72). Preschool to second grade preservice teachers were also found to be less like to be receiving video links from others (AOR = .51; p = .002; BIC = 3.17).

Teaching major and minors were also found to be associated with the video activities. Typically, the trend indicated that preservice teachers with majors or minors in

the sciences and mathematics were less likely to be engaging in the video activities. For instance, PSTs in the "Some Sciences and Mathematics" category were significantly less likely than those without majors or minors in the sciences to say they are watching or downloading video (AOR = .48; p = .002; BIC = 2.60). Having some or all of one's majors or minors in the sciences and mathematics categories was also associated with significantly decreased odds of sending and receiving video links.

The strongest associations as indicated by the BIC, however, were due to gender differences. When it came to watching or downloading video, the odds that a female preservice teacher engaged in this behavior were 67% lower than for male PSTs (AOR = .33; $p < .001$, BIC = 6.54). That is, when controlling for the other predictor variables, the probability of currently watching or downloading video content was .26 lower for females than males at the mean of the dependent variable (.71). On the other hand, female preservice teachers were much more likely to report uploading artwork or photos to the Internet. The odds that a female preservice teacher was currently uploading art or photos was 2.6 times that of male PSTs ($p < .001$; BIC = 12.28) translating to an increased probability for females of .20 at the mean of the dependent variable (.59).

Conclusion

This chapter provided estimates of preservice teachers' use of several online activities that subsequent chapters will use to compare with other populations. However, relative to itself, a few key points should be made:

1. Usage was not consistent across the social communication, web publishing, and audio/visual activities. Almost all preservice teachers were currently engaging in the social communication technologies surveyed, about three

quarters to half of PSTs were engaging in the audio/visual technologies surveyed, and about a quarter were currently doing the web publishing activities.

2. Though the Preservice Teacher Survey collected data about use of online activities for all purposes (e.g., personal or professional), the data did suggest that the coursework students took in the teacher preparation program did not incorporate the social communication technologies surveyed. Overwhelmingly, the preservice teachers used social networking sites, text messaging, and instant messaging exclusively for personal reasons. On the other hand, large percentages of the preservice teachers who blog or use wikis do so only because they are required to as part of their coursework.
3. Preservice teachers were more likely to be engaging in the consuming activities (e.g., reading blogs, downloading music or video) than the creative activities (e.g., blogging, uploading music or video).
4. For the web publishing and audio/visual activities, skill level was positively correlated with perceived usefulness in the classroom (See Appendix S). Unfortunately, the activities that showed the strongest correlations also tended to have the lowest percentages of preservice teachers claiming to have good or very good skills for those activities.
5. The relationship between preservice teachers' skill and the activity's perceived usefulness in the classroom varied across technology categories. Preservice teachers reported being the most skilled with the social communication technologies, but also rated them as not being potentially

useful in their teaching. They reported having low skill level with the web publishing technologies, but saw them as being potentially useful in the classroom. And they reported having higher skills and higher perceived usefulness for the audio/visual technologies.

These points are a good beginning to understanding preservice teachers' online activities. However, in addition to comparing preservice teachers to themselves, comparisons need to be made between preservice teachers and other groups. Chapter five contextualizes the preservice teachers' estimates by comparing them with the estimates from the literature review. This chapter helps us gain a picture of how the online activities of the preservice teachers differed, if at all, from other American youth and young adults. Chapter six, then, takes a different slice through the data by comparing the preservice teachers' data with the data collected from their instructors in the teacher preparation program.

CHAPTER FIVE

COMPARING PRESERVICE TEACHER DATA TO AMERICAN YOUTH AND YOUNG ADULT DATA

The comparisons made in this chapter between the preservice teachers ages 20-25 in the teacher preparation program and the estimates assembled in the literature review is meant to provide a general idea of how preservice teachers' online activities compare to other Americans and young adults. Caution is required when interpreting the comparisons made. Obvious problems exist such as differences in instrument design, wording of questions, and variations in the dates when data were collected that limit the ability to make precise comparisons. This is, in part, an inevitable consequence of conducting research on the rapidly changing world of technology. However, these limitations do not preclude the general comparisons and conclusions drawn in this chapter.

Internet Access Comparisons

The preservice teachers[7] in the study are more highly connected to the Internet than the average 18 to 29-year-old American in terms of access and frequency of use. According to the survey data collected by the Pew Internet and American Life Project in March 2007, 71% of all American adults age 18 and older were Internet users (Horrigan & Smith, 2007, July 3). For preservice teachers in the teacher preparation program, Internet access appeared universal[8] and in line with a previous report projecting that 95%

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[7] As in the preceding chapter, unless otherwise stated, the preservice teacher estimates were calculated only for PSTs ages 20-25.

[8] Obviously because the Preservice Teacher Survey was administered online, 100% of respondents would be Internet users. While it may be unlikely that all PSTs are online, the high response rate of 70%

of college students are online (eMarketer, 2007, July). The preservice teachers surveyed also reported higher than average proportions of broadband access in their homes and at the university. A little more than 90% of PSTs reported having broadband access—either wireless or Ethernet access—from home and just under 99% said they had wireless or Ethernet access from the university. This degree of home broadband access for the preservice teachers surpassed the national estimate of 70% for 18 to 29-year-old Americans (Horrigan, 2008, July 2).

Not only did the preservice teachers in the study have better connections to the Internet than others at or near their age, but more of them also used the Internet on a daily basis. Practically all of the preservice teachers reported using the Internet daily as opposed to 71% of online 15 to 17-year-olds who accessed the Internet daily (Lenhart et al., 2008, April 24). In a typical week, the preservice teachers averaged using the Internet about 16 hours a week. This estimate was lower than that from a study of American undergraduates (freshman and seniors) conducted by EDUCAUSE in 2008 that found the mean hours per week for education majors to be 17.6 (Salaway et al., 2008, p. 46). Conversely, the median number of hours the PSTs in the teacher preparation program spent online weekly (15) exceeded the EDUCAUSE study's finding of 14 hours per week for education majors. However, both the EDUCAUSE study and the preservice teacher data found no significant gender differences in the amount of hours spent online for males and females.

(1,021/1463) suggests that non-respondents would have to be quite different from the other PSTs to move the estimate much below the 95% figure found elsewhere.

Comparison of Social Communication Technologies Use

When it came to the social communication technologies like social networking sites, text messaging, and instant messaging, preservice teachers in the teacher preparation program appeared on par with other undergraduates and more active than those belonging to younger age groups.

Social Networking Comparisons

The preservice teachers in the study were only slightly more likely to be using social networking sites compared to university students in general. Salaway et al., (2008) found 93% of undergraduate freshman and seniors ages 20-24 were using social networking sites as of the spring 2008, whereas the Preservice Teacher Survey data indicated 95% of the PSTs ages 20-25 were using them during this same period (p. 83). The two data sets agreed that the median frequency of use was daily and that the proportion of daily users was approximately 60% for each study—59% for the EDUCAUSE study and 61% for the Preservice Teacher Survey.

Although the preservice teachers in this study used social networks at about the same rate as their university peers, their use rates exceeded that of American youth. This generalization does not apply to every social networking activities surveyed. For example, a survey conducted by the National School Boards Association found that 12% of 9 to 17-year-olds updated their social networking profiles daily (National School Boards Association, 2007, July, p. 2). In contrast, only nine percent of preservice teachers said they created or updated their profiles daily.

Texting Comparisons

Like social networking use, preservice teachers were slightly more likely to be texting compared to undergraduate freshman and seniors and considerably more likely than younger Americans. This was perhaps in part an issue of access. Both the Preservice Teacher Survey data and the EDUCAUSE (2008) data showed practically all university students owned cell phones. With the degree of personal ownership being the same, preservice teachers and undergraduate freshman and seniors showed similar percentages engaging in text messaging, but differences in their frequencies of use. The preservice teachers were slightly more likely to be texting with 86% of them saying they sent text messages and 90% saying they received text messages compared to 84% of students in the EDUCAUSE study who said they text messaged (p. 47). When it came to frequency, however, the preservice teachers were more likely to be texting multiple times a week than the general undergraduate (91% for PSTs ages 20-25 and 69% for undergraduate freshman and seniors ages 20-24 (p. 50)).

About two-thirds of preservice teachers sent text messages on a daily basis compared to 36% of all teens ages 12-17 (Lenhart et al., 2008, April 24, p. 22). It is possible this difference was at least partly due to only 71% of 12 to 17-year-olds having cell phones (Lenhart et al., 2008, April 24, p. 22). However, the gap was narrowed considerably when preservice teachers are compared to the 50% of older teen girls 15-17 years of age who sent text messages daily (Lenhart et al., 2008, April 24, p. 23). This gender difference found in prior studies was replicated in the Preservice Teacher Survey data. Similar to the Lenhart et al. study where the percentage of females sending text messages daily exceeded the percentage of males sending text messages daily by 16%

(44% to 28%) (p. 23), the Preservice Teacher Survey data showed a comparable gap of 13% percent between females and males (69% to 56%, respectively). The preservice teachers' figures were also quite consistent with the Youth Trends (2007) study of 18-24 year-olds where 89% of females were found to have sent a text message in the past week compared to 67% of males the same age. In the Preservice Teacher Survey data, 86% of all females reported sending text messages at least once a week or more compared to 68% of their male counterparts.

Instant Messaging Comparisons

Though not quite as popular as texting, preservice teachers were more likely to be current users of instant messaging services compared to the general undergraduate population and younger Americans. Once again, preservice teachers showed a slight edge over undergraduates in the EDUCAUSE data in terms of the percentage of current users. The preservice teacher data indicated 77% of PSTs currently used instant messaging whereas the EDUCAUSE (2008) study found 74% of freshman and seniors used it (p. 47). Only about a third of teens currently used instant messaging services according to Lenhart et al. (2008, April 24, p. 22). Generally speaking, the daily frequency of IM use by current users was practically the same for each group. About half of females 12-17 years of age who use instant messaging and 45% of boys the same age sent who use IM sent at least one instant message a day (Lenhart et al., 2005, July 27, p. 16). For preservice teachers who instant message, 56% of females and 52% of males were instant messaging daily.

When engaging in instant messaging, both preservice teachers and teens frequently held multiple simultaneous conversations. Forty-five percent of 12 to 17-year-

olds who instant message reported holding multiple conversations at the same time on a daily or almost daily basis (Lenhart et al., 2005, July 27, p. 22). An estimated 70% of preservice teachers held multiple simultaneous IM conversations at least a couple days a week with 36% of them holding multiple conversations daily.

In terms of social networking use, sending text messages, and instant messaging, preservice teachers appeared equally likely or slightly more likely than the typical undergraduate to be currently engaging in activities involving these technologies. Comparisons drawn with American youth ages 12-17 showed higher percentages of preservice teachers to be current users; however, current users of each group tended to have daily usage patterns that were reasonably similar.

Comparison of Web Publishing Technologies Use

Whereas preservice teachers tended to use the social communication technologies at about the same rate as undergraduate freshman and seniors and at rates greater than those reported in younger populations, PSTs' usage statistics with web pages, blogs, and wikis fell at or below the levels in comparative populations.

Web Page Comparisons

Preservice teachers are less likely to be creating or updating their own web pages compared to both teens and undergraduate populations. One in four (25%) PSTs reported currently creating or updating web pages while Lenhart et al. (2007) reported 27% of online 12 to 17-year-olds worked on web pages of their own and 33% created or worked on web pages for others (Lenhart et al., 2007, December 19, p. 7). Across all majors, Salaway et al. (2007) established that 29% of undergraduate freshman and seniors created web pages (Salaway et al., 2007, p. 42).

Blogging Comparisons

The statistics for blogging read quite similarly to those of web pages. Again, one in four (26%) PSTs were blogging compared to 28% of online 12 to 17-year-olds (Lenhart et al., 2008, April 24; Lenhart et al., 2007, December 19) and 28% of undergraduate freshman and seniors (Salaway et al., 2007, p. 42). Like the teen population, the Preservice Teacher Survey data showed females were blogging at twice the rate of males (29% v. 16%, respectively), yet this 29% female preservice teacher usage rate remained below the 41% of females 15-17 years of age who blogged (Lenhart et al., 2008, April 24, p. 25).

In addition to a lower percentage of preservice teachers blogging, fewer PSTs were reading blogs compared to 12 to 17-year-olds. Thirty-eight percent of preservice teachers read blogs while just under half of 12 to 17-year-olds read blogs or online journals (Lenhart et al., 2007, December 19, p. 11). The discrepancy was even higher when older teens were considered. Sixty-four percent of online 15 to 17-year old girls read other people's blogs and 52% of boys that age did the same. For preservice teachers, the numbers did not approach these levels with only 39% of female PSTs reading blogs and 35% of males reading them.

The ties between blogging and social networks were not as strong in preservice teachers as they were in teens. Only 27% of PSTs who used social networking sites also blogged. For 12 to 17-year-olds, this figure was 42% (Lenhart et al., 2007, December 19, p. 6). The gap was even bigger for reading blogs where 70% of 12 to 17-year-old social network users read blogs, but just 39% of preservice teachers who used social networking sites read them (Lenhart et al., 2007, December 19, p. 6).

Wikis Comparisons

As reported in the literature review, there was little prior data on wiki use with which to compare to preservice teachers' estimates. One pertinent study conducted by Salaway et al. (2007) found that 42% of undergraduate freshman and seniors accessed or used wikis (p. 42). The Preservice Teacher Survey data suggest that the percentage of PSTs ages 20-25 who accessed and used wikis (35%) was significantly lower than Salaway et al. found ($z = -4.15$; $p < .01$). In spite of differences in the percentages of current users, both the data collected by Salaway et al. and the Preservice Teacher Survey data are in agreement that the median frequency of use of those who currently read or contributed to wikis was weekly.

Comparisons of Audio and Visual Technologies Use

The comparative results for the audio and visual technological activities were mixed. Though slight differences were found in the percentages of current users between preservice teachers and other groups, larger differences existed when frequency of use was considered. Additionally, the trends for consumptive activities such as downloading video or music did not appear to hold true for their creative counterparts (e.g. uploading video or music).

Video Comparisons

Fewer preservice teachers were watching or downloading video from the Internet compared to the average 18 to 29-year-old American. According to data collected in the spring of 2007 by the Pew Internet & American Life Project, young adults ages 18-29 were the heaviest consumers of online video with 76% of this age group watching or downloading video (Madden, 2007, July 25, p. 3). A slightly lower percentage of

preservice teachers (71%) reported this same behavior. The PSTs were also less likely to be sharing video links with others. Only about one in four preservice teachers said they currently sent video links to others, for example through email or IM, as opposed to Madden's estimate of 67% of 18 to 29-year-olds who shared links (p. 7).

While the percentage of video consumers appeared slightly lower for preservice teachers compared to their larger age group, video consumption by PSTs was also a less frequent activity. In Madden's study, 31% of 18 to 29-year-olds who currently engaged in consuming video said they watched or downloaded a video the day prior to taking the survey—an estimate of daily usage (p. 3). In the Preservice Teacher Survey, about half that percentage (18%) said they watched or downloaded video from the Internet on a daily basis.

Another important difference, or lack thereof, had to do with gender and video consumption. In Madden's study, no significant differences were found between males and female in terms of the percentages watching or downloading video. In contrast, the data collected from the Preservice Teacher Survey clearly showed gender differences for the preservice teachers even after controlling for variables like age, major, desired grade level, and level in the teacher preparation program. When it came to watching or downloading video, the odds that a female preservice teacher engaged in this behavior were 67% lower than for a male PST (AOR = .331; $p < .001$; BIC = 6.54). That is, when controlling for the other variables mentioned, the probability of currently watching or downloading video content was .26 lower for females than males at the mean of the dependent variable (.71).

Unlike with the consumption of video media, no gender differences were present for preservice teachers when it came to creation of video for the web. Seventeen percent of PSTs reported currently uploading video to the Internet, a figure consistent with Madden's estimate of 15% for 18 to 29-year-old Americans (p. 3). Just under half of preservice teachers who uploaded video (48%) did so on a weekly or greater basis. This was more than twice the weekly rate (22%) estimated by the National School Boards Association (2007) for younger users ages 9-17 (p. 2).

Music and Podcasting Comparisons

Preservice teachers were slightly more likely to be downloading music than the average 15 to 17-year-old. Sixty-one percent of preservice teachers were currently downloading music compared to 57% of 15 to 17-year-olds (Lenhart & Madden, 2005, November 2, p. 11). However, such a claim must be tempered by the increased rates of high-speed Internet access for PSTs—a factor shown in previous literature to be positively correlated with music downloading. For example, when only 15 to 17-year-olds with high-speed Internet connections were considered, 67% of males and 58% of females download music (Lenhart & Madden, 2005, November 2, p. 10). For preservice teachers with wireless or Ethernet access at the university, on the other hand, 59% of males and 63% of female were found to be downloading music.

Preservice teachers were also more likely to have downloaded a podcast sometime in their life than were other 18 to 29-year-olds. About four in 10 preservice teachers ages 20-25 had ever downloaded a podcast, while 27% of online 18 to 29-year-olds had ever done so (Madden & Jones, 2008, August 28, p. 3) . In line with Madden & Jones' findings, male preservice teachers were more likely to have downloaded a podcast.

Over half (54%) of male preservice teachers had downloaded a podcast compared to 38% of female PSTs ($\chi^2 = 13.25$; df = 1; $p < .001$).

Even though larger percentages of preservice teachers downloaded music or audio podcasts compared to other groups, fewer PSTs were uploading their own audio content to the Internet. A study of online 9 to 17-year-olds suggested that 29% of online youth this age uploaded audio, music, or podcasts (National School Boards Association, 2007, July, p. 2). The estimate from the Preservice Teacher Survey data suggests about 18% of PSTs currently uploaded audio or music to the Internet. Despite the reduced percentage of preservice teachers uploading audio content, those who did were significantly more likely to be uploading content on weekly basis compared to younger uploaders. Over half (52%) of preservice teachers who currently uploaded audio content did so once a week or more, while just 12% of youth 9-17 years of age uploaded audio on a weekly basis (National School Boards Association, 2007, July, p. 2).

Conclusion

Compared to other groups, the preservice teachers in the study were more highly connected. At home or at the university, more than nine in ten preservice teachers reported having wireless or Ethernet connections. Given that previous literature indicated that broadband access and female gender were two factors consistently associated with increased online activity rates, one might hypothesize that the preservice teachers in the study ought to surpass most other referent groups in term of the percentage of current users. The comparisons in this chapter cast doubt on such a claim. While it seems true that greater percentages of preservice teachers were active with social communication technologies compared to American youth ages 12-17, comparisons made with other

university students showed that usage levels were fairly similar between the two groups. Moreover preservice teachers' usage statistics for web pages, blogging, wikis, video, and music tended to fall at or below the levels observed in other populations including those between the ages of 12-17. These findings support one of the conclusions from the previous chapter, that the category of technology—social communication, web publishing, or audio/visual—needs to be considered when making claims about preservice teachers' current online activities.

CHAPTER SIX

COMPARING PRESERVICE TEACHER AND INSTRUCTORS

In addition to the Preservice Teacher Survey data discussed thus far, a second survey was distributed to instructors in the teacher preparation program. This chapter compares and contrasts the online activities of the preservice teachers with their teacher education instructors.

Instructor Survey Demographics

According to the university's online schedule of course offerings, 100 individuals instructed courses in the teacher preparation program during the fall 2007 and spring 2008 semesters. The instructor data in this chapter came from the survey responses of 81 of these instructors.

Of the 81 instructors, 45 (56%) indicated they were graduate assistants at the university while 11 held assistant professor positions there. Ten respondents were associate professors and three were full professors. Just under half of the instructors (47%) reported being more involved with elementary education at the university. Forty-two percent said they were more involved with secondary education while 11% claimed equal responsibility for elementary and secondary preparation. The greatest number of respondents (46) came from senior-level course instructors, though 41 of the instructors taught at the internship level. Only 10 instructors taught junior-level coursework in the teacher preparation program[9].

[9] Some instructors taught at multiple levels in the program. This accounts for why the sum of instructors of junior, senior, and internship levels supersedes 81 (the number of total respondents).

The average age of all instructors in the survey was 43 years old[10]. However, the mean age of graduate assistants was found to be significantly lower than the mean age of the other instructors. The average age of graduate assistants in the teacher preparation program was 37-years-old whereas the faculty/staff[11] had a mean age of 51 years. Finally, like the Preservice Teacher Survey respondents, the data reflected a higher number of responses from female instructors (68%) compared to male instructors.

One hundred percent of instructors who responded to the survey said they use the Internet on a daily basis. In a typical week, their usage added up to an online average of just under 18 hours ($\bar{x} = 17.86$; $\sigma = 11.92$)—two hours more per week than the preservice teachers' spent online.

Comparative Use

When it came to the online activities of teacher preparation program instructors, no significant differences were found between instructors with elementary education emphasis and those with secondary emphasis. However, the discrepancies between graduate assistants and faculty/staff suggested it was sometimes appropriate to consider these two groups as separate populations. In half of the activities discussed below, graduate assistants and faculty/staff had significantly different proportions of users/non-users[12]. Figure 6.1 below presents a comparative view of graduate assistant and faculty staff usage with statistically significant differences between these two instructor groups

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[10] Age reports are estimates based on the instructor's year of high school graduation. Age was calculated by subtracting 18 years from the year they graduated to provide an approximate year of their birth.

[11] For the purposes of this chapter, faculty/staff refers to instructors who were not graduate assistants. This group is comprised of assistant, associate, and full professors as well as adjunct, visiting, and postdoctoral instructors.

[12] Although the usage estimated discussed below indicated statistically significant differences between graduate assistants and faculty staff, these differences disappeared for all but one technology (IM) when controlling for age.

indicated by asterisks to the right of the group's percentage (e.g., 47%**). Additionally, Figure 6.1 permits comparison of instructor use with the use estimates observed from the PSTs. Asterisks to the left of the activity (e.g., **Use Social Networks) indicate that the proportion of instructors (all) engaging in the specific activity were significantly different from the proportion of PSTs who do the same (See Appendices T and U for actual test statistics).

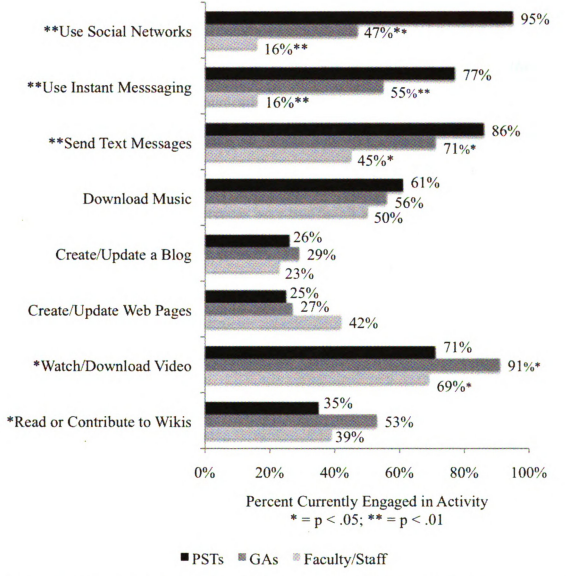

Figure 6.1. ***Usage Comparisons Between Preservice Teachers and All Instructors and Between Two Categories of Instructors***

Despite the traditional trend of usage declining with age, the proportion of instructors currently using the technologies surveyed were not statistically different for three out of the eight technologies from the proportion of preservice teachers currently using them. For example, 54% of all instructors reported currently downloading music which was only 7% fewer than their preservice teacher counterparts and within the 95% confidence intervals for these estimates. Or, in the case of blogging and creating/updating web pages where instructors outpaced PSTs, the differences were nonsignificant.

The majority of the usage differences between instuctors and preservice teachers were observed in the social communication technologies. Instructor usage for each of the three social communication technologies—social networks, instant messaging, and text messaging—were found to be significantly different from the preservice teachers' estimates. These significant differences were true for all levels of comparison: for PSTs versus all instructors, PSTs versus graduate assistants, PSTs versus faculty/staff, and graduate assistants versus faculty/staff (See Appendix V). In all cases, the preservice teachers' estimates superceded instructor estimates of any kind and graduate assistant estimates were always significantly larger than faculty/staff estimates. Social network use topped the list for the biggest discrepancy between preservice teacher use and instructor use with 61% fewer instructors using them than PSTs. The percentage differences were 40% and 26% for instant messaging and sending text messages, respectively.

Watching/downloading video and reading or contributing to wikis were the only activities for which instuctor use significantly exceeded preservice teachers' use. Eighty-one percent of instructors currently watched or downloaded video from the Internet

whereas only 71% of preservice teachers shared this trait ($z = 2.14$; $p < .05$). This overall difference, however, is due to the proportion of graduate assistants who watched or downloaded video (91%) being significantly higher than the preservice teachers' estimate ($z = 4.39$; $p < .01$). The proportion of faculty/staff who watched or downloaded video (69%) was not significantly different from that of PSTs. The story was similar for reading or contributing to wikis. A statistically higher percentage of instructors were reading or contributing to wikis (48% v. 35%; $z = 2.23$; $p < .05$) though once again this difference was due to more graduate assistants engaging in the activity (53% v. 35%; $z = 2.36$; $p < .05$) rather than differences between faculty/staff and preservice teachers (39% v. 35%; $z = .46$; n.s.).

When usage was considered across the eight technologies surveyed, preservice teachers remained ahead of instructors in terms of the average number of activities they were currently doing and graduate assistants remained ahead of faculty/staff (see Figure 6.2).

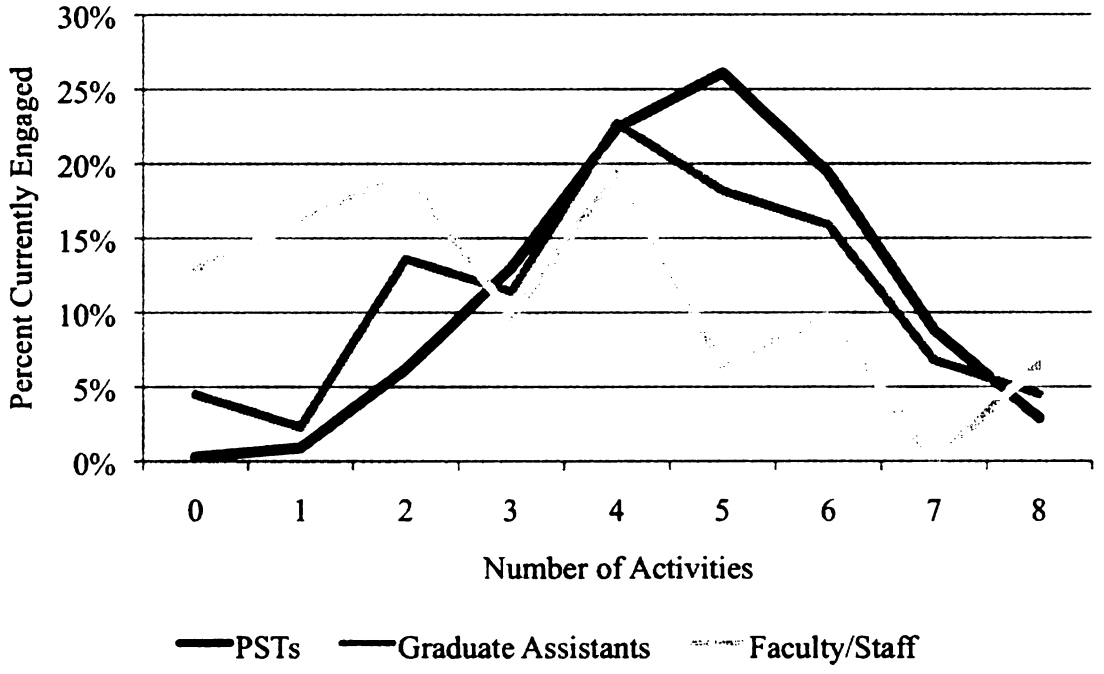

Figure 6.2. ***Number Out of Eight Activities that Preservice Teachers and Instructors Currently Engage In***

On average, preservice teachers were engaging in 4.74 of the eight activities compared to 3.79 of the eight for all instuctors ($t = 5.04$; $df = 822$; $p < .01$), and graduate assistants outpaced faculty/staff 4.25 to 3.03 ($t = 2.499$; $df = 73$; $p < .05$). The overall difference between preservice teachers and instructors was due to the discrepancy between faculty/staff and PSTs ($t = 4.18$; $df = 31$; $p < .01$). No significant difference was found between preservice teachers and graduate assistants ($t = 1.64$; $df = 46$; $p = .11$). The median number of the eight activities were 5 for preservice teachers, 4 for graduate assistants, and 3 for faculty/staff.

Congruent with the individual social communication technologies presented above, the aggregate use of these technologies by instructors lagged behind preservice teachers' use (see Figure 6.3).

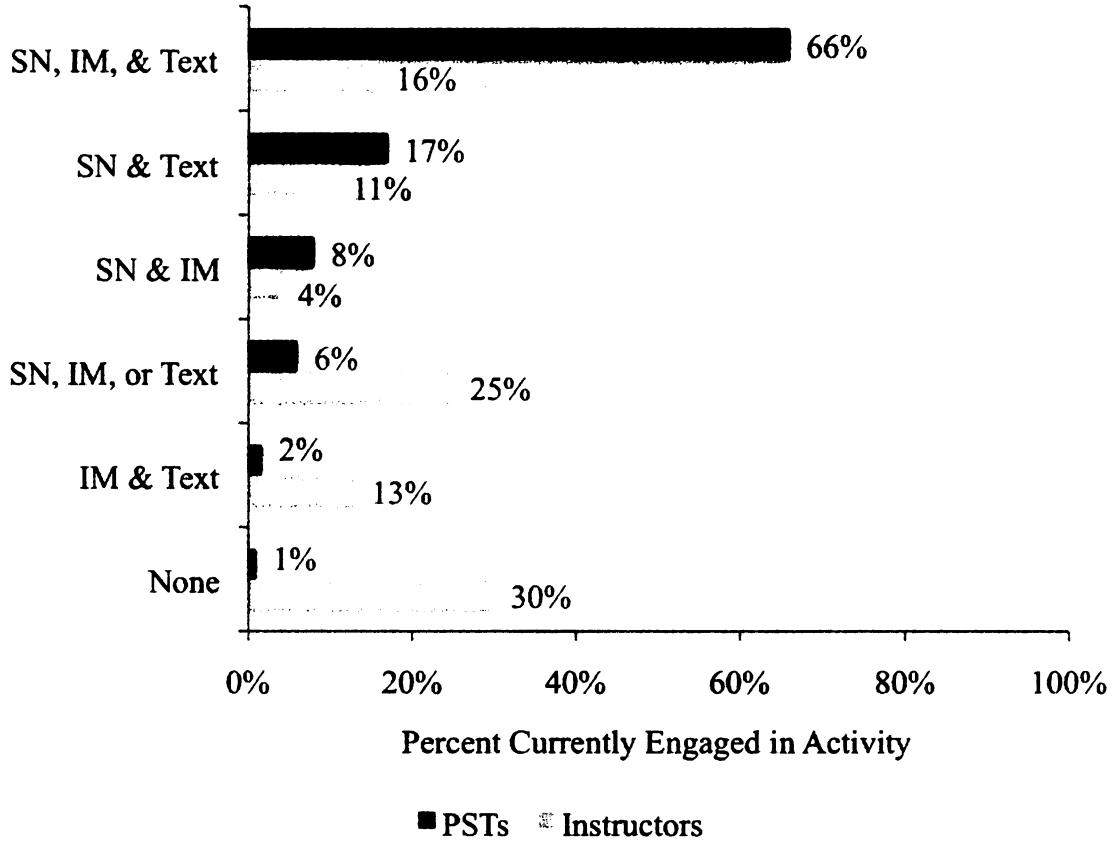

Figure 6.3. ***Comparisons of Various Combinations of Social Communication Activities Between Preservice Teachers and Instructors***

Instructors in the teacher preparation program were most likely (30%) to be doing none of the three activities—using social networks, using instant messaging, or sending text messages—and an additional 25% were doing only one of the three. In contrast, over 66% of preservice teachers ages 20-25 reported currently doing all three.

Unlike the social communication technologies, Figure 6.4 below, showing the combined use of web publishing technologies, indicates that preservice teacher and instructor use was quite similar.

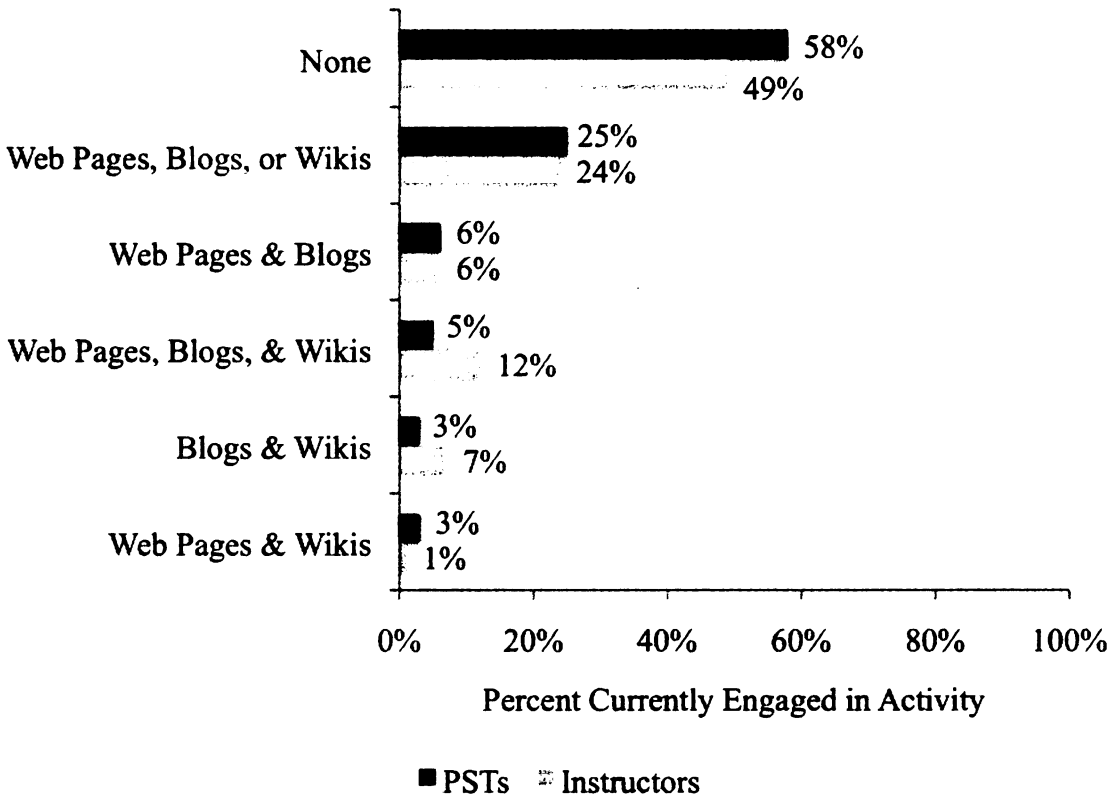

Figure 6.4. ***Comparisons of Various Combinations of Web Publishing Activities Between Preservice Teachers and Instructors***

About half of each populaton was not doing any of the three activities and another 25% was currently doing only one. That left roughly one in four preservice teachers or instructors who were currently doing two or more of the web publishing activities surveyed.

In order to limit the length of the Instuctor Survey, fewer questions were asked regarding the audio/visual technologies. In terms of usage, instructors were only asked if they download music and if they watched/downloaded video from the Internet. Here, like the web publishing technologies, the proportion of current users was similar among preservice teachers and instructors (see Figure 6.5).

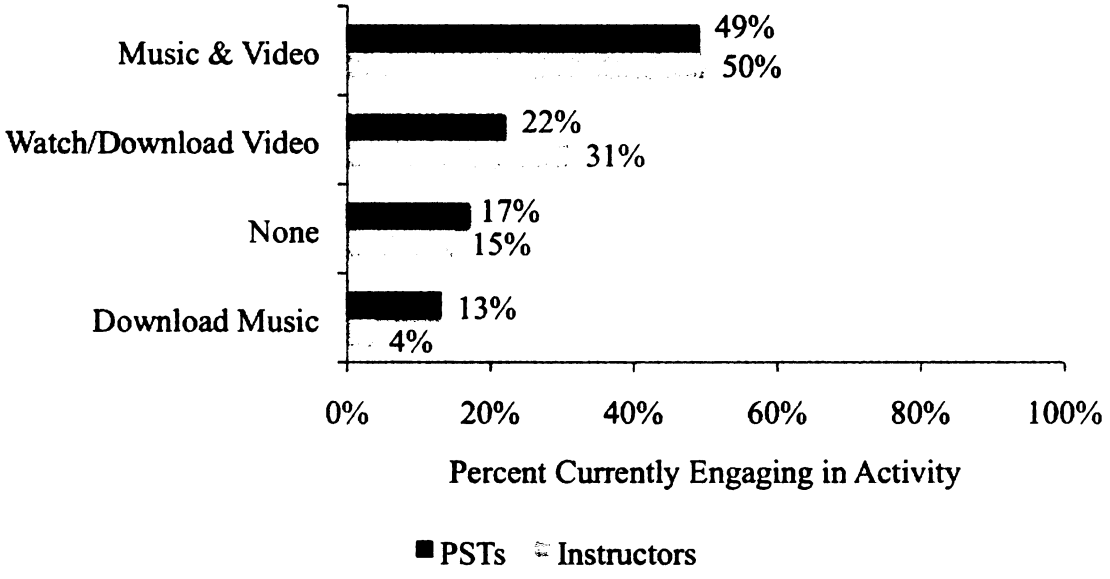

Figure 6.5. ***Comparisons of Various Combinations of Music and Video Activities Between Preservice Teachers and Instructors***

Half of each group both downloaded music and watched/downloaded video from the Internet and those doing only one of the two were more likely to be watching/downloading video.

Overall, despite the trend of age being negatively correlated with technology use, the proportion of preservice teachers and instructors currently engaging in various web-based activities were not that different for web publishing and audio/visual activities. In fact, for two of the five activities involving web publishing or audio/visual activities, higher percentages of instructors were found to be doing them than the preservice teachers were. The data seemed to indicate that preservice teachers' use only exceeded that of instructors when it came to the social communication technologies.

Comparative Frequency of Use

The frequency patterns mirrored the usage data for preservice teachers and instructors. That is, preservice teachers who currently used the social communications technologies did so at a significantly higher frequency than did instructors. Perhaps the

clearest examples of this was evident in the percentages of daily users of social networks, instant messaging, and sending texts messages. For each of these activities, about twice as many preservice teachers claimed to be daily users compared to instructors. Though theses gaps close when frequency of use was extended to a week-long timeframe, each remained double-digits and statistically significant at the .01 alpha level.

Table 6.1. ***Comparative Frequency of Use Between Preservice Teachers and Instructors***

Activity		Modal Response	Daily	Once a Week or More
Use Social Networks	PST	Daily	64%**	95%**
	Instructor	Couple Days a Week	26%**	81%**
Use Instant Messaging	PST	Daily	55%**	89%*
	Instructor	Couple Days a Week	28%**	72%*
Send Text Messages	PST	Daily	67%**	96%**
	Instructor	Daily	37%**	78%**
Create/Update Web Page	PST	< Once a Week	7%	55%*
	Instructor	< Once a Week	4%	36%*
Create/Update Blog	PST	Once a Week	4%	80%
	Instructor	Once a Week	10%	71%
Read Wikis	PST	≤ Once a Week	11%	72%
	Instructor	< Once a Week	11%	61%
Contribute to Wikis	PST	Once a Week	9%	77%
	Instructor	Couple Days a Week	14%	67%
Watch/Download Video	PST	Couple Days a Week	18%*	77%
	Instructor	Once a Week	9%*	77%
Download Music	PST	< Once a Week	7%	55%
	Instructor	< Once a Week	7%	42%

* = $p < .05$; ** = $p < .01$

As with the usage statistics, instructors and preservice teachers who used web publishing and audio/visual technologies appeared to do so with relatively the same frequency. In only one instance, watch/download video, was the percentage of daily users signficantly different between instructors and preservice teacehers, and in only one

case was there a significant difference in the percentage of weekly users—this time with creating/updating web pages.

Comparison of Perceived Usefulness

In their respective surveys, both instructors and preservice teachers were asked questions about the usefulness of specific activities for K-12 teaching[13]. Preservice teachers were asked how useful they thoughts specific activities would be in their own teaching, and instructors were asked to consider the usefulness of these same activities for K-12 teaching. Unlike the instructor usage estimates that exhibited significant differences between graduate assistants and faculty/staff, the perceptions of relative usefulness of these technologies were similar for each group and are therefore reported below only as an instructor aggregate[14] (See Figure 6.6).

Obviously given the rate at which preservice teachers outpaced instructors with regard to social networking activities (95% to 34%), it would not be surprising to find that PSTs viewed an activity such as creating or updating a social networking profile as being more useful to teaching than instructors did. But, surprisingly, they do not. On the contrary, despite their relative lack of use, a significantly higher proportion of instructors (27%) rated creating or updating a social network profile as "very useful" or "useful" compared to only 12% of preservice teachers ($z = -2.93$; $p < .01$). This pattern was not limited to the social networking rankings.

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[13] Questions 19-21 on the Preservice Teacher Survey and 7-9 on the Instructor Survey.

[14] Interestingly, elementary and secondary instructors seem to share the same opinions as to the usefulness of various activities. For seven of the eight activities, there were no significant differences in the average usefulness score for the two groups. The only significant difference was that secondary instructors on average found uploading video more useful than elementary instructors. Though this might be in part due to smaller sample sizes, there was also no consistent trend observable. For some activities, elementary means were greater (though non-statistically) and vice versa.

For seven of the nine activities reported below, significantly greater percentages of instructors held more optimistic views than the preservice teachers, and for the other two, there were no significant differences. (Also see Appendix W).

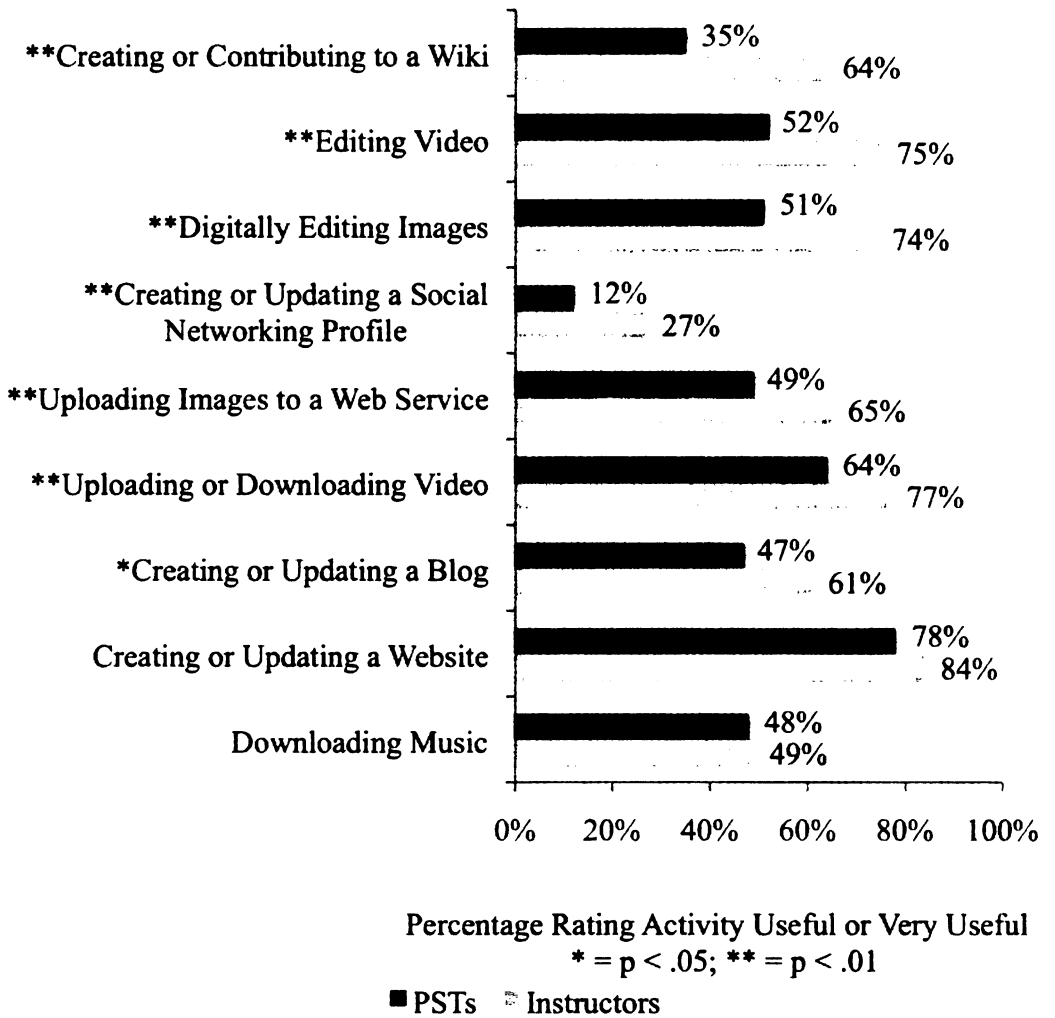

Figure 6.6. ***Comparisons of Preservice Teachers' and Instructors' Ratings for Usefulness of Activities in K-12 Teaching***

The largest disagreement between instructors and preservice teachers was found in the activities of creating or contributing to wikis where 64% of instructors viewed these activities as "very useful" or "useful" compared to only 35% of PSTs ($z = -5.11$; $p < .01$). This time, the trend aligned with instructors' increased use of wikis. The results

were mixed for activities in which the same percentage of instructors and preservice teachers engaged in them. For instance, essentially the same proportion of instructors and preservice teachers perceived creating or updating a web page as being on the useful end of the spectrum, though for blogging, instructors were significantly more optimistic.

As mentioned in chapter four, preservice teachers' skill level was positively correlated with how useful they thought the activity would be in their own teaching. Unfortunately, it appears that preservice teachers' skill level ratings were negatively correlated with instructors' ratings of activities for K-12 teaching (see Figure 6.7).

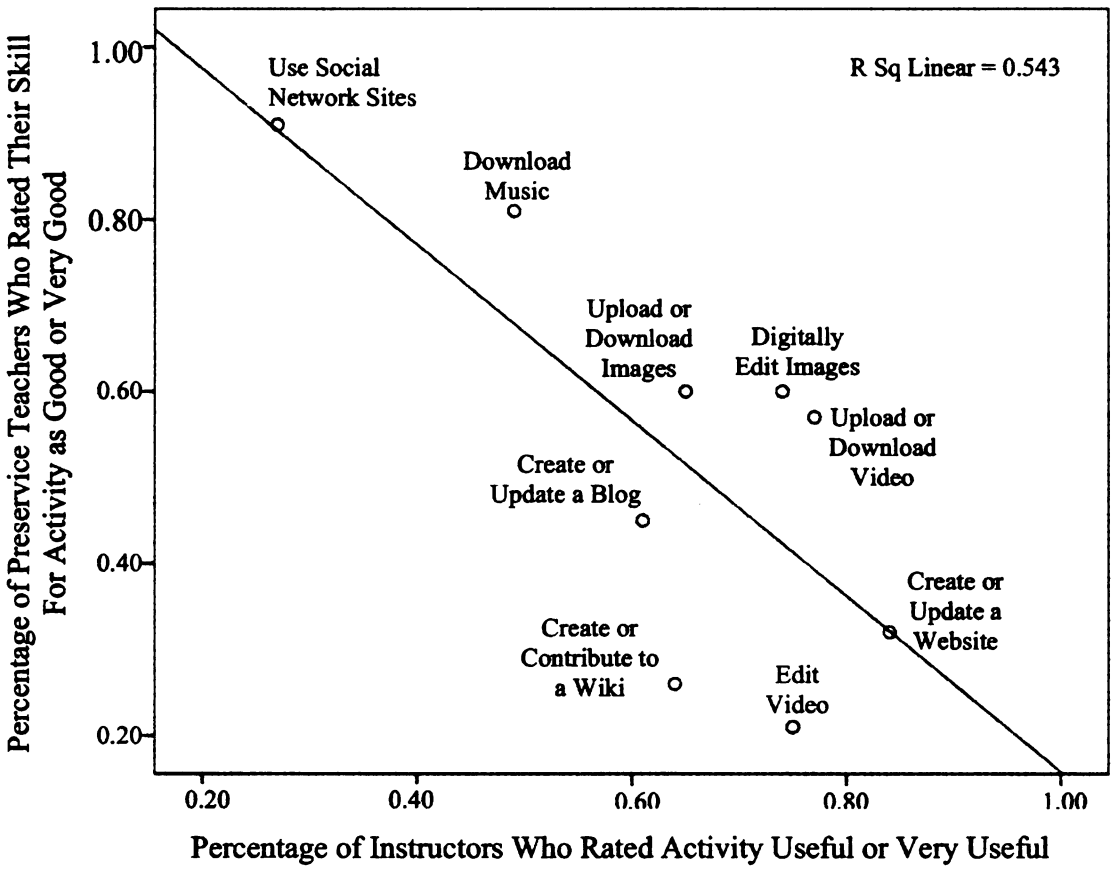

Figure 6.7. ***Negative Relationship Between Preservice Teachers' Skill Levels for Activities and Instructors' Usefulness Ratings of Activities for K-12 Teaching***

Figure 6.7 depicts that as the percentage of instructors who rated an activity as being useful or very useful for K-12 teaching increased, the proportion of preservice teachers in the program who rated their skills for the activity as good or very good decreased. The correlation coefficient between instructor usefulness and preservice teachers' skill level was found to be -.74. This negative relationship was most apparent for the web publishing technologies of blogs, wikis, and web design, whereas the percentages were slightly more in balance for the audio/visual activities (excluding editing video). Clearly, this wide divergence between instructors' perceived usefulness and preservice teachers' skill levels warrants further exploration.

Instructors' Perceptions of Preservice Teachers' Use

Though earlier sections of this chapter concerned themselves with the difference in actual use and frequency of use between instructors and preservice teachers, perhaps a more intriguing question was whether instructors in the teacher preparation program accurately perceived the number of preservice teachers who were currently engaging in specific online activities. In one section of the Instructor Survey, instructors were asked to estimate the percentage of preservice teachers[15] who said they currently engaged in a specific technological activity. The mean estimates from instructors allowed for comparison with the proportion of preservice teachers who self-reported as being current users of those technologies. As Figure 6.8 highlights below, the tendency appeared for instructors to overestimate the percentage of PSTs who were currently engaging in the activities surveyed.

Of the activities reported in Figure 6.8, instructors significantly overestimated the proportion of preservice teachers currently doing the activity five out of the eight times (See Appendix X for test statistics). Surprisingly, the activity of downloading music from the Internet yielded the largest discrepancy between instructors' perceptions and preservice teachers' actual use. The mean instructor estimate for preservice teachers who currently downloaded music was 80%—an overestimation of 21% more that the actual PST percentage ($z = -16.38$; $p < .01$). In a practical sense, this means that in an average class of 25 students, there were five fewer preservice teachers who were currently downloading music than instructors would have guessed, or across the teacher

[15] The Instructor Survey asked instructors to estimate the percentage of all preservice teachers currently doing a specific technological activity rather than just PSTs ages 20-25. Therefore, the PST estimates slightly vary from those reported in other sections and chapters because they include the entire age range of PST responses. In none of the 8 cases, though, did the preservice teachers' estimates shared here differ significantly (α=.05) from the 20-25 year-old PST responses.

preparation program[16], 308 fewer preservice teachers downloading music.

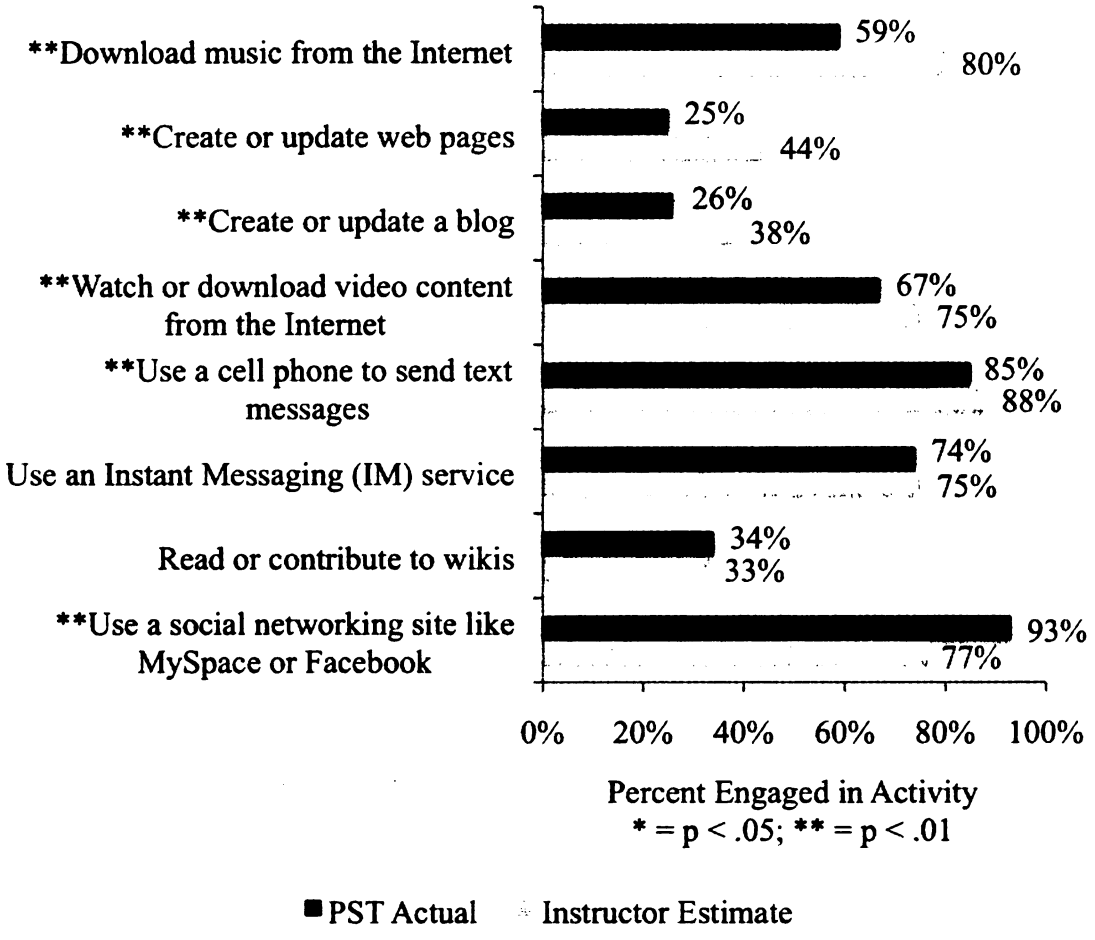

Figure 6.8. ***Comparisons of Preservice Teachers' Use with Instructors' Estimates of Their Use***

Perhaps of more pedagogical interest than the downloading music differences were differences involving web design. Roughly four out of five preservice teachers and instructors believed that creating or updating a web page would be "useful" or "very useful" for K-12 teaching. Yet when it came to actually doing this activity, instructors thought that just less than half of PSTs were currently designing web pages when the data suggested only a quarter of the preservice teacher population were currently working on

[16] Program estimates were calculated using the 1,466 PSTs who enrolled in teacher preparation program courses during the fall 2007-spring 2008 semesters.

web pages. Again, in practical terms, this means that in an average class of 25 students, there were five fewer preservice teachers who were creating or updating web pages than instructors thought and about 279 fewer across the teacher preparation program.

The instructor estimates did not always exceed actual preservice teacher use. For the activities of using instant messaging services and reading or contributing to wikis, instructor estimates were only off by one percent. And even in the case of sending text messages, where the difference was statistically significant, the three percent overestimation by instructors seems to be of little practical significance. The only activity instructors underestimated was preservice teachers' use of social networks. For this activity, the instructor estimate came in 16 percentage points lower than the 93% of preservice teachers found to be currently using them.

Besides the trend that instructors tended to overestimate the percentage of preservice teachers currently engaging in the activities surveyed, two other trends were worth mentioning. The first was that an instructor's own engagement with an activity was correlated with higher preservice teacher use estimates, and therefore, worse estimates (see Figure 6.9).

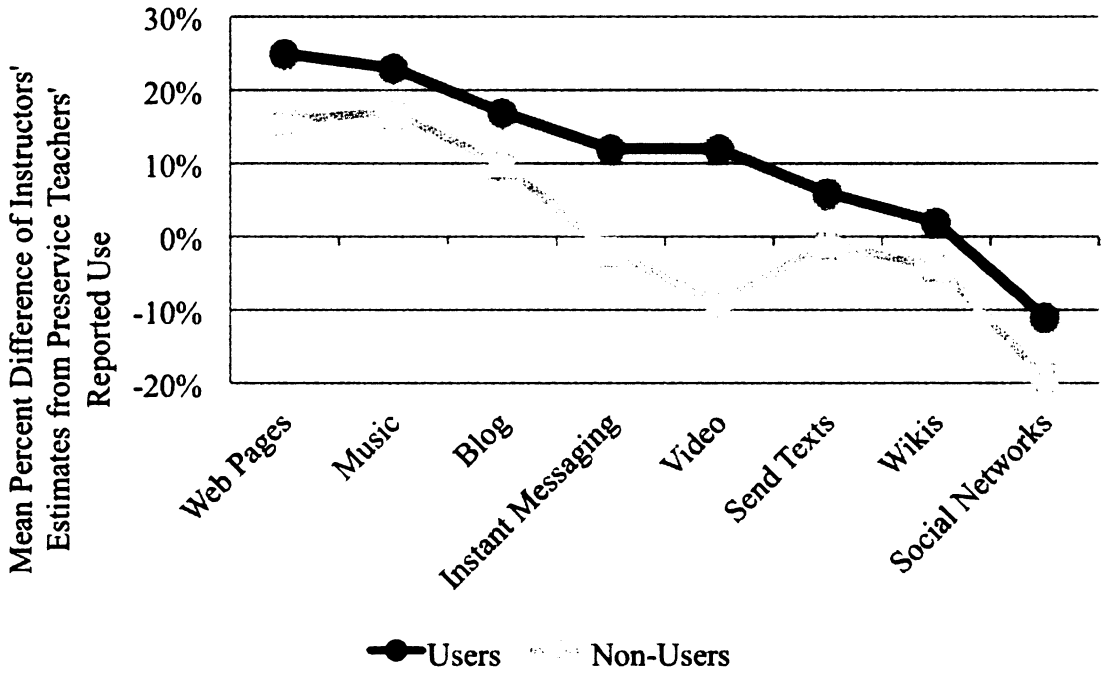

Figure 6.9. Effects of Instructors' Use on Their Estimates of Preservice Teachers' Current Use

As Figure 6.9 indicates, the mean residuals[17] for instructors who were users of a specific technology were always greater (more in the positive direction) than the mean residuals for non-using instructors for that technology. This shows that on average, instructors who were using a technology themselves estimated more preservice teachers were using the technology than the non-using instructors. Additionally, with the exception of estimates for wiki use and social network use, the mean residual scores for instructors who used a technology were further away from zero than the non-users mean residual scores were. That is, for six of the eight activities surveyed, instructors who used the technology themselves produced worse estimates of preservice use than the non-using instructors did.

[17] For each activity, the residuals were calculated by first subtracting the estimate derived from the preservice teacher data from each instructor's estimate of preservice teachers' use. Then, the mean residuals were calculated for users and non-users separately by summing the residuals for each group and dividing by the number of instructors in that group.

Furthermore, the other trend was that, on average, instructors who personally engaged in a specific online activity tended to be more confident in their estimates of preservice teachers' engagement in the same activity compared to those instructors who were not doing the activity themselves (see Figure 6.10).

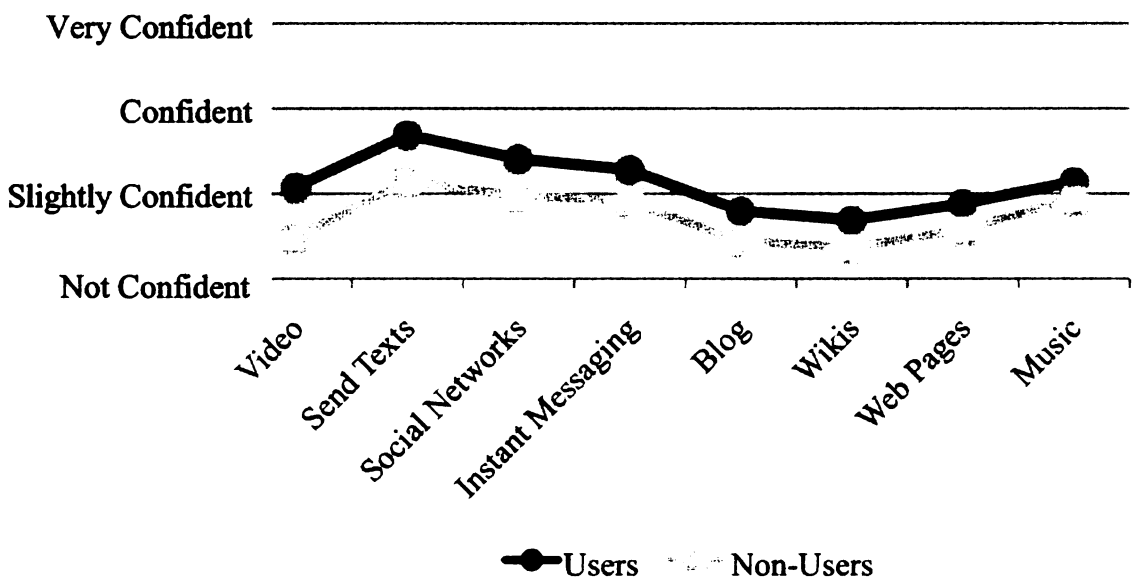

Figure 6.10. ***Mean Confidence Differences Between Instructor Users and Non-Users for Their Estimates of Preservice Teachers' Use***

Though the differences between users and non-users were not always significant, users always had a higher mean confidence level compared to non-users.

These three trends—that instructors tended to overestimate the percentages of preservice teachers who currently engaged in the online activities surveyed, that instructors who engaged in the activities themselves tended to have estimates that were even greater overestimates of actual PST use, and that instructors who did the activities themselves were more confident in their estimates—should act as red flags for relying on instructors' opinions about preservice teachers' technology use as the only data source. The fact that 68% of instructors indicated observing preservice teachers engaging in the

activities was "important" or "very important" in shaping their estimates and that 73% of instructors marked one of the same two categories for hearing students talk about engaging in the activities is a testament to just how difficult it is to get an accurate appraisal of technology use from classroom interactions yet how powerful an impact these interactions have on instructors' perceptions.

Comparisons of Perceived Preparedness

Almost 60% of preservice teachers[18] in the teacher preparation program felt they were very prepared or prepared to teach with technology. The instructors in the program, on the other hand, held the opposite perspective. Sixty-percent of instructors felt that the preservice teachers in the program were slightly prepared or not prepared to teach with technology.

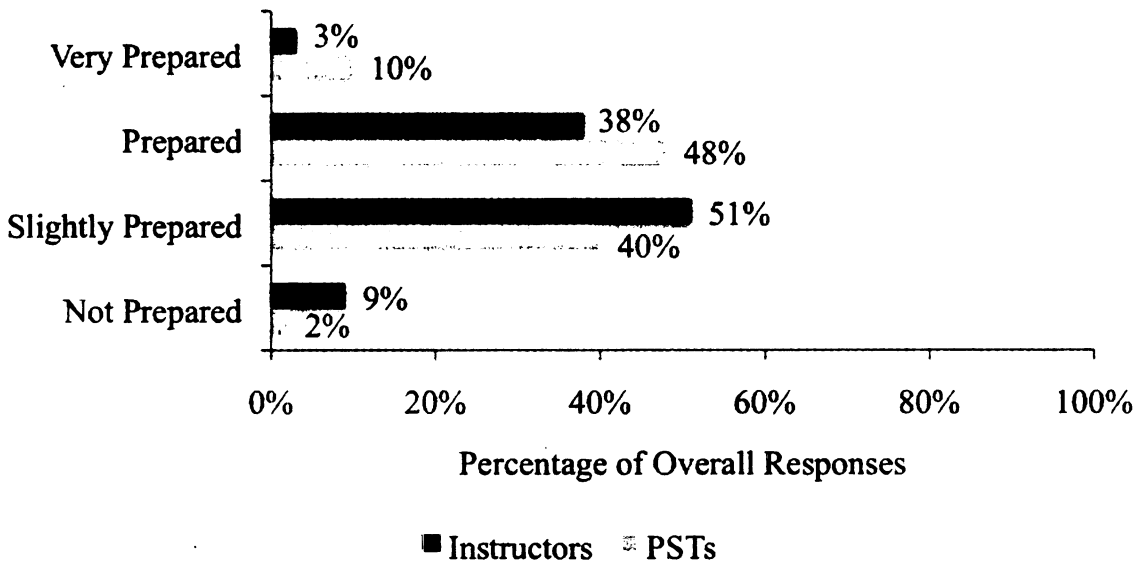

Figure 6.11. ***Perceived Preparedness of Preservice Teachers to Teach with Technology***

Though the data presented in this chapter do not provide a final answer as to whether or not these preservice teachers are prepared to teach with technology, they do

[18] Calculated for all respondents of the PST survey, N=1021, or 923 who answered the question although the statistics are also consistent for the 20-25 yr olds.

provide reliable and accurate information that bears on this question. Such data might be leverage by programs to engage both instructors and preservice teachers in constructing meaning from the data and using it to adjust perceptions of preparedness.

Conclusion

The data presented in the chapter indicated that while preservice teachers were heavier users of social communication technologies, when it came to the web publishing and audio/visual technologies they were at or below the rates of use for instructors. This contradicts the notion of younger age groups being more likely to be using the technologies surveyed compared to their older instructors. The data also showed that the preservice teachers were less likely to see these activities as being potentially useful in their own teaching compared to the instructors' perceptions of these activities for K-12 teaching. Moreover, the activities that the instructors valued the most for K-12 teaching were unfortunately the same activities for which the lowest percentages of preservice teachers self-reported having good or very good skills. These findings, along with the evidence presented that instructors' held little confidence in their estimates of preservice teachers' online technological activities and with good reason, demonstrate the need for quality data to inform programs.

CHAPTER SEVEN

CONCLUSIONS AND DISCUSSION

This chapter presents a brief summary of major findings, discusses implications for teacher preparation programs, and suggests future directions for research.

Key Findings

This study began with the pragmatic questions of instructors wanting to know more about the technological qualities of their students. The research yielded data that began to answer these questions and provided a feasible and frugal example for programs to follow in designing their own programmatic inquiries. The data and methods provided are not a comprehensive solution. Other forms of inquiry will be necessary to capture the richness of the paths by which preservice teachers become technologically competent. Yet, in its own small way, it contributed five key findings regarding these preservice teachers and their instructors.

First, instructors in the teacher preparation program were not confident in estimating preservice teachers' use of online technologies. This lack of confidence appears warranted given their consistent overestimations of the percentages of preservice teachers who currently engage in the online activities surveyed. Second, despite the popular perception that young Americans are heavy users of technology, this study showed such a generalization is limited to social communication technologies. While almost all preservice teachers used social communication technologies, about three quarters to half engaged in audio/visual technologies and only a quarter worked on web publishing activities. Third, preservice teachers' self-reported skill level for online

activities was positively correlated with their perceived usefulness ratings of activities in their own teaching. However, the preservice teachers' skill levels for nine different online activities were negatively correlated with their instructors' ratings of the usefulness of these tools for K-12 teaching. Fourth, preservice teachers were less likely to see specific technological activities as useful in their own teaching compared to the instructors' perceptions of these activities for K-12 teaching. Fifth, compared to Americans the same age or younger, a greater percentage of preservice teachers used social communication technologies. Yet, for activities involving web publishing and audio/visual technologies, the preservice teachers displayed percentages similar to or below those of other individuals. Surprisingly, preservice teachers and instructors reported similar usage of web publishing and audio/visual technologies with instructors being the more likely users.

The Need for a Top-Down Approach to Programmatic Data Collection

One implication of these findings is that teacher preparation programs should assist instructors by collecting reliable and up-to-date information that can inform their pedagogical decision-making. Fortunately, programmatic data gathering would not only benefit instructors in the program, but would also have the additional benefit of producing the systematic, faculty-driven research that credentialing organizations like TEAC demand.

There are three major limitations when trying to aggregate programmatic data from inquiries at the course level that make a top-down approach a more attractive option at times. First, creating reliable and valid instruments takes substantial time and skill. Having multiple instructors design similar instruments, distribute them through their

courses, and compile their data for sharing with other faculty or institutions is inefficient. It seems reasonable that instructors who already have heavy workloads would agree with TEAC that the collection of programmatic information should not be a burdensome enterprise, but rather reflect a frugal process that limits unnecessary activity. Second, when individual instructors design their own instruments, there will be inconsistencies in the types of questions asked and the wording of these questions. These inconsistencies lead to measurement error and difficulty when comparing findings across course sections—a necessity for collecting programmatic evidence.

Third, the variation due to sampling classes with 25 or less students in them makes estimating overall program means difficult. As an example of why extrapolating data from individual courses to make inferences about the entire program is difficult, consider the following four random samples drawn from the preservice teacher data set. Using SPSS, four random samples of 25 preservice teachers were drawn and the percentages of preservice teachers who claimed to be currently creating or updating web pages were calculated (see Table 7.1).

Table 7.1. ***Percentages of Preservice Teachers Creating or Updating a Web Page in Four Randomly-Drawn Samples from the Survey Data***

Random Sample of 25 PSTs	Percent Creating or Updating a Web Page
A	17%
B	16%
C	35%
D	9%

One can imagine each sample representing the results of four instructors' attempts to measure the percentage of preservice teachers in their courses who create or update web pages. In sharing their results, professor D would claim less than 10% of preservice

teachers are designing web pages. Professors A and B would argue the true percentage is in the upper teens, and professor C would say the other estimates are too low and that the true percentage is closer 35%. In further discussion, they might explain away the differences as being caused by their subject matter or variation in their question wording, or they might view one of the extreme scores as an outlier. In any event, it is hard to imagine the four using statistically plausible data to converge on the actual average of 25% calculated from preservice teacher data set.

Collecting Programmatic Data from the Top-Down

Because of the problem with using data collected at the course level to make inferences about the entire program, it would be preferable for data to be collected using a top-down approach. One such approach would be to use a common instrument that aggregates the data for all students in the teacher preparation program, but which also allows instructors to generate reports specific to the individuals enrolled in the courses they teach. Since Learning Management Systems (LMS) are ubiquitous at the university level (Market Data Retrieval, 2005), leveraging these systems may provide a suitable solution. One can imagine a web-based survey collaboratively designed by faculty that preservice teachers complete once a year or more often. The data from each survey could be stored in a database that interfaces with the learning management system used in the program. Course instructors could then generate technology reports through the LMS that provide data for those enrolled in their courses. Such an aggregated view of the data would yield timely, up-to-date information about one's students while also offering a picture of how these 25 students compare to the larger population. Instructors could use this information prior to meeting students to design syllabi and instruction that reflect the

needs of the particular students in their courses. The collective faculty could use the programmatic data to reflect on areas for improvement and cite evidence of progress in accreditation reports.

Ways this Study Illustrates the Usefulness of Programmatic Data

As a way of illustrating how programmatic data might generate discussion, consider three ways the data presented in this study could be used. First, the data collected on these preservice teachers captures a reliable and valid measure of preservice teachers' online activities at a single point in time, which can be compared to instructors' estimates and to the technology standards. For example, faculty and other instructors could use this data to refine their schemas of preservice teachers' actual technology use and to reflect on reasons for their overestimation. Similarly, the data can be compared to the technology standards to identify areas that represent the biggest challenges for teacher educators. From this data set, for example, instructors can surmise that less emphasis is needed to help preservice teachers develop technology knowledge of social communication technologies and that more emphasis must be placed on helping them develop the pedagogical and content knowledge components. Conversely, the data suggest most preservice teachers lack the technology knowledge needed for web publishing technologies. Addressing these weaknesses, perhaps in part by sharing these data directly with students, seems an appropriate strategy for improving their technological pedagogical content knowledge, TPACK (Koehler & Mishra, 2008; Mishra & Koehler, 2006).

Second, because technology standards stress teacher modeling and student application of a variety of technologies, the percentage of preservice teachers currently

using specific technologies coupled with data from self-reports of their skill level with these technologies represent one kind of evidence programs might collect over time to demonstrate preservice teachers' growth with technology. Such data must be interpreted cautiously though. Simply being a current user or possessing high skill level with an activity does not guarantee a preservice teacher possesses the technological pedagogical content knowledge needed to integrate it into the classroom; such assessment is likely beyond the scope of a self-administered survey instrument. However, it does seem reasonable given the rate of change with technology that non-users and those who self-report lower skill ratings lack the fundamental aspects of TPACK needed to successfully model these technologies in their classrooms and facilitate its use with students. Therefore, teacher preparation programs should demonstrate that the percentages of preservice teachers currently using specific technologies increase as students move through the teacher preparation program and that students' skill levels with these technologies also follow a similar trajectory.

The data presented in Table 7.2 represent three different cohorts as opposed to longitudinal data on one cohort over three years, so one must exercise caution when interpreting whether these preservice teachers are following the positive growth trajectory. Longitudinal work would be needed to confirm the existence of a trend. Nevertheless, Table 7.2 appears to indicate that preservice teachers get a boost in their technology level during their senior year, but fall off during their internship year.

Table 7.2. ***Percentage of Current Users by Level in Program***

Activity	Juniors	Seniors	Interns
Social Networks	97%	96%	92%
IM	85%	78%	69%
Send Texts	89%	87%	80%
Web Pages	13%	33%	30%
Blogs	12%	53%	14%
Wikis	28%	43%	35%
Watch Video	70%	74%	71%
Download Music	68%	58%	56%

Consider, for example, the data on blogging. Only 12% of juniors in the program claimed to be current bloggers. Over 50% of seniors, on the other hand, reported being bloggers. Closer investigation of the senior preservice teachers who blogged showed that 44% of them said the only reason they blogged was because it was required as part of their coursework—evidence that the program was having a positive effect on these students' technological activity. Unfortunately, the blogging levels for interns dropped to about the same level as the juniors, 14%. There are certainly plausible explanations for why interns' level of technology use would decrease: lack of available technology in their placement settings, little technology integration modeled or supported by the mentor teachers, increased demands on their time. These are real challenges teacher preparation programs and their preservice teachers face, and both will be held accountable for making progress towards satisfying the technology integration expectations established by ISTE and state boards of education. Teacher education programs must continue exploring ways they can support preservice teachers and their mentor teachers in learning to integrate technology into their field placements.

Third, the data collected on the preservice teachers and their instructors indicated there were two important relationships between skill level and ratings of usefulness for

these technologies in the K-12 classroom. First, preservice teachers' skill levels were positively correlated with their perceived usefulness ratings meaning that the higher preservice teachers rated their skill level for an activity, the more useful they saw the activity as potentially being for their own teaching. Unfortunately, the second important relationship was that the activities instructors rated as being most useful for K-12 teaching were negative correlated ($r = -.74$) with preservice teachers' current skill levels. For instance, 84% of instructors rated creating or updating web pages as a useful or very useful activity for K-12 teachers. Interestingly, 78% of preservice teachers also rated web page design as potentially useful or very useful in their own teaching. Despite this agreement, only 32% of preservice teachers rated their skill levels with creating or updating web pages in the good or very good categories. Once again, one can imagine instructors using this data in discussions with their students to brainstorm possible ways to help them reach the technological goals they share in common.

Methodological Suggestions for Survey Design

The survey instruments used in this study were designed to allow for comparisons with American youth and young adults in general. Therefore, the surveys themselves probably should not be taken and used as is for longitudinal, programmatic assessment. In working with and studying this data for almost a year, there are a couple of recommendations I would make to teacher educators working to design technological surveys.

The first recommendation is to condense use and frequency of use questions into a single question that inquires about use through frequency. For web pages, a sample question would be "About how often do you create or update a web page?" (Never, Every

Couple Months, Monthly, Weekly, Daily). Such a question frame still provides insight into the percentage of preservice teachers engaging in the activity, but does so in a more precise manner that asking about current use. The second recommendation is to write questions capable of producing a more nuanced look at preservice teachers' skill levels, perceived usefulness, and teaching preparedness for an activity than the instruments in this study allow. Appendix Y contains a more in-depth discussion of these recommendations and provides sample survey questions that follow these suggestions.

In the end, survey design is a difficult process. Technologies change rapidly, which makes it more challenging to write questions that will remain relevant and consistent over a three-year period. When need be, instructors should sacrifice comparisons over time when necessary to give priority to questions that will yield immediately useful data for the present instruction of students.

Future Directions

This study sheds light on the technological variations that exist in the teacher education enterprise. Some preservice teachers are currently engaging in many online activities; others participate in only a couple. Almost all preservice teachers use social communication technologies while only a few use web publishing technologies. Senior-level coursework seems to represent the pinnacle of technological participation for preservice teacher, though these participation levels appear to be unsustainable for many in their internship year. These examples are evidence that further research is needed to continue exposing the substantial variation present in the technological activity of Millennial preservice teachers and the programs that prepare them to teach. The belief that all Millennial preservice teachers are already heavy users of technology is not true,

and such a depiction acts as an impediment to preparing all teachers to assist their students in mastering the new technological literacies of the 21st century.

The new technology standards set high bars for teacher preparation programs and their students to reach. In view of the results of the present study, these standards may be too high for all individuals to master all standards. This is not to say that we cannot provide students with the kinds of modeling and facilitation of technologies called for, but rather that teacher preparation programs must focus on helping preservice teachers in two ways. First, teacher preparation programs need to continue to concentrate on the best ways to augment individual teachers' technological pedagogical content knowledge during their brief time at universities. It follows that more research is needed to understand the variations in TPACK with which preservice teachers enter teacher preparation programs and to document and to theorize about the strategies and pedagogies that demonstrate the immediate enhancement of learning as well as the attainment of lifelong learning habits. As a supplement to survey data, longitudinal qualitative work is needed to that follows smaller groups of preservice teachers through the program. Special attention must be paid to the internship year, as well as to understanding preservice students in the left tail of the technological curve.

However, such individual capacity is limited. No one can know it all, and knowing a lot comes at the cost of knowing fewer things well. Thus, the second way teacher preparation programs can help their students is to foster collaborative and cooperative environments for preservice teachers to learn new technologies. More research is needed to that focuses on TPACK as a participatory activity rather than the possession of TPACK as an individual quantity.

Final Thoughts

Paradoxically, the end of this study also represents the beginning. Since these data were collected in February of 2008, already the rapid pace of technological change and the continued learning of participants in this study assure that the estimated means have changed. Still, the patterns found in the data may have more stability over time. Ironically, the ephemeral nature of the data gathered in this study may be the strongest proof that teacher preparation programs need to establish systematic data collection procedures that frequently explore the technology preparedness of their students. When the only constant is change, the only programmatic response must be continued gathering of timely information that informs instruction in the here and now.

APPENDIX A

PRESERVICE TEACHER SURVEY

Invitation to Participate in Preservice Teacher Survey

This survey is intended to study the online activities of students who are enrolled in the teacher preparation program. The survey is 39 questions long and should only take you about 10-15 minutes to complete. In the survey, you will be asked about:

- Whether you engage in specific online activities and how often you do so;
- Your skill level with performing these activities, and
- Your beliefs about these activities and their connections to teaching and learning

Participation is completely voluntary, and you have the right to refuse to answer any question without penalty. Survey results are collected anonymously, and the results are submitted on a page by page basis when you click the "next" link. Though you may withdraw from the survey at any point, answers on pages already submitted cannot be withdrawn due to the anonymous collection procedure. Your choice to participate will have no effect on your status in the teacher preparation program.

There are no known risks to participating in this study. A potential benefit to you is that your instructors will have access to accurate and comprehensive data on a range of students' online activities and can use this information to inform course design and offerings.

If you have any questions about this study, please contact Joe Freidhoff, (517) 487-3069, freidhof@msu.edu or Dr. Patrick Dickson, (517) 355-4737, pdickson@msu.edu.

If you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish – Peter Vasilenko, Ph.D., Director of Human Research Protections, (517) 355-2180, fax (517) 432-4503, e-mail irb@msu.edu, mail 202 Olds Hall, Michigan State University, East Lansing, MI 48824-1047.

Please click "Next" below to volunteer to take the survey.

Internet Usage

Directions: In this survey you will be asked questions about online activities in which you may or may not participate. PLEASE CONSIDER ALL TIMES YOU GO ONLINE (for school, work, entertainment, etc.) when answering questions. Thanks.

1. How frequently do you use the Internet?

O Daily
O Couple days a week
O Once a week
O Less than once a week
O Not at all

2. In a typical week, how many hours do you spend online? Your best guess is fine.

Please enter the total number of hours for a typical week

3. How do you access the Internet from the following places? (Please check all that apply.)

	Wireless	Ethernet	Modem
a. From home	☐	☐	☐
b. From the University	☐	☐	☐
c. From a coffee shop or cafe	☐	☐	☐
d. From work	☐	☐	☐

e. Please list any other places you access the Internet

Internet Activities

Please consider all of the different reasons you may use the Internet (school, work, recreation, etc.) when responding.

Social Networking, IM, & Texting

4. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Use a social networking site like Facebook or MySpace	O	O	O
b. Create or update a personal profile on a site like Facebook or MySpace	O	O	O
c. Send messages using a site like Facebook or MySpace	O	O	O
d. Use an Instant Messaging (IM) service	O	O	O
e. Hold multiple conversations on IM at the same time	O	O	O
f. Use a cell phone to send text messages	O	O	O
g. Receive text messages	O	O	O

5. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Use a social networking site like Facebook or MySpace	O	O	O	O	O
b. Create or update a personal profile on a site like Facebook or MySpace	O	O	O	O	O
c. Send messages using a site like Facebook or MySpace	O	O	O	O	O
d. Use an Instant Messaging (IM) service	O	O	O	O	O
e. Hold multiple conversations on IM at the same time	O	O	O	O	O
f. Use a cell phone to send text messages	O	O	O	O	O
g. Receive text messages	O	O	O	O	O

Videos, Music & Podcasts

6. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Watch or download video content from the Internet	O	O	O
b. Upload video content from the Internet	O	O	O
c. Send video links to others, for example through email or IM	O	O	O
d. Receive video links from others, for example through email or IM	O	O	O
e. Download music from the Internet	O	O	O
f. Download a podcast from the Internet	O	O	O
g. Upload music or audio content to the Internet	O	O	O

7. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Watch or download video content from the Internet	O	O	O	O	O
b. Upload video content to the Internet	O	O	O	O	O
c. Send a video link to others, for example through email or IM	O	O	O	O	O
d. Receive a video link from others, for example through email or IM	O	O	O	O	O
e. Download music from the Internet	O	O	O	O	O
f. Download a podcast from the Internet	O	O	O	O	O
g. Upload music or audio content to the Internet	O	O	O	O	O

Web Pages, Blogs & Wikis

8. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Create or update a web page	O	O	O
b. Create or update a blog	O	O	O
c. Read blogs	O	O	O
d. Leave comments on blog	O	O	O
e. Read wikis	O	O	O
f. Contribute to wikis	O	O	O

9. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Create or update a web page	O	O	O	O	O
b. Create or update a blog	O	O	O	O	O
c. Read blogs	O	O	O	O	O
d. Leave comments on blog	O	O	O	O	O
e. Read wikis	O	O	O	O	O
f. Contribute to wikis	O	O	O	O	O

Games & Images

10. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Play online computer games	O	O	O
b. Play offline computer games	O	O	O
c. Upload artwork or photos to the Internet	O	O	O
d. Download artwork or photos from the Internet	O	O	O

11. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Play online computer games	O	O	O	O	O
b. Play offline computer games	O	O	O	O	O
c. Upload artwork or photos to the Internet	O	O	O	O	O
d. Download artwork or photos from the Internet	O	O	O	O	O

Online Calendars, Social Bookmarking, & RSS Aggregators

12. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Create or update an online calendar	O	O	O
b. Use a social bookmarking site like del.icio.us to keep track of websites	O	O	O
c. Use an RSS aggregator such as Bloglines or Google Reader to subscribe to websites	O	O	O

13. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Check or add content to your online calendar	O	O	O	O	O
b. Use your social bookmark account to find websites you have saved	O	O	O	O	O
c. Add new sites to your social bookmarking account	O	O	O	O	O

14. For what purposes do you engage in the following activities? (Please check all that apply.)

	Personal or recreational use	Required as part of coursework	For my teaching/field placements	None of these / Don't use
a. Use a social networking site like Facebook or MySpace	☐	☐	☐	☐
b. Use an Instant Messaging (IM) service	☐	☐	☐	☐
c. Read or contribute to a wiki	☐	☐	☐	☐
d. Create or update a blog	☐	☐	☐	☐

Self-Assessment

15. How would you rate your skill level with each of the following activities?

	Poor	Fair	Good	Very Good	Never Done
a. Creating or updating a website	O	O	O	O	O
b. Creating or updating a blog	O	O	O	O	O
c. Creating or contributing to a wiki	O	O	O	O	O
d. Creating or updating an RSS aggregator (e.g., Bloglines, Google Reader)	O	O	O	O	O
e. Creating or updating a social bookmarking account (e.g., del.icio.us)	O	O	O	O	O
f. Creating or updating an online calendar (e.g., Google Calendar)	O	O	O	O	O

16. How would you rate your skill level with each of the following activities?

	Poor	Fair	Good	Very Good	Never Done
a. Creating or updating a social networking profile (e.g., Facebook, MySpace)	O	O	O	O	O
b. Digitally editing images (e.g., Photoshop, iPhoto)	O	O	O	O	O
c. Uploading images to web services (e.g., Flickr, Photobucket)	O	O	O	O	O
d. Editing video (e.g., MovieMaker, iMovie)	O	O	O	O	O
e. Uploading or downloading video (e.g., YouTube)	O	O	O	O	O
f. Downloading music (e.g., iTunes)	O	O	O	O	O

17. How would you rate your skill level if you had to accomplish each of the following tasks?

	Poor	Fair	Good	Very Good
a. Use technology to prepare and plan a lesson	O	O	O	O
b. Use technology to present a lesson to students (your use)	O	O	O	O
c. Have your students use technology as a part of lessons (students' use)	O	O	O	O
d. Use technology to communicate with parents and students outside of the class times	O	O	O	O
e. Use technology to evaluate students' progress	O	O	O	O
f. Use technology for your own professional development	O	O	O	O

18. How would you rate your skill level in using the Internet if you had to locate the following content?

	Poor	Fair	Good	Very Good
a. Locate a lesson plan you could use to teach specific topics from your discipline	O	O	O	O
b. Locate primary source content you could use with your students to teach specific topics from your discipline	O	O	O	O
c. Locate websites you could use with your students to teach specific topics from your discipline	O	O	O	O
d. Locate images or photos you could show to your students to teach specific topics from your discipline	O	O	O	O
e. Locate videos you could show to your students to teach specific topics from your discipline	O	O	O	O
f. Locate music or audio content you could play for your students to teach specific topics from your discipline	O	O	O	O

Your Thoughts About Teaching and Technology

19. In your opinion, how useful do you think each of the following activities will be for your teaching?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. Creating or updating a website	O	O	O	O	O
b. Creating or updating a blog	O	O	O	O	O
c. Creating or contributing to a wiki	O	O	O	O	O
d. Creating or updating an RSS aggregator (e.g., Bloglines, Google Reader)	O	O	O	O	O
e. Creating or updating a social bookmarking account (e.g., del.icio.us)	O	O	O	O	O
f. Creating or updating an online calendar (e.g., Google Calendar)	O	O	O	O	O

20. In your opinion, how useful do you think each of the following activities will be for your teaching?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. Creating or updating a social networking profile (e.g., Facebook, MySpace)	O	O	O	O	O
b. Digitally editing images (e.g., Photoshop, iPhoto)	O	O	O	O	O
c. Uploading images to web services (e.g., Flickr, Photobucket)	O	O	O	O	O
d. Editing video (e.g., MovieMaker, iMovie)	O	O	O	O	O
e. Uploading or downloading video (e.g., YouTube)	O	O	O	O	O
f. Downloading music (e.g., iTunes)	O	O	O	O	O

21. In your opinion, how useful do you think each of the following activities will be for your teaching?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. To prepare and plan a lesson	O	O	O	O	O
b. To present a lesson to students	O	O	O	O	O
c. To communicate with parents and students	O	O	O	O	O
d. To evaluate students' progress	O	O	O	O	O
e. To grow professionally	O	O	O	O	O

22. In your opinion, how important is it for K-12 students to have teachers who integrate technology into the classroom?

O Not Important
O Slightly Important
O Important
O Very Important

23. In thinking about your experiences as a student, how would you rate your exposure to good examples of teaching with technology in each of the following settings?

	Poor	Fair	Good	Very Good	Can't Remember
a. In elementary school	O	O	O	O	O
b. In middle school	O	O	O	O	O
c. In high school	O	O	O	O	O
d. In courses at [University Name] outside of the College of Education	O	O	O	O	O
e. In courses at [University Name] inside the College of Education	O	O	O	O	O

24. How important do you think each of the following experiences has been in shaping your views about teaching with technology?

	Not Important	Slightly Important	Important	Very Important	Uncertain
a. Your in-school experiences as a K-12 student	O	O	O	O	O
b. Your out-of-school experiences as a K-12-aged individual	O	O	O	O	O
c. Your in-school experiences as a college student	O	O	O	O	O
d. Your out-of-school experiences as a college-age individual	O	O	O	O	O

25. At this point in time, how prepared are you to teach with technology?

O Not prepared
O Slightly prepared
O Prepared
O Very prepared

A Little About You

26. Which of the following best describes you?[19]

O I love new technologies and am among the first to experiment with and use them.
O I like new technologies and use them before most people I know.
O I usually use new technologies when most people I know do.
O I am usually one of the last people I know to use new technologies.
O I am skeptical of new technologies and use them only when I have to.

27. What is your gender?

O Male
O Female

28. What is your age?

Please enter your age in years

29. Do you live on or off campus?

O Live on campus
O Live off campus

30. In a typical week, about how many hours do you do work for which you are paid?

Please enter the number of hours

31. What grade levels would you most like to teach when you complete your certification?

O Preschool
O Grades K-2
O Grades 3-5
O Grades 6-8
O Grades 9-12
O Other (please specify)

32. In which setting would you most like to work?

O Urban
O Suburban
O Rural

33. Please check all of the teacher preparation program courses you took during the fall 2007 and spring 2008 semesters. (Check all that apply.)

☐ TE 301
☐ TE 302
☐ TE 401
☐ TE 402
☐ TE 407
☐ TE 408
☐ MUS 495
☐ TE 501
☐ TE 502
☐ TE 801
☐ TE 802
☐ TE 803
☐ TE 804
☐ None of the above

[19] From Salaway, G., Caruso, J. B., & Nelson, M. R. (2007).

34. Please check your teacher preparation program.

O Elementary Integrated Major
O Elementary Disciplinary Major
O Elementary Double Minor
O Secondary

35. What majors and minors are you pursuing for teacher certification? (Check all that apply.)

☐ Elementary Integrated Major – Language Arts
☐ Elementary Integrated Major – Social Studies
☐ Elementary Integrated Major – Science
☐ Early Childhood
☐ Special Education
☐ Agriscience
☐ Art Education
☐ Anthropology
☐ Biology
☐ Chemistry
☐ Communicative Sciences & Disorders (Formerly Audiology & Speech Science)
☐ Computer Science
☐ Earth Science
☐ East Asian Languages & Cultures (Japanese)
☐ Other (please specify
☐ Economics
☐ English
☐ Environmental Science
☐ French
☐ Geography
☐ German
☐ History
☐ Integrated Science
☐ Italian
☐ Journalism
☐ Kinesiology (Physical Education)
☐ Latin
☐ Mathematics
☐ Music
☐ Physical Science
☐ Physics
☐ Political Science
☐ Psychology
☐ Religious Studies
☐ Russian
☐ Science/General Science
☐ Social Science – Interdisciplinary
☐ Social Sciences – James Madison
☐ Sociology
☐ Spanish
☐ Teaching English to Speakers of Other Languages (TESOL)

36. How old are some of the technologies you own?

	< 1 year old	1 year old	2 years old	3 years old	4+ years old	I do not own
a. Newest desktop computer	O	O	O	O	O	O
b. Newest laptop computer	O	O	O	O	O	O
c. Newest MP3 player	O	O	O	O	O	O
d. Newest cell phone	O	O	O	O	O	O
e. Newest digital camera	O	O	O	O	O	O
f. Newest video camera	O	O	O	O	O	O

37. Have you ever taken CEP 416?

O Yes
O No

Any Other Input?

38. Please list any specific technologies that I haven't asked you about (web-based or non-web-based) that you feel may be particularly useful for teachers and their students.

39. If there is anything else about your online activities or your thoughts on technology and teaching that you think might be important for instructors to know, please share your thoughts below.

APPENDIX B

INSTRUCTOR SURVEY

Invitation to Participate in Instructor Survey

This survey is intended to study instructor assumptions about the online activities of students who are enrolled in the teacher preparation program—namely juniors, seniors, and interns. The survey is 28 questions long and should only take you about 10 minutes to complete. In the survey, you will be asked about:

- Whether you do some specific online activities and how often you do them;
- Your beliefs about specific online activities for K-12 teaching and learning, and
- The percentage of students in our teacher preparation program whom you believe engage in specific online activities.

Participation is completely voluntary, and you have the right to refuse to answer any question without penalty. Survey results are collected anonymously, and the results are submitted on a page by page basis when you click the "next" link. Though you may withdraw from the survey at any point, answers on pages already submitted cannot be withdrawn due to the anonymous collection procedure.

If you have any questions about this study, please contact Joe Freidhoff, (517) 487-3069, freidhof@msu.edu or Dr. Patrick Dickson, (517) 355-4737, pdickson@msu.edu.

If you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish – Peter Vasilenko, Ph.D., Director of Human Research Protections, (517) 355-2180, fax (517) 432-4503, e-mail irb@msu.edu, mail 202 Olds Hall, Michigan State University, East Lansing, MI 48824-1047.

Please click "Next" below to volunteer to take the survey.

Your Internet Usage and Online Activities

Directions: In this survey you will be asked questions about online activities in which you may or may not participate. PLEASE CONSIDER ALL TIMES YOU GO ONLINE (for school, work, entertainment, etc.) when answering questions. Thanks.

1. How frequently do you use the Internet?

O Daily
O Couple days a week
O Once a week
O Less than once a week
O Not at all

2. In a typical week, how many hours do you spend online? Your best guess is fine.

Please enter the total number of hours for a typical week

3. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Use a social networking site like Facebook or MySpace	O	O	O
b. Create or update a personal profile on a site like Facebook or MySpace	O	O	O
c. Use an Instant Messaging (IM) service	O	O	O
d. Use a cell phone to send text messages	O	O	O
e. Watch or download video content from the Internet	O	O	O

4. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Use a social networking site like Facebook or MySpace	O	O	O	O	O
b. Create or update a personal profile on a site like Facebook or MySpace	O	O	O	O	O
c. Use an Instant Messaging (IM) service	O	O	O	O	O
d. Use a cell phone to send text messages	O	O	O	O	O
e. Watch or download video content from the Internet	O	O	O	O	O

5. Do you currently . . .?

	Yes, Currently Do	No, But Have in Past	No, Never Have
a. Download music from the Internet	O	O	O
b. Create or update web pages	O	O	O
c. Create or update a blog	O	O	O
d. Read wikis	O	O	O
e. Contribute to wikis	O	O	O
f. Play online computer games	O	O	O

6. About how often, if at all, do you . . .?

	Daily	Couple days a week	Once a week	Less than once a week	Never or not anymore
a. Download music from the Internet	O	O	O	O	O
b. Create or update web pages	O	O	O	O	O
c. Create or update a blog	O	O	O	O	O
d. Read wikis	O	O	O	O	O
e. Contribute to wikis	O	O	O	O	O
f. Play online computer games	O	O	O	O	O

Your Thoughts About Technology and K-12 Teaching

7. In your opinion, how useful do you think each of the following activities might be for K-12 teachers?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. Creating or updating a website	O	O	O	O	O
b. Creating or updating a blog	O	O	O	O	O
c. Creating or contributing to a wiki	O	O	O	O	O
d. Creating or updating an RSS aggregator (e.g., Bloglines, Google Reader)	O	O	O	O	O
e. Creating or updating a social bookmarking account (e.g., del.icio.us)	O	O	O	O	O
f. Creating or updating an online calendar (e.g., Google Calendar)	O	O	O	O	O

8. In your opinion, how useful do you think each of the following activities might be for K-12 teachers?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. Creating or updating a social networking profile (e.g., Facebook, MySpace)	O	O	O	O	O
b. Digitally editing images (e.g., Photoshop, iPhoto)	O	O	O	O	O
c. Uploading images to web services (e.g., Flickr, Photobucket)	O	O	O	O	O
d. Editing video (e.g., MovieMaker, iMovie)	O	O	O	O	O
e. Uploading or downloading video (e.g., YouTube)	O	O	O	O	O
f. Downloading music (e.g., iTunes)	O	O	O	O	O

9. In your opinion, how useful do you think technology can be in helping K-12 teachers accomplish each task?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. To prepare and plan a lesson	O	O	O	O	O
b. To present a lesson to students	O	O	O	O	O
c. To communicate with parents and students	O	O	O	O	O
d. To evaluate students' progress	O	O	O	O	O
e. To grow professionally	O	O	O	O	O

10. In your opinion, how important is it for K-12 students to have teachers who integrate technology into the classroom?

O Not Important
O Slightly Important
O Important
O Very Important

11. At this point in time, how prepared do you think students in the teacher preparation program are to teach with technology?

O Not prepared
O Slightly prepared
O Prepared
O Very prepared

The Online Activities of Preservice Teachers

Students in our teacher preparation program (juniors, seniors, and interns) were surveyed to find out about some of the activities they do online. I'd like for you to please guess as to the results of some questions. I know that for some questions you may not have a good idea, but please enter your best estimate anyway. The survey is, of course, anonymous. Thanks!

12a. What percentage of students in our teacher preparation program say they currently use a social networking site like Facebook or MySpace?
Please enter a whole number without a percent sign.

12b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

13a. What percentage of students in our teacher preparation program say they currently use an Instant Messaging (IM) service?
Please enter a whole number without a percent sign.

13b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

14a. What percentage of students in our teacher preparation program say they currently use a cell phone to send text messages?
Please enter a whole number without a percent sign.

14b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

15a. What percentage of students in our teacher preparation program say they currently watch or download video content from the Internet?
Please enter a whole number without a percent sign.

15b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

16a. What percentage of students in our teacher preparation program say they currently download music from the Internet?
Please enter a whole number without a percent sign.

16b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

17a. What percentage of students in our teacher preparation program say they currently create or update web pages?
Please enter a whole number without a percent sign.

17b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

18a. What percentage of students in our teacher preparation program say they currently create or update a blog?
Please enter a whole number without a percent sign.

18b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

19a. What percentage of students in our teacher preparation program say they currently read or contribute to wikis?
Please enter a whole number without a percent sign.

19b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

20a. What percentage of students in our teacher preparation program say they currently play online computer games?
Please enter a whole number without a percent sign.

20b. How confident are you in this estimate?
O Not Confident at All
O Slightly Confident
O Confident
O Very Confident

21. How important do you think each of the following activities has been in shaping your assumptions about the online activities of students in the teacher preparation program?

	Not Useful	Slightly Useful	Useful	Very Useful	Uncertain
a. Hearing students talk about engaging in specific online activities	O	O	O	O	O
b. Observing students engage in specific online activities	O	O	O	O	O
c. Reading, viewing, or listening to media reports about the online activities of youth and young adults (e.g., TV, newspapers, magazines)	O	O	O	O	O
d. Reading scholarly publications (e.g., peer-reviewed journals or books) or attending scholarly conferences	O	O	O	O	O

A Little About You

22. Which of the following best describes you?[20]

O I love new technologies and am among the first to experiment with and use them.
O I like new technologies and use them before most people I know.
O I usually use new technologies when most people I know do.
O I am usually one of the last people I know to use new technologies.
O I am skeptical of new technologies and use them only when I have to.

23. What is your gender?

O Male
O Female

24. What year did you graduate from high school?

Please enter the four-digit year.

25. What best describes your status with the university?

O Graduate Assistant
O Adjunct Instructor
O Assistant Professor
O Associate Professor
O Full Professor
Other (please specify)

26. Please check all of the teacher preparation program courses you taught during the fall 2007 and spring 2008 semesters. (Check all that apply.)

☐ TE 301
☐ TE 302
☐ TE 401
☐ TE 402
☐ TE 407
☐ TE 408
☐ TE 501
☐ TE 502
☐ TE 801
☐ TE 802
☐ TE 803
☐ TE 804
☐ None of the above

27. Are you more involved with primary or secondary education instruction at the university?

O Elementary
O Secondary
O Both
Other (please specify)

Any Other Input?

28. If there is anything else regarding your assumptions of the online activities of students in the teacher preparation program or about your thoughts on technology and teaching that you think might be important for me to know, please share them below. Thank you.

[20] From Salaway, G., Caruso, J. B., & Nelson, M. R. (2007).

APPENDIX C

PILOT STUDIES

Pilot Studies

The researcher piloted both surveys in December 2007. The primary purpose for each pilot was to receive feedback as to the length of time each survey would take participants to complete, the problems, if any, they had in understanding questions, and the degree of difficulty respondents had in constructing answers for questions. Since the multiple contact strategy (Dillman, 2007) had a prior research base, neither pilot study was designed to estimate the potential response rate from the multiple contacts. Rather, for each pilot, only a single contact was made. However, the collection procedure for the Preservice Teacher Survey mirrored that of the formal study and allowed the researcher to become familiar with using SurveyMonkey to send survey links to participants and to analyze the incoming data.

The population for the Preservice Teacher Survey consisted of 34 students (eight respondents) enrolled in two online sections of an undergraduate course in the university's teacher education program. Because the course is a prerequisite to formal admittance into the university's teacher preparation program, the participants in the pilot study were assumed to be sufficiently similar (thought some difference might exist given that these were online courses) to those in the preservice teacher population and could be surveyed without overlapping the preservice teacher population.

Similarly, 35 instructors (22 respondents) were sent invitations to participate in the Instructor Survey pilot. These individuals were listed as instructors in fall sections of two undergraduate courses that were prerequisite to the teacher preparation program, but did not instruct a teacher preparation program course during the fall 2007-spring 2008 academic year.

Based on the results of the pilot studies, minor revisions were made to the instruments themselves. The average amount of time reported by participants to complete the survey (10-15 minutes in Preservice Teacher Survey, and 5-10 minutes in the Instructor Survey) was included in the instruments' formal consent forms.

APPENDIX D

PRESERVICE TEACHER SURVEY: PRENOTICE

Subject Line: MSU TE Student Survey: Prenotice

Dear [FirstName],

In a few days, you will receive an email from me asking you to complete a brief survey for an important study I am doing for my dissertation. The survey concerns the online activities of students in the Teacher Education Program here at MSU and their thoughts about these activities for teaching and learning.

As a student myself, I know how busy you are and how important your time is. The study is important and will help instructors in the College better understand the activities you do and don't do online.

Thank you for your time and consideration. I couldn't complete my dissertation without you.

Sincerely,

Joe Freidhoff

--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

APPENDIX E

PRESERVICE TEACHER SURVEY: PLEASE COMPLETE

Subject Line: MSU TE Student Survey: Please Complete

Dear [FirstName],

I am emailing to ask for your help in completing a brief survey for an important study I am doing for my dissertation. This study will help instructors in the College better understand the activities TE students do and don't do online and their thoughts about these activities for teaching and learning.

[SurveyLink]
Click on the link to begin the survey

It is only by asking for honest responses of people like you that we can learn about the actual experiences and opinions of all our students in the program. The results of the survey are collected anonymously, and a summary will be shared with instructors in the College

Thank you for your completing this important survey. I couldn't finish my dissertation without you.

Please click on the survey link above to begin the survey.

Sincerely,

Joe Freidhoff

–
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX F

PRESERVICE TEACHER SURVEY: THANK-YOU/REMINDER

Subject Line: MSU TE Student Survey: Thank-You/Reminder

Dear [FirstName],

A week ago, I emailed you a link to my dissertation survey to seek your input about the activities you do and don't do online and your thoughts about these activities for teaching and learning. I've asked every student in the program to complete surveys so that I can inform instructors in the College about the actual experiences and opinions of all students.

If you have already completed your survey, I greatly appreciate your prompt response. If you have not completed your survey, please do so today. I especially appreciate responses from people like you that help me better understand the full range of our students.

[SurveyLink]
If you have not already completed the survey, the link above will allow you to do so now.

Thanks again for helping me with my dissertation.

Sincerely,

Joe Freidhoff

--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX G

PRESERVICE TEACHER SURVEY: LAST REQUEST

Subject Line: MSU TE Student Survey: Last Request

Dear [FirstName],

In the last month, I have sent you several emails about an important study I am conducting regarding the online activities of teacher candidates. A link to the survey is below.

[Survey Link]

My study is ending soon, and this email is my last attempt to contact you about participating in the study. I believe the results are going to be helpful to our teacher preparation program.

So far, over 800 students have responded to the survey, but naturally I would like these results to reflect the views of all students.

I also wanted to assure you that your survey results are confidential and anonymous. The survey does not ask for any personally-identifying information, nor can results be traced back to an individual.

Hopefully my multiple attempts to contact you show that I care about hearing from you, and that I very much would like to have you participate in this study. Please click on link below to complete your survey.

[Survey Link]

I truly appreciate your consideration of my request as I wrap up this effort to learn about all our students. Thank you very much.

Sincerely,

Joe Freidhoff
--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX H

INSTRUCTOR SURVEY: PRENOTICE

Subject Line: MSU TE Instructor Survey: Prenotice

Dear [FirstName],

In a few days, you will receive an email from me asking you to complete a brief survey for an important study I am doing for my dissertation.

The survey concerns the online activities of instructors and students in the Teacher Education Program at MSU, and their thoughts about these activities for K-12 teaching and learning.

As a student in the midst of dissertating, I know how busy you are and how important your time is. The study is important and has been approved by the TE review committee. A summary of the results will be shared with you to provide a rich description of the activities our instructors and students do and don't do online.

Thank you for your time and consideration. I couldn't complete my dissertation without you.

Sincerely,

Joe Freidhoff

–
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

APPENDIX I

INSTRUCTOR SURVEY: PLEASE COMPLETE

Subject Line: MSU TE Instructor Survey: Please Complete

Dear [FirstName],

I am emailing to ask for your help in completing a brief survey for an important study I am doing for my dissertation. This study will help us better understand the activities TE students and instructors do and don't do online and their thoughts about these activities for K-12 teaching and learning.

[SurveyLink]
Click on the link above to begin the survey

It is only by asking for honest responses of people like you that we can learn about the actual experiences and opinions of all our instructors in the program. The results of the survey are collected anonymously, and a summary will be shared with you.

Thank you for your completing this important survey. I couldn't finish my dissertation without you.

Please click on the survey link above to begin the survey.

Sincerely,

Joe Freidhoff

--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX J

INSTRUCTOR SURVEY: THANK-YOU/REMINDER

Subject Line: MSU TE Instructor Survey: Thank-you/Reminder

Dear [FirstName],

A week ago, I emailed you a link to my dissertation survey to seek your input about the activities you do and don't do online and your thoughts about these activities for teaching and learning. I am asking every instructor to complete surveys so that my dissertation research can provide a more accurate and comprehensive look at our teacher preparation program.

If you have already completed your survey, I greatly appreciate your prompt response. If you have not completed your survey, please do so today. I am especially thankful for responses from people like you that provide me with a better understanding of the full range of our instructors.

[SurveyLink]
If you have not already completed the survey, the link above will allow you to do so now.

Thanks again for helping me with my dissertation.

Sincerely,

Joe Freidhoff

--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX K

INSTRUCTOR SURVEY: LAST REQUEST

Subject Line: MSU TE Instructor Survey: Last Request

Dear [FirstName],

In the last month, I have sent you several emails about an important dissertation study I am conducting regarding the online activities of instructors and teacher candidates. You can find the survey below.

[Survey Link]

My study is ending soon and this email is part of my last attempt to contact you about participating in the study.

Because I have not heard from you yet, I am concerned that you may not be using this email account. Therefore, I will be placing a paper version of the survey in your campus mailbox or door.

So far, over 70% of instructors have responded to the survey, but naturally I would like these results to reflect the views of all instructors. I believe the results are going to be helpful to our teacher preparation program.

I also want to emphasize that participation is voluntary, and that your survey results are collected anonymously so that your confidentiality is protected.

Hopefully my multiple attempts to contact you show I care about hearing from you, and that I very much would like to have you participate in the study. If you would prefer, you can still complete the survey online by clicking on the link below.

[Survey Link]

I truly appreciate your consideration of my request as I wrap up this effort to learn about all our instructors. Thank you very much.

Sincerely,

Joe Freidhoff
--
Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

P.S. Please do not forward this email because the link is intended only for your own use.

Again, I do appreciate your help.

If you do not wish to receive further emails, you may click the link below, and you will be automatically removed from the mailing list.
[RemoveLink]

APPENDIX L

INSTUCTOR SURVEY: PAPER CONTACT

2-20-08

Dear Dr. Name,

In the last month, I have sent you several emails about an important dissertation study I am conducting regarding the online activities of instructors and teacher candidates. My study is ending soon and this envelope is part of my last attempt to contact you about participating in the study.

Because I have not heard from you yet, I am concerned that you may not have received my emails. For your convenience, in this envelope you will find a paper version of the survey.

So far, over 70% of instructors have responded to the survey, but naturally I would like these results to reflect the views of all instructors. I believe the results are going to be helpful to our teacher preparation program.

I also want to emphasize that participation is voluntary, and that your survey results are collected anonymously so that your confidentiality is protected. You can send your completed survey through campus mail to Sue Barratt in the envelope provided.

Hopefully my multiple attempts to contact you show I care about hearing from you, and that I very much would like to have you participate in this study. If you would prefer, you can still complete the survey online through any of the emails I've sent.

I truly appreciate the time your consideration of my request as I wrap up this effort to learn about all our instructors. Thank you very much.

Sincerely,

Joe Freidhoff

–

Joseph R. Freidhoff
Doctoral Candidate
Michigan State University
Educational Psychology and Educational Technology

APPENDIX M

CATEGORIZATION OF PRESERVICE TEACHERS' MAJORS AND MINORS VARIABLE

CATEGORIZATION OF PRESERVICE TEACHERS' MAJORS AND MINORS VARIABLE

Arts and Letters: Elementary Integrated Major—Language Arts, Art, Communication Sciences and Disorders, East Asian Language and Cultures (Japanese), English, French, Germany, Italian, Journalism, Latin, Music, Religious Studies, Russian, Spanish, TESOL

Science: Elementary Integrated Major—Science, Agriscience, Biology, Chemistry, Computer Science, Earth Science, Environmental Science, Integrated Science, Kinesiology, Mathematics, Physical Science, Physics, Science/Gen Science

Social Science: Elementary Integrated Major—SS, Anthropology, Early Childhood, Economics, Geography, History, Political Science, Psychology, Sociology, Special Ed, Social Sciences—Interdisciplinary, Social Sciences—James Madison

APPENDIX N

CORRELATION MATRIX FOR PRESERVICE TEACHER SURVEY DATA

CORRELATION MATRIX FOR PRESERVICE TEACHER SURVEY DATA

	SN Users	SN Prof	SN Mess	IM Users	Multi IM	Send Texts	Rec Texts	Web Pages	Blog	Read Blogs	Com Blogs	Read Wikis	Con Wikis	Watch Vid	Up Vid	Send Links	Rec. Links	Down Music	Down Pod	Up Music	Up Photo	Down Photo
SN Users	1.000																					
SN Prof	0.644	1.000																				
SN Mess	0.675	0.623	1.000																			
IM Users	0.174	0.238	0.192	1.000																		
Multi IM	0.138	0.234	0.171	0.883	1.000																	
Send Texts	0.093	0.095	0.124	0.083	0.085	1.000																
Rec Texts	0.131	0.094	0.138	0.071	0.063	0.858	1.000															
Web Pages	0.033	0.057	0.043	0.044	0.045	-0.070	-0.054	1.000														
Blog	0.049	0.054	0.082	0.058	0.075	0.051	0.032	0.243	1.000													
Read Blogs	0.029	0.077	0.089	0.113	0.130	0.037	0.012	0.210	0.611	1.000												
Com Blogs	0.045	0.087	0.074	0.093	0.114	0.043	0.041	0.225	0.676	0.768	1.000											
Read Wikis	0.029	0.064	-0.007	0.073	0.046	-0.053	-0.024	0.222	0.211	0.283	0.216	1.000										
Con Wikis	-0.013	0.020	0.000	0.049	0.037	0.018	0.022	0.283	0.323	0.251	0.252	0.539	1.000									
Watch Vid	-0.030	0.076	-0.022	0.024	0.037	-0.024	0.013	0.101	0.070	0.152	0.077	0.170	0.051	1.000								
Up Video	-0.096	-0.037	-0.029	-0.022	0.003	0.010	0.012	0.088	0.092	0.093	0.118	0.144	0.142	0.262	1.000							
Send Links	0.034	0.085	0.024	0.143	0.162	0.008	0.022	0.211	0.135	0.217	0.145	0.194	0.105	0.462	0.305	1.000						
Rec Links	-0.005	0.065	0.027	0.130	0.113	0.014	0.048	0.196	0.075	0.188	0.127	0.166	0.101	0.446	0.263	0.752	1.000					
Down Music	0.101	0.175	0.135	0.134	0.152	0.160	0.114	0.079	0.023	0.110	0.042	0.167	0.040	0.230	0.163	0.211	0.206	1.000				
Down Pod	-0.027	0.045	-0.007	-0.035	-0.050	0.016	0.017	0.123	0.161	0.150	0.140	0.276	0.120	0.164	0.236	0.229	0.167	0.203	1.000			
Up Music	0.016	0.076	0.075	0.131	0.129	0.071	0.063	0.134	0.116	0.110	0.140	0.070	0.064	0.132	0.484	0.179	0.186	0.253	0.172	1.000		
Up Photo	0.076	0.161	0.158	0.112	0.127	0.104	0.067	0.115	0.125	0.152	0.135	0.072	0.116	0.189	0.137	0.194	0.233	0.123	-0.011	0.157	1.000	
Down Photo	-0.017	0.080	0.011	0.053	0.050	-0.007	-0.036	0.128	0.063	0.139	0.087	0.158	0.091	0.254	0.145	0.244	0.289	0.144	0.080	0.139	0.398	1.000

APPENDIX O

GRADE-LEVEL BREAKDOWN FOR PRESERVICE TEACHER SURVEY DATA

GRADE-LEVEL BREAKDOWN FOR PRESERVICE TEACHER SURVEY DATA

Desired Grade Level Teaching Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grades P-2	222	25.3	26.7	26.7
	Grades 3-5	187	21.3	22.4	49.1
	Grades 6-8	120	13.7	14.4	63.5
	Grades 9-12	304	34.6	36.5	100.0
	Total	833	94.8	100.0	
Missing	99	46	5.2		
Total		879	100.0		

APPENDIX P

ORDINAL REGRESSION OUTPUT FOR WEB PAGE SKILLS AND USEFULNESS

ORDINAL REGRESSION OUTPUT FOR WEB PAGE SKILLS AND USEFULNESS

The highlighted SPSS output below shows even when holding constant the five predictor variables, the lower the PSTs skill level for creating or updating web pages, the lower they rated the potential usefulness of this activity for their own teaching.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	Not Useful	-4.242	1.934	4.813	1	.028
	Slightly Useful	-2.483	1.927	1.660	1	.198
	Useful	-.544	1.925	.080	1	.778
Location	AGE	-.008	.084	.008	1	.927
	Males	-.196	.200	.962	1	.327
	Females	0[a]	.	.	0	.
	Juniors	-.211	.258	.673	1	.412
	Seniors	.365	.203	3.248	1	.072
	Interns	0[a]	.	.	0	.
	No Sci/Math	.170	.209	.661	1	.416
	Some Sci/Math	-.059	.265	.050	1	.822
	All Sci/Math	0[a]	.	.	0	.
	P to 2	.053	.196	.073	1	.786
	3 to 5	.133	.199	.450	1	.502
	6 to 8	.205	.220	.869	1	.351
	9 to 12	0[a]	.	.	0	.
	Never Done	-1.484	.320	21.494	1	.000
	Poor	-1.638	.301	29.713	1	.000
	Fair	-1.063	.288	13.623	1	.000
	Good	-.386	.297	1.693	1	.193
	Very Good	0[a]	.	.	0	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

The following table shows the how the probability is affected by changes in a PSTs' skill level for creating or updating a web page. Note that the trend is for the probability to increase as skill increases in the useful or very useful columns, whereas the probability tends to decrease as skill level increases in the not useful or slightly useful columns.

	Not Useful	Slightly Useful	Useful	Very Useful
Never Done	.06	.21	.44	.29
Poor	.07	.23	.44	.26
Fair	.04	.15	.42	.39
Good	.02	.09	.34	.55
Very Good	.01	.06	.28	.65
Total	.04	.15	.40	.41

APPENDIX Q

ORDINAL REGRESSION OUTPUT FOR BLOG SKILLS AND USEFULNESS

ORDINAL REGRESSION OUTPUT FOR BLOG SKILLS AND USEFULNESS

The highlighted SPSS output below shows even when holding constant the five predictor variables, the lower the PSTs skill level for creating or updating blogs, the lower they rated the potential usefulness of this activity for their own teaching.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	Not Useful	.054	1.934	.001	1	.978
	Slightly Useful	1.790	1.935	.856	1	.355
	Useful	3.683	1.938	3.611	1	.057
Location	AGE	.086	.084	1.052	1	.305
	Male	.150	.203	.548	1	.459
	Female	0[a]	.	.	0	.
	Junior	.087	.255	.117	1	.732
	Senior	.769	.201	14.572	1	.000
	Intern	0[a]	.	.	0	.
	No Sci/Math	.684	.211	10.526	1	.001
	Some Sci/Math	.429	.270	2.524	1	.112
	All Sci/Math	0[a]	.	.	0	.
	P to 2	.126	.196	.415	1	.519
	3 to 5	.352	.199	3.139	1	.076
	6 to 8	.474	.222	4.579	1	.032
	9 to 12	0[a]	.	.	0	.
	Never Done	-2.288	.255	80.705	1	.000
	Poor	-1.812	.250	52.731	1	.000
	Fair	-1.230	.224	30.051	1	.000
	Good	-.613	.207	8.736	1	.003
	Very Good	0[a]	.	.	0	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

The following table shows the how the probability is affected by changes in a PSTs' skill level for creating or updating blogs. Note that the trend is for the probability to increase as skill increases in the useful or very useful columns, whereas the probability tends to decrease as skill level increases in the not useful or slightly useful columns.

	Not Useful	Slightly Useful	Useful	Very Useful
Never Done	.26	.34	.28	.12
Poor	.20	.34	.32	.14
Fair	.16	.31	.35	.18
Good	.15	.28	.37	.20
Very Good	.12	.22	.37	.28
Total	.18	.31	.34	.18

APPENDIX R

ORDINAL REGRESSION OUTPUT FOR WIKI SKILLS AND USEFULNESS

ORDINAL REGRESSION OUTPUT FOR WIKI SKILLS AND USEFULNESS

The highlighted SPSS output below shows even when holding constant the five predictor variables, the lower the PSTs skill level for creating or contributing to a wiki, the lower they rated the potential usefulness of this activity for their own teaching.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	Not Useful	-2.133	2.170	.966	1	.326
	Slightly Useful	-.496	2.168	.052	1	.819
	Useful	1.362	2.169	.394	1	.530
Location	AGE	.007	.095	.005	1	.943
	Male	.013	.222	.004	1	.952
	Female	0[a]	.	.	0	.
	Junior	-.197	.286	.473	1	.492
	Senior	.195	.220	.784	1	.376
	Intern	0[a]	.	.	0	.
	No Sci/Math	.578	.242	5.683	1	.017
	Some Sci/Math	-.063	.314	.040	1	.842
	Only Sci/Math	0[a]	.	.	0	.
	P to 2	-.213	.220	.936	1	.333
	3 to 5	.210	.223	.882	1	.348
	6 to 8	.468	.237	3.887	1	.049
	9 to 12	0[a]	.	.	0	.
	Never Done	-2.455	.304	65.336	1	.000
	Poor	-1.934	.304	40.601	1	.000
	Fair	-1.262	.294	18.412	1	.000
	Useful	-.455	.284	2.562	1	.109
	Very Useful	0[a]	.	.	0	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

The following table shows the how the probability is affected by changes in a PSTs' skill level for creating or contributing to wikis. Note that the trend is for the probability to increase as skill increases in the useful or very useful columns, whereas the probability tends to decrease as skill level increases in the not useful or slightly useful columns.

	Not Useful	Slightly Useful	Useful	Very Useful
Never Done	.45	.35	.16	.04
Poor	.32	.38	.24	.07
Fair	.18	.34	.35	.13
Good	.09	.24	.42	.26
Very Good	.06	.18	.42	.35
Total	.24	.31	.31	.15

APPENDIX S

CORRELATIONS BETWEEN PRESERVICE TEACHERS' SKILLS AND PERCEIVED USEFULNESS

CORRELATIONS BETWEEN PRESERVICE TEACHERS' SKILLS AND PERCEIVED USEFULNESS

The table below shows the bivariate correlations between PSTs self-reported skill level (never used, poor, fair, good, very good) for each activity and how useful PSTs see the activity as being in their future teaching (not useful, slightly useful, useful, very useful). Those who were uncertain about the usefulness of the activity were excluded from these analyses.

The PST Skills column shows the percentage of preservice teachers who indicated their skill level for each activity was either good or very good.

Activity	**r**	**PST Skills**
Creating or Contributing to a Wiki	0.434**	0.26
Creating or Updating a Blog	0.405**	0.45
Editing Video	0.311**	0.21
Creating or Updating a Website	0.263**	0.32
Uploading or Downloading Video	0.235**	0.57
Digitally Editing Images	0.230**	0.6
Uploading Images to a Web Service	0.174**	0.6
Downloading Music	0.131**	0.81
Creating or Updating a Social Networking Profile	0.027	0.91

** = $p < .01$

APPENDIX T

TEST STATISTICS FOR PRESERVICE TEACHERS' AND INSTRUCTORS' COMPARATIVE USE

TEST STATISTICS FOR PRESERVICE TEACHERS' AND INSTRUCTORS' COMPARATIVE USE

Test statistics below were computed using the formula for the difference between two population proportions:

$$H_o : \pi_{pst} - \pi_{inst} = 0$$

$$H_a : \pi_{pst} - \pi_{inst} \neq 0$$

$$T.S.: Z = \frac{\left(\hat{\pi}_{pst} - \hat{\pi}_{inst}\right)}{\sqrt{\frac{\hat{\pi}_{pst}\left(1-\hat{\pi}_{pst}\right)}{n_{pst}} + \frac{\hat{\pi}_{inst}\left(1-\hat{\pi}_{inst}\right)}{n_{inst}}}}$$

Activity	PST (Users/N)	INST (Users/N)	Z-Score
Use a Social Network Site	.95 (834/876)	.34 (27/80)	11.41**
Use Instant Messaging	.77 (671/873)	.37 (29/79)	7.12**
Send Text Messages	.86 (755/874)	.60 (49/81)	4.67**
Downloading Music	.61 (517/853)	.54 (43/80)	1.20
Create/Update Blog	.26 (228/864)	.27 (21/79)	-.19
Create/Update Web Pages	.25 (215/857)	.35 (28/81)	-1.82
Watch/Download Video	.71 (577/814)	.81 (65/80)	-2.14*
Read/Contribute to Wikis	.35 (296/857)	.48 (38/80)	-2.23*

* $p < .05$; ** $p < .01$

With Bonferroni Correction, Critical Z value for alpha=.05 is 2.75; for .01, it is 3.291

APPENDIX U

TEST STATISTICS FOR COMPARING GRADUATE ASSISTANTS' USE WITH FACULTY/STAFFS' USE

TEST STATISTICS FOR COMPARING GRADUATE ASSISTANTS' USE WITH FACULTY/STAFFS' USE

Test statistics below were computed using the formula for the difference between two population proportions:

$$H_o : \pi_{ga} - \pi_{fac} = 0$$

$$H_a : \pi_{ga} - \pi_{fac} \neq 0$$

$$T.S.: Z = \frac{\left(\hat{\pi}_{ga} - \hat{\pi}_{fac}\right)}{\sqrt{\frac{\hat{\pi}_{ga}\left(1-\hat{\pi}_{ga}\right)}{n_{ga}} + \frac{\hat{\pi}_{fac}\left(1-\hat{\pi}_{fac}\right)}{n_{fac}}}}$$

Activity	GA (Users/N)	FAC/STAFF (Users/N)	Z-Score
Use Instant Messaging	.55 (24/44)	.16 (5/32)	3.93**
Use a Social Network Site	.47 (21/45)	.16 (5/32)	3.14**
Watch/Download Video	.91 (41/45)	.69 (22/32)	2.39**
Send Text Messages	.71 (32/45)	.45 (15/33)	2.37**
Read/Contribute to Wikis	.53 (24/45)	.39 (13/33)	1.24
Create/Update Blog	.29 (13/45)	.23 (7/31)	.59
Downloading Music	.56 (25/45)	.50 (16/32)	.52
Create/Update Web Pages	27% (12/45)	42% (14/33)	-1.38

* $p < .05$; ** $p < .01$

With Bonferroni Correction, Critical Z value for alpha=.05 is 2.75; for .01, it is 3.291

APPENDIX V

DIFFERENCES IN USE OF SOCIAL COMMUNICATION TECHNOLOGIES

DIFFERENCES IN USE OF SOCIAL COMMUNICATION TECHNOLOGIES

Social Networks			
PSTs v. Instructors	95% v. 34%	$z = 11.41$	$p < .01$
PSTs v. GAs	95% v. 47%	$z = 6.42$	$p < .01$
PSTs v. Faculty/Staff	95% v. 16%	$z = 12.11$	$p < .01$
GAs v. Faculty/Staff	47% v. 16%	$z = 3.14$	$p < .01$
Instant Messaging			
PSTs v. Instructors	77% v. 37%	$z = 7.12$	$p < .01$
PSTs v. GAs	77% v. 55%	$z = 2.88$	$p < .01$
PSTs v. Faculty/Staff	77% v. 16%	$z = 9.19$	$p < .01$
GAs v. Faculty/Staff	55% v. 16%	$z = 3.93$	$p < .01$
Sending Text Messages			
PSTs v. Instructors	86% v. 60%	$z = 4.67$	$p < .01$
PSTs v. GAs	86% v. 71%	$z = 2.18$	$p < .05$
PSTs v. Faculty/Staff	86% v. 45%	$z = 4.69$	$p < .01$
GAs v. Faculty/Staff	71% v. 45%	$z = 2.37$	$p < .05$

APPENDIX W

USEFULNESS COMPARISONS BETWEEN PRESERVICE TEACHERS AND INSTRUCTORS

USEFULNESS COMPARISONS BETWEEN PRESERVICE TEACHERS AND INSTRUCTORS

Test statistics below were computed using the formula for the difference between two population proportions:

$$H_o : \pi_{pst} - \pi_{inst} = 0$$

$$H_a : \pi_{pst} - \pi_{inst} \neq 0$$

$$T.S.: Z = \frac{\left(\hat{\pi}_{pst} - \hat{\pi}_{inst}\right)}{\sqrt{\frac{\hat{\pi}_{pst}\left(1-\hat{\pi}_{pst}\right)}{n_{pst}} + \frac{\hat{\pi}_{inst}\left(1-\hat{\pi}_{inst}\right)}{n_{inst}}}}$$

The proportions below represent individuals who responded with answers of "useful" or "very useful."

Activity	PST (Usefuls/N)	INST (Usefuls/N)	Z-Score
Creating/Contributing to a Wiki	.35 (305/870)	.64 (50/78)	-5.11**
Editing Video	52% (453/870)	75% (60/80)	-4.48**
Digitally Editing Images	51% (448/872)	74% (59/80)	-4.43**
Creating/Updating a Social Networking Profile	12% (106/873)	27% (21/79)	-2.93**
Upload Images to a Web Service	49% (424/871)	65% (51/79)	-2.84**
Uploading or Downloading Video	64% (552/867)	77% (61/79)	-2.60**
Creating/Updating a Blog	47% (411/874)	61% (49/80)	-2.45*
Creating/Updating a Website	78% (684/874)	84% (67/80)	-1.39
Downloading Music	48% (420/869)	49% (39/80)	-.17

* $p < .05$; * $p < .01$

With Bonferroni Correction, Critical Z value for alpha=.05 is 2.75; for .01, it is 3.291

APPENDIX X

TEST STATISTICS FOR INSTRUCTORS' ESTIMATES OF PRESERVICE TEACHERS' USE

TEST STATISTICS FOR INSTRUCTORS' ESTIMATES OF PRESERVICE TEACHERS' USE

Test statistics below were computed using the following formulas:

$$H_o : \pi = InstructorEstimate$$

$$H_a : \pi \neq InstructorEstimate$$

$$TS.: z = \frac{\hat{\pi}_{pst} - \pi_o}{\sigma_{\hat{\pi}}}; \sigma_{\hat{\pi}} = \sqrt{\frac{\pi_o(1-\pi_o)}{n_{pst}}}$$

Activity	Instructor Estimate	PST Estimate (95% CI)	Z-Score
Downloading Music	.80 (.77, .84)	.59 (579/974) (.56, .63)	-16.38**
Create/Update Web Pages	.44 (.39, .49)	.25 (243/974) (.22, .28)	-11.95**
Create/Update Blog	.38 (.33, .43)	.26 (255/974) (.23, .29)	-7.72**
Watch/Download Video	.75 (.71, .79)	.67 (649/974) (.64, .70)	-5.77**
Send Text Messages	.88 (.86, .90)	.85 (835/979) (.83, .88)	-2.89**[19]
Use Instant Messaging	.75 (.70, .80)	.74 (723/979) (.71, .77)	-.72
Read/Contribute to Wikis	.33 (.28, .39)	.34 (330/974) (.31, .37)	.66
Use a Social Network Site	.77 (.73, .81)	.93 (914/980) (.92, .95)	11.90**

* $p < .05$; ** $p < .01$

With Bonferroni correction, critical Z value for alpha =.05 is 2.75; for .01, it is 3.29.

[19] It is important to note that despite the Z-score indicating a statistically significant difference between the instructor estimate and the PST estimate for sending texts, the 95% CIs for each estimate overlap suggesting that if the Z-score took into account the fact that the instructor estimate actually varies, the finding would be non-significant.

APPENDIX Y

SURVEY DESIGN RECOMMENDATIONS

SURVEY DESIGN RECOMMENDATIONS

The survey instruments used in this study were designed to allow for comparisons with American youth and young adults in general. Therefore, the surveys themselves probably should not be taken and used as is for longitudinal, programmatic assessment. In working with and studying this data for almost a year, there are a couple of recommendations I would make to teacher educators working to design technological surveys.

First, in many of the general population surveys cited in the literature review, questions tended to ask about current use, often using the word "currently" in the actual stem. An example of this would be "Do you currently create or update a web page?" (no/yes). One problem with this wording is that without formally defining what is meant by "currently," measurement error is increased due to variation in how survey respondents view the length of time intended. This non-specific timeframe is also a problem for people interpreting the results of the data. Some surveys, like the two instruments in this study, use a follow-up question regarding the frequency of use to provide greater insight into current use. In the case of this study, this two-question approach allowed for the data to yield information both about the percentage of current users and the percentage of preservice teachers who had ever engaged in the activity. However, since the study demonstrated the large differences in percentages of ever users compared to current users, collecting both measures are not likely to be fruitful.

Instead, to maximize space and increase efficiency, I recommend asking a single question that inquires about use through frequency. For web pages, a sample question would be "About how often do you create or update a web page?" (Never, Every Couple

Months, Monthly, Weekly, Daily). Such a question frame still provides insight into the percentage of preservice teachers engaging in the activity, but does so in a more precise manner.

The second recommendation for designing surveys that might be helpful is to write questions capable of producing a more nuanced look at preservice teachers' skill levels, perceived usefulness, and teaching preparedness for an activity. In the Preservice Teacher Survey, for example, the measure of skill was rather generic—"How would you rate your skill level with creating or updating a website?" (Never Done, Poor, Fair, Good, Very Good). The question in its present form fails to take into account the purpose for which the preservice teachers are creating or updating a website. A more insightful set of questions regarding preservice teachers skill levels with web page design might take the following form:

1. "How would you rate your skill level with creating and maintaining a website . . .

    a) for personal use?

    b) for use in your teaching?

    (Example foils: Never Done, Poor, Fair, Good, Very Good)

With the usefulness and teaching preparedness measures, borrowing language from the technology standards might provide a more nuanced understanding. Rather than asking how useful creating or updating web pages will be for their teaching generally, multiple questions that tease apart their perceived usefulness and teaching preparedness would be helpful. For example:

2. "How important do you feel the following activities will be for your teaching?"

    a) Creating and maintaining a teaching website?

    b) Modeling the creation of web pages for students?

    c) Facilitating students' creation of web pages

    (Example foils: Not Important, Slightly Important, Important, Very Important)

3. "How prepared are you to . . .

    a) Create and maintain your own teaching website?

    b) Model the creation of web pages for students?

    c) Facilitating students' creation of their own web pages?

    (Example foils: Not Prepared, Slightly Prepared, Prepared, Very Prepared)

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