

Distance Education in Teacher Preparation Programs: A National Study

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The growing demand for distance education at both the K-12 school and university level, has prompted a number of teacher education programs to integrate distance-based technology into their preparation programs. This study examines data from 102 teacher education programs to analyze the current status of distance education in teacher preparation across the United States. Findings show limited use of distance education, with Web 1.0 technologies more commonly used than Web 2.0. Use of distance education was primarily within the contexts of course settings and more frequently in hybrid formats than in online formats. The role of the individual faculty member in the decision-making process was also found to be prominent. Further noted was that many institutions did not have a plan for the integration or the assessment of distance education in their programs.

Keywords: distance education, online learning, teacher education, teacher preparation

INTRODUCTION

Teacher education programs prepare new teachers by teaching pedagogy, content knowledge, and technology integration strategies informed by state and national standards and accrediting agencies. Field experiences and internships (or student teaching) extend course content into dynamic K-12 classroom environments. It is imperative for teacher education to not only keep pace with changes in the traditional learning environment including advances with technology (Picciano & Seaman, 2009; Rice, 2006), but also to model best practices.

Distance education is becoming commonplace in K-12 classrooms. In a national study on distance education in K-12 schools, Picciano and Seaman (2009) found over one

million K-12 students enrolled in online courses in 2007-2008, a growth rate of 47% from their previous study in 2005-2006; continued growth in K-12 settings is expected (Archambault & Crippen, 2009; Christensen, Horn, & Johnson, 2008; Setzer & Lewis, 2005). In a national study describing the characteristics of online K-12 teachers, Archambault and Crippen (2009) found that the “vast majority” of teachers online began their careers in traditional, face-to-face classrooms. This growth of distance education in K-12 schools will inevitably result in increased demand for qualified online teachers. However, there has been little attention given to the role of teacher education in preparing new teachers for a future embracing distance education. This article will present the results of a study designed to examine the types of distance education technologies used in teacher preparation, the setting within which they are used, their frequency of use and factors influencing use. Distance education for the purposes of this study refers to teaching or learning in which students receive instruction or engage in instructional practices by accessing information or communicating with instructors or peers over a distance using computer and network-based technologies.

LITERATURE REVIEW

This literature review will present the body of research on distance education at the macro-level including description of uses and frequency of uses for distance education in higher education and K-12 schools. The growth and implementation of distance education will also be likened to the growth and implementation of computers in education 20 years ago. Subsequently, the micro-level, teacher education research will be presented in order to demonstrate the need for a similar evolution of research on distance education in teacher education as was completed over 20 years prior on computers in schools. The review will be divided into the following sections: The Growth of Distance Education, Research on Computer Use, and Distance Education in Practice.

THE GROWTH OF DISTANCE EDUCATION

The term “distance education” dates from the late 1800's and denotes learning that geographically separates the instructor and the learner (e.g., book clubs, correspondence courses, radio and television courses) (Beldarrain, 2006; Saba, 2005). Today, distance education more commonly refers to applications of teaching and learning conducted online over a computer network. Further distinctions for the term distance education are based upon the types and frequency of use. For example, the terms *online* and *hybrid* or *blended learning* denote a type of distance education based upon the portions of course content that is delivered online. The terms Web 1.0 and Web 2.0 denote Internet-based technologies that are used in online learning environments. For the purposes of this study, *online* courses are defined as having 80% or more course content provided online and *hybrid* or *blended* courses include both face-to-face and online interactions with 30-79% of instruction provided online; terms standardized by Allen and Seaman (2013, 2011, 2010, 2009, 2008). Web 1.0 applications refer to first generation web-based technologies which can be used for the presentation of information through the creation of websites or interaction via email and discussion forums in distance education (Rosen & Nelson, 2008). Web 2.0 applications refer to Internet-based technologies providing for collaboration and interactivity among users in distance education (Rosen & Nelson, 2008). An understanding of the use of these technologies will help us to determine the state of teacher preparation with regard to distance-based education, teaching and learning.

The increased use of distance education in higher education has been studied by the Sloan-C Consortium for over ten years through survey questionnaires of chief academic officers. Findings from the most recent report (2013) indicate over 6.7 million students took at least one course online in the fall of 2012, representing a 9.3% growth rate. This growth outpaces the growth rate for higher education overall during the same period of time (Allen & Seaman, 2013). A variety of factors have been found to influence growth in the last decade including: institutional size (Allen & Seaman, 2010; Allen & Seaman, 2008; Allen & Seaman, 2007; Allen & Seaman, 2006; Parsad & Lewis, 2008; Wirt, Choy, Rooney, Provasnik, Sen, & Tobin, 2004), institutional type (Allen & Seaman, 2010; Allen & Seaman, 2008; Parsad & Lewis, 2008), time of adoption (Allen & Seaman, 2008), and acceptance of faculty (Allen & Seaman, 2013). More importantly, distance education is also becoming more prevalent in K-12 schools (Picciano & Seaman, 2009; Archambault & Crippen, 2009; Horn, & Johnson, 2008; Setzer & Lewis, 2005) as over 1.8 million K-12 students took at least one course online in the academic year 2009-10 (Queen & Lewis, 2011).

The technologies used for distance education in the last decade have also changed rapidly. In two National Center for Educational Statistics (NCES) studies, Parsad and Lewis (2008) and Queen and Lewis (2011) found the most commonly used distance education method to be asynchronous discussion. The New Media Consortium (NMC) has been successful in predicting emerging technologies for higher education since 2002. In their 2013 report, technologies in their near future horizon (integration within 12 months) for higher education included massively open online courses (MOOCs) and tablet computing (Johnson, et al., 2013). In 2011, the NMC issued its first Horizon Report for K-12 schools (Johnson, Adams, & Cummins, 2011). In the five years since the first NCES study found asynchronous discussion as the most commonly used distance education method, great strides have been made in access, availability, and uses of technology. Today, educators in higher education and K-12 schools have access to YouTube videos, Web 2.0 tools, mobile broadband, and mobile technologies. Today, even physical education and health courses are being taught online (Ransdell, Rice, Snelson & DeCola, 2008). The variety of methods for using new technology in both online and hybrid/blended instruction continues to grow. This growth has stimulated varied approaches to using distance education tools in teacher education, much as the computer changed the same learning environments in the 1990s.

RESEARCH ON COMPUTER USE

A phenomenon similar to the growth of distance education occurred in the early nineties; the unprecedented infusion of computer technology in K-12 schools changed instructional practices and redefined learning environments (Papert, 1993; ACOT, 1995; NCES, 2000). Research in the field began to focus on how computers and the Internet were being used. Studies focused on the types, frequencies, and rationales for use (e.g. Becker & Ravitz, 1999; Becker, Wong & Ravitz, 1999; NCES, 2000). Once research established that computers had the potential to enhance student learning and were a viable instructional tool, the focus shifted to teacher education and analyzing what teacher education programs do to foster technology integration in classroom teaching (e.g. Lawson & Comber, 1999; Moursund & Bielefeldt, 1999; Pelligrino & Altman, 1997). Studies focused on determining what factors influence best practices (e.g. Mergendollar, et al., 1994; Strudler & Wetzel, 1999) and determining the barriers to technology integration (e.g. Cherup & Snyder, 2003; Ertmer, 2005; Fabry & Higgs, 1997; Gomez, et al., 2008; Groff & Mouza, 2008; Hew & Brush, 2007; Hinson, et al., 2006; Kay, 2000; Pierson & McNeil, 2000; Strudler, et al., 1995; Zhao & Frank, 2003). A

similar evolution to research on distance education should be expected if the field is to reach these same levels of understanding.

DISTANCE EDUCATION IN PRACTICE

Distance education is complex with many variables influencing outcomes. Historically, research on distance education has reflected rather than driven practice (McIsaac & Blocher, 1998). There are few consistent lines of inquiry as the field is known for its adoption and abandonment of distance education methods, frequently opting for the newest technology before fully utilizing existing ones (Hannum, 2009). This leaves many questions unanswered. However, the field is rich with research on effective practices in distance education including best practices for teaching online (Bernard, Rojo de Rubalcava & St. Pierre, 2000; Haughton & Romero, 2009; Manathunga, 2002; McAlpine, 2000; McFadzean & McKenzie, 2001; Murphy & Cifuentes, 2001), comparative analysis of face-to-face and distance-based coursework (Saba, 2000), and comparative analysis of student achievement for distance and traditional learners (Kanuka & Anderson, 1998; Smith, Ferguson & Caris, 2001; Stern, 2004). These studies typically occur outside the realm of teacher education and focus on distance education as an instructional method. To mirror the research which advanced our knowledge on computers and schools, research specific to teacher education applications of distance education are needed. While some research on the use and popularity of distance education in teacher education programs exists, a clear understanding of its status and integration does not.

Distance education is used in teacher education for a variety of purposes and in multifaceted ways. Some programs access these technologies to span large distances between their faculty and their students interning in schools (Strudler & Wetzel, 1999). Others use the technology to connect university students with K-12 students in mentoring and tutoring activities (Bowers Sipe, 2000; Cook-Sather, 2007). Still, others use the technology to create small group discussion areas online for mentor teachers and teacher candidates to communicate (Clift, et al., 2001). Many use these tools within university classrooms in hybrid approaches while others use the tools to deliver instruction fully online (Levin, et al., 2006).

There are examples of distance education being used in teacher education programs, most using first generation technologies such as electronic networks to facilitate discussion and collaboration. Several examples are shared in this section to illustrate the variety of uses of distance education in teacher education and the types of research being conducted.

First generation technologies. First generation, or Web 1.0, technologies have contributed to successful uses of distance education in teacher education. For example, Cook-Sather (2007) and DeWert, Babinski, and Jones (2003) connected preservice or inservice teachers through email-based learning communities. Cook-Sather (2007) connected preservice teachers to both experienced teachers and high school students and suggested there were opportunities for analysis and reflection, but also limitations due to access and inconsistent dialogue. Levin, He, and Robbins (2006) studied the use of asynchronous and synchronous discussion forums for discussion and analysis of cases in a classroom management course and found that some teachers' initial preferences for asynchronous discussions changed to synchronous discussions. McCrory and Putnam (2008) found that student dispositions and frequent post responses made for more active online discussions. Pierson and McNeil (2000) shared the experiences of an action research project to establish networked learning communities focused on preservice teacher development. These examples highlight some of the ways first generation

distance education technologies have been used in teacher education to facilitate discussion and collaboration.

Second generation technologies. Second generation, or Web 2.0, technologies have also changed the face of distance education. Distance education technologies such as wikis, weblogs, podcasts, and social media are opening even more possibilities for distance education in teacher education. The examples that follow further illustrate the variability of uses in teacher education and types of research currently available in the field. Wassell and Crouch (2008) found weblogs stimulated discussion and critical thinking on multiculturalism and diversity. So, Pow, and Hung (2009) found that student teachers use of classroom instructional videos increased understanding of teaching and promoted dialogue with peers. Dexter, Riedel, and Scharber (2008) found that preservice teachers improved technology integration decision making following exposure to virtual cases. Doering, et al. (2008) found that preservice teachers used instant messaging (IM) primarily for social interactions rather than academic purposes, which enhanced the formation of a sense of community, but had the potential to create tensions between preservice teachers and their school students. Wang and Morgan (2008) found that IM positively affected educational technology graduate student learning. Students reported increased interaction with peers, greater encouragement and concern and prompt responses from instructors, and improved student preparation for course discussions as compared to courses not using IM. Dexter, Riedel, and Scharber (2008) found, in their mixed methods study, that preservice teachers benefitted from the addition of virtual cases into their field experiences. Bonk, et al. (2001), in the third of three studies on computer mediated communication in preservice preparation, used a web-based conferencing tool to support students in a psychology course with accompanying field based experiences observing teachers. Foulger, et al. (2009) analyzed a two-week, online homework process using the “Thinking Routines” developed for Project Zero at Harvard University to evaluate preservice teachers’ perspectives about the ethical dilemmas of social networking. Matthew, Felvegi, and Callaway (2009) used a wiki as a collaboration tool in three language arts methods courses. Data showed that participants believed their learning of course content was improved by using the wiki.

Presently, if leaders in teacher education want to make informed decisions on distance education for their programs, we have to review this scattered field of research and determine in our own silo what method or technology best suits our needs. A description of current practice, specifically focused on teacher education, is needed to inform decision-making and guide future uses. Distance education is clearly growing in usage and popularity in higher education, K-12 schools, and teacher education. The field is replete with examples of use of both first- and second-generation Web tools. The research noted above highlights the scattered nature of the web-based tools and revealed the inconsistency between types of use, frequency of use, rationale for use, and ability to judge success with use. To reflect again on the situation in the 1990s and our understanding of computer use in schools, today as then, there is a push forward to new technologies and new strategies without considering the current status. Large studies such as the work conducted by Moursund and Bielefeldt (1999) shaped our understanding of the field and informed progress forward.

Research on computers in schools, unlike distance education research, has spanned over twenty years focused on a relatively straightforward research agenda and has expanded on issues of practice, as well as developed research theory. Research on distance education has not sufficiently carried through a line of inquiry (Hannum, 2009; Ritzaup et al., 2010). We have an opportunity with research on distance education in teacher education to focus on the key trends and critical issues involved and that research necessarily begins with a description of the current status of the field.

METHODOLOGY

This research was implemented using a quantitative research design. Descriptive data, focusing on current practices in teacher preparation programs in the United States, were collected using a survey instrument developed through modification of the Information Technology in Teacher Education (ITTE) survey originally created by Moursund and Bielefeldt (1999).

RESEARCH QUESTIONS

The following research questions were used to guide this study:

1. What is the current status of distance-based technology use in teacher education?
 - a. What types of distance-based technologies are used in teacher education?
 - b. How frequently are distance-based technologies used in teacher education?
 - c. In what settings are distance-based technologies used in teacher education?
2. What are common rationales and purposes for the use of distance-based technologies in teacher education?
3. What successes have been achieved using distance-based technology in teacher education?

SURVEY DESIGN

Building upon the ITTE survey, the Distance Education in Teacher Education (DETE) survey was developed through feedback from expert reviews, and an extensive literature review. In the redesign of this instrument, 19 of the original 29 questions from the ITTE survey were created by replacing the term “Information Technology” with “Distance Education” or the name of other appropriate distance education technologies. The one distance education based question from the ITTE survey was included in the DETE survey as it was originally written.

Ten questions from the 29 item ITTE survey were not used in the DETE survey because they did not meet the needs of this research study. Additional survey items were developed in order to identify current practices with distance education (e.g., items including Web 2.0 tools). Although new items were created, the initial design of the ITTE was followed.

A pilot study was conducted to further confirm content validity and determine functionality of the online administration of the survey. The final version of the DETE survey was comprised of 26 items in five sections, including: About Your Education Program, Types of Use, Frequency of Use, Rationale for Use, and Successes (Appendix A). The overall final instrument ($N=102$) demonstrated adequate internal consistency (Cronbach's $\alpha=.93$).

SAMPLE

This research study was designed to collect data from deans, department chairs, and program directors from member institutions of the American Association of Colleges for Teacher Education (AACTE). AACTE institutions prepare over two thirds of all new teachers entering United States schools each year (McCabe & Murray, 2008). For-profit distance-based teacher preparation programs such as University of Phoenix and Walden

University were excluded because they specialize in distance education and the study was focused on traditional teacher education programs.

The DETE survey was administered via email. Recipients of the survey had the option to forward the survey to another individual at their university if they believed that individual would be a better informant. Over seven hundred ($N=744$) requests for participation were emailed; 102 (13.7% response rate) completed surveys were returned representing 40 states and the District of Columbia. While this is a low response rate, effort was made to determine if this sample was representative of the larger group making up the teacher preparation program population. In order to determine how representative the respondent sample was to the AACTE population from which the sample was drawn, institutional characteristics from the sample of respondents were compared to those from the AACTE membership. Results of a Chi-Square analysis revealed no significant difference in the “public versus private” variable (AACTE: 56%, $n=415$; DETE: 58% $n=56$), $X^2(1) = 0.13$; $p=0.72$, whereas significant differences were noted in Carnegie classification, FTE, and accreditation status (AACTE: 73%, $n=483$; DETE: 84%, $n=86$), $X^2(1) = 5.69$; $p=0.02$: Table 1). DETE response data were representative of the population in all size ranges except in the under 5,000 FTE category and in the 15,001-20,000 FTE category.

Table 1. Comparison between AACTE population and DETE sample for Carnegie Classification and FTE

		Carnegie Classification						
		Assoc.	Baccal.	Masters	Res. & Doc.	Other	No class.	
AACTE		1.1%	25.0%	47.8%	25.9%	0.2%	0.2%	
	N	7	164	314	17	1	1	
DETE		0%	21.6%	40.2%	29.4%	7.8%	1.0%	
	N	0	22	41	30	7	1	
		FTE						
			0-1,000	1,001-5,000	5,001-10,000	10,001-15,000	15,001-20,000	>20,000
AACTE	% within case sources		6.3%	39.1%	22.2%*	11.7%*	6.5%	14.2%*
	N		47	291	165	87	48	106
DETE	% within case source		15.8%	33.7%	22.1%*	10.5%*	3.2%	14.7%*
	N		15	32	21	10	3	14

Note: $X^2(5) = 49.35$; $p < 0.001$. Contribution from each classification type. $X^2(5) = 12.49$; $p = .03$. * Denotes areas where the sample is more representative of the population.

Of those who responded ($n=102$), 41.0% reported their role at their institution as dean, 16.0% department chair, 13.0% program director, 15.0% faculty, 6.0% technology specialist, and 9.0% reported “other” (e.g., associate dean, accreditation coordinator, and director of distance learning). Most respondents were from public institutions (57.4%), 40.6% were from private institutions. Almost 22% (21.8%) were from research doctoral programs, 22.8% were from comprehensive liberal arts schools; 40.6% indicated Carnegie Classification Master’s College, 21.8% Baccalaureate College, 20.8% Research University, 8.9% Doctoral Research, and 7.9% reported a different classification. Institutional size varied from less than 1,000 full-time equivalent (FTE) to greater than

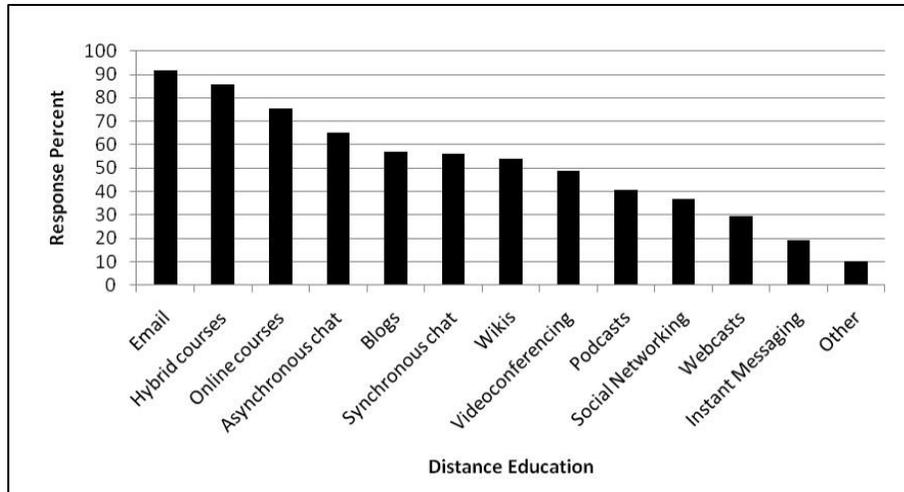


Figure 2. Response percentage for each distance education tool or delivery method. Respondents were directed to select all that applied for their institution (n=102).

FREQUENCY OF USE

To determine the frequency of use of distance-based technologies in teacher education respondents were asked “What percent of required courses in your program use online discussion forums, synchronous chats, videoconferencing, podcasts, blogs, wikis, streaming video/ webcasts, instant messaging, and social networking?” Response options were noted using the following scale: 0=0%, 1=1-25%, 2=26-50%, 3=51-76%, 4=76-99%, 5=100%, and *don't know how frequently these technologies are used*. Web 1.0 technologies (e.g., online discussion forums and synchronous chats) were reported more frequently than Web 2.0 technologies (e.g., wikis, blogs, podcasts, streaming video/ webcasts, instant messaging, and social networking). Online discussion forums were the most frequently used distance education in required teacher education courses followed by synchronous chats. Web 2.0 technologies were used less frequently in required courses (Table 2).

Table 2. Descriptive statistics: Percent of required courses using distance education

Distance Education	N	Min	Max	Mean	SD
Online Discussion Forums	92	0	5	1.89	1.30
Synchronous Chats	85	0	5	1.02	0.96
Streaming Video/ Webcasts	78	0	4	0.89	0.85
Wikis	79	0	4	0.85	0.77
Blogs	80	0	3	0.83	0.63
Social Networking	71	0	5	0.78	1.00
Videoconferencing	77	0	5	0.71	0.92
Podcasts	75	0	2	0.68	0.57
Instant Messaging	66	0	4	0.53	0.77

Note: Scale 0 = 0%; 1=1-25%; 2=26-50%; 3=51-76%; 4=76-99%; 5=100%

With the exception of webcasts, all distance education technologies shown in Table 3, had a significant positive correlation between FTE and required use. Correlations were run using Pearson r for both Public/Private and Carnegie classification and showed that technologies used in required courses were not significantly correlated

Table 3. Correlations: Full-time equivalent and percent of required courses using distance education methods

Distance Education	N	R	P
Blogs	77	0.250*	0.028
Instant messaging	65	0.264*	0.034
Online discussion forum	89	0.306*	0.004
Podcasts	72	0.238*	0.044
Social networking	70	0.343*	0.004
Streaming video/ webcasts	76	0.193	0.095
Synchronous chats	82	0.246*	0.026
Videoconferencing	75	0.339*	0.003
Wikis	76	0.250*	0.029

Note. * $p < .01$.

SETTING OF USE

To determine the settings of use of distance-based technologies, respondents were asked to “Consider all settings where distance education is used in [their] program.” Scaled response options ranged from 1=No Use through 4=Frequently used. The settings included distance education used for coursework, distance education used for mentoring, distance education used in field experiences/ internships/student teaching, and distance education used for professional development. Respondents were also provided a textbox to describe other uses of distance education. Distance education used for coursework was the most commonly used setting, followed by distance education used for professional development. In all other settings, use was predominantly “limited use” to “no use” (Table 4).

Table 4.

Descriptive statistics: Frequency of use for various purposes of distance education

Distance Education	N	Min	Max	Mean	SD
Collaboration between and among faculty and students	93	0	5	1.77	1.41
Bridge geographic distances	94	0	5	1.61	1.43
Collaboration between and among higher ed faculty and K-12 partners	90	0	5	1.08	1.10
Collaboration between and among teacher candidates and K-12 students	87	0	5	1.00	0.96

Note: Scale 0 = 0%; 1=1-25%; 2=26-50%; 3=51-76%; 4=76-99%; 5=100%

Further analysis on the use of distance education during field experiences and practice teaching revealed that 60% of participants indicated that 25% or fewer of their students use distance education during field experiences and practice teaching. Twenty-nine percent of respondents never use distance education for collaboration with K-12 partners, and 28% of respondents indicated that distance education was never used by teacher candidates for collaboration with K-12 students (Table 5).

Table 5. Frequency of response: Setting for use of distance education

Setting of Use	N	No Use	Limited Use	Moderate Use	Frequent Use	Don't Know
Coursework	96	11.5% (11)	30.2% (30)	20.8% (19)	35.4%* (34)	2.1% (2)
Mentoring	95	15.8% (15)	51.6%* (49)	13.7% (13)	15.8% (15)	3.2% (3)
Field Experiences	96	26.0% (25)	41.7%* (40)	14.6% (14)	15.6% (15)	2.1% (2)
Professional Development	93	19.4% (18)	45.2%* (42)	16.1% (15)	17.2% (16)	2.2% (2)

Note: * denotes highest response percent.

To further understand use in coursework settings, respondents were asked “What percentage of your graduates will have spent at least 9 credits taking coursework via distance education while in your program?” Scaled response options included: 0%, 1-25%, 26-50%, 51-75%, 76-99%, 100%, and *don't know*. Respondents noted infrequent use with 57% indicating that less than 25% of their graduates would have taken 9 credits of coursework via distance education while in their program.

When asked how many credit hours of instruction students received in required teacher education courses using distance education, responses varied from 0 to more than 12 credit hours: 3-6 hrs (21.9%), 1-3 hrs (18.8%), 12+ hrs (15.6%), 0 hrs and 6-9 hrs (14.6%), don't know (9.4%), and 9-12 hrs (5.2%). The mean response for this question ($n=87$) was 2.26 ($SD=1.66$) showing mean responses in the 3-9 credit hour range.

To discern use frequency by type of use, hybrid or online, respondents were asked to identify the point in their teacher education program when at least 80% of students will have completed a total of at least three credits in a hybrid course. Scaled response options included: *before entering*, *by midway*, *by completion*, *not during*, and *don't know*. Thirty-two respondents (33.3%) indicated that 80% of their students will have completed at least three credits in a hybrid course by midway in their program, 27.1% indicated by program completion, 20.8% indicated not during the program, and 15.6% did not know. Three (3.1%) indicated that their students would have taken a hybrid course before entering their program.

Respondents were asked the same question for when at least 80% of their students will have completed a total of at least three credits in an online course. Response options again included: *before entering*, *by midway*, *by completion*, *not during*, and *don't know*. Twenty-eight respondents (29.2%) indicated that 80% of their students will not have completed at least three credits in an online course during their program of study, 26.0% indicated by program completion, 22.9% did not know, 18.8% indicated by midway, and 3% responded before entering.

The frequency of use of distance-based technologies in the field experiences and practice teaching setting was minimal. As with previous questions addressing distance education use, the most frequently reported use categories were 25% or less, with 60% of respondents indicating that 25% or fewer of their students use distance education during field experiences and practice teaching (Table 6).

Table 6. Frequency of response: Use of distance education for field experiences and practice teaching

	<i>N</i>	0%	1-25%	26-50%	51-75%	76-99%	100%	Don't Know
Percent of students using distance education	96	26.0% (25)	34.4%* (33)	8.3% (8)	6.3% (6)	7.3% (7)	9.4% (9)	8.3% (8)

Note: * denotes highest response percent.

Respondents were asked to identify the percentage of courses in their program delivered online and in hybrid formats. As with previous questions addressing distance education use, the most frequently reported use categories were 25% or less, with 80% of respondents indicating that 25% or fewer of the courses in their program are delivered online (Table 7). For the hybrid delivery format the most frequently reported use categories were 50% or less. In fact, only 10% of respondents indicated that more than half of the courses in their program were offered in the hybrid format.

Table 7. Frequency of response: Percent of courses delivered online and hybrid

	<i>N</i>	0%	1-25%	26-50%	51-75%	76-99%	100%	Don't Know
Percent of courses delivered online	97	22.7% (22)	57.7%* (56)	7.2% (7)	3.1% (3)	4.1% (4)	3.1% (3)	2.1% (2)
Percent of courses delivered hybrid	95	17.9% (17)	51.6%* (49)	20.0% (19)	3.3% (3)	5.3% (5)	0% (0)	2.1% (2)

Note: * denotes highest response percent.

RATIONALES AND PURPOSES FOR USE

Often, the reasoning or rationale for implementing a new program strategy or integrating new technological tools is developed in a plan. The plan typically acknowledges a timeline for the implementation. To determine the relative importance of distance education and the rationale for use of distance education in teacher education, respondents were asked “Does your program have a multi-year plan for the integration of distance education that is updated regularly?” Response options included *yes*, *no*, and *don't know*. Sixty-nine respondents (73.4%) indicated that they did not have a multi-year plan for the integration of distance education that is updated regularly, while eighteen respondents (19.1%) indicated that they had such a plan and seven respondents (7.4%) did not know (*n*=94). Using Pearson *r*, no significant associations were found between having a multi-year plan and FTE, Public/Private, and Carnegie classification.

Further analysis on the rationale for using distance education included identification of an evaluation plan. When asked if their program had a documented multi-year plan for the evaluation of distance education that is updated regularly (*n*=96) 64 respondents (66.7%) indicated that they did not have a multi-year plan for the evaluation of distance education that is updated regularly while 28 respondents (29.2%) indicated that they had such a plan and four respondents (4.2%) did not know.

To obtain information on the origin of the decision-making to begin using distance education, respondents were asked “From where does the decision to use distance education originate in your program? You may check more than one response if needed.” Response options included individual faculty members, dean, department chair, program director, institution of higher education administration, and other. Study results showed that the individual faculty member has the greatest influence in the decision-making on distance education with 78 responses (80.4%) followed by department chair (43 responses, 44.3%), dean (38 responses, 39.2%), program director (34 responses, 35.1%), institution of higher education administration (20 responses, 20.6%), and other (8 responses, 8.2%). Other responses included academic committee, IT, curriculum groups, faculty in a program make joint decisions, school partner, Vice President for Academic Affairs, combination: professional Education unit faculty and administration, and not sure (Figure 3).

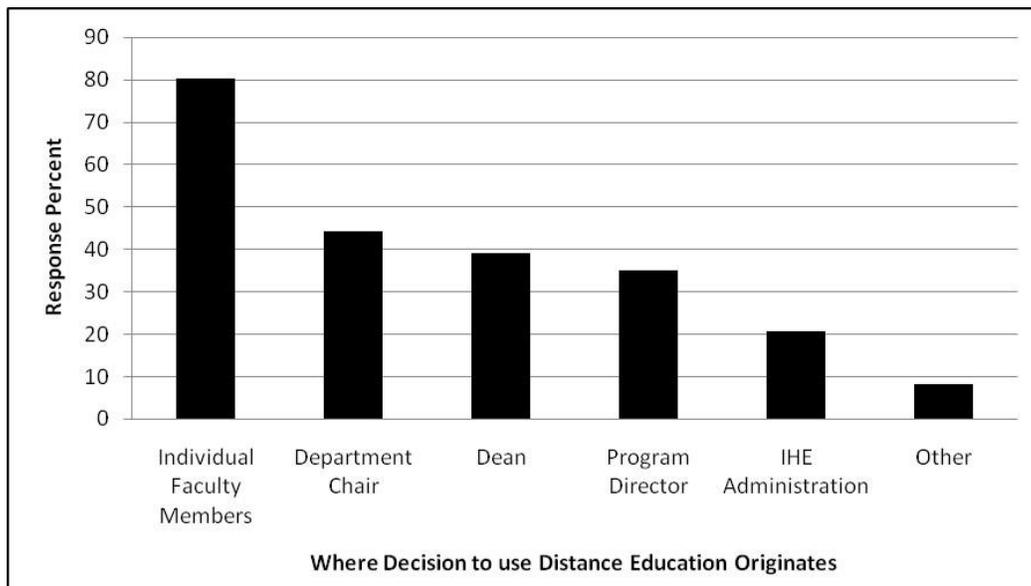


Figure 3. Response percentage for where the decision to use distance education originates (n=97).

To obtain information on the purposes for using distance education in teacher education programs, respondents were asked to “Check the boxes that best describe the reasons for using distance education in your program. You may select more than one reason.” Figure 4 shows the distribution of responses by reason for use. Respondents (n=93) were able to select more than one response for this item. *Interest of faculty* recorded the largest response as a reason for use (76.3%) followed by the *interest of students* (75.3%).

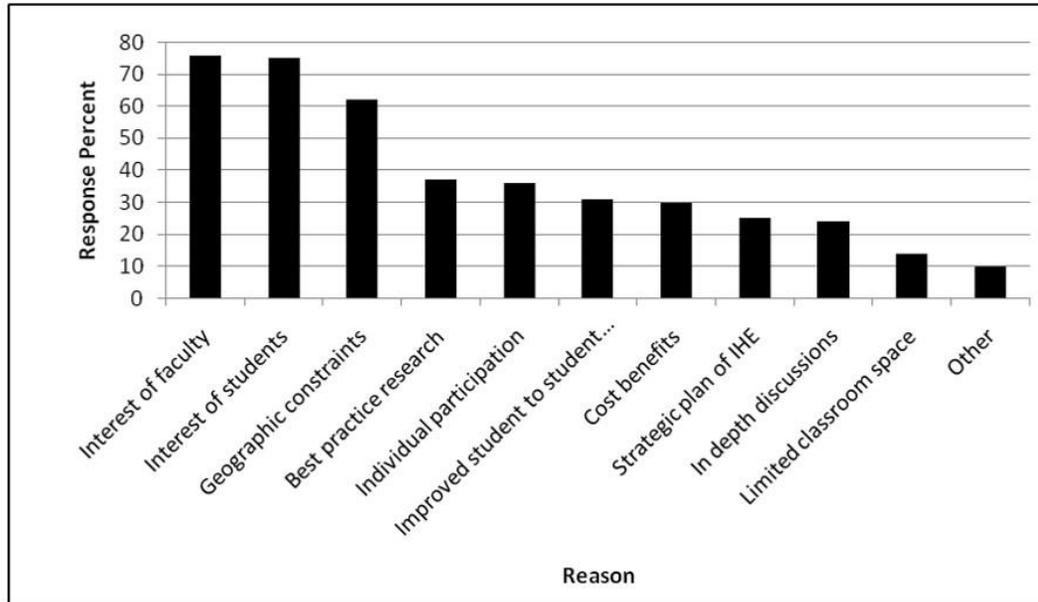


Figure 4. Reasons for using distance education (n=93).

In summary, the current status of distance-based technology use in teacher education is limited. Web 1.0 technologies such as email and asynchronous discussions are more commonly used than Web 2.0 technologies such as wikis, blogs, and podcasts. Similarly, Web 1.0 technologies are more frequently used in required teacher education courses than Web 2.0. Use of distance-based technologies is primarily within the contexts of course settings and is only minimally used for mentoring purposes or during field experiences. The hybrid delivery format was slightly favored over the online format.

SUCCESSSES WITH USE

In an analysis of the current status of distance education in teacher education, it is also important to identify the successes that have been achieved using distance education. This was achieved by asking respondents to share information about successful teacher education programs using distance education and through questions on their program graduates' abilities using distance education for both their own learning and to teach K-12 students. Respondents were asked to identify, from their experiences, the names of teacher education programs or K-12 schools that were effectively using distance education. Eighteen institutions were named by the respondents, with one institution being cited twice. Respondents were also asked to include the attributes of the programs that they believed made them successful. A variety of responses were recorded such as distance courses at advanced levels, faculty commitment, major outreach to rural areas, collaboration with school partners, and dedicated to continuous improvement. There was no consistency in identified characteristics of successful programs.

To further analyze how successfully distance education has been implemented in teacher education, an item was developed to discern the level of teacher education program graduates' abilities using distance-based technologies. Respondents were asked "What percentage of graduates from your program can effectively use: online discussion forums, synchronous chats, videoconferencing, podcasts/ mp3, blogs, wikis, streaming video/ webcasts, instant messaging, and social networking?" Scaled response options included: 0%, 1-25%, 26-50%, 51-75%, 76-99%, 100%, and *don't know*. Respondents noted that Web 2.0 tools were rated more effectively used than Web 1.0 options. Results

indicated that graduates' have the ability to effectively use instant messaging and social networking, two distance education technologies cited as infrequently used in the teacher education programs responding to this study. Both instant messaging and social networking recorded larger means than online discussion forums, one of the most commonly used distance education tools used in the teacher education programs. Curiously, 20% of all respondents selected "don't know" for each response option except online discussion forum, and the variability between response options was greater than observed in any other section of the DETE survey (Table 8, See next page).

Carrying the line of inquiry on teacher education program success with distance education, an item was developed to discern teacher education program graduates' abilities to use distance-based technologies to teach. Respondents ($n=80$) were asked "What percentage of your graduates have the ability and experience to teach their K-12 students age appropriate distance education skills and knowledge?" Scaled response options included: 0%, 1-25%, 26-50%, 51-76%, 76-99%, 100%, and *don't know*. The transferability of teacher candidates' distance education abilities to their ability to teach K-12 students in age appropriate ways with distance education was analyzed with mixed results. Four respondents (4.3%) indicated 0%, 20 (21.7%) indicated 1-25%, 17 (18.5%) indicated 26-50%, 16 (17.4%) indicated 51-75%, 18 (19.6%) indicated 76-99%, 5 (5.4%) indicated 100%, and 12 (13%) responded "don't know."

In summary, the successes that have been achieved using distance education in teacher education are mixed, and may not originate from experiences within the teacher education program, but rather from experiences outside of the program. For example, respondents noted that more of their students can effectively use instant messaging and social networking tools than online discussions. These Web 2.0 tools, however, were not frequently cited as being a part of instructional practices in the teacher education programs responding to the survey.

Table 8. Frequency of Response: Percent of Graduates Who Can Effectively Use Distance Education

Distance Education	<i>N</i>	0%	1-25%	26-50%	51-75%	76-99%	100%	Don't know
Blogs	95	5.3%	23.2%*	23.2%*	10.5%	14.7%	3.2%	20.0%
Instant Messaging	93	4.3%	8.6%	9.7%	9.7%	34.4%*	10.8%	22.6%
Online Discussion Forums	96	0%	14.6%	17.7%	16.7%	30.2%*	12.5%	8.3%
Podcasts	92	8.7%	22.8%	18.5%	7.6%	12.0%	4.3%	26.1%*
Social Networking	95	2.1%	9.5%	7.4%	15.8%	32.6%*	12.6%	20.0%
Streaming video/webcasts	92	8.7%	23.9%	12.0%	10.9%	14.1%	5.4%	25.0%*
Synchronous chats	92	3.3%	23.9%*	20.7%	12.0%	12.0%	4.3%	23.9%*
Videoconf.	93	11.8%	26.9%*	17.2%	6.5%	9.7%	3.2%	24.7%
Wikis	91	8.8%	24.2%	18.7%	9.9%	8.8%	3.3%	26.4%*

Note: * Denotes highest response percentage.

DISCUSSION

The presence of distance education in institutions of higher education is growing faster than enrollment in traditional learning environments (Allen & Seaman, 2013). This rapid expansion in course content delivery method has fueled many new technological advances and new pedagogical strategies (Lee, Driscoll & Nelson, 2004). In teacher education, case study research illustrates just how varied these new approaches to teaching and learning can be. The situation is reminiscent of the introduction of computers and the Internet into classrooms in the 1990s. Computers changed instructional practices in higher education, teacher education, and K-12 classrooms. Similarly, distance education is changing instructional practices in these same environments today.

Because of computers and their impact on teaching and learning, a whole new field of research was born. The new field of study on computers in schools was grounded in our experiences with research on the role of previous innovations in education (e.g. motion pictures, film strips). Similarly, our research in the field of distance education must be grounded upon our knowledge from research on computers in schools.

In teacher education, that research began with the sharing of best practices often through case study analysis. It then progressed to quantitative analysis to determine current status of use, and finally progressed to analysis on barriers to use and strategies for improved use (Willis, Thompson & Sadera, 1999). With this knowledge on computer use in teacher education, programs were equipped with the information necessary to inform decision-making and enact change.

Findings from the DETE study support this evolution of research practices for distance education and provide a cohesive snapshot of distance education use to inform decision-making. Study results found that email and discussion forums were the most frequently reported distance education used by the teacher education programs (Frazier, 2010; Frazier & Sadera, 2010; Frazier & Sadera, 2011). These findings support the National Center for Educational Statistics results (Parsad & Lewis, 2008; Queen & Lewis, 2011) which also reported Web 1.0 uses as the most pervasive uses of distance education. This study also highlights the limited use of Web 2.0 technologies by teacher education programs, which is ironic given the collaborative nature of these tools and the focus on collaboration in current pedagogy (Frazier, 2010; Frazier & Sadera, 2010; Frazier & Sadera, 2011). Likely, these teacher education programs instruct on teaching and learning theories such as Constructivism, Social Constructivism, Social Development Theory, and Collaborative Learning Theory, which emphasize the collaborative and social nature of learning. Web 2.0 provides an interactive environment for collaboration among users, and "...offers unique opportunities for educational application in inquiry practice, collaboration, communication and individual expression, and literacy" (Drexler, Baralt & Dawson, 2008, p.272). Yet, when it comes to distance education, the less collaborative Web 1.0 tools are the most pervasively used.

Study results also found that hybrid uses of distance education were more prevalent than fully online uses. This finding corroborates the Sloan-C data which indicated that hybrid coursework was more pervasive than online coursework in education programs (Allen, Seaman, & Garrett, 2007). It is important to note that in higher education, as a whole, online offerings have been found to be more prevalent than hybrid offerings (Parsad & Lewis, 2008; Allen, et al., 2007). That education applications more frequently assume hybrid formats is not surprising as teacher education courses often focus on the interactions between teachers and students. Many of the teaching and learning strategies included in teacher education may necessarily need to be delivered face-to-face; the hybrid delivery method allows for such interactions in addition to online engagement

(Frazier, 2010; Frazier & Sadera, 2011). Further noted by DE TE respondents was the limited number of courses offered via distance education (hybrid and online formats). These results further corroborate Sloan-C data for education programs (Parsad & Lewis, 2008; Allen, et al., 2007). However, if teacher education aims to prepare new teachers for the classrooms they may one day enter, then they must more fully integrate distance education into programming by increasing the distance education offerings that it provides (Frazier, 2010; Frazier & Sadera, 2011).

According to DE TE findings, integration of distance education into teacher education programs may be challenging given the lack of institutional planning for distance education use. The need for institutional planning was acknowledged by the Sloan-C respondents; however, from DE TE respondents, only a limited recognition of the need for institutional planning on the use of distance education was demonstrated. Instead, the individual faculty member leveraged personal decision-making to use distance education. This finding is somewhat surprising as few decisions in academia are left to the discretion of individual faculty members. Faculty needs the support of program level leaders in the way of a strategic plan in order to create sustainable initiatives. The lack of strategic planning for distance education in teacher education is a serious threat to its successful and sustained implementation (Frazier, 2010; Frazier & Sadera, 2011). While isolated attempts at distance education innovation can be successful, often following the trends of the innovation decision process (Rogers, 2003), and sometimes leading to program-wide change, the likelihood of sustained implementation is greater with program-wide acceptance and support (Welsh, Nunez, & Petrosko, 2006).

In addition to faculty decision-making, DE TE respondents noted “interest of students” as a reason for the use of distance education. This is in line with existing research (Allen & Seaman, 2008) where “interest of students” was an influencing factor, but contrasts existing research since “meeting student needs” was not identified as a leading influence for use by the respondents in this study. This finding highlights the importance of this study to leaders in teacher education programs. Teacher education programs must reflect upon their practices in relation to their peers across the nation and set goals to meet their specific needs and ambitions with distance education. New teachers may well need experiences with distance education to prepare for their future classrooms (Archambault & Crippen, 2009) and national initiatives such as those defined in the National Educational Technology Plan (2010) call for a teaching force trained to use and collaborate with distance education tools and resources (Frazier, 2010; Frazier & Sadera, 2011).

From DE TE findings, it was clear that many graduates of teacher preparation programs bring with them existing knowledge about several distance education tools, such as instant messaging and social networking. However, many respondents were unaware of their graduates’ abilities with these and other Web 2.0 tools. A large number of “don’t know” responses to questions in this section impacted the researchers’ ability to make a conclusive analysis, but with the growing emphasis on teacher technology standards it was surprising to find the uncertainty these program leaders had with regard to their graduates’ distance education skills. This lack of knowledge may be the forecast to a larger problem. Program level leaders may not have the necessary knowledge about distance education used in their own programs, the capabilities of their faculty, and more importantly, the current practices in distance education use in teacher education to make informed decisions (Frazier, 2010; Frazier & Sadera, 2011).

LIMITATIONS AND ASSUMPTIONS

Limitations and assumptions for this study include: (a) The selection of deans, directors and department chairpersons from member institutions of the American Association of Colleges for Teacher Education (AACTE) as representative of teacher education programs in the United States. Member institutions of AACTE do not constitute the entire teacher education population; (b) Respondents may not necessarily have had the background to accurately report on distance education and technology use at their institution; and (c) A low response rate limits the ability to generalize findings beyond the sample.

AREAS FOR FUTURE RESEARCH

The findings of this research indicate that distance education is primarily being used for coursework, but the content and breadth of that coursework is unknown, as are the barriers to use. It would be important to explore which courses are perceived as being best suited to distance education. Use in other settings such as mentoring, field experiences, and collaboration with K-12 partners and students was limited. An analysis into the barriers to these uses would serve to inform decision-making for future uses (Frazier, 2010; Frazier & Sadera, 2011).

Faculty members appeared to have the largest influence on the decision to use distance education. Factors faculty consider before implementing distance education and the professional development that they receive when doing so would be important to assess. Data from these types of inquiry would provide a clearer understanding as to why distance education decision-making so often originates with the faculty member (Frazier, 2010; Frazier & Sadera, 2011).

CONCLUSION

The use of distance education is expanding in higher education, teacher education, and K-12 schools. Prior to this research, there was little descriptive data on distance education in teacher preparation programs. This study presented the types, frequencies, settings, and purposes of use for a sample of teacher education programs in the United States. Use of Web 1.0 technologies such as email and online discussion forums was more pervasive in teacher education programs than Web 2.0 tools such as wikis, blogs, and podcasts. However, teacher candidates were proficient with the Web 2.0 technologies of instant messaging and social networking, which were, for the most part, not a component of their experiences in their teacher education program. Research on where and how teacher candidates build their distance education skills would provide additional information to extend these research findings (Frazier, 2010; Frazier & Sadera, 2011).

This research is important to the field of distance education in teacher preparation in that it provides a description of current practice to inform future research. Current research on distance education supports a move from “trial and error” approaches (Saba, 2005) to more focused and strategic implementations and analysis. Experiences from research studying the use of computers in schools tells us that it is time to move forward to pursue more detailed and methodologically compelling research approaches to understanding why the use of distance education in teacher preparation is limited. Once we understand the factors influencing use we can identify the barriers to use, establish indicators of successful use, and outline best practice strategies.

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APPENDIX

Distance Education in Teacher Education Survey

Distance Education in Teacher Education 2

1. Introduction

A National Survey of Teacher Educators and their Usage of Distance Education

The following survey is intended to collect data on the use of distance education in teacher education so as to provide baseline data on the types of use, frequency of use, and rationale for use of distance technologies in teacher education. This information along with data collected on successful uses of distance education will help advance the field and inform instructional decision making.

In this survey, the following terms are defined as:

Distance education refers to education in which students receive instruction or engage in instructional practices by accessing information or communicating with instructors or peers over a computer network.

Online instruction/course refers to instruction having at least 80% of the content delivered online (Allen, Seaman, & Garrett, 2007).

Hybrid or Blended instruction/course refers to instruction having between 30% and 79% of the content delivered online (Allen, Seaman, & Garrett, 2007).

Teacher Education/ Teacher Preparation Program refers to any program that qualifies graduates for state certification as a classroom teacher.

Directions:

Please complete the questions below for your teacher education program. If you do not believe you are the best person to answer questions about the usage of distance education in your teacher education program, please forward the survey to the person you believe would best be able to respond.

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2. Your Teacher Education Program

1. Check the boxes that best describe your higher education institution. You may select more than one.

 Private

 Research Doctoral

 Public

 Comprehensive Liberal Arts

2. Check the region that best describes your higher education institution. You should select only one region.

 Northeast

 South Central

 Northwest

 Southwest

 North Central

 Pacific Southwest

3. Check the Carnegie Class that best describes your higher education institution. You should select only one classification. [Click here](#) to find your institution's Carnegie Classification.

 Research University (RU/VH, RU/H)

 Master's College (Master's L/M/S)

 Doctoral Research (DRU)

 Baccalaureate College (BAC)

 Other (please specify)

4. Check the response that best describes your institution's FTE equivalent.

- 0 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001+

5. Select your state.

State:

Distance Education in Teacher Education 2**6. Is your teacher education program nationally accredited?**

- Yes
- No

If yes, through what accrediting organization?

7. Number of education graduates (those receiving certification; undergraduate and graduate) expected in the current calendar year:

	0	1-25	26-50	51-75	76-100	100+
Elementary Education	<input type="radio"/>					
Secondary Education	<input type="radio"/>					
Special Education	<input type="radio"/>					
Other	<input type="radio"/>					

If other, please describe:

8. Select the best description of your title or role at your institution.

- Dean
- Program Director
- Department Chair
- Faculty
- Technology Specialist
- Other (please specify)

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3. Types of Use

9. Check all boxes that describe the distance-based technologies used for instructional purposes in your teacher education program.

- | | |
|-------------------------------------------------|--------------------------------------------------------------------------------|
| <input type="checkbox"/> Online Courses | <input type="checkbox"/> Blogs |
| <input type="checkbox"/> Hybrid Courses | <input type="checkbox"/> Wikis |
| <input type="checkbox"/> Podcasts | <input type="checkbox"/> Webcasts |
| <input type="checkbox"/> Email | <input type="checkbox"/> Synchronous Chat |
| <input type="checkbox"/> Videoconferencing | <input type="checkbox"/> Asynchronous Discussion |
| <input type="checkbox"/> Instant Messaging | <input type="checkbox"/> Social Networking (Facebook, Twitter, LinkedIn, etc.) |
| <input type="checkbox"/> Other (please specify) | |
-

10. What percentage of required courses in your program use:

	0%	1-25%	26-50%	51-75%	76-99%	100%	Don't Know
Online Discussion Forums	<input type="radio"/>						
Synchronous Chats	<input type="radio"/>						
Videoconferencing	<input type="radio"/>						
Podcasts	<input type="radio"/>						
Blogs	<input type="radio"/>						
Wikis	<input type="radio"/>						
Streaming Video/Webcasts	<input type="radio"/>						
Instant Messaging	<input type="radio"/>						
Social Networking	<input type="radio"/>						

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11. Consider all settings where distance education is used in your program. Please use the following scale to rate the usage of distance education in each setting.

No use – distance education is not used in this setting in any of our programs

Limited use – distance education is used sporadically in this setting by individuals

Moderate use – distance education is used in this setting by numerous individuals, but is not a program-wide expectation

Frequent use – distance education is regularly and systematically used in this setting

	No Use	Limited Use	Moderate Use	Frequent Use	Don't Know
Distance education used for coursework	<input type="radio"/>				
Distance education used for mentoring	<input type="radio"/>				
Distance education used in field experiences/internships/student teaching	<input type="radio"/>				
Distance education used for professional development	<input type="radio"/>				

Please describe other uses of distance education below:

12. What percentage of required courses in your program use distance education for the following purposes?

	0%	1-25%	26-50%	51-75%	76-99%	100%	Don't Know
Bridge geographic distances	<input type="radio"/>						
Collaboration between and among faculty and students	<input type="radio"/>						
Collaboration between and among institution of higher education faculty and K-12 partners	<input type="radio"/>						
Collaboration between and among teacher candidates and K-12 students	<input type="radio"/>						

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4. Frequency of Use

13. What percentage of your graduates will have spent at least 9 credits taking coursework via distance education while in your program? Courses might include online and hybrid instruction.

- 0%
 1-25%
 26-50%
 51-75%
 76-99%
 100%
 Don't Know

14. How many credit hours of instruction do students receive in required teacher education courses using distance education? Examples might include online and hybrid courses.

- 0 hrs.
 1-3 hrs.
 3-6 hrs.
 6-9 hrs.
 9-12 hrs.
 12+ hrs.
 Don't Know

15. At what point in your teacher education program will at least 80% of students have completed a total of at least three credits in a hybrid course (instruction having between 30-79% of the content delivered online)?

- Before entering
 Not during
 By midway
 Don't Know
 By completion

16. At what point in your teacher education program will at least 80% of students have completed a total of at least three credits in an online course (instruction having 80% or more of the content delivered online)?

- Before entering
 Not during
 By midway
 Don't Know
 By completion

17. What percentage of your students routinely use distance education during field experiences and practice teaching?

- 0%
 1-25%
 26-50%
 51-75%
 76-99%
 100%
 Don't Know

18. What percentage of courses in your program are delivered online (instruction having 80% or more of the content delivered online)?

- 0%
 1-25%
 26-50%
 51-75%
 76-99%
 100%
 Don't Know

19. What percentage of courses in your program are delivered in a hybrid format (instruction having between 30-79% of the content delivered online)?

- 0%
 1-25%
 26-50%
 51-75%
 76-99%
 100%
 Don't Know

