Using Distance Technology to Sustain Teacher Education for Student Teachers in Isolated Areas: The Technology Supported Induction Network

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Abstract

This qualitative study evaluated the Technology Supported Induction Network's (TSIN) effect on 15 elementary education student teachers in isolated rural schools. The student teachers were 50-300 miles away from their university; thus, it was difficult for faculty to provide support and supervision. The TSIN provided student teachers with professional development opportunities and virtual connections to their peers and university through distance technology, including an online discussion board and compressed video. Findings indicate that the TSIN supported reflective practice, curricular and emotional support, and connections to peers, but not connections to the university. TSIN participants also developed their technology skills and confidence. The strengths and limitations of using distance technology to support student teachers are discussed along with recommendations for improving the TSIN design.

The purpose of this investigation was to determine the effect of the Technology Supported Induction Network (TSIN) on elementary school student teachers with rural or isolated field placements. The TSIN used a multi-media delivery model consisting of compressed video, an Internet discussion board, e-mail, and telephone to combine successful elements from different studies that used a single form of distance technology to support novice teachers (Brintnall, 2002; Roddy, 1999; Venn, Moore, & Gunter, 2000-2001).

The challenges of supporting student teachers and developing strong school-university partnerships are tremendous in rural areas. Lengthy travel time and dangerous winter road conditions decrease time available for student teacher supervision and/or the number of visits in a term. Students can't be centrally clustered, and complaints from cooperating teachers regarding inadequate supervisory dialogue are common (Gruenhagen, McCracken, & True, 1999).

This investigation of the TSIN's impact took place at a land grant university located in a rural state with a low population density and lengthy winters. The university's teacher preparation program faces the problems Gruenhagen et al. (1999) described. At the time of the study, most practicum sites were 50 to 300 miles away from the university. Mentor teachers assumed most of the responsibility for supervision and support of student teachers. During the semester, each student teacher was visited twice, weather permitting, by a consultant who provided additional support. As many as 75% of student teachers had a non-university staff member for a consultant—usually a retired teacher who lived nearby.

This model made student teaching possible in a state where weather and geography limit options. Limitations of supervision by non-professorial personnel and isolation from peers are well documented in the literature, as are suggestions for improving student teacher support (Beck & Kosnik, 2002; Kamens, 2000; Lortie, 1975; Roddy, 1999; Venn et al., 2000-2001). Despite these quarter-century old and contemporary recommendations, the university's student teaching model did not provide consistent opportunities for professorial supervision or peer interaction.

Purpose of the Study

After consulting research literature about induction, social learning, and distance technology, the researchers designed the TSIN to meet the support needs of isolated preservice teachers during student teaching. The TSIN utilized multiple forms of distance technology to provide social learning opportunities to help connect theory and practice, allowing student teachers to remain connected to their peers and teacher preparation institution during student teaching. The TSIN's impact on 15 participants was investigated through a case study. Specifically, the TSIN targeted student teachers who, by nature of their rural placement or teacher preparation institution limitations, might have been isolated from concerted support. This study used an innovative approach that provided virtual peer and instructor support through distance technology.

Literature Review

Single forms of distance technology have successfully been used to help student teachers and beginning teachers in rural and isolated areas blend theory and practice. E-mail has supported mentoring relationships since the late 1980s (Bull, Harris, Lloyd, & Short, 1989). Brintnall (2002) and Roddy (1999) have used e-mail more recently to support beginning teachers and student teachers, respectively. Other studies found discussion boards a meaningful method of supporting beginning teachers (Babinski, Jones, & DeWert, 2001; Edens, 2000). Compressed video connects two or more locations so participants can see and hear each other in real time, virtually overcoming geographic distances (Branburg, 2001). Venn et al. (2000-2001) and Gruenhagen et al. (1999) used compressed video to support student teachers in rural schools and found it helped to increase faculty supervision and feedback for student teachers who would otherwise have had minimal support. Gruenhagen et al. also pointed out that technology was not a replacement for personal contact.

Distance technology support for isolated student teachers in rural areas may be helpful because preservice teachers' experiences during student teaching are a vital part of the teacher preparation process (Lortie, 1975; Mayer, 2002). During this time, student teachers begin to connect theory and practice (Weaver & Stanulis, 1996), assumedly with guidance from their cooperating teachers (Fairbanks, Freedman, & Kahn, 2000). Frequently missing, however, is the presence of college or university personnel. Beck and Kosnik (2002) explained that supervision by non-professorial personnel contributes to a gap between campus courses and practicum experiences. This supervision approach ignores "respect for practice; a close theory-practice connection; … an integrated curriculum; and a caring, supportive, teacher-student relationship" (p. 17). Richardson-Koehler (1988) found that preservice teachers discounted "the influence of most

of their previous pedagogical instruction on their classroom practices" (p. 30) within two weeks of beginning student teaching.

Connecting student teachers with peers and university instructors seems to help reduce isolation, improve support, and increase the transfer of theory into practice (Kamens, 2000; Roddy, 1999). Induction programs typically provide this kind of support to beginning teachers during the first three years of their career and reduce attrition rates among beginning teachers (Chubbuck, Clift, Allard, & Quinlan, 2001; Feiman-Nemser, 2001). Odell and Huling (2000) recommended that student teachers also receive induction support. Although the benefits of induction for beginning teachers are clear, formal induction, via technology or direct interaction, is rarely provided for preservice teachers. Therefore, this study filled a gap in the literature, modifying elements of successful induction programs for inservice teachers for delivery via distance technology to preservice teachers with isolated student teaching placements.

Methods

An evaluative case study was used to answer the question: What is the effect of the Technology Supported Induction Network on student teachers in terms of reflective practice, curricular support, emotional support, and maintaining connections to their peers and teacher preparation institution? According to Yin (1994), a case study is an appropriate method when a phenomenon's variables cannot be separated from its context. In the case of the TSIN, there was no way to separate the impact TSIN had on student teachers' reflective practice from the context of their student teaching placements, relationships with their mentor teachers, and other variables unique to each student teacher. A case study research design was also selected based on Merriam's (1998) definition of a case as a "phenomenon that is inherently bounded, with a finite amount of time for data collection or a limited number of people who could be interviewed or observed" (p. 27). Since the student teaching semester was 15-weeks long, there was a finite amount of time for data collection with any one group of preservice teachers. Educational case studies can take a variety of forms, including theory seeking and theory testing, storytelling, and evaluative (Bassey, 1999). Evaluative case study was selected in order to assess how the multi-media TSIN affected 15 elementary education student teachers.

TSIN Design

The TSIN was based on existing successful induction and student teacher support programs, as well as recommendations for effective induction (Chubbuck et al., 2001; Kamens, 2000; Odell & Huling, 2000). In effective induction models, social learning opportunities bring beginning teachers together to examine professional development topics and share concerns. The TSIN consisted of two forms of distance technology supported induction: an Internet-based discussion board and compressed video sessions. Telephone and e-mail were used as supplemental forms of support.

The Internet-based discussion board was designed to be an integral part of the TSIN where student teachers could post questions, comments, and reflections. Every week or two, the researchers or participants posted a question. The objective was for participants to engage in a threaded discussion as colleagues and peers. This opportunity would allow the student teachers to problem solve, share triumphs, and seek guidance from the support network they had established during their campus studies.

Five 90-minute compressed video professional development sessions were held as part of this investigation. The TSIN utilized a compressed video system that connects every high school in the state, as well as the origination site at the university where the TSIN was based (Gates Leadership Project, 2002). Participants interfaced with two television screens. One screen always showed the origination site. The second screen showed the non-origination site when someone spoke, or, when someone at the origination site was speaking, the second screen rotated through each of the distance sites. The compressed video sessions served two purposes: 1) provide opportunities for student teachers to network with their peers, and 2) allow student teachers to examine professional development topics in the context of student teaching with guidance from university instructors. Topics were selected based on input from the participants and a review of the literature. Classroom management was the topic twice. The other sessions addressed literacy, the use of children's literature to promote science and mathematics problem solving skills, and job interviews.

Participants

In order to facilitate the peer support that is a foundation of the TSIN, participants needed to be supportive of one another. Because student teaching only lasts 15 weeks and most participants were isolated from one another, there was not time during the TSIN's operation to establish a trusting and supportive community. Therefore, 15 elementary education student teachers who were part of the same cohort were invited to participate. All 15 agreed; participation was voluntary and no incentives were provided. Fourteen of the participants were women. Twelve participants were traditional-aged college students. Pseudonyms are used to protect each participant's anonymity.

Eight participants taught in towns between 90 minutes and 6 hours away from the university. These eight were the only student teachers in their respective schools. Seven other participants were placed at schools in the university town, yet each reported feeling isolated from the university in part because their student teaching supervisor was not a university faculty member. One of these seven participants was the only student teacher in her school; the other six were in schools with at least one other student teacher. Involvement in the TSIN varied among the participants; four were highly involved, four were moderately involved, and participation was low for seven. The participants who student taught in the university town were not geographically isolated like their peers in rural settings and thus might have been predicted to use the TSIN less frequently; however, participation levels were similar between both groups.

A smaller case study embedded within the investigation examined in-depth the experiences of four participants. Additional data were collected from these four student teachers. Participants with variability in their proximity to the university were selected in order to see if the TSIN's impact was greater for student teachers that are more isolated. These participants student taught 5 minutes, 90 minutes, 3 hours, and 6 hours away from the university and were given the pseudonyms Chrysti, Pam, B.J., and Zoro.

Data Collection and Analysis

Fifteen student teachers participated in the TSIN; their discussion board postings, interactions at the compressed video sessions, and exit interviews served as the primary data sources. Occasionally participants e-mailed one another or the researchers, and these e-mails were preserved as an additional data source. Three additional data sets were obtained from the four participants in the smaller, embedded case study: journal entries, and notes from three teaching observations and post-observation interviews. One of the researchers, Fry, conducted the observations and interviews.

All data were analyzed for indications of reflective practice, curricular support, emotional support, and the student teachers' maintenance of connections to their peers and teacher preparation institution. Analysis was begun during data collection in order to structure future data collection efforts based on emerging themes and hunches, while avoiding collecting unfocused, repetitive, and voluminous data (Merriam, 1998). Data were analyzed promptly upon collection; for example, discussion board postings were analyzed weekly.

Open coding, memos, debriefing, and member checking were among the methods used to promote consistent and reliable findings (Bogdan & Biklen, 1998). Open coding involved examining every line of the discussion board postings and compressed video transcripts to identify categories and repetitive patterns. Data from interviews, observations, and journal entries for the student teachers in the embedded case study were used to confirm recurring patterns. Memos allowed the researchers to reflect on the issues presented in the data and keep track of their emerging thoughts about the findings. The researchers had debriefing sessions with one another, as well as another qualitative researcher who was not part of the investigation. This credibility procedure promoted good findings by requiring the researchers to talk through the data's themes and implications, answer questions, and consider the emerging findings from another person's point of view. Member checking was also used to promote credible findings. Emerging themes were discussed with each of the embedded case study participants throughout the investigation. All 15 participants were invited to read and critique the results and discussion of the study.

In addition to collecting and analyzing data, one of the researchers, Fry, facilitated the TSIN and visited four of the participants in their classrooms. Through these roles, Fry became part of the student teachers' emotional and curricular support network, and thus a participant-observer rather than an observer of the TSIN. Toma (2000) stated that this kind of involvement generates good qualitative data because when researchers "care deeply about what and whom they are studying" (p. 177) they are more likely to become "insiders" (p. 183) who get to know and negotiate meaning about their research topic.

Results

Levels of participation varied among the 15 student teachers who participated in this study; thus, the answer to the research question is multifaceted. The TSIN had a great deal of impact on some participants in terms of reflective practice, curricular support, emotional support, and maintaining connections to their peers, but little or no impact on other participants. The TSIN supported the professional development of four student teachers, played a moderate role in the experiences of four more student teachers, and had little or no effect on the other participants. The TSIN had a greater effect on those who participated more. Participation and impact levels were fairly consistent among those student teachers with isolated placements and those who were in the university town. Of the four who benefited the most from the TSIN, two were in the university town and two were in rural schools. Of the four for whom the TSIN had a moderate benefit, one was in the university town and three were in rural areas. For the seven student teachers who received little or no benefits from the TSIN, four taught in the university town and three were in rural areas.

Low levels of participation among half the student teachers were a concern throughout the study. Before conducting exit interviews, the researchers were prepared to declare the TSIN unsuccessful and expected participants to be critical of the TSIN. Instead, student teachers who did not participate much wished they had had more time for the TSIN and were glad the TSIN was available for those who needed it. Convenient Internet access for the discussion board and access to the compressed video were not reported as problems by any of the participants; thus, technology access did not seem to be a reason for low participation among some participants. For those who were active participants, the TSIN was reported to be very valuable. One participant said, "TSIN reminded me that I am not the only beginning teacher, I am still a college student, and I am not isolated out here in the middle of nowhere." Other participants explained how they used strategies from the compressed video sessions in their teaching, thus connecting theory and practice.

Discussion Board

It made me be a more reflective teacher because we've had to share things. I don't communicate very well, so having to think about my thoughts enough to share them was good.

— B.J., exit interview

The discussion board did not prove to be an effective way to support all of the participating student teachers. Just four out of 15 participants used the discussion board more than four times. Exit interviews revealed that most of the student teachers simply could not prioritize visiting the discussion board when they were already spending 50 or more hours a week as student teachers. The discussion board primarily influenced reflective practice—more postings were classified as reflective practice than the other four categories identified in the research question combined. Although discussion board use was low, most participants reported that it was useful or could have been useful if they had more time for it. Some student teachers also considered the discussion board unappealing because there was no immediate interaction with peers. Although the participants who used the discussion board found it valuable, this form of technology did not appeal to everyone.

Unlike the beginning teachers in Brintnall's (2002) study, the student teachers did not use electronic communication for emotional support. For example, B.J., who was 3 hours away from the university and was the only student teacher at her school, substitute taught for her mentor in the first month of the study. That afternoon B.J. sent one of the researchers, who was also her university consultant, an e-mail about the experience. B.J. wrote, "I am completely drained-mentally, physically, emotionally. At times it felt like the kids were going to eat me alive." She did not turn to the discussion board to share her experience because she wanted tangible people who could respond immediately. She was able to get that support from the teachers in her school who kindly checked in throughout the day to offer words of encouragement. People who could respond to B.J. immediately were a more valuable means of emotional support than virtual support from her peers who were hours away.

The discussion board provided some of the participants with a way to stay in touch with their peers. In their exit interviews, Chrysti and Erica both reported that they would not have stayed in touch with their former classmates if they had not been part of the TSIN. Chrysti, who student taught in the university town, explained that she valued hearing "what everyone else was doing and how they were doing it" (EI, 12/11/03). Erica, who student taught 3.5 hours away from the university, said, "Reading other people's frustrations helped me feel better that I wasn't alone with my own. We built good relationships last semester, and it was nice to know that these people were in the same situation I am." Kari, who student taught at a school that was 5 hours from the university, also appreciated learning that other people were facing similar challenges. She found that, on the discussion board, her peers often "made suggestions I was able to take to class with me." These benefits are consistent with Chubbuck et al.'s (2001) findings.

The discussion board was meant to be a place where student teachers could interact, but Kari used it in a way that differed from the researchers' expectations. She only posted on the discussion board once, but still checked it regularly because she enjoyed learning about her peers' experiences. Kari was shy and uncomfortable having a lot of attention focused on her, so the discussion board allowed her to feel connected to her peers without having to draw attention to herself. This unanticipated use approach allowed Kari to feel comfortable and supported.

The discussion board was supportive of reflective practice, which is consistent with Levin's (1999) findings. In the second month of student teaching, Zoro, who student taught 6 hours away from the university, wrote about her growing appreciation for detailed lesson plans:

When I was in methods classes, I felt that the lessons I had to write were too extensive. With 20/20 hindsight, I now understand why [our instructors] wanted us to plan so extensively. To begin with, I feel writing thorough lessons allow us, as new teachers, to physically see where our lessons are both strong and weak. For example, I was reviewing my lessons and noticed that I was missing many teachable moments and extension possibilities. So, I was having to teach three lessons to cover material that I could have covered in maybe one or two lessons.

Zoro also shared the "original" format she developed for lesson plan writing. The format was almost identical to the one she was taught in her teacher education program, but she made a minor alteration and thus felt ownership of the format. Zoro's reflections spurred a thoughtful response from Pam, who student taught 90 minutes away from the university:

Like Zoro, I really feel all of the extensive plans from methods were a great tool for us to learn how to connect theory and practice. I started out the semester trying to do all of my lesson plans that same way. But after I was spending over 4 hours on the computer each night typing them, I figured out a much better way to do it that is so simple but also still keeps the connection. Each week, I do a rough outline of what I'm going to be doing. Once I have that figured out, I think about the individual lessons, look at where there may be problems or good places for extensions, and do correctives/enrichments for the whole week instead of trying to do it for the individual lessons.

Pam and Zoro developed approaches to planning that connected theory and practice, developing skills they could use as inservice teachers. Both were isolated from the university and were the only student teachers at their school; without the discussion board, this opportunity for reflective practice and idea sharing would not have happened.

Compressed Video

The compressed video sessions provided me with a lot of support. Having support from a mentor is good and all, but having contact with people who know me, that I've gone to school with, is nice. It was also helpful to learn strategies from people other than my mentor; we don't necessarily approach everything the same way.

— Pam, exit interview

Attendance for the compressed video sessions never reached 100%; however, twelve student teachers attended at least one session. During their exit interviews, participants reported that the compressed video sessions were valuable and provided information they had been able to use in their teaching. Pam explained, "I got at least one major thing from each session; they were very valuable to me." Zoro pointed out another advantage: "The [compressed video] discussion each week seemed to correlate with the questions on the discussion board that week, too. This really gave me a chance to think about [the topic], say it, hear it."

For most of the participants, the TSIN provided their first exposure to compressed video. It took time for some participants to get used to compressed video and its idiosyncrasies. This was particularly true for the student teachers who attended sessions from distance sites. After the first compressed video session, Pam humorously explained that she was sitting alone in a room and "talking to a TV," and was worried that this was not normal behavior. Another problem resulted from the technology training available at the distant locations. Usually the compressed video coordinator for each site provided first-time users with instructions for

how to use the system, helped turn it on, and made sure the connection worked. When Erica attended her first compressed video session, she did not receive an orientation and it took her 10 minutes to figure out how to use the system. Although participants laughed about the technological problems, the inconsistent support available for new users was frustrating.

Unlike the discussion board, the compressed video sessions affected the student teachers in all five areas identified by the research question. Using technology to bridge geography and have virtual face-to-face conversations in real time, participants were able to reflect on classroom situations with their peers and former university instructors. Emotional support and curricular support often were provided while the student teachers engaged in reflective practice. At the third session, Zoro, nervously said, "I'm kind of freaking out right now because my principal told me today that I'm having my mock interview tomorrow. And I don't have my portfolio here; it's in [the university town], so do you have any pointers?" Zoro was usually calm and collected in her speech; that afternoon there was a panicky tone in her voice that was striking considering her typical composure. At first, there was stunned silence because mock job interviews are supposed to be held in the last two weeks of student teaching. Even though no one else had done theirs, the group brainstormed suggestions for how Zoro could prepare in less than 24 hours. Collectively, the preservice teachers offered suggestions and supported Zoro. After the compressed video session, the facilitator, who was also Zoro's university consultant, was concerned that Zoro might still be nervous, so she called Zoro to talk further about the upcoming interview. Without the TSIN, the consultant would not have known Zoro needed support. Zoro's interview was successful, and she shared some of her experiences on the discussion board:

Hi all, I just got done with my interview and it went great! I was a little nervous, but that's to be expected. [Facilitator] thank you for calling me last night. I really needed the pep talk. In regard to portfolios, they personally do not view them and suggested you use them as a resource during the interview… Basically, they said be yourself, know yourself, and be able to share yourself in a concise organized fashion.

Zoro received the emotional support she needed, was successful in her mock interview, and was able to offer support for her peers who had their interviews scheduled later in the semester.

During the third compressed video session, the preservice teachers' needs for support were not limited to Zoro's upcoming interview. Later the conversation switched to challenges the preservice teachers faced regarding control of the classroom and developing their own style of teaching. Chrysti stated, "I teach entirely different when [my mentor is] not there," and Pam responded, "I've noticed that, too. And the kids act different. I don't know if they're confused about who's in charge when [my mentor is] in the room, or what." The conversation continued as Zoro, Jo, and B.J. shared similar challenges. No concrete suggestions or solutions were offered. Instead, this dialogue was valuable because the preservice teachers were able to hear that their challenges were not unique. Research on induction indicates that beginning teachers benefit from the opportunity to learn that they are not alone in their struggles (Chubbuck et al., 2001). The compressed video sessions allowed participants to do so.

The compressed video sessions were also able to support participants' reflective practice. During the compressed video session addressing literacy, Chrysti shared her frustrations with keeping her kindergarten students engaged during shared writing, an instructional technique that allows one student at a time to write part of a shared document. A large piece of lined paper is often used, and the student whose turn it is to write gets one-on-one support from the teacher. Because the teacher's attention is directed toward one student, classroom management problems

are common unless the teacher uses methods to keep the rest of the class engaged. Chrysti explained how she was using the literacy technique. Before sharing research-based solutions, the literacy instructor who was providing guidance for the session asked the rest of the participants if they had encountered similar challenges and, if so, if they had come up with ways to keep the children interested. This approach showed respect for the preservice teachers' developing knowledge, allowed them to reflect on their practice, and may have contributed to the preservice teachers' growing view of themselves as teachers rather than students. After two student teachers shared strategies they used, the literacy instructor offered an additional suggestion: have the students who are waiting practice writing on the carpet, write in the air, or write on a partner's back. Chrysti proceeded to implement the recommended strategy, and she wrote about its success in her journal. When Chrysti was observed in her classroom two weeks after the compressed video session, she was using the strategy successfully.

Discussion

For the TSIN to be successful, participants needed to be comfortable with the technology, and the technology needed to work. Studies using discussion board technology and e-mail to support isolated teachers allude to problems with participant use and satisfaction (Brintnall, 2002; Edens, 2000; Roddy, 1999). In contrast, participants in this study were satisfied with the technology. Although many were uncomfortable with compressed video at first, 12 of the participants had no critical comments about the technology at the conclusion of the study. Of the remaining three, B.J. never became comfortable with compressed video, Pam found the discussion board impersonal, and Jo had difficulty accessing the discussion board for two weeks in early October. Despite these criticisms, B.J., Pam, and Jo were among the most active TSIN participants.

The TSIN's purpose was not to replace university consultant visits; it was intended to enhance student teacher learning and support. Although the TSIN could be used to enhance supervision and perhaps reduce the number of site visits faculty need to make, it cannot replace the one-on-one feedback that results from observations and follow-up discussions to help connect theory and practice. Participating in the TSIN can allow consultants or supervisors to maintain closer connections to their student teachers. For example, one of the researchers served as the consultant to five TSIN participants. Because she also participated in the TSIN, the researcher/consultant was alerted to times when the student teachers might benefit from additional support. Although weather and road conditions limited her number of in-person visits, the researcher/consultant was able to establish supportive relationships with her student teachers through the TSIN. For teacher preparation programs relying on consultants to support student teachers, the TSIN can help enhance communication.

Despite the challenges faced during this inaugural implementation, the TSIN seemed moderately effective in providing induction support by distance technology. With improvement, the TSIN has potential to play an important role in induction for student teachers. Strengthening the discussion board format is a good place to start. One possible improvement is to have preservice teachers alternate responsibility for developing the discussion board prompting question, encouraging participation, and responding to peers by probing for deeper reflection and action plans. Scheduling weekly live chats on the discussion board so preservice teachers can obtain immediate feedback from peers, the TSIN facilitator, and other university personnel, and aligning discussion board questions with upcoming compressed video topics might help participants make meaning from their TSIN-based professional development experiences. Since technology innovations develop rapidly, other forms and combinations of distance technology that may be more user-friendly than discussion boards and compressed video should be explored for future implementation of the TSIN.

The results of this study suggest three areas for future investigations. Firstly, for some of the student teachers in this study, the TSIN was their first experience with compressed video. Heather explained, "[Participating in this study] gave me insight to how advanced technology is. I thought that was really cool that we could communicate throughout the state and see each other and have actual discussions." Lloyd, Merkley, and Dannenbring (2001) suggested that using distance technology in teacher preparation may increase comfort and may contribute to a greater likelihood of using technology as a teaching tool during inservice practice. Longitudinal studies that follow student teachers who used distance technology during teacher preparation may provide valuable information about the long-term benefits of projects like the TSIN. Measuring comfort with technology prior to distance technology use during teacher preparation, post distance technology use, and during inservice teaching years would add to the understanding of the effect exposure has on future use.

Secondly, when endeavoring to achieve goals similar to those of the TSINs, teacher preparation programs should consider using technology with greater appeal for student teachers. A combination of telephone and compressed video contact may be more helpful than computer-based dialogues. Teacher preparation programs should also consider the effectiveness of discussion boards; these systems are not all free and may not accomplish all that is expected of them. Comparing the effectiveness of compressed video and telephone support to discussion board and e-mail support might lead to valuable information about how to best support isolated student teachers through distance technology.

Finally, this was a low budget study. No external funding was obtained to provide incentives for participation. In contrast, Wepner (1997) was able to provide student teachers with a laptop and modem for personal use during their required participation in a study examining the effectiveness of linking triads of cooperating teachers, student teachers, and university faculty via e-mail as a means of instruction and support during field experience. During her TSIN exit interview, B.J. mentioned that she felt the comments and reflections on the discussion board were genuine and meaningful as opposed to the "canned" ones she was used to in classes where participation was mandatory. It would be worthwhile to compare participation rates and interactions in studies with mandatory involvement and incentives versus studies with no incentives and optional participation.

Conclusion

This study demonstrated how distance technology can provide professional development opportunities that help student teachers connect theory and practice. Additionally, the results suggest that exposure to distance technology during teacher preparation may allow student teachers to increase their knowledge of and comfort with educational technologies. Induction through distance technology has the potential to help bridge the gap between theory and practice, therefore improving teaching and learning in America's K–12 schools.

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proof that technology can make a difference. Recommendations included: thorough description of both the technology and its implementation; attention to student outcomes, including both test score-driven factors and higher-level thinking skill factors; collection of longitudinal data; collaborative research efforts; and partnerships with classroom teachers and local district personnel. Finally, we need to be thinking about how the disciplines are shifting because of and with the impact of emerging technologies and what our students need to know and how they need to know it. *(Copied from material posted at* http://necc2006.blogspot.com/ *and edited by A. Borthwick.)*

Panel members: Melissa Pierson (Chair), Gerald Knezek and Rhonda Christensen (instructional technology), Maggie Niess (math), Sarah Kajder (English), Tom Hammond (social studies), Susan Albaugh (blog recorder).

Facilitating Effective Technology Research in the Core Content Areas

General agreement among the panel members emerged on the need for the educational technology community to build an understanding of what we currently know, and what our schools, educators, researchers, and policymakers need to know regarding the use of educational technology for teaching and learning. It appears that there are large discrepancies between states and schools in the implementation of access and integration of technology. It was also discussed that evaluation of some block grant funds to states have not been systematic or resulted in information that has been useful. This is due in part to lack of assistance to the project coordinators in the strategies and tools of evaluation, and partly due to the lack of federal assistance to the states in understanding what the evaluation components should include. Members of the panel also would like to see more bridges between research articles and "implication for practice" which is often talked about but not frequently included. *(Summarized by Lynne Schrum)*
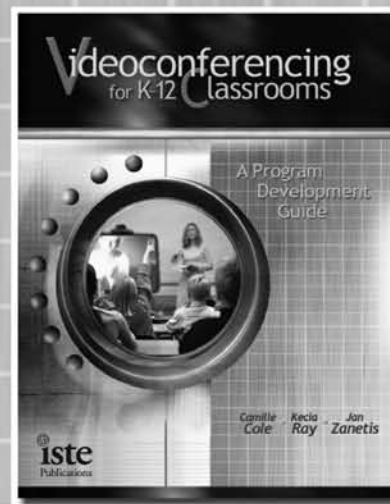
Panel members: Lynne Schrum (Chair), Susan Albaugh, Talbot Bielefelt, Tom Hammond, Tim Magner.

nology use by student teachers and that instructional barriers outweigh technology barriers in influencing this use.

Although we are all quite new to examining the use of podcasting in teacher education, it appears that this new technology capability might also help in our quest to use technology to better connect teacher education to PK–12 schools. Stay tuned for further developments in the applications of podcasting and for our *JCTE* podcast debut!