Technology Leadership: Shaping Administrators’ Knowledge and Skills
Through an Online Professional Development Course

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Abstract: This research examined changes in administrators’ ideas about technology integration and technology leadership while participating in an online professional development course. Eight administrators, enrolled in a semester-long course, participated in 15 discussion forums related to k-12 technology implementation issues. Pre- and post-course surveys indicated significant changes in ideas about technology integration as well as methods used to support teachers’ integration efforts. Analysis of interview and course discussion data suggests that administrators view technology leadership as a “shared responsibility” that requires both administrative skills and technical knowledge.

Theoretical Framework

According to the SouthEast Initiatives Regional Technology in Education Consortium (SEIR*TEC, 2000) "leadership is the single most important factor” influencing the successful integration of technology within our schools. Based on their extensive work in k-12 schools, SEIR*TEC noted that the schools that have made the most progress toward technology integration are those with energetic and committed leaders. Stegall (1998) reported that this influence held true despite wide differences in schools’ enrollments, locations, and operating budgets.

Few educators today would argue with the notion that the principal plays an important role in facilitating technology use in the schools. According to Crystal (2001), building administrators are the “nexus through which all issues flow” (p. 36). Yet many of our administrators are novice technology-users and have gained little experience or training in the knowledge and skills needed to be effective technology leaders. Even though administrators understand the importance of implementing and supporting technology use in their schools (Mehlinger & Powers, 2002), the development of technology leadership skills seems to have been left almost completely to chance. Since it is possible to obtain a principal’s license without knowing anything about technology, how, then, are our administrators expected to develop these critical skills?

Unfortunately, there is very little research delineating best practices for preparing administrators to be technology leaders. Most school administrators are simply acquiring their technology knowledge and skills on the job, with occasional training provided by assorted vendors, professional organizations, and, to a lesser extent, colleges and universities. According to Mehlinger and Powers (2002), "Graduate school programs generally are doing a poor job in preparing school principals and superintendents to be technology leaders" (p. 218).

Still, colleges of education have started to consider ways to address technology needs within their school administration programs (O’Neill, 1999). Furthermore, a national collaborative has recently drafted a set of technology standards for school administrators (TSSA, 2001) that can guide the redesign and/or development of new
graduate courses. Given the number of issues that need to be addressed, however, innovative approaches will be needed if administrators are to gain the pedagogical, as well as the technical, knowledge and skills needed.

**Purpose of the Study**

This study was designed to examine changes in administrators' knowledge and skills, related to technology leadership, as they participated in a semester-long online professional development course. By requiring administrators to use technology to examine issues of technology leadership, we hoped to support the development of administrators' ideas related to technology leadership, while simultaneously building their confidence and competence related to technology skills. Specifically, the questions guiding data collection and analysis included:

- What are administrators' ideas about technology leadership and how do these ideas change while participating in an online professional development course?
- What knowledge and skills do administrators need to affect technology leadership in their schools and to what extent can participation in an online professional development course build both knowledge and skills?

**Methods**

We gathered both quantitative and qualitative data to examine changes in the knowledge and skills of eight administrators enrolled in a 3-credit course, *Integration and Management of Computers in Education*, during the fall semester of 2001. This course was one of two courses that participants were required to take during their first semester in the university's cohort doctoral program in school administration. Although cohort students had been required to take this course in the past, this was the first time the course was offered completely online. Furthermore, this was the first time the course enrolled only administrators; previous offerings of the course included a mix of administrators, undergraduate pre-service teachers, graduate in-service teachers, and graduate students in educational technology. Having a homogenous audience in the course allowed for a more extensive focus on administrative leadership issues than had been possible previously.

All 8 administrators agreed to participate in the study. Participants included 2 females; 4 participants were assistant principals, 3 were principals, and one was a district-wide instructional technology coordinator. Teaching experience ranged from 3 to 18 years, with an average of 7 years, while administrative experience ranged from 2 to 8 years, with an average of 4 years. At the beginning of the course, participants had varied levels of technology skills. Although most (n = 6) indicated that they used e-mail "as an integral part of their lives," only 4 indicated previous experiences with bulletin boards or chat rooms. In general, participants described their uses of technology as being limited to "word processing and surfing the Web." None of the participants had previously taken an online course ("WebCT is completely new to me, as well as chat rooms and message boards."). Participants expressed some initial uncertainty about learning via an online approach ("At this point, I am still uncomfortable using this type of technology to communicate.").

The 3-credit course (http://tcct.soe.purdue.edu/tipdoc) was designed to help administrators gain both the competence and confidence needed to facilitate and support effective learning environments supported by technology. Participation in the course comprised a variety of virtual interactions and discussions and incorporated three primary strategies (modeling, reflecting, and collaborating) that, based on previous research, were judged to be effective in supporting teacher and school change. For example, participants observed (via the Web and CD-ROM) a number of model teachers, engaged in ongoing reflective conversations, and collaborated with each other for the completion of various course activities. As a cumulating activity, each participant created a WebQuest that they planned to implement with their building teachers during the spring, 2002.

**Data Collection and Analysis**

Participants completed three online surveys at the beginning of the semester. These related to 1) previous experiences with technology applications, 2) specific ideas about technology integration, and 3) current technology practices within their schools. The first survey (15 questions) gathered information about participants' current
positions, previous uses of computers, and comfort with specific technology applications (e.g., chatrooms, discussion boards). The second survey (10 items) examined administrators’ perceptions of how well they could conceptualize and define various components of technology integration. Survey items were presented in a Likert-style format; participants rated their level of agreement (from 1-strongly disagree to 5-strongly agree) with statements related to the possession of specific ideas regarding technology use (e.g., “I have specific ideas about how to define teacher/student roles in a technology integrated classroom.”). The third survey, comprised of 44 items, examined the technology practices of both the administrators and teachers within the participants’ school environments. Although this survey provided important information about the contexts in which our participants worked, not all items were relevant to our research questions. However, 13 items, representing two subscales, were particularly relevant. One subscale (6 items) examined administrators’ personal uses of technology (e.g., “I use technology to support lectures and/or professional development.”) while the other subscale (7 items) asked the administrators to rate the extent to which they supported teachers’ efforts to use technology (e.g., “I give individual feedback to teachers during technology use.”). On a scale from 1 (entry) to 4 (proficient), administrators rated their current levels of competence. The second and third surveys were completed again at the end of the semester in order to measure changes in administrators’ ideas about, and strategies for providing, technology leadership in their schools.

In addition to survey data, all assignments (included the completed Web Quests) and discussion board postings (917 total messages) were used as data. Weekly discussions included, among other topics, administrators’ reflections on their current visions for technology use in their schools; roles they play in supporting high-, medium-, and low-level technology users; strategies for supporting teachers’ early efforts; incentives and barriers to technology use, and so on. Weekly electronic chat sessions, focusing on issues of technology leadership, were also recorded for analysis purposes. During the 12th week of the semester, during a scheduled campus meeting for their other cohort course, all administrators participated in an in-depth interview that was tape-recorded and later transcribed. Questions built on earlier survey responses; we examined participants’ current ideas about technology leadership and probed for any changes that may have occurred during the course (e.g., What does it mean to you to be a technology leader in your school? How have your ideas about technology leadership changed since the beginning of the course?).

Data analysis began during the first week of the course and continued throughout the semester. Both quantitative (descriptive statistics and paired t-tests) and qualitative (pattern seeking) analysis methods were used to determine the extent to which the online course offered a viable method for increasing administrators' understanding of, and capacity for, technology leadership.

Results and Discussion

Perceptions of Technology Leadership

Participants were asked to define technology leadership and to describe the skills and knowledge needed by a technology leader. In general, administrators defined technology leadership as the methods they, and others, use to encourage and support teachers’ technology use. Strategies such as visioning, modeling, and coaching were considered key to being an effective leader. Although 7 of the 8 administrators believed that they, themselves, played this role in their schools, most participants noted that they shared this role with others—either their technology-using teachers, the technology coordinator, or some other person in the school. As one elementary principal noted:

I would not say I was the leader. I am more of a cheerleader. I view my role as a role model but also as a cheerleader who focuses teachers on what is the best. I have the opinion that I should not be the smartest person in the building, that it should be the teachers who are the best resources. And that, thankfully, in my school, certainly is the case.

Carr (1995) refers to this style of leadership as participatory, suggesting that power and control are shared, at least to some degree, among constituents. This participatory style was commonly discussed, and agreed upon, by the administrators in this course. Although they believed that the effort should be started and supported by them, they felt that others shared responsibility for seeing it through:

I think it’s ultimately my role … but then we’re all in this together. It’s a building effort; it’s something we all need to take responsibility for.
Although many of the administrators did not think that their ideas about leadership had changed during the semester, they noted that they had gained many ideas about technology integration as well as how to support teachers’ efforts. One middle school principal described this change (posted on the discussion board):

> When I entered the class I was unclear about the proper integration of technology. I would encourage teachers to use the Internet, drill and skill software, and word processing. Other than that I did not have a good handle on the many possibilities. Since then I have really begun to better understand the use of technology in the classroom through WebQuests, research projects, presentations, etc. The second idea has been the techniques and confidence to lead staff as a technology leader in the building. It is something that I had not very concerned about prior to this class.

### Perceptions of Knowledge and Skills Needed by Technology Leaders

When asked what knowledge and skills they needed to be effective technology leaders, participants mentioned the need to be models for their teachers, but were unsure if they needed to know more than their teachers in order to be effective. One principal suggested that a good technology leader identifies the exemplary users in his school and then “gets out of their way.” However, an assistant principal disagreed, “I don’t think I am going to be an effective leader … if I am not using it myself.” Another principal suggested that he “had to believe in it, had to use it, and had to model it.” Certainly, the administrators agreed that they needed to have enough knowledge to hire the right people, to acquire the best resources, and most importantly, to know what good technology integration looked like so that they could encourage their teachers to continue to grow. According to one assistant principal, “these skills are just good leadership skills, not necessarily technology knowledge skills. These are people skills, management skills.”

Administrators agreed that an online course, focused on technology integration and technology leadership, filled an important need for practicing administrators. By requiring them to “live and breathe technology” they increased their own skill levels as well as their expectations for their teachers. They believed that by developing a strong personal vision of technology integration they could, in turn, support the development of their teachers’ visions.

### Developing the Skills and Knowledge of a Technology Leader via an Online Course

Strudler and Wetzel (1999) stated, “At the core of informed leadership is a person who has internalized the complexity of effective technology integration and who exercises influence to ensure that the various enabling factors are in place” (p. 68). This suggests that technology leadership requires two sets of competencies: 1) understanding technology integration and 2) providing the necessary support to ensure that effective integration can occur. These competencies relate specifically to the knowledge and skills needed by technology-leading administrators. In order to determine the impact that this online professional development course had on the development of administrators’ technology leadership knowledge and skills, pre- and post-course survey results were compared.

A two-tailed paired t-test (df = 7) indicated a significant increase in administrators’ ratings of perceived ideas about technology integration (survey 2) from pre- to post-course (t = 3.81, p = .007). Average ratings increased from 3.7 (undecided-agree) to 4.0 (agree). This suggests that, as the course progressed, administrators gained ideas about what technology integration should look like, as well as how technology might be implemented within various classroom contexts (e.g., one-computer classroom; in support of content-learning). Given that administrators play a key role in establishing a technology vision for their schools, as well as evaluating teachers’ efforts toward achieving that vision, it is critical that they gain specific ideas about effective technology use. These ideas, then, represent an important prerequisite to being able to both lead and support teachers’ efforts.

Although no significant differences were noted from pre- to post-course (t = 1.19, p = .14) on the first subscale of survey 3 (administrators’ personal uses of technology), average ratings of competency on the second subscale (administrators’ support of teachers’ technology use) increased from 2.0 (emergent) to 2.4 (emergent-fluent). This increase was significant (t = 2.82; p = .01). Thus, as the administrators participated in weekly discussions, focused extensively on technology support issues, they were able to identify and implement new ways to support technology use among their teachers. As one principal noted:
Taking this course has brought technology to the forefront for me … it’s something that I discuss more with teachers … I have started conversations with them about what they can do to help bring more technology into their classrooms. I ask them what are some of the things they need in order to accomplish the things they are thinking about. This course has helped me to go out of my comfort zone and to do a paradigm shift in my thinking on instructional practices in the classroom.

Ongoing discussions with the administrators suggest that this approach to professional development may be an effective way to increase confidence for, and ideas about, technology leadership. Administrators agreed that the course increased their understanding of how to support technology use among their teachers, as noted by the following comment:

(When I was a teacher) I did not have any training on how to effectively integrate technology in my classroom. Actually this is the first course that I have had that teaches how to integrate technology. Too bad I am not a teacher anymore. At least after having taken this class I will have an idea of how to assist someone in integrating technology.

**Educational Significance And Implications**

Participation in an online course, focused on technology integration and leadership issues, appears to offer one means for helping administrators understand the complexity of the integration process and to find new ways to support their teachers’ integration efforts. By requiring administrators to deal with technology issues as part of their ongoing course participation allows them to experience, first-hand, both the benefits and challenges of dealing with technology in a meaningful and substantive way.

According to Mehlinger and Powers (2002), “It is no longer possible for administrators to be both naive about technology and be good school leaders” (p. 218). Yet, to date, the professional development needs of the administrator, as a technology leader, have been virtually ignored. Despite the large amount of time, money, and resources being directed toward supporting teachers’ efforts to integrate technology in the classroom, little has been done to either recognize or support the needs of the administrator. “Clearly, it is not reasonable to imagine that teachers, the "followers," are going to get very far ahead of the "leaders," their administrators” (Mehlinger & Powers, p. 213). The results of this study highlights the importance of the administrator in helping schools achieve sound technology practices, and proposes one strategy (participation in an online course) for increasing administrators' capacity for technology leadership.

**References**


SouthEast Initiatives Regional Technology in Education Consortium (2000). *Factors that affect the effective use of technology for teaching and learning: Lessons learned from the SEIR*TEC intensive site schools*. Available online (October 4, 2001) at: http://www.seirtec.org/publications/lessondoc.html#1
