Leadership for Technology Integration: The Role of Principals and Mentors

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ABSTRACT
This article reviews the preliminary results of a five-year Technology Innovation Challenge Grant initiative in North Dakota. A stratified sample of 72 schools was selected from the 423 schools participating. Data on the competencies of the leadership within each school (both administrators and mentors) was compared to technology integration success factors of the teachers associated with the leaders. Results on the impact of mentors on teacher preparedness to integrate technology and teacher likelihood to continue to the next phase of professional development were not as strong as expected. Two of the reasons are believed to be insufficient mentor training and selection of mentors and mentees.

Keywords
Administrative support, Mentor support, Technology integration, Technology integration competencies

Introduction
The discussion and findings in this article are derived from the North Dakota Teaching with Technology (TWT) Initiative. This initiative was funded in 1998 through the Technology Innovation Challenge Grant program. The initiative is being implemented statewide in both public and private K-12 schools. The primary goal of the TWT initiative is to provide three phases of professional development that move educators toward transformation with regard to technology integration. The initiative content and outcomes are based on the ISTE (International Society for Technology in Education) Standards. Each Phase of TWT includes two strands of professional development. One strand is for classroom educators and the other strand is for administrators. In the classroom educator strand, teachers had an opportunity to redesign a lesson or unit to better integrate technology as a tool for teaching and learning. The teachers were required to implement the new lesson or unit into their classroom and reflect on their experiences. The resulting product was a portfolio documenting what they changed and how it worked. This strand of professional development was facilitated by the TWT Regional Educational Technologists (RETs) with building-based support from mentors and administrators.

The administrator strand participants worked to increase their knowledge base regarding leadership for technology integration and modeling the effective use of technology. Administrators also supported the classroom educators in their buildings. This strand was facilitated by the TWT co-directors through regional meetings, interactive video network sessions, and an online course.

Context for the Study
There are two important support strategies built into the process. The first is the requirement that at least one building administrator participate in the administrator strand of the initiative in order for their school to participate. The second is the identification of school-based mentors, at a ration of 1 mentor to 10 teachers (maximum). The identification of mentors was based on recommendations and appointments by the administrator. The roles of the administrators and mentors were to provide the day-to-day support necessary to help the classroom educators achieve success and to prepare the school environment for transformational
teaching and learning. Mentors and administrators attended a half-day leadership and support workshop to assist them in understanding the initiative and their roles. Statewide results from the follow-up survey indicated that about two-thirds of participants felt they received some form of technical assistance or support, most often from their mentors. Mentors were also required to complete the same professional development activities as their mentees so they would be better prepared to support the process.

The incorporation of mentors and administrators into the professional development processes was done, in part, to try to increase the integration of technology into the classroom. There is a need for change in how professional development for technology integration is conducted. Many researchers have suggested that the lack of high quality teacher training is a major factor impeding the integration of technology in education (Kearsley & Lynch, 1994; Shermis, 1990; Stoddart & Neiderhauser, 1993). Recent surveys point to the fact that after almost two decades of introducing new technologies into schools, teachers still do not feel prepared to integrate technology into their curriculum in rich and meaningful ways (Technology Counts, 1999). The President’s Committee of Advisors on Science and Technology (1997) suggests that on a nationwide basis, pre-K-12 schools should be spending twice as much on IT professional development as they now spend. Other commonly cited reasons for the lack of success in integrating technology are deficits and gaps in expertise and support (Colburn, 2000; Hanby, 2000). This article is the first of several planned research projects aimed at examining “support” as a success factor for technology integration. The specific support elements that are being reviewed are mentor support and administrator support.

Mentoring

The term mentor comes from the Greek word for enduring. Mentor was a character in Homer’s Odyssey. Mentor was the teacher of Telemachus, the son of Odysseus. Although in the traditional sense, mentoring occurred between an adult and a youth, today the mentor/mentee relationship can take on various characteristics. Through mentoring, a mentee or protégé is offered guidance and assistance to meet challenges (Dennis, 1993).

Within the education realm, mentoring is often cited as a strategy for supporting and retaining new teachers. Increasingly, mentoring is being used by all levels of professionals who wish to develop new expertise or advance in their professions (Janas, 1996). Current research and thought points to the need for professional development models to incorporate a support structure (McKenzie, 2001).

It has been noted that, in general, individualized support from peers and experts encourages teachers to experiment with new strategies for technology integration (NCREL, 1999; Hanby, 2000). Mentoring programs have been cited as successful strategies for helping teachers gain the skills necessary to better apply technology as a tool (Tenbusch, 1998).

Administrator Support

The National Center for Education Statistics (2000) indicates that principal leadership has been described as one of the most important factors affecting the effective use of technology in classrooms. Additionally, principals who exhibit leadership are instrumental in modeling the use of technology in classrooms. They understand how technology can support best practices in instruction and assessment, and they provide teachers with guidance. In a study of three schools identified as successful integrators of technology, Wilburg (1991) found in all three cases, the administrator was a strong advocate and user of computer technology. This seems to support the notion that administrative modeling may be one key to integrating technology.

The Office of Technology Assessment (1995) found that principals who are knowledgeable about technology and technological issues are important advocates for the integration of technology into schools. Sandholtz, Ringstaff, and Dwyer (1997) found administrative support was crucial in determining whether or not teachers would integrate technology. By making technology use a priority, administrators reduced such problems as insufficient time for continued learning, limited access to technology, and lack of technical support. In the study, Sandholtz, Ringstaff, and Dwyer (1997) observed that administrators offered their teachers much needed emotional and moral support by showing interest in changes teachers were instituting in their classrooms. In addition, by working with their staff to create a shared vision for the future, effective administrators eased tensions among teachers and fostered teacher collaboration rather than competition.
Throughout the remainder of this article we will review the results and summarize what we have learned thus far. The focus of this paper is the impact of administrator and mentor support on classroom educators. It is hypothesized that teachers associated with administrators and mentors rating average or above average in leadership and technology integration skills will feel better prepared to integrate technology and will be more likely to continue to the next phase of the initiative.

**Research Questions**

Incorporating building-based support through administrator participation and mentoring are two components of this initiative. We report the findings to these questions:
- Do individuals selected as mentors and the participating administrators rate themselves higher on a continuum of technology integration than classroom teacher participants?
- Are self-reported proficiencies of the mentors and administrators corroborated by the Regional Educational Technologists working with the mentors and administrators?
- Is there a relationship between support either by mentors or administrators and the likelihood educators will participate in the second phase of the initiative?
- Do participants who worked with at or above average mentors feel more prepared to integrate technology as a tool for teaching and learning than those with below average mentors?
- Are participants who worked with at or above average mentors more likely to continue to the next phase than those with below average mentors?
- Do administrators who ranked at or above average in core technology skills provide valuable support to their teachers?

**Methods and Findings**

The main data collection tool was the Professional Competency Continuum (PCC) profile assessment. All educators completed this assessment upon entering the initiative. The educators will again complete the profile prior to entering Phase II, prior to entering Phase III, and several months after completing Phase III.

The PCC project was developed out of a partnership between the Milken Exchange on Educational Technology and the North Central Regional Educational Laboratory (NCREL) and is based on research and expert panel input. The PCC assesses the classroom behavior of educators in relation to national technology integration standards. Upon completion of the instrument, educators are placed on a continuum ranging from entry to adaptation to transformation. An educator’s placement on the continuum corresponds to the degree to which the educator has met the national technology integration standards.

ND TWT uses two versions of the PCC. One is aimed at classroom educators and the other at administrators. The classroom educator instrument rates educator behavior on four major themes: Classroom & Instructional Management; Curriculum, Learning, and Assessment; Core Technology Skills; and, Professional and Collegial Practices. The administrator instrument focuses on three themes: Core Technology Skills; Professional and Collegial Practices; and Administrative Competencies. In both versions, respondents are asked to identify behaviors that best illustrate their own behaviors. The classroom educator version of the PCC is available at http://www.mff.org/publications/publications.taf?page=280.

Two additional sources of data were used to investigate the questions listed above. One was the follow-up survey results from a random sample of administrators, mentors, and classroom educators and the other was the results of Regional Educational Technologists’ ratings of the selected administrators and mentors with regard to technology integration.

A total of 9,120 educators participated in the first phase of the initiative. This represents 89% of all full and part-time certified K-12 staff in North Dakota. The PCC results for these individuals ranged from 1 to 10 where 1-3 indicated an Entry skill level; 4-7 indicated an Adaptation skill level; and 8-10 indicated a Transformational skill level. The statewide Phase I mean and standard deviation for each competency is identified in Table 1.

Further, the PCC results indicated that individuals in the roles of mentors or administrators did report higher proficiency levels in all relevant PCC competency area categories. Mentors rated themselves as the most proficient, followed by the administrators, and then the classroom educator participants (See Table 2).
### Table 1. State-wide mean and standard deviation on PCC

<table>
<thead>
<tr>
<th>Competency Area</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Technology Skills</td>
<td>3.95</td>
<td>1.81</td>
</tr>
<tr>
<td>Curriculum, Learning, and Assessment</td>
<td>3.82</td>
<td>1.60</td>
</tr>
<tr>
<td>Classroom and Instructional Management</td>
<td>3.98</td>
<td>1.73</td>
</tr>
<tr>
<td>Professional Practice</td>
<td>3.95</td>
<td>1.70</td>
</tr>
<tr>
<td>Administrative Competencies</td>
<td>5.04</td>
<td>1.50</td>
</tr>
</tbody>
</table>

### Table 2. PCC scores by administrator, mentor, and teacher

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Core technology skills (Mean)</th>
<th>Curriculum, learning, &amp; assessment (Mean)</th>
<th>Classroom management (Mean)</th>
<th>Professional practices (Mean)</th>
<th>Admin competency (Mean)</th>
<th>Aggregate PCC (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>62</td>
<td>4.71</td>
<td>4.80</td>
<td>4.90</td>
<td>4.80</td>
<td></td>
<td>4.80</td>
</tr>
<tr>
<td>Mentor</td>
<td>88</td>
<td>5.61</td>
<td>4.99</td>
<td>5.37</td>
<td>5.36</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>242</td>
<td>3.58</td>
<td>3.49</td>
<td>3.52</td>
<td>3.43</td>
<td>3.49</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3. Administrator and Mentor Self-Report Ratings and RET ratings

<table>
<thead>
<tr>
<th>Mentors</th>
<th>PCC Self-rating (Mean)</th>
<th>RET Rating (Mean)</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Technology Skills</td>
<td>5.45</td>
<td>6.39</td>
<td>.450**</td>
</tr>
<tr>
<td>Professional Practices</td>
<td>5.24</td>
<td>5.54</td>
<td>.264</td>
</tr>
<tr>
<td>Administrators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Technology Skills</td>
<td>4.59</td>
<td>5.78</td>
<td>.642**</td>
</tr>
<tr>
<td>Professional Practices</td>
<td>4.68</td>
<td>5.66</td>
<td>.393*</td>
</tr>
<tr>
<td>Administrative Competency</td>
<td>4.77</td>
<td>5.41</td>
<td>.349</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).  * Correlation is significant at the 0.05 level (2-tailed).

### Table 4. Follow-up survey findings

The follow-up survey was conducted by Mid-continent Research for Education and Learning (McREL), the third party evaluator for this effort. The purpose of the survey was to assess the quality and utility of the services provided and to identify aspects of the project that were successful and those that might need improvement. Several questions from this survey and the results for the PCC address the impact of administrator and mentor support.

Initially, the classroom teachers’ ratings of the value of the support they received was compared to the responses on how prepared they were to integrate technology as a tool for teaching and learning and how likely they were to continue to Phase II. Teachers rated the value of mentors’ and administrators’ support on a four point scale: 1= not valuable; 2= somewhat valuable; 3= mostly valuable; 4= very valuable. Teachers rated their preparedness to integrate technology on a four point scale: 1= not prepared; 2= somewhat; 3= mostly prepared; 4= very well prepared. Their likelihood to continue to Phase II was rated on a four point scale: 1= not likely; 2= somewhat likely; 3= mostly likely; 4= very likely.

Table 4 indicates there is a positive relationship between teachers and the support of both mentors and administrators. The relationship between both mentor and administrator support and the likelihood of teachers to participate in Phase II is significant at the 0.01 level. The relationship between teachers’ preparedness to integrate technology into their classrooms with administrator support is significant at the 0.01 level and with mentor support at the 0.05 level. Though the relationships are statistically significant, the correlations are weak (see Table 4).
### Table 4. Relationship between Support, Technology Integration and Continuation to Phase II

Mentor PCC scores were also investigated in conjunction with teacher success. Mentors were split into two groups, those with PCC scores below the mean and those with PCC scores at or above the mean. The mentees working with below mean mentors were compared to the mentees working with at or above mean mentors. The comparison with regard to the questions of how prepared the mentees were to integrate technology as a tool for teaching and learning and how likely they were to continue to Phase II. The mean aggregate PCC score for mentors was 5.4 out of 10 points (1-3 = entry level skills; 4-7 = adaptation level skills; 8-10 = transformational skills). There were 38 mentors whose aggregate PCC scores were below the mean. Mentees associated with these mentors rated their preparedness to integrate technology at 2.4 and their likelihood to continue to Phase II at 2.2. Mentees associated with mentors whose aggregate PCC scores were at or above the mean rated their preparedness to integrate technology at 2.4 and their likelihood to continue to Phase II at 2.6.

Finally, administrators who ranked at or above the mean in core technology skills were compared to those ranking below mean on the question of the value of the support they provided to teachers. Administrators had a mean score of 4.59 in core technology skills. Those at or above mean in skills had a mean score of 2.36 in the value of administrator support as rated by participating teachers. Administrators below the mean received a score of 2.17 in supporting teachers. The results indicate that there is a slight difference in the value of support as rated by teachers, but it was not statistically significant.

The reported results do not point to a connection between mentor/administrator competency and teacher success as originally hypothesized. One of the reasons is believed to be the limited amount of training administrators and mentors received. A second significant factor could likely be the selection and assignment of mentors.

### Conclusion

Previous research and observations point to the importance of support when technology integration initiatives are implemented. It is believed that the importance of the mentoring role is not fully apparent from the variables that were investigated in this study. Staff observations have consistently pointed out the importance of the mentor and administrator role both for the management of the initiative and for ensuring building-based support for teachers. Additional research will be done to better understand the criteria that make administrator and mentor support features a successful part of professional development models. Phase II data will be used for some of this research. It is expected that the Phase II support from mentors and administrators will more significantly impact teacher success because of the improved approach to prepare the school leadership teams.

### References


