

2012

## The role of the school principal in technology integration : a literature review

Lance Lennon  
*University of Northern Iowa*

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### Recommended Citation

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## The role of the school principal in technology integration : a literature review

### Abstract

The effective integration of technology into a school's curriculum is strongly influenced by the role played by a school principal. This literature review aims to examine a principal as a school leader, a principal as a technology leader, and specifically what a principal needs to be an effective leader of technology integration. This paper reviews peer-reviewed journal articles, research studies, and doctoral theses focused on the role of a principal in technology integration. Research indicates principals and other school leaders are crucial to the success of school initiatives, and that administrators need more training opportunities to have the positive impact desired for successful technology integration in a school system. The characteristics needed by effective administrators analyzed in this review include vision, leadership and modeling, and a willingness to learn.

THE ROLE OF THE SCHOOL PRINCIPAL IN TECHNOLOGY INTEGRATION:  
A LITERATURE REVIEW

A Graduate Review

Submitted to the

Division of Instructional Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

by

Lance Lennon

April 2012

This Review by: Lance Lennon

Titled: The Role of the School Principal in Technology Integration: A Literature Review

has been approved as meeting the research requirement for the  
Degree of Master of Arts.

5/10/12  
Date Approved

5/10/12  
Date Approved

5-10-12  
Date Approved

Leigh E. Zeitz  
Graduate Faculty Reader

Ping Gao  
Graduate Faculty Reader

Jill Uhlenberg  
Head, Department of Curriculum and Instruction

### **Abstract**

The effective integration of technology into a school's curriculum is strongly influenced by the role played by a school principal. This literature review aims to examine a principal as a school leader, a principal as a technology leader, and specifically what a principal needs to be an effective leader of technology integration. This paper reviews peer-reviewed journal articles, research studies, and doctoral theses focused on the role of a principal in technology integration. Research indicates principals and other school leaders are crucial to the success of school initiatives and that administrators need more training opportunities to have the positive impact desired for successful technology integration in a school system. The characteristics needed by effective administrators analyzed in this review include vision, leadership and modeling, and a willingness to learn.

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## Introduction

The role of the building principal has changed over the years as current administrators are required to be an instructional leader and manager. According to Kristen Kozloski (2006) “The distinction of leader versus manger is of importance as it is the leader of an organization that creates a vision for change and the manager that can plan and implement the details of the change” (p. 145). A principal must fulfill both roles, as he or she needs to be able to support and guide the school on its current path and create the vision of future change. A principal must be an educational leader who helps the teachers create an environment that prepares students for an ever-changing world. This new role necessitates that a building principal play an integral part in developing and implementing a forward-looking vision. This review will explore the role of the principal in establishing a new paradigm for learning supported through technology integration.

Miller (2008) states “Only in the last 10 to 15 years has information and communication technologies become commonplace in schools in North America” (p. 1). This influx of technology is not going to end any time soon. With almost 100% of schools having Internet access and computer ratios of 3.1 to 1 (NCREL, 2011), there is proof that technology inroads have been made. With the increase in technology availability, there is an increase in expectations that the available technology will be used by teachers and students. Despite the financial commitment by the state and federal governments and the purchases of technology by local school districts, the goal of integration has not yet been achieved. Stakeholders at all levels who are looking for returns on investments are questioning this lack of achievement. (Bennett & Gerlernter, 2001)

“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” (Kincaid & Feldner, 2002, p. 3). As the need for the principal to be the technology leader in a school grows, it necessitates an understanding by the administration to provide the guidance necessary for success.

It is difficult to make improvements in education unless there is knowledge of its problems and the willingness and ability to make the needed changes. The link has been established between principal technology leadership and technology integration (Kincaid & Feldner, 2002). Unfortunately there is a large disparity between what is expected of administrators and what they have been trained to do (Brooks-Young, 2009). The next step is empowering the principal with the technology skills to be the leader that the school needs. As with any educational initiative, there needs to be vision and management to make these changes. Thus the duality of the role of the principal becomes important in school innovation.

Further examination of Kincaid and Feldner (2002) shows that effective principals understand how technology can support best practices in instruction and assessment, and provide teachers with the necessary guidance. Their research was a review of a five-year North Dakota grant initiative looking into the correlation between principal competencies in technology and the competencies of their staff. Similarly, Anderson and Dexter (2005) used data from the 1998 Teaching, Learning, and Computing nationwide survey which collected data from 4,000 teachers, technology coordinators, and principals. It gathered

information on use, implementation, and perceived success of technology use. The results confirm that a school will not be successful in technology integration if the school leader (the principal) does not become an active technology leader. For this singular reason, it is necessary to provide information and training to principals so that they may make the needed changes in their leadership styles to provide that technological support for their staff.

Although the research in the area of technology leadership is limited, this literature review will focus on research that explains the role a building principal plays in the success of a school. It will use the past literature in the area of principal leadership to support the limited available research concerning how principals are important in integrating technology. The studies have shown what can be modeled as best practices for school principals, and how that information can and has been correlated to leadership in technology. This review will then look at what is expected of administration as school leaders, how they can get the training that they need, and what is the end result of successful technology integration for a school.

### **Research Questions**

1. What is the role of the principal as an educational leader?
2. What is the role of the principal in technology integration?
3. What is needed by principals to accomplish technology integration?

## **Definitions of Terms**

### **Acceptable Use Policy (AUP)**

A document that covers expectations for the proper use of school technology equipment and often the consequences that will occur in the event of a violation of those expectations (McLeod & Lehman, 2012).

### **Administration**

A broader term used to describe anyone in one of the leadership roles at a school or school district, specifically, the superintendent, principal, or technology director.

### **Instructional Leadership**

Those actions taken by a principal to promote growth in student learning. These actions are outside of the administrative tasks of the principal and enter into the area of professional development and working with teachers to define educational objectives (Blase & Blase, 2000).

### **Principal**

A principal is a building level leader at the elementary, middle school, high school, or alternative school level (Dexter, 2011b).

### **Technology Integration**

“The use of technology as an effective instructional tool in the acquisition of content. The focus of technology integration must be on the curriculum and learning, not the amount or type of technology used.” (Miller, 2008 p. 28)

**Technology Director**

Position in a school system that is responsible for the purchasing, maintaining, and upgrading of school hardware and software. This position is in charge of the school or district network and such documents as the Acceptable Use Policy and Technology Plan (Kozlowski, 2006).

**Technology Plan**

A written document that describes the district or buildings goals and plans to reach those goals that deal with technology (McLeod & Lehman, 2012).

## Methodology

The research for this review was performed using the following databases, *ERIC*, *EBSCO*, *Google Scholar*, and *WilsonWeb*. The search terms used included *administrator*, *administrator role*, *leadership effectiveness*, *instructional leadership*, *principals*, *technology*, *technology literacy*, *technology integration*, and various combinations of these terms. The most successful searches were executed using the combined terms *technology integration* and *administrator role*.

After finding the articles in the databases based on the search, a review of their resources was performed and a search for those articles was completed. Articles were considered for the literature review after looking at their abstracts and the publication dates and sources. Peer-reviewed journals had precedence over non-reviewed journals. The sources were reviewed and searches were performed on the authors to see if any of the articles had been thoroughly refuted. If no such refutation was found, then the article was accepted into the review.

A further search was conducted by looking at the sources used by authors of selected articles. Those sources were then held to the same standards of the original search and accepted for the review after making it through the vetting process.

In the end, more than fifty articles, dissertations, and books were selected for the review based upon the criteria mentioned before. The articles were closely reviewed a second time to find information that directly relates to the research questions mentioned earlier. That information was then synthesized for the purpose of this review.

## **Analysis and Discussion**

Although there have been many technological advances in the past, few have become as prevalent in education as computers and software. The invention of the radio and television promised to change the face of education, yet that did not happen. Current technology has not made instruction practices change either. Educators have tried to shoe horn technology into their ideas of education rather than changing their ideas and practices to make it all work effectively (Cuban, 1986). To positively affect pedagogical change, school administrators must be leaders in both vision and action. They have to be able to provide to their staff a direction for change and an example of how to make it happen. As with any initiative, all too often it can fail as a result of poor leadership.

### **The Principal as Educational Leader**

“Ask anyone who has had 1 or more years working in a school whether leadership has made a difference in their work and the answer will be an unhesitating ‘Yes’.” (Wahlstrom & Louis, 2008, p. 459) There are a plethora of things that a principal can do to lead a school. In their research analysis paper *Learning From Leadership: A Review of Research (2004)*, Leithwood, Louis, Anderson, and Wahlstrom established three sets of practices that make up the basic core of successful leadership: (1) setting directions; (2) developing people; and (3) organizing.

Evidence suggests that setting directions includes those practices that have the largest proportion of a leader’s impact. Included in this set is establishing understandings about the school and its goals, giving the staff a sense of purpose and vision. Setting goals gives people the ability to make sense of their work. The principal is often not the

only one setting these goals, but is often responsible for modeling them and making sure they are being carried out (Leithwood et al., 2004).

By researching and conducting studies, Leithwood et al. report on ways in which principals are most effective in their influence. By having high expectations (setting directions) and hiring most of the teachers (developing people) within a school, research found that a principal could create higher academic gains (Hallinger & Heck, 1998). Although not all research agrees on the same number or names of the areas of effective leadership, Leithwood et al. (2004) offer concise domains with broad enough titles to encompass the majority of the research.

Another way that principals affect the success of a school is by modeling. Modeling falls under the Leithwood et al. practice of setting direction. As stated by Blase and Blase (2000) “According to teachers, effective principals demonstrated teaching techniques in classrooms and during conferences; they also modeled positive interactions with students. These forms of modeling were viewed as impressive examples of instructional leadership that primarily yielded positive effects on teacher motivation as well as reflective behavior” (p. 134). Zimmerman (2006) asserts that by modeling behaviors of change, principals can create a willingness on the part of teachers to overcome their resistance to change. By modeling the behaviors desired in a school, the principal sets a tone and sets a precedent of what is expected from their staff.

Another aspect of direction setting is establishing building level goals and initiatives. Principals need to consider such matters as the focus of professional development, building level goals, and meeting annual growth requirements. This places the principal in the role of instructional leader. In 2008, Robinson, Lloyd, and Rowe

completed a meta-analysis of the findings of 27 published studies of the relationship between leadership and student outcomes. The goal was to determine the type of leadership styles that had the greatest effect on student outcomes. Statistical measures of the relationship between leadership types and student outcomes were then converted to z scores. The theoretical framework that informed the conceptualization and measurement of leadership categorized the studies. Fourteen studies employed instructional leadership; twelve of these could be used in the meta-analysis. Six studies used transformational framework, of which five could be used in the meta-analysis. The remaining studies used a variety of leadership theories and five of those were included in the meta-analysis. Examining the meta-analysis shows an effect size for each leadership style. The effect size for the leadership styles is as follows: transformational ( $ES = 0.11$ ), instructional leadership ( $ES = 0.42$ ), and other types of leadership ( $ES = 0.30$ ). The data shows that administrators who concentrate on teaching and learning were shown to be a stronger influence on student outcomes (Robinson, Lloyd, & Rowe, 2008).

As the instructional leader in a building, the principal is expected to understand the foundation of quality education as well as have enough knowledge of the school's curriculum to make sure that appropriate content is being taught to all students. The principal is the leader of the building and as such, plays a major role in the success of the school. "School leaders are capable of having significant positive effects on student learning and other important outcomes" (Leithwood, Patten, & Jantzi, 2010, p. 672). This has been further supported by research done by Waters, Marzano, and McNulty (2003), which showed a ten percentile point increase in student scores when principals increased their demonstrated abilities by one standard deviation in the 21 areas of responsibility.

Equally important were their findings that a principal can have “marginal, or worse, a negative impact on achievement” (Waters, Marzano, & McNulty, 2003, p. 5) when they focus on the wrong school or classroom practices. The significant role of the principal as contributing factor in school success is widely accepted and research continues to demonstrate the importance of choosing and training good leaders. Creemers and Reezigt (1996) conducted a three-level study looking at, not only school success and school level factors, but also at the classroom level. While the research does show that the most significant factor in successful schools is the classroom level factor, it only slightly surpasses that of school level and in particular the role of the principal. In truth, about one fourth (10 to 20 percent) of the total variation in success was explained by school level variables. And the key school level variable in the Creemers and Reezigt study was school leadership.

The third area of practice for a principal is organization. The principal is key when it comes to setting the desired goals and overall schedule of his or her building. Their responsibility ranges from class schedules to building level staff development. Although there is overlap here with the second area of practice, it encompasses more of the administrative tasks and less of the instructional leadership. As shown in the Robinson, Lloyd, and Rowe research, while this area has impact on student achievement, it is not as significant as instructional leadership. Research conducted by Leithwood et al. in 2010 looked into the effects of leadership on student learning. The study collected data from both principals and teachers. The researchers gathered surveys from 1,445 teachers in 199 schools. Using a 5-point Likert-type scale, respondents were asked to respond to the extent to which they agreed with statements on the survey. Six hypotheses were

established before the survey, one dealing with organizational settings as established by the school. Instruction time (school schedule) had the greatest effect in this path (Leithwood, Patten, & Jantzi, 2010). By setting the school schedule, the principal has an indirect effect on student achievement.

The research and literature indicates that the principal plays a key role, not only in leading the school, but also that the administrator can have positive effects on student achievement. Taking on the role of leader does not apply to one specific area of school such as discipline or academics, nor does it allow a principal to pick and choose the initiatives that he or she supports. For a school to be successful, the leadership needs to provide positive support and lead by example in all areas. “The more that teachers report their school leaders (usually the principal) to be active participants in teacher learning and development, the higher the student outcomes” (Robinson, Lloyd, & Rowe, 2008, p. 665). The leadership role can then be applied to school initiatives in the area of technology.

### **The Principal as Technology Leader**

“In 2004, the National Education Technology Plan states that the problem of technology integration is not necessarily lack of funds, but lack of adequate training and understanding of how computers can be used to enrich the teaching and learning process.” (Kozloski, 2006, p. 25). This statement shows the need for educators to have an awareness of the usefulness of computers in education. That awareness must come from the administration. As there is no clear definition of the role of principals in technology integration, the International Society for Technology in Education (ISTE) (2009) published standards to help define that role. The standards created were the National

Educational Technology Standards for Administrators or NETS-A. These standards are used for evaluating the skills and knowledge school administrators and leaders need to support digital age learning, implement technology, and transform the instruction landscape. “According to the NETS-A standards, the goal is to train school principals who have understood the school model in information society to start, to implement, and to manage the changes in schools” (Eren & Kurt, 2011, p. 626).

As noted by Kincaid and Feldner (2002), in schools that were identified as having successfully integrated technology, the administrator was a strong advocate and user of computer technology. The role that the administration has in integrating technology is significant. “Administrators, who provide resources such as mentoring teachers who are themselves proficient in technology, and the time needed to integrate the technology as basic support to new teachers, may likewise promote higher levels of technology integration in the classroom” (Webb, 2011, p. 5). Further support for the role of the principal in technology integration comes from Brockmeier, Sermon, and Hope (2005), who write that what principals do to facilitate the integration of technology into the curriculum is a crucial variable. Principals need to model use of technology, demonstrate to the staff how important and useful the tools being integrated are.

As principals become more adept at guiding technology integration, more efficient and effective technology use should become prevalent in schools. The principal’s increased knowledge of the benefits and uses of technology should lead to more support of teachers’ attempts to infuse technology into the teaching and learning model. The principal’s improved technology skills should lead to

increased use of technology tools, thereby producing principals who are models of technology use. (Dawson & Rakes, 2003, p. 43)

This modeling is essential to the success of technology integration. “Principals who are prepared to act as technology leaders are central to computer technology’s integration into teaching and learning and for achieving technology’s promise” (Brockmeier et al., 2005, p. 46).

In 2003, Dawson and Rakes performed a study to determine the overall level of technology integration in a school and factors that contribute to the integration. The measurement used to determine the integration was the School Technology and Readiness (STaR) Chart Assessment. This was then examined to determine its relationship to seven independent variables. Three of these variables were demographic data (age, sex, and experience). Two variables represented the school environment (size and grade level). The remaining two variables concerned the amount and type of training received by the principals in the twelve months prior to the study. The data collected from part four of the study concerned differences in technology integration in schools in relation to technology training received by the principals. The study showed a significant difference in the integration of technology into the schools between the principals receiving the fewest hours of training and those receiving the most hours. The principals with more training had a higher integration score.

As the school leaders, principals play a key role in the acceptance of technology and change. “Technology-facilitated instruction reform must be led by visionary school leaders who understand these learning and pedagogical perspectives and expect digital technologies to play a crucial role in preparing youth to excel within the global

knowledge society that exist today” (Hughes & Navarrete, 2010, p. 9). This role is emphasized by Wilmore and Bertz (2000) as they write that the degree of technophobia of many school principals is still holding back technology integration. Principals must be leaders, they must model technology use, and not just use for use’s sake, but rather for the practical application of technology in the educational setting. In the end “Leadership is the single most important factor affecting the successful integration of technology. This is true at the state level and at the school level. Schools which have made the most progress are those with energetic and committed leaders” (US Department of Education, 2002, p. 71).

### **What Principals Need to be Technology Leaders**

To be effective leaders, there are certain criteria for administrators. They must have vision, be instructional models, and be adequately trained. Sara Dexter, through her research (explained later in this review), came to the following conclusion. “These findings thus underscore the long-standing admonition that leaders must have a vision for technology, but they provide nuance by illustrating the recursive effect between the situation and the what, how, and why of technology leadership practices” (2011b, p. 185). Realizing the need for vision and modeling, Ertmer and Bai agree that administrators need opportunities to learn new technologies. “Administrators agreed that an online course, focused on technology integration and technology leadership, filled an important need for practicing administrators” (2002, p. 485). Further analysis of these areas shows how to best develop quality administrators.

**Principals need to have vision.**

Part of being a leader is vision. School principals must have a vision as to the role technology will play in their school. It is a principal's job to establish the context for technology and to understand how technology can be used to restructure pedagogy (Brockmeier et al. 2005). The *Journal of School Leadership* published a cross case analysis by Sara Dexter in 2011 that discusses best practices for school technology leaders. Researchers went on site visits to five schools that currently had a 1:1 laptop initiative for one to three days. During this time, interviews were done with school principals and teaching staff. The interviews questions were focused on leadership styles, vision, and staff perception about the success of the initiative. In her conclusion, Dexter discussed the significance of a leader having vision. "Perhaps the central implication of these results for technology leaders is the importance of being cognizant of the power of a technology vision, and expressing the vision in a coherent fashion" (2011b, p. 185). Further support is garnered from the Brockmeier, Sermon, and Hope study that concludes, "Achieving the promise requires leadership with vision and expertise. Principals are central to achieving successful learning outcomes with technology." (2005, p. 55)

Similar stances are taken by many of the prominent authors in the area of technology leadership. David Warlick is a nationally known speaker on the topic of technology in education and director of *The Landmark Project*, an education consulting firm. He states "Preparing students for an unpredictable world will take, above all things, vision" (Ohler & Warlick, 2001, p. 4). David Warlick is not alone in this belief. Dr. Scott

McLeod is widely recognized as one of the leading experts on K-12 technology leadership. He is the founding director of the UCEA Center for the Advanced Study of Technology Leadership in Education or CASTLE. In his book *What School Leaders Need to Know About Digital Technologies and Social Media*, he speaks directly to the need for vision in successful technology integration (McLeod & Lehman, 2012).

People are motivated by goals, particularly when those goals are personally compelling. Having goals aids people in making sense of their work; it also allows them to find a sense of identity within the context of their work. Often helping to set direction is the practice of identifying and articulating a vision (Leithwood et al., 2004). Establishing a vision is therefore the starting point for technology leadership.

### **Principals need to be leaders**

Having a vision is the starting point. Setting the goals and directing the school are essential for success, but vision alone is not enough. The principal must be the leader. As with any school initiative, principals play a key role in its success or failure. When it comes to technology integration, there have been few studies completed, but those that exist concur that leadership involves modeling. Principals need to lead by example. According to the results of Ertmer and Bai, when leaders use the technology that they expect their staff to use, it fosters a positive perception and encourages the staff to embrace it. Good technology leadership skills are just good leadership skills (Ertmer & Bai, 2002).

In the survey section of the Schrum, Galizio, and Ledesma research, it was mentioned by many respondents that they use technology in their work on a regular basis, but for productivity. They currently use office applications, student management systems,

and electronic communication tools such as e-mail. A large majority felt that this use sent a strong message to the staff that using technology was important. They also felt that if they used the tools that they asked the staff to use, it would send a stronger message (Schrum, Galizio, & Ledesma, 2011). By being the agent of change that they ask their staff to be, the administrators make it clear that, not only is technology a goal, it is a priority.

### **Principals need the appropriate training.**

Dawson and Rake, as mentioned earlier, conducted a survey to measure the overall effectiveness of technology integration in schools. Part of their research showed the need for principals to take time to get adequate training for themselves. “The findings that principals with more than 51 hours of technology training lead school that are noticeably different from other schools confirmed the belief of many that long-term training is worth the effort and expense” (Dawson & Rake, 2003, p. 44). The *Journal of School Leadership* published a cross case analysis by Sara Dexter in 2011 that discusses best practices for school technology leaders. Part of her research, which was looking into a team based leadership approach, found that integration success is directly related to helping teachers develop pedagogical content knowledge. Administrators cannot deliver this knowledge without first possessing it, or realizing its significance (2011a). While the need is present, the reality is that the skill set of the majority of administrators falls short. “School principals were found to be inefficient in educational technologies and to be in need of personal development in all dimensions of NETS-A standards (Eren & Kurt, 2011, p. 626). Dawson and Rakes (2003) further state “Many principals still have little firsthand experience with technology” (p. 32). This lack of experience can only be

rectified through training and personal use. Cynthia Geer agrees in her findings that professional development opportunities in technology are limited for school administrators (2002). Schrum, Galizio, and Ledesma conducted a study based on three research questions:

1. What are specific state requirements regarding licensure preparation in each of the 50 U.S. states?
2. What is the current status of technology integration courses in major institutions in the 50 U.S. states
3. What do current technology savvy administrators report about their preparation for promoting technology integration?

The findings for question one were predictable; only two states require administrators to demonstrate any knowledge of technology use, and those two states have vague requirements at best (2011). Research on this topic was gathered by contacting the state licensure offices and analyzing the requirements. Research question number two did not fare any better. “Thus the answer to our first two questions was relatively disappointing” (Schrum, Galizio, & Ledesma, 2011, p. 246). For their third question, Schrum et al. distributed an online survey to identify skills, knowledge, and training that administrators had regarding the integration and use of technology. The survey was distributed to a select group of administrators who were involved with the Classroom 2.0 Ning (An online platform for social networking), and administrators who were blogging about their technology use. Forty-eight administrators responded. The response to the questions regarding how administrators learned about new technology and their uses came back mostly “through reading literature, attending conferences, as well as using school

equipment” (Schrum et al, 2011, p. 248). In conclusion, Schrum et al., explain the need to increase the technology requirements for licensure. They also question what impact administrators who are not using or learning technology have on their teachers and students.

Leonard and Leonard (2006) conducted a survey of 214 principals in Louisiana, asking questions concerning technology planning and technology competency of teachers. The research found that 43% of principals reported not being familiar with various technologies while 44% reported not feeling qualified to lead technology integration in their schools. Overall there is a large disconnect between what the principals need to be effective in their role as instructional technology leaders and what they are being offered in the area of educational preparation professional development. McLeod, Bathon, and Richardson agree in their findings “We also continue to turn out new administrators that are woefully unprepared to be effective leaders in the area of technology, even though we know that if the leaders do not ‘get it’ their systems, and most importantly their students, will not either” (2011, p. 294).

Having the needed skills and information allow the principal to bring, not only the tools for integration, but also the reasoning behind the change in pedagogy.

## **Conclusions and Recommendations**

This review investigated the available research to determine the role principals play in leading a school in successful integration of technology. The review found the authors and their studies to be in agreement that one of the key components to any school initiative was the ability of the principal to model the desired behavior. “As school leaders, principals can influence and mold school culture in positive ways” (U.S. Department of Education, 1990). When they model these behaviors, there is a positive response. As mentioned by Hallinger and Heck when goal setting was demonstrated by the building principal, “principal leadership affected both the selection and motivation of teachers in terms of their classroom goals” (1998, p. 171). They are the leader of the building and as such, yield a great responsibility.

Looking back to the first research question concerning the role that principals have as an educational leader, it was evident that it was significant. The research examined a number of different ways that principals had a positive effect on their schools. School environment, educational initiatives, and technology were areas the research analyzed and results showed a strong correlation between leadership and success. A strong, positive leader was instrumental to the success of the initiative.

Technology is not a passing trend. It has permeated our lives. There is no denying the importance it has in the workplace.

The US Congress’s Office of Technology Assessment was unequivocal in its assertion that incorporating technology into the instructional process was one of the most important steps the nation can take to make the most of past and continuing investments in educational technology.” (Leonard & Leonard, 2006, p.

213)

There are very few jobs today that do not require some degree of technical knowledge. The fact that it has not become as pervasive in schools is due to old pedagogy. Education is slow to change and adopt new trends. Far too often educators hold onto the old methodology simply because it worked in the past. For education to work in the future, it must embrace technology and make it an integral part of the school structure. “These leaders expect that the uses of technology in the next 5 years will expand in many ways (one-to-one computing, online courses, assessment, access and equity)” (Schrum et al., 2011, p. 254).

The second research question asked what the role of the principal was in technology integration. Given the importance of the principal in other initiatives, it is therefore justifiable to claim that the principal has a significant role when it comes to technology integration. The need for the principal to model using technology is essential. Modeling desired behaviors has positive results in the eventual success of a school initiative (Eren & Kurt, 2011; Kozlowski, 2006; and Webb, 2011).

Lastly the review looked into what academic leaders need to also be leaders in technology use. The literature reviewed determined that there were three essential parts to helping an administrator become an effective agent of change.

Administrators need to have vision, leadership, and training. Setting goals and direction are essential to any initiative and technology integration is no different. As discussed by the content experts and supported by the research, principals need to be the ones to set the goals and see that they are being met. Establishing goals is the first step in the process of integration and pedagogy change.

Principals and other school administrators cannot be hypocritical of technology use. It is not acceptable to claim that technology is important, then not be able to use the technology. Principals must be leaders in technology use. They must be role models if they expect their staff to believe that it is important. Demonstrating the use of technology by blogging or by using social media shows their staff that they are an agent of change. Not only must they “talk the talk”, they must “walk the walk”. Very seldom does an initiative succeed if the leader does not believe in it and demonstrate its use.

Lastly, there needs to be an increase in training for current and future administrators. Too little is required in the area of technology in current administrative programs. While there may be inclusion of technology into some courses, the research has shown that the divide between what is needed and what is offered is too great. All too often, administrator programs are based on philosophy and management. They do not supply the future administrator with tools in the area of technology. “It does not appear that the same level of effort has been given to prepare administrators in understanding the challenges they will face to support the effective use of technology in instructionally integrated ways” (Schrum et al., 2011, p. 242). There is not a course on how to best integrate technology in a building or a district. There is little in the area of what technology has to offer, even in the areas of management and educational philosophy (Schrum et al., 2011).

The research shows that when a principal or school administrator models technology use for his or her staff, it enforces the understanding with the staff that it is important (Kincaid & Feldner, 2002; Kozloski, 2006; Leonard & Leonard, 2006; & Webb, 2011). Principals who use technology and are active in the technological goals of

the school have higher levels of integration than those who do not. It establishes a precedent that technology is important and is not going away.

The research of Dawson and Rakes (2006) and Webb (2011) shows that school administrators need training in the uses of technology. There need to be changes made in the administrator programs to this effect as well as opportunities after degree completion. Professional development is not just for staff; administration should participate in the technology trainings in the school. "IT will only be successfully implemented in schools if the principal actively supports it" (Wilmore & Betz, 2000, p. 15). When the initiative is important enough to be implemented in a school, then it is important enough for the principal to participate. This will also help to ensure its success. There also needs to be specific training for administrators in the area of modeling proper technology use.

Principals responded more strongly that they need professional development in assessing computer technology's influence on student achievement (85%), using computer technology to collect and analyze data (85%), integrating computer technology into the curriculum (84%), using computer technology in their work as principal (80%), and using computer technology to facilitate organizational change (80%). (Brockmeier et al., 2005, p. 53)

As the building leaders, they need to be able to show the staff how to use the technology and be ready to support new staff use.

This review will be made available to principals and superintendents so that they have the information needed to make informed decisions regarding the future of technology integration in their buildings and districts. Administrators should be active participants in staff development, especially those that are centered on technology and

technology integration. They should play an active role in modeling the use of technology and support staff who are willing to take risks in the use of technology. Further research will be done to determine what principals most need to effectively model technology integration for their staff.

Future research still needs to be done in the area of school leadership and technology. McLeod and Richardson (2011) reported in their study on the lack of research in this area. The research revealed that between 1997 and 2009, there were only 43 articles on this topic. As technology increases its presence in our world through social media, presence of technological devices, and an increase in needed skills for today's jobs, there needs to be more research to inform best practices for our school leaders.

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