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The principal as technology leader: the skills e-learners consider essential to the creation of a technology-rich school community

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THE PRINCIPAL AS TECHNOLOGY LEADER:  
THE SKILLS E-LEADERS CONSIDER ESSENTIAL TO THE CREATION OF A  
TECHNOLOGY-RICH SCHOOL COMMUNITY

A Dissertation  
Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy  
in  
The Department of Educational Theory, Policy, and Practice

By  
Tammy S. Seneca  
B.A., Southeastern Louisiana University, 1993  
M.Ed., Southeastern Louisiana University, 1999  
December 2008
DEDICATION

This dissertation is dedicated to my four nephews and future niece: Gavin, Connor, Garrett, Landon, and Seneca #4. It is my desire that this work serves as an example to them of how important education is for their personal and professional life. May they realize that even though it is sometimes harder to take the “road less traveled,” it is so much more fulfilling than “taking the easy way out.” I do not know where their futures will take them. My hope is for them to look upon my struggles and accomplishments as an inspiration to challenge themselves in their own endeavors.

Your Nanny!
ACKNOWLEDGEMENTS

I would like to begin by acknowledging Dr. Janice Hinson; she recruited me and then encouraged me throughout this long process with her patience and support. Jan has been steadfast in her encouragement and commitment to ensuring that I produced quality work. Her guidance and friendship have been invaluable and I can not begin to thank her enough. I would like to thank all of my committee members who were supportive throughout everything allowing me to remain positive about the entire process. This has been such a wonderful experience in my life and I am honored to have participated in such a program.

Without the love and support from my parents, Johnny and Laurie Seneca, none of this would have been possible. They have supported all of my choices both personally and professionally and have been a source of never-ending love and encouragement. I would like to give thanks to Becky Purdom and Eric Seneca. The best siblings I know. To their spouses, Steve Purdom and Jennifer Seneca, they have made our family all the more special. I do not think that I would have made it through this entire experience without my family. They have celebrated each step of this process and have encouraged me to “stick with it” in order to complete this process with the most basic of words, “Tammy, you can do this.”

To my fellow colleagues, I thank you for your support and encouragement. All of you have been so helpful whenever I had to leave work to rush to class or to get to the library. A special thanks to Mr. Jerry Lowe who, without knowing it, has mentored my career by showing me not to compromise my morals in the workplace. You taught and lead through example. I am happy to be labeled a “Jerry’s Kid”.

iii
Finally, I would like to thank my friend, Dawn Henry, for being my personal editor and reading every page of this dissertation to make sure that I dotted every “i” and crossed every “t”. I am sure that this forced her to read through her favorite time of the day, twilight, but she did it nonetheless. Thank you!
TABLE OF CONTENTS

Dedication .................................................................................. ii

Acknowledgements .................................................................... iii

List of Tables ........................................................................ viii

List of Figures .......................................................................... ix

Abstract ................................................................................... x

Chapter 1 Introduction............................................................. 1

Current Practices in Technology Professional Development
for Administrators................................................................. 3

Statement of the Problem....................................................... 4

Purpose of the Study............................................................... 7

Significance of the Study......................................................... 8

Research Questions............................................................... 9

Limitations............................................................................. 9

Definition of Terms............................................................... 9

Chapter 2 Review of Related Literature................................. 11

The Changing Roles of the School Leader ......................... 11

Digital Immigrants and Digital Natives.............................. 13

School Leaders and Innovation Implementation............... 14

The Principal as Technology Leader................................. 18

Leadership........................................................................... 20

Leadership and Technology Integration......................... 20

Technology Leadership Indicators..................................... 23

Professional Development.................................................. 25

Principal Training and Planning...................................... 28

What Administrators Need to Know................................. 32

Support Levels and Influencing Factors.......................... 33

Conclusion............................................................................ 36

Chapter 3 Research Methodology ........................................ 38

Research Questions............................................................. 38

Rationale for Methodology................................................ 39

Data Collection Procedures............................................... 39

Quantitative.......................................................................... 39

Pilot Study.......................................................................... 40

Leadership Survey............................................................ 40

Qualitative.......................................................................... 43

Interviews.......................................................................... 43

Data Analysis....................................................................... 44

Quantitative Data Analysis............................................... 44

Qualitative Data Analysis................................................ 46
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development</td>
<td>73</td>
</tr>
<tr>
<td>Technology Vision</td>
<td>74</td>
</tr>
<tr>
<td>Technology Integration</td>
<td>75</td>
</tr>
<tr>
<td>Effective Technology Integration Users</td>
<td>76</td>
</tr>
<tr>
<td>Communication</td>
<td>77</td>
</tr>
<tr>
<td>Student Skills and Student Achievement</td>
<td>77</td>
</tr>
<tr>
<td>Data Interpretation</td>
<td>78</td>
</tr>
<tr>
<td>Summary of Qualitative Data</td>
<td>78</td>
</tr>
<tr>
<td>Chapter 6 Discussion and Conclusions</td>
<td>80</td>
</tr>
<tr>
<td>Findings</td>
<td>80</td>
</tr>
<tr>
<td>Theory-based</td>
<td>80</td>
</tr>
<tr>
<td>Supporting Learning Communities</td>
<td>81</td>
</tr>
<tr>
<td>Technology Vision and Integration</td>
<td>82</td>
</tr>
<tr>
<td>Operational Skills</td>
<td>82</td>
</tr>
<tr>
<td>Basic Skills and Needs</td>
<td>83</td>
</tr>
<tr>
<td>Technology Culture and Integration</td>
<td>84</td>
</tr>
<tr>
<td>Administrator Experience</td>
<td>84</td>
</tr>
<tr>
<td>Research Questions Revisited</td>
<td>85</td>
</tr>
<tr>
<td>Recommendations for K-12 Institutions</td>
<td>87</td>
</tr>
<tr>
<td>Description of Professional Development Module</td>
<td>88</td>
</tr>
<tr>
<td>Implications for Future Research</td>
<td>91</td>
</tr>
<tr>
<td>Conclusions</td>
<td>91</td>
</tr>
<tr>
<td>References</td>
<td>93</td>
</tr>
<tr>
<td>Appendix A: National Education Technology Standards for Administrators (NETS-A)</td>
<td>99</td>
</tr>
<tr>
<td>Appendix B: A Model of a Technology –Rich School Community</td>
<td>103</td>
</tr>
<tr>
<td>Appendix C: Individual Interviews Question Protocol</td>
<td>105</td>
</tr>
<tr>
<td>Appendix D: K-12 Technology Leadership: A Survey of Professional Development Needs for Technology Leaders</td>
<td>107</td>
</tr>
<tr>
<td>Appendix E: Table 4.1 Mean (M) and Standard Deviation (SD) of Survey Indicators</td>
<td>113</td>
</tr>
<tr>
<td>Appendix F: Sample Online Module</td>
<td>116</td>
</tr>
<tr>
<td>Appendix G: Institutional Review Board Consent Form and Doctoral Study Consent Form</td>
<td>123</td>
</tr>
<tr>
<td>Vita</td>
<td>134</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1.1 Technology Proficiency Self Assessment Results ...................... 5
Table 3.1 Frequency Table of Years of Experience of Survey Respondents .... 41
Table 3.2 Survey Demographics ...................................................... 41
Table 3.3 Interviewee Identification Table ........................................ 43
Table 3.4 Study Timeline ................................................................. 49
Table 4.1 Mean (M) and Standard Deviation (SD) of Survey Indicators ....... 113
Table 4.2 Top Areas of Skills Needed by Experience Level ...................... 60
Table 4.3 Importance versus Understanding ...................................... 64
Table 5.1 Interview Coding Frequencies .......................................... 72
Table 6.1 Module 5: Data Analysis to Make Leadership Decisions Module .... 90
LIST OF FIGURES

Figure 2.1 Roger’s Distribution of Adopters Over Time .......................... 14
Figure 2.2 Maslow’s Hierarchy of Needs .............................................. 17
Figure 2.3 Johnson’s Hierarchy of Educational Technology Needs .......... 18
Figure 2.4 Roles, Responsibilities, and Goals of Technology Integration ...... 21
Figure 2.5 A Model of Technology Leadership ..................................... 25
Figure 3.1 Percentage of Respondents School Configuration ................... 42
Figure 4.1 Comparison of Importance and Understanding ....................... 57
Figure 4.2 15 or more years experience: Importance versus Understanding ... 66
ABSTRACT

This study examined the skills that e-learners considered essential to the creation of a technology-rich school community. The focus was upon the skills that acting district and school administrators deemed essential to becoming an effective e-leader.

The quantitative investigation associated with this study consisted of a researcher created survey based upon the International Society of Technology Educators (ISTE) National Educational Technology Standards for Administrators (NETS-A). The intent of this survey was to obtain a list of skills that the participants felt were necessary for administrators to obtain in order to be effective leaders. These skills are categorized into both theory-based and operational.

The qualitative investigation examined interview data from one-on-one interviews. The interviews were conducted in order to obtain a greater insight into the views of school-based and district-based administrators in terms of technology leadership.

The intent of this study was to investigative and gather information in order to create online self-paced professional development opportunities for school and district administrators.
CHAPTER 1: INTRODUCTION

In directing the activities of the young, society determines its’ own future in determining that of the young. Since the young at a given time will at some later date compose the society of that period, the latter’s nature will largely turn upon the direction children’s activities were given at an earlier period. This cumulative movement of action toward a later result is what is meant by growth. (Dewey, 1916, p. 41)

The above quote from John Dewey’s 1916 work, *Democracy and Education*, could be a precursor to the instructional climate being faced by educators today. Technology has exploded onto the scene helping to provide opportunities for our next generation of leaders to experience vibrant schools that emphasize the use of active learning. As we embark upon our journey into the 21st century, a new generation of high-tech kids known as the Net Generation or N-Geners is currently sitting in our classrooms, surfing the Internet with us, and composing our future society. These children, like no other generation in history, are more comfortable, knowledgeable, and literate than their parents with an innovation that has exploded upon the scene (Tapscott, 1998). Just as the parents of these N-Geners are struggling to come to grips with computer-savvy children at home, school administrators and teachers are increasingly challenged to utilize the most effective techniques to educate and communicate with the Net Generation. Thanks to technology, the world outside of the school walls has changed more in one generation than it has in any previous generation (Brooks-Young, 2006). As a result, teachers and administrators are being forced to grow and change in order to keep up with the vast knowledge that students are obtaining today from their cultural surroundings. Students sitting in classrooms today will be faced with workplace demands far greater than anything in the past. All educators must prepare their students to become lifelong learners who are willing to mature into individuals who can problem solve, think critically, work in teams, and use technology in an effective way (Brooks-Young, 2006).
In order to respond to this demand for growth, schools have inundated classrooms with computers, Internet access, digital cameras, interactive boards, multimedia machines, scanners, and digital visual presenters all in an effort to capitalize on these new technological advances and to develop a society of independent critical thinkers. Therefore, school administrators are faced with the challenge of managing and promoting the utilization of these innovations in their schools. Consequently, questions arise concerning how prepared these administrators are in the area of technology proficiency and integration in order to be effective leaders of technology.

Leadership sets the tone for schools and supports the school climate and culture. Thus it is imperative that school principals understand their responsibilities as e-leaders in the terms of learning, student entitlement, capacity building, community, and resource management (Flanagan & Jacobsen, 2003). Hence, principals must begin to examine ways in which their technology leadership skills can grow and develop in order to become planners and managers of technology in an educational setting which promotes and sustains student learning and teacher development (Creighton, 2003).

It is vital that both school and district administrators understand the various aspects of both informational and educational technology. This will allow e-leaders to cultivate a community of learners and teachers that have the necessary knowledge to successfully utilize the tools associated with this innovation (McKenzie, 1999). As noted by Dawson and Rakes (2003), no matter how much training teachers receive in order to prepare them to utilize technology in their classrooms, without the support and leadership of the principal, they will not be successful in the deployment of that training. Therefore, it is essential for technology leaders at the school and district level to participate in their own professional development opportunities.
Current Practices in Technology Professional Development for Administrators

An essential component for effective technology usage in schools is the competence level of the educational leader (Bozeman & Spuck, 1991). School administrators today are faced with what seems to be an overwhelming job. According to Bottoms and O’Neill (2001), in the world of school leadership new high-stakes accountability policies have changed nearly everything. In the past, principals were considered “effective” if they made sure that each student had all of their textbooks, the halls were cleared, and the classrooms were quiet. In today’s world, school administrators can no longer remain in their offices; it is imperative that they become more involved in the daily academic life of their school. All of the pressure of approved student achievement and accountability has been squarely placed upon their shoulders. Technology is one tool that has demonstrated a positive impact upon student achievement therefore; it is an innovation that administrators should embrace (Slowinski, 2000).

School and district administrators participate in a variety of professional development experiences in order to learn and grow. Traditionally, most of these trainings consist of traditional methods which include university courses or one-shot face-to-face workshops. Administrators who are interested in keeping up with new and innovative educational strategies must struggle to elevate professional journal articles to the top of the huge pile of papers on their desks (Barth, 1986). The responsibilities and demands of today’s administrators are extremely time-consuming. Therefore, over the last several years, schools have attempted to find ways in which to provide principals with professional development opportunities that fit the busy lives of today’s educators.

Online learning opportunities have started to enter the mainstream, consequently providing educators with additional professional development. Due to the busy lifestyles that we all live today, adults are becoming increasingly impatient with sitting in a classroom and
therefore searching for learning that can take place on the run (McKenzie, 1999). Administrators are no different. Online learning allows administrators’ schedules to remain flexible while still providing the opportunity to obtain much needed skills and knowledge. School districts have begun to answer the call for online learning by providing a variety of Internet-based professional development opportunities. Consequently, it should be noted that according to the National School Board Foundation’s (2002) report, *Are We There Yet?*, 63% of the 811 districts surveyed utilized online learning to provide professional development opportunities.

Teachers have generally noted that online learning helped them to obtain the skills necessary for software and hardware integration and administrators agree with the benefits of this delivery method (Tyre, 2002). It is extremely important that school administrators participate in on-going professional development, to fully understand this innovation. Therefore, instructional designers must identify the varied needs of school-based technology leaders when creating professional development opportunities. This leads to several excellent questions.

- What do school administrators want to know about technology?
- What skills do administrators need to obtain in order to be a successful technology leader?
- What delivery method would be the most beneficial for school administrators today?

**Statement of the Problem**

It is abundantly clear that school and district technology leaders in this day and age are faced with emerging innovations that will forever change the face of the classroom. With new technologies, come new teaching strategies. In order for any innovation to ultimately improve student achievement, it is crucial that administrators understand that the success or failure of the innovation lies in the hands of the teachers (Brooks, 1997). It is also essential for administrators to be aware of the techniques and strategies that teachers are utilizing in their classrooms.
Administrators must recognize that the increased use of technology in the classroom must result in the utilization of different instructional strategies. With the increasing number of instructional strategies that revolve around technology, do administrators know how to conduct and compose an accurate and adequate evaluation of a WebQuest, how a virtual field trip is designed, or what a Trackstar involves. Shouldn’t they be aware of these techniques if they are to properly and accurately evaluate the teacher?

According to Creighton (2003), rarely are school administrators presented with training which provides them with the skills that are conducive to increasing the utilization of technology in the curriculum in order to increase student achievement. Therefore, it is important to afford administrators with professional development opportunities in the area of technology integration. A major issue facing administrators is how to successfully create a technology-rich school community where they support and lead their teachers. The main goal is to build a culture where teachers are willing to take risks and integrate technology into the curriculum.

Administrators must be provided with professional development opportunities that are designed to improve their technology proficiency and leadership skills. One way in which the state of Louisiana measures administrators’ progress is through the Technology Proficiency Self Assessment. Table 1.1 notes the results over a two-year period for the school district in which the researcher works. The results clearly indicate a need for additional professional development. In order to address this issue, the district utilized a “traditional method” of technology training.

Table 1.1
Technology Proficiency Self Assessment Results

<table>
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<tr>
<th></th>
<th>Number of Administrators</th>
<th>Percent Proficient</th>
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<tr>
<td>2004-2005</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>2005-2006</td>
<td>17</td>
<td>6</td>
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During the summer of 2006, the district conducted a four-day, face-to-face technology training entitled Leading with Technology, for district and school level administrators. It did not take long on the first day to realize that the participating administrators had a lot to learn about technology use, integration, and evaluation. There would be no way that we would be able to accomplish all that was planned in the time set aside for this training experience. The levels of proficiency amongst the 15 participants ranged from novice to advance. It was difficult to ensure that all participants would receive the training they really needed.

After this professional development experience, the researcher began to ponder what would be the most beneficial way to provide additional on-going training. Such issues are not isolated to small districts, but are being faced by technology coordinators and instructional designers across the state and nation. What skills do school administrators need to possess in order to create a technology-rich school community? The researcher also noticed, in the several months since the original training, that our principals have started to support and promote the use of technology within their schools. For the first time in the history of our district, all principals are using email to communicate with teachers and have begun to encourage the same communication between schools and homes. If four days of technology training could initiate such a drastic change, what would ongoing job-embedded training accomplish?

In a study by Flanagan and Jacobsen (2003), they called upon school districts to provide adequate, ongoing, and intensive professional development for school leaders in the areas of implementation and management of this every-changing innovation. Ongoing job-embedded professional development, based upon the needs of administrators that are currently in the trenches, is necessary. This study attempts to understand the needs of administrators and provide a record of skills what are essential to their success. This would serve as a springboard for the development of a self-guided online technology training courses for technology leaders.
Purpose of the Study

Roseabeth Moss Kanter (2001) from Harvard Business School attempted to explain why, when utilizing the Internet in business, it is important not to base changes on a superficial cosmetic modification of current practices when it comes to technology innovations. She notes that many established companies who try to conduct business online are likened to “putting lipstick on a bulldog” (p. 72). They attempt to simply create a website without rethinking their company model. The bulldog with the lipstick is not transformed into a beautiful creature nor does it change its behavior. The lipstick is cosmetic and only covers up the existing problem. The problem remains and the bulldog’s appearance does not ultimately change.

The same analogy is true of administrators and technology. E-leaders must implement actions within their schools and districts that are proactive when dealing with technology. They must be willing to alter their existing leadership practices in order to open themselves, their teachers, and students to the exciting world of technology (Creighton, 2003). Before this alteration is possible, administrators must receive the proper training and support necessary to become successful e-leaders. The purpose of this study is to investigate what skills administrators consider important in order to successfully incorporate technology into their schools and districts.

Schools must move beyond inundating classrooms with the cosmetic changes of expensive boxes and wires, but rather concentrate on ways in which to improve the knowledge of their leaders and educators (Creighton, 2003). According to Kearsley and Lynch (1992), school administrator training is one of the critical areas of technology leadership training that has been greatly ignored. In general, administrators have gained their technology knowledge through informal experiences and observations. Therefore, this study seeks to review which conceptual
and strategic issues, administrators believe must be addressed in order to allow them to develop into effective e-leaders.

**Significance of the Study**

This study is expected to explore more deeply the technology skills that both district and school-based leaders feel are essential in the 21st century school. According to Creighton (2003), the principal as technology leader has the greatest chance to influence teaching and learning. Dawson & Rakes (2003) noted the importance of having administrators that are well-trained and technology-capable in order to support teachers in their integration of technology into the school curriculum. Furthermore, Kearsley and Lynch (1994) concluded that teachers and administrators are not properly prepared to manage technology in their schools due to a lack of specific training centered on technology leadership. They further noted the critical need for the establishment of training programs for teachers and administrators that focus on a wide selection of topics such as theory and practice in leadership, policy studies, distance education, and instructional design to name a few.

Additionally, it is anticipated that this study will contribute to the deficiency in the literature which focuses on the skills that current administrators consider essential to becoming an effective technology leader. It is expected that this study will assist in filling this gap in the literature. It is anticipated that this study will provide instructional designers with a list of specific operational skills and topics in which to create online learning courses for current district and school administrators. The data gathered from this study, can be used to create relevant self-paced online learning courses for school administrators. These professional development opportunities will allow for the development of a more prepared and versatile administrator that looks on e-leadership as the key to the sustainability of a technology-rich school community.
Research Questions

Traditionally, the face-to-face technology training provided to both teachers and administrators is functional and merely explores such skills as word processing (Kearsley & Lynch, 2003). Therefore, the central question to be addressed in this study is:

(RQ1) What are the technology skills, both operational and theory-based, that administrators consider vital to the development of themselves as an effective e-leader?

Further questions to be addressed are:

(RQ2) Based upon the International Society for Technology Educators’ National Technology Standards for Administrator (ISTE NETS-A), what productivity, integration, and leadership skills do administrators view as essential?

(RQ3) What leadership skills are necessary for the e-leader to possess in order to create a technology-rich school community?

(RQ4) What cognitive changes are needed in order to obtain the global perspective necessary for administrators to recognize and address all aspects of technology integration and incorporation into schools?

Limitations

Since a survey instrument needed to gather the data for this study does not exist, the researcher created one. Therefore, the validity and relativity of the entire instrument has not been established. However, the survey has been piloted prior to the actual study. A factor analysis utilizing the pilot study results has been completed and is discussed in Chapter 3.

Definition of Terms

For the purposes of this study, the following pertinent definitions are listed:

E-leadership: the capacity to bring people and resources together in order to solve problems and achieve desired results in a technology-rich environment.
**E-learner**: any learner taking part in an online course.

**ISTE**: International Society for Technology Educators

A nonprofit professional organization with a worldwide membership of leaders in technology.

**LEADTech**: an intense, technology-rich, leadership-driven professional development program for Louisiana administrators.

**Division of Leadership and Technology (DLT) Technology Proficiency Self Assessment**: a self-assessment tool based upon national technology standards created by Louisiana’s Division of Leadership and Technology in order to measure technology proficiency for students, teachers, and administrators.

**NET Generation or N-Geners**: Young people (generally between the ages of 12 and 25) who are familiar and comfortable with the utilization of a variety of technologies including computers and the Internet.

**NETS-A**: National Education Technology Standards for Administrators, See Appendix A

**Technology Proficiency**: the ability to utilize both hardware and software in a competent fashion.

**Technology-Rich School Community**: community is measured based upon standard indicators from the NETS-A. A model of evident indicators for a technology-rich school community is found in Appendix B.
CHAPTER 2: REVIEW OF RELATED LITERATURE

In a recent article in Technology & Learning, Peter Reilly (2005) adequately summed up the plight of educational leaders in today’s society. He noted:

We are in the midst of an age of transformation in education. It is an age of creativity and new frontiers, but also of shifting roles and beliefs and the feelings of being, technology-and-education-wise, on the unsettling cusp of the past and the future. If we are to successfully lead our children into a world we cannot yet fully imagine; if we are to prepare them to become active, confident leaders and shapers of their own destiny, then we must do more than just talk about leadership, we must show it.

Administrators must be willing to display the leadership skills needed to provide their teachers with the leeway they need to allow their students to become leaders in their own rights. It is important that principals invest time and funding into professional opportunities for themselves as well as the rest of their staff.

Technology has often been referred to as a moving target. Once a new innovation has been incorporated successfully, it changes or something new appears upon the educational scene. It is important for this reason that school administrators continue to grow and develop professionally. Like a pencil, technology is an educational advancement that depends on what the user does with it. If a teacher has hundreds of pencils in their classroom and nobody knows how to use them, then it does not help to have such a tool available, but a good teacher can assist those students in writing a masterpiece, a story, or design the next technological advance (Sparks, 1998). It is the job of the school administrator to use his/her leadership skills to ensure that the teachers at their school are utilizing all technologies as they work on improving student achievement.

The Changing Roles of the School Leader

Technology has completely changed the landscape of schools and classrooms. The days of McGuffey readers and rote memorization have vanished. As our society and our students rush
into the 21st century, many of our schools have become stuck in the 20th century (Prensky, 2005). The school leaders of today are faced with creating a school culture that facilitates learning while dealing with school accountability requirements at the local, state, and national level.

Authoritative schools and top-down district leadership is no longer an acceptable form of school leadership. Educational leaders are now expected to base their influence on “professional expertise and moral imperative” rather than a upon a top-down authoritative pyramid approach to leadership (Normone, 2004). School leaders must develop skills that will enable them to become e-leaders who facilitate and empower. Full and complete technology integration within schools depends upon the school administrator’s knowledge about these new advanced technologies.

Administrators are beginning to understand that when technology takes a prevalent role in their organization it changes the face of the school and leads to a rapid change in what educators are comfortable doing (Miller, 1998).

For school leaders, trained prior to the educational technology revolution, there were few opportunities for the attainment of necessary knowledge (Awalt & Jolly, 1999). Therefore, administrators were left to their own devices when it came to obtaining necessary skills. As technology began to enter schools, Texas A&M University and The University of Texas at Austin conducted a survey of the 1,043 school districts in Texas with a 45% return. Denton, Davis, Strader, Gessup, and Jolly (1999) concluded that administrators welcomed and applauded the professional development that they received, but the researchers felt that a higher level of technical knowledge and understanding was necessary to obtain the needed expertise to utilize technology. Shuldman (2004) stated that administrators lacked the understanding necessary to change and improve their schools through technology. Consequently, the researcher believes that in order to thoroughly understand the changing roles of the school leader and how they
might better understand their e-leadership roles, a review of relevant literature must address leadership, theory, and professional development.

**Digital Immigrants and Digital Natives**

Over 25 years ago, the desktop computer began to appear in classrooms across the United States. Some early adopters embraced this innovation and discovered ways in which to incorporate this new innovation into their daily routines, but overall educators today are still debating the usefulness of this innovation. Brooks-Young (2006) writes that it is imperative that educators accept the fact that in order to prepare our students for the technology-infused global economy of the 21st century, we must make some considerable changes in the way in which we educate them.

The students sitting in our classrooms today are no longer the individuals that our educational system was designed to teach (Prensky, 2001). The *Leave it to Beaver* days, where students walk into the classroom in an orderly manner with their books tied together by a leather strap, are gone. Students today have never known a world without desktop computers in their homes and schools, cellular telephones, and video games. Prensky (2001) coined the term digital native to describe these students. A digital native is a technology user that is under the age of 30, who is accustomed to receiving information rapidly, is able to multitask, and prefers graphics to text.

So where does that leave the rest of us, including most of our teachers and administrators currently in schools today? Prensky (2001) refers to these individuals as digital immigrants. A digital immigrant is a technology user, by and large over the age of 30, which was not born into the digital world of today, but has either voluntarily or forcibly embraced technology in their lives. Digital immigrants are being challenged to abandon traditional practices and acknowledge the new educational landscape. By recognizing and analyzing the characteristics of this new
landscape, the teacher and administrator will be able to understand the type of leadership that our students deserve (Prensky, 2005)

**School Leaders and Innovation Implementation**

In order for administrators to truly understand their roles as e-leaders in the creation of a technology-rich school community, they must first understand the theories relative to the diffusion of this innovation. Rogers (1962) in his groundbreaking work on innovations noted that “some of the greatest struggles encountered by mankind have been not with the sword but with ideas that diffused into their daily lives and emerged as cultural change (p. 1).” The innovation of technology integration has certainly saturated our social, economic, and academic culture. As the Net Generation becomes increasing more familiar with this innovation, school administrators and teachers have struggled with ways in which to grasp the new and emerging strategies that have resulted.

![Figure 2.1. Roger’s Distribution of Adopters Over Time (Shuldman, 2004), page 320](image)

Research over the last few decades clearly illustrates that school leaders determine whether or not an innovation is successful at the school level (Awalt & Jolly, 1999). In this ever-changing world, the school leader must wear many hats, one being that of technology planner, manager, and supporter. In order for the principal to promote and maintain a technology-rich school community they must promote the diffusion of technology into all areas of the school.
The principal must become a manager of programs and people while providing an atmosphere for tackling this ever changing innovation.

Diffusion is the process by which a new idea or innovation spreads to the users and adopters (Rogers, 1962). Furthermore, Rogers’ theory concerning the rate of adoption suggests that the potential adopter, namely teachers and administrators, will adopt an innovation over time in the pattern consistent with a standard curve (Shulman, 2004). The adopter will classify their views of the innovation in a certain way. (See Figure 2.1) Early adopters and innovators will need little or no support for the integration of this innovation, but late majority and laggards tend to need more information, convincing, and support. School administrators should be familiar with Roger’s theory in order to understand where their staff stands as well as their ability levels. Consequently, just as teachers fall along this bell curve, so will administrators in their roles as e-leaders. Technology leadership is inherently connected to innovation, thus it is important for administrators to understand the procedures, policies, and situations involved (Kearsley & Lynch, 1992).

More specific to the adoption of innovations in education is the Concerns-Based Adoption Model, CBAM (Hall & Hord, 1987). There are several basic foundations underlying this model. These include:

- change is a process, not an event;
- the understanding of the change process in organizations requires an understanding of what happens to individuals as they are involved in change;
- for the individual, change is a highly personal experience;
- for the individual, change entails developmental growth in terms of feelings about the skill in using the innovation; and
• Information about the change process collected on an ongoing basis can be used to facilitate the management and implementation of the change process (Heck, Stiegelbauer, Hall & Loucks, 1981).

CBAM places the individual in the center of the process and characterizes early adopters of an innovation as uncertain and self-doubting. This model, which has been in use for more than 25 years, has become an indispensable tool for the development and continuation of evaluation reform efforts. CBAM examines the process of innovation in three distinct ways: stages of concern, levels of use, and innovation components (Horsley & Loucks-Horsley, 1998).

CBAM is based upon the premise that change is an ongoing, personal experience which is mediated by the extent of the training that is received (Bailey & Palsha, 1992). In her study of how this affects schools, Anderson (1997) noted that a school may display a “culture of change” when the principal and teachers’ attitudes are those of support for the acceptance of the innovation. A collegial atmosphere that embraces the sources of change, adoption and implementation of the innovation, and the magnitude of the change needed for full execution of the integration efforts is vital.

Any new technology or innovation that is introduced into the educational culture faces a difficult path to its school wide adoption. According to Ely (1990, 1999), there are eight conditions which play a role in the successful implementation of an innovation. These eight conditions are: dissatisfaction with the status quo, knowledge and skills, adequate resources, adequate time, rewards or incentives, participation, commitment, and leadership. Ely (1990) conducted a variety of structured interviews of 25 educational technology leaders in several countries. Ely noted that when these eight conditions are present then the implementation of an innovation would be successful. If the implementation of an innovation is not working then an examination of the missing conditions should be done. Surry, Porter, Jackson, and Hall (2004)
further noted that by understanding the importance of these conditions and fostering the appropriate levels of support within the organization, the likelihood of the successful implementation of the innovation may occur.

![Maslow's Hierarchy of Needs](image)

**Figure 2.2**
**Maslow’s Hierarchy of Needs**

Before school administrators or teachers can successfully implement technology into their schools and classrooms, they must understand the overall scope of its use. Abraham Maslow developed a theory of human motivation in 1943 (Figure 2.2). The basic premise of Maslow’s theory is that human behavior is determined by biological, cultural, and situational conditions (Lord, 2002). Maslow’s theory states that in order to shape the motivation for an individual to act, the following needs from lowest to highest must be met: physiological, security, social, self-esteem, and self-actualization (Maslow, 1943). Conversely, Johnson (2003) notes that within the world of technology, certain basic needs must be met before total technology integration can occur. Johnson’s Hierarchy of Educational Technology Needs (Figure 2.3) starts from the lowest basic technology need of an established infrastructure to the ultimate goal of any technology-rich school community that of empowered students.
Just as with Maslow, the physiological needs must come before the psychological needs, when dealing with technology. Schools must meet the infrastructure needs of the school before being able to improve the achievement level of the students. In order to do this successfully at the school level, the principal must become both the managerial and educational leader of the school in technological terms. By understanding the diffusion of innovations and the concerns of the stakeholders involved, administrators are more likely to create a culture of systemic change which is necessary for the successful integration of technology (Shuldman, 2004).

**The Principal as Technology Leader**

During this time of great academic change, it is logical to assume that the leadership role of the principal must also undergo great change as well (Gurr, 1996). Administrative roles are certainly a more complex job for principals today than in the past. Consequently, information and communication technology has become an important feature of this new world (Gurr, 2001). Such technology has dramatically changed the way in which administrators work and thus in what they expect from the teachers on a daily basis in the classroom. As noted by Fullan and Smith (1999), the incorporation of technology into the classroom will necessitate that teachers change their pedagogy to make learning more meaningful and relevant for students as they acquire the knowledge and skills necessary to become productive citizens.
The main goal of any school leader is the betterment of the school and the improvement of student achievement. As the managerial and instructional leader of the school, the principal helps to establish the instructional goals of the school and determine how these goals are effectively measured by staff members. The achievement of short-term goals does not require great leadership, but it is essential that leaders form a bond of trustworthiness with their followers if they wish to make long-term sustainable changes (Cottrell, 2000). Thus a prosperous school is an organization which defines these goals and objectives then engages in activities in order to achieve the intended vision (Glickman, Gordon, & Ross-Gordon, 2001).

In *Good to Great*, Jim Collins (2001) examines what makes businesses such as Walgreens, Circuit City, and Gillette not just good companies, but great companies. In his study, he examined how these companies CEO’s took a good organization and turned them into ones that create sustained great results (p. 15). One aspect of this transformation included the embracing of technology within the organization. In every case, technology became an “accelerator of momentum, not a creator of it” (p. 152). School and district leaders can take a cue from the leaders of these companies. The implementation of technology can assist schools in achieving not just goodness, but greatness. According to Collins (2001), greatness is a matter of conscious choice.

Before administrators can make the conscious choice to create a great organization where they successfully implement the utilization of technology into their school to improve student achievement, school administrators must understand and support a variety of educational technology goals. Technology leadership is more than just simply purchasing and implementing programs. In order to reform schools, the principal must stay focused on the individual needs of their teachers and students (Creighton, 2003).
Leadership

Leadership plays an important role in the integration and formation of technology-rich school communities. Thus, leaders must embrace the role that technology can play in such reform and understand the characteristics of effective school leadership. The ultimate purpose of any organization is the achievement of a goal. In order to do this, the leader and their followers must create a synergy in which the attainment of an outcome or the achievement of a goal is reached. This atmosphere of responsibility that is established in the organization will further define how it will run and accomplish its goals.

School administrators must move beyond viewing their jobs as that of manager to that of educational leader. This involves moving beyond the matter of making others follow your vision to that of the development of a shared vision (Wilmore & Betz, 2000). Principals must strive to create a culture where the stakeholders emphasize a building of shared camaraderie. The principal is a crucial factor in the ability of teachers to implement change within their classrooms and thus must understand the importance of their role (ACOT, 1996).

A vision for technology integration into schools is an essential part of the entire integration piece. Yogi Berra summed it up best when he stated, “If you don’t know where you’re going, you’re likely to wind up somewhere else.” Both school and district leaders must understand and communicate their vision of technology and be able to work with everyone to make this school improvement quest possible (Byrom & Bingham, 2001).

Leadership and Technology Integration

Thomas & Knezek (1991) examined this vision of technology as it relates to school reform and restructuring. The Accreditation Committee of the International Society for Technology in Education (ISTE) conducted a national survey where they polled professionals in the fields of education and instructional technology. Of the 240 surveys that were mailed, 74
were returned by teacher education faculty, K-12 school leaders, and district supervisors. The study revealed that a myriad of opportunities to apply technology in school reform are available. The study’s intent was to document the vision that leaders had in terms of technology and school restructuring. The results indicated that it was important for technology administrators, including school principals, to display particular technological competencies. These competencies are viewed as avenues to assist the administrator in their role as technology integrator. Accordingly, Thomas and Knezek (1991) suggested that technology leaders should know how educational technology can support the efforts of teachers in the classroom in order to promote a technology-rich school community.

As noted by Gronn (2003), the basic ingredients for effective leadership whether with or without technology continues to remain the same: leaders need to be people centered, have highly developed interpersonal skills, demonstrate decisiveness and prudent risk taking and exhibit transformational leadership qualities.

Figure 2.4: Role Responsibilities and Goals of Technology Integration (Flanagan & Jacobsen, 2003), page 132.
In 2000, the Calgary Board of Education’s Leadership Development Program outlined core competencies, personal attributes, and role responsibilities for school-based leaders (Flanagan & Jacobsen, 2003). This program identified five role responsibilities as it relates to the process of technology integration: leader of learning, leader of student entitlement, leader of capacity building, leader of community, and leader of resource management (See Figure 2.4). These responsibilities serve as a starting point for the development of a model for technology leadership.

The goal for a leader of learning is to nurture an environment where teachers are encouraged to continuously learn and improve. Additionally, the principal, as the leader of technology, encourages an atmosphere of risk-taking while rewarding the adoption of an innovation. This environment also fosters a problem-based collaborative atmosphere for students to construct knowledge (Flanagan & Jacobsen, 2003).

The principal, as leader of student entitlement, provides equal access to technology for all students regardless of their gender, economic background, ethnicity, or native language differences. This includes the goal of providing age-appropriate opportunities for students to develop technology skills (Flanagan & Jacobsen, 2003). School and district level administrators are ultimately responsible for spending technology dollars. Without an understanding of the use, need, and ability of technology in our schools, these dollars will not be spent in the most beneficial way (Testerman & Hall, 2001).

In order to build capacity for technology use and integration in schools, the principal must develop a shared vision with all stakeholders. The empowerment of teachers, parents, students, and support staff is essential to the development of a technology-rich school community. By empowering all stakeholders, a climate of risk-taking, creativity, and collaboration is encouraged (Flanagan & Jacobsen, 2003).
According to Flanagan & Jacobsen (2003), the principal as community leader has three main objectives:

1. to involve the community, including parents and business partners, in achieving the goals of technology integration;
2. to communicate the schools’ accomplishments and challenges to the community; and
3. to extend student learning beyond the walls of the school.

Shulman (2004) noted that if teachers perceive that their needs are being met then they will feel that the principal is truly committed. Therefore, it is important that the principal as the leader of the school community display the proper leadership.

The principal as a leader of resource management is responsible for providing students and teachers with the resources necessary to achieve the integration of technology. This involves the development of a technology plan that takes into account purchasing, maintaining, and replacing equipment. Additionally, policies and procedures should be put into place that encourages Internet safety and network security (Flanagan & Jacobsen, 2003). These responsibilities are essential to establishing effective technology leadership. Technology changes require a significant adaptation and change in emerging realities thus requiring a continuous evolution to remain productive (Avolio & Kahai, 2001).

**Technology Leadership Indicators**

The National Educational Technology Standards for Administrators (NETS-A) are a set of indicators that educational leaders should know and be able to do with educational technology (ISTE, 2002). These six indicators (Appendix A) are:

1. leadership and vision;
2. learning and teaching;
3. productivity and professional practice;
4. support, management, and operations;
5. assessment and evaluation; and
6. social, legal, and ethical issues.

There are four to six standards grouped under each indicator. The purpose of these standards are
to provide guidelines to assist administrators in school reform as it relates to technology use
(Brooks-Young, 2002).

In 1998, the Teaching, Learning, and Computing (TLC) staff surveyed principals,
technology coordinators, and teachers from public, private, and parochial schools across the
nation in order to gather information on technology leadership. Surveys were collected from
1,150 schools, including 4,100 teachers, 800 technology coordinators, and 867 principals.

Anderson & Dexter (2005) examined the survey results in reference to the International Society
for Technology in Education National Educational Technology Standards for Administrators
(ISTE NETS-A). The researchers concluded that technology leaders are expected to understand
how educational technology can support what occurs in the classroom. Their leadership is
generally recognized as an important influence on the effectiveness of the school and technology
innovation.

Consequently, Anderson & Dexter (2005) identified eight dichotomous indicators
(technology committee, principal time on technology, principal email, staff development policy,
school technology budget, district support, grants, and intellectual property policy) which best
embodied the construct of school technology leadership and these six administrator technology
standards or ISTE NETS-A.

Anderson and Dexter (2005) investigated several outcome measures that described the
role of technology leadership in reference to educational technology utilization in schools. These
researchers constructed three outcome indicators (net use, technology integration, and student
tool use) from several administered questionnaires. The results of the survey were examined in the terms of technology leadership components, national technology adoption policies, the breakdown of technology leadership by school demographic factors, and an examination of technology leadership and technology outcomes. The results confirmed that technology leadership is vital and plays a central role in technology-related outcomes as Figure 2.5 outlines. Additionally, Anderson & Dexter (2005) also called for continued research in the area of leadership as it is relates to technology in schools.

Figure 2.5: A Model of Technology Leadership (Anderson & Dexter, 2005), page 56.

According to Brooks-Young (2002), the school administrator must work collaboratively to leverage the resources necessary to sustain a commitment to the integration of the technology innovation into their schools in order to create a technology-rich school community. Anderson & Dexter (2005) concluded that technology leadership plays a central, pivotal role in technology-related outcomes. Furthermore, they concluded that technology leadership has a greater effect on desired outcomes than technology infrastructure and expenditures.

**Professional Development**

A bridge, like professional development, is a critical link between where we are and where we would like to be. Every bridge requires careful design and consideration of its purpose. The bridge designer must be aware of what will anchor the structure and the resources
required to construct it. Similarly, each professional development program requires a careful and
unique design to meet the needs of the school, its teachers, and the students. Professional
development is a critical link or bridge between where we are and where we would like to be.

As school districts invest enormous amounts of money into new technologies for schools,
educational leaders must not ignore the importance of an effective professional development
program to bridge the gap between utilization and understanding. The power of technology as a
learning tool will be wasted unless educators, both teachers and administrators, are provided with
both training and follow-up to ensure successful implementation.

Professional development came of age in the 1980’s. At that time, it essentially became
the focus of countless conferences, workshops, articles, and books. Many districts initiated
extensive staff development programs, which focused mainly upon student learning. These
programs have substantially advanced since the early 1980’s into the staff development programs
which exist today (Sparks & Loucks-Horsley, 1989).

At the same time, technology began to explode upon the educational and private scene.
Educational leaders were faced with developing programs to provide effective training to allow
teachers to become comfortable with the new technology while utilizing it within the classroom
to improve student achievement.

Scribner (2000) noted that one can think of professional development as multiple threads
of different colors, textures, and weights which weave together to form a tapestry that represents
a successful learning environment for all stakeholders. Professional technology learning should
be woven through the tapestry of school life, while providing a springboard for incorporation
into daily lessons and activities. Consequently, any tapestry needs to have a well-structured,
dependable frame. The frame should consist of four things: motivation, knowledge, context, and
evaluation. It is also important that the staff developer becomes familiar with the obstacles that participants may face when incorporating this new training.

Access to technology and professional development must occur simultaneously for the integration of technology to be thoroughly incorporated into the classroom. Educational leaders cannot simply provide computers and Internet access to educators and assume that they will be used in the classroom in day-to-day instruction. The only way in which to ensure that technology will be effectively integrated into the teaching and learning process is to provide sufficient time, resources, training, and technical support for individuals through the staff development process (Vojtek & Vojteck, 1997).

According to Horsley and Loucks-Horsely (1998), based upon knowledge from research, theory, and the “wisdom” of experienced, practical professional developers suggested five principals of effective professional development:

(1) Professional development experiences must have the students and their learning at its core. For teachers to effectively integrate technology into their classrooms, they should begin with what students need to know and what they should be able to do.

(2) Staff development should concentrate on the development of pedagogical sound content knowledge. This involves knowing how to teach specific concepts and principles to a variety of students. The goal of developing pedagogical sound content knowledge must be the focus of professional development opportunities for teachers.

(3) The principles that guide the improvement of student learning should also guide the professional learning for teachers and administrators. Engaging in active learning, focusing on fewer ideas more deeply, and learning collectively are all principles that must be addressed during educator learning. Technology training should not consist of just
how to repair a computer or navigate the Internet, but how to actively utilize this
innovation into the classroom.

(4) The content of professional learning must come from both inside and outside the learner
and from both research and practice. Effective staff development must successfully
combine both research and theory. Technology staff development programs should
utilize national educational technology standards and be aligned to both state and local
guidelines and regulations.

(5) Professional development must both align with and support system-based changes that
promote student learning. It should support changes in standards, assessment, and
curriculum while creating a culture for change and continuous improvement.

These guidelines reflect a constructivist perspective where teachers and administrators should
collaborate with peers, researchers, and students to make sense of the teaching and learning
process. Coley, Cradler, and Engel (1997) noted that by utilizing these standards and
approaches, a new paradigm of professional development and understanding will gradually
become a reality within the classroom.

Principal Training and Planning

Wilmore & Betz (2000) suggested that it is the school leaders’ responsibility to be the
head learner at their schools. In order to accomplish this objective, principals must be provided
with professional development opportunities that are worthwhile to their attainment of
knowledge. Good leadership requires that the principal develop the capacity to keep well-
informed about the changes and improvements within each component of the school (Kearsley &
Lynch, 1994). In terms of technology, very little formal preparation has been provided for
instructional technology leaders. Most practicing administrators have obtained their technology
skills through informal experiences and observations of others. As noted by Kearsley & Lynch (1992), technology leadership training for school administrators was largely ignored.

Noting the importance of technology training for principals, Dawson & Rakes (2003) conducted a study to investigate the level of technology integration in schools as measured by the School Technology and Readiness (STaR) Chart Assessment. This online data-collection survey instrument asked questions about five topics: connectivity, hardware, content, professional development, and integration and use.

Dawson & Rakes (2003) administered the survey to a purposive sample of Internet-using, K-12 public and private school principals. Surveys were sent electronically to 1,104 principals from the Web66 International School Web Registry. Three hundred ninety-eight (N = 398) K-12 principals completed the survey. Participants were asked to define their level of technology integration at their school as either high tech, low tech, mid tech, or target tech.

Results indicated that professional development which included technology integration was more preferable to training which concentrates only on the study of basic technology tools. Furthermore, this study indicated that principals who receive the proper training will make a positive difference in their schools. Based upon their findings, Dawson & Rakes (2003) called for additional research into the level and types of training necessary for administrators to become successful technology supporters in their schools. They also reported that training which teaches administrators to use basic technology tools are not as effective as training that concentrates on methods and procedures for technology integration.

Bozeman & Spuck (1991) investigated the issue of knowledge and proficiency and how it relates to effective instructional leadership and support in schools. A survey was created to list possible educational computer applications and technology-related issues that may be presented in an introductory university course for educational administrative leaders. The instrument
invited participants to rate the importance of the topics on a five-point scale from “Essential” to “Not at All.”

Surveys were sent to 152 large school districts nationwide with enrollments of more than 10,000 students. The surveys were completed by the information-processing directors within these districts in order to gauge their thoughts on needed knowledge of school administrators. Bozeman & Spuck (1991) indicated that few practicing school administrators are adequately trained to support the integration of technology in the school community.

Gurr (2004) contended that many people, including educators, are increasingly working in environments that did not exist a decade ago. Both teachers and administrators must be properly prepared for the challenges of managing technology at their schools thus specifically focused training must be offered. Objectives and topics that must be covered include that of current and emerging applications of computers in both teaching and administration. A review of theory and practice in leadership, policy studies, and program evaluation should also be addressed (Kearsley & Lynch, 1992).

An example of a professional development opportunity which was designed to provide K-12 administrators with knowledge about managing technology and making leadership decisions was created by the Louisiana Department of Education. This program is known as LEADTech (Louisiana Educational Advancement and Development with Technology). This technology leadership initiative provides 75 hours of instructional collaboration including face-to-face seminars, a web-based course, and hands-on technology training. The planned benefits of the program include the ability to:

- communicate the importance of instructional technology to staff, students, and the extended learning community;
- identify and develop administrative competencies;
• identify and be able to develop strategies to build upon the effective and sustained integration of technology to support school improvement and increased student achievement;
• demonstrate an awareness of a variety of tools to assess technology readiness and implementation;
• identify specific reasons and strategies in order to employ and support technology in teaching and learning;
• cite current research in educational settings;
• recognize specific Louisiana educational initiatives; and
• engagement in positive and reflective dialogues with colleagues (LaDOE, 2007).

This professional development opportunity has been designed in an effort to assist principals in their efforts to improve student achievement through the use of technology in the classroom. The program’s curriculum was designed around the Milken Seven Dimensions of Learning (learners, learning environment, professional competency, system capacity, community connections, technology capacity, and accountability), the CEO Forum School Technology and Readiness Report, and the ISTE National Standards for Technology.

LEADTech provides a professional development opportunity, but it is still extremely important that school administrators participate in on-going professional development in order to fully understand this innovation. In turn, it is important that administrators create an environment in their schools that encourages the exploration of current technologies. Administrators must be prepared to make wise program decisions, invest in professional development, and emphasize the use of strategic teaching in the classroom. McKenzie (1999) noted that administrators must understand that they are unlikely to improve reading, writing, and reasoning with new technologies without the combination of “strategic teaching.”
What Administrators Need to Know

Awalt and Jolly (1999) noted that one of the major reasons that there was a lack of technology professional development for administrators is the struggle to identify the knowledge-base needed to manage technology in a school setting. This leads to a question of what professional development is necessary for e-leaders to be successful. What “administrator knowledge base” in technology is needed in order to manage its use and integration into the school culture?

McKenzie (1999) presented the analogy of how school administrators often view the field of technology integration and knowledge building. He noted that principals often surge ahead with Titanic confidence rarely aware of what is lurking in the darkness when dealing with technology. “Ignorance is bliss until icebergs appear suddenly under your bow (p. 83).” School administrators must be proactive and not reactive. Administrators must make the effort to obtain the needed skills in order to become effective leaders. Both administrators and teachers need more job-embedded learning and less one-shot training. The old approach of after-school or Saturday training sessions does not work. These gatherings usually train participants on the software itself instead of its application into the curriculum.

Hess and Kelly (2005) surveyed 56 of the 496 programs across the country that granted master’s degrees in educational administration. The researchers examined course syllabi from 31 of the programs. The results indicated a lack of attention to accountability, using data, or making personal decisions. Hess and Kelly (2005) found that school principals are among the first to suggest that they may not be adequately prepared for their role as technology leader and manager.

As a result of their research, Hess and Kelly (2005) suggested four lessons for district officials and school boards to keep in mind in terms of professional development:
1. don’t assume that new principals are familiar skills with such as data analysis and accountability;
2. don’t assume that new principals have a realistic sense of management practices in a variety of areas;
3. don’t assume that new principals have been exposed to management practices outside of the school setting; and
4. don’t be surprised if new principals are unenthusiastic about different reform topics (Hess and Kelly, 2005).

In a 2003 report, *Trying to Stay Ahead of the Game: Superintendents and Principals Talk About School Leadership*, 60% of the school superintendents and 66% of the school principals surveyed found that “too much of the professional development offered to administrators is impractical and focuses on the wrong things (p. 31).” Additionally, 56% of school superintendents and 54% of school principals felt that by improving the quality of the professional development opportunities it would in turn be a very effective way in which to improve their leadership skills.

Sparks and Hirsh (1997) noted that professional development is at the center of all educational reform efforts and trainers must remember the importance of creating relevant activities that involve the administrator in the development of their training and knowledge-base acquisition. The issue with principal training and technology knowledge leads to the question of what level of support do teachers expect from administrators?

**Support Levels and Influencing Factors**

It is essential that school administrators receive the proper professional development in order to support their teachers. The principal is the key facilitator of technology in their schools; therefore technology training for principals as well as teachers is a priority (Dawson & Rakes,
The principal as technology leader must be careful not to allow the “lightening speed” of the technology revolution to drive the bus (Creighton, 2003). It is important that leaders gradually introduce and support a new innovation.

In order to examine how teachers can be supported in becoming technology integrators and facilitators, Orrill (2001) acted as the professional developer and participant observer in his study of simulation software integration in two New York City classrooms.

As both professional developer and researcher, Orrill (2001) investigated how teachers became more student-centered in terms of critical thinking. Additionally, he identified different levels of support that are essential to the integration of a new innovation. Orrill found it essential that teachers be provided with the opportunity to reflect upon the professional development process and ways in which to successfully integrate technology in a learner-centered environment. Additionally, it was noted that the foundation for any professional development framework should be grounded in a belief that change is individual and should be supported in context and over a period of time.

Furthermore, Orrill (2001) examined the support levels needed for teachers to integrate student-centered innovations in their classrooms. The results highlighted a need for an analysis of the professional development framework in reference to the provided support for the teachers. Orrill (2001) concluded that support was a major issue for educators who are dealing with any new innovation or program that is being integrated into the curriculum and classroom. The Apple Classrooms of Tomorrow (ACOT) (1996) study noted that principals do not need to be “technology gurus” themselves, but must be willing to provide the support to their teachers as they learn and implement this innovation.

MacNeil and Delafield (1998) surveyed 64 school administrators, both principals and assistant principals, from school districts in southeast Texas. The researchers developed survey
questions to specifically gauge what factors support the integration of technology into the classroom as well as the inhibitors that prevent incorporation. A total of 112 surveys were administered with a return rate of 57%. MacNeil and Delafield (1998) noted that principals in southeast Texas schools felt that technology was extremely important to their schools and was significantly important to the teachers. A major finding indicated that principals felt that teachers needed to be provided with time for professional development and planning.

Marcinkiewicz (1993) examined the factors which influenced teachers to utilize available computers in their teaching. Teachers (N=170) from four schools completed questionnaires that collected data on innovativeness, teacher focus of control or self-efficacy, perceived self-competence in computer use, perceived relevance of computers to teaching, and three demographic variables (age, gender, and years of computer experience).

The results of the questionnaire suggested that about half of the teachers in the study did not use computers for teaching because of a lack of self-competence, innovativeness, and lack of professional development. Marcinkiewicz (1993) suggested a need to further study teachers and what makes them want to use computers in their classrooms. Additionally, a call for future research in the areas of self-competence and innovativeness was suggested.

Marcinkiewicz (1993) suggested that it is important for school administrators to understand this process in order to appreciate the disparity of computer usage among their faculty. Additionally, issues of professional development, personal motivation, and support become crucial to understanding why some teachers will integrate technology into their classrooms and others will not. In order for principals to adequately support the use of technology in their schools, to produce a technology-rich school community, they must first understand what motivates their teachers to utilize the innovation in order to provide the needed support.
Kincaid and Felder (2002) examined findings derived from the North Dakota Teaching with Technology (TWT) Initiative. This statewide program was designed and implemented in order to provide three phrases of professional development in order to move teachers toward the implementation of technology into the curriculum. The main collection tool for this initiative was the Professional Competency Continuum (PCC) assessment. All educators completed this assessment upon entering the initiative as well as prior to entering subsequent phases.

A total of 9,120 educators participated in the first phase of the initiative representing 89% of the full and part-time certified teachers of North Dakota. Kincaid and Felder (2002) noted that results from the surveys indicated the importance of support for technology integration initiatives in the classroom. Observations conducted during the initiative indicated the importance of the administrator’s role in both management and initiative.

Bitner and Bitner (2002) developed eight areas of consideration that have been shown to be important to the successful integration of technology into schools by teachers. They include a fear of change, training in basics, personal use, teaching models, learning-based, climate conditions, motivation, and support. To assist educators in facing these eight indicators, it is important for administrators to both plan and commit to their teachers.

Conclusion

According to Slowinski (2000), the school administrator must be prepared for a significant time investment as the school moves from utilizing technology as a part-time tool to a more active tool that is fully integrated into the curriculum. Professional development and leadership skills are essential to this success. Principals can not expect technology to be the answer to everything at their schools. Technology alone will not get administrators where they want to go. Teachers and students must drive the use of technology as a tool in order to perform at a higher level (Creighton, 2003).
According to Harvey, Cottrell, Lucia, and Hourigan (2003), the principal as leader should assist their teachers in understanding the values that are important to the school. The ultimate goal is student achievement and every effort must be made to ensure that not only the teacher, but the school leader has the proper training to enable students to perform at their highest levels. The principal or district leader must set the example for technology usage. According to Hall (1999), the administrator must demonstrate to students and teachers how technology can benefit them in their everyday lives. Former United States Secretary of Education, Rod Paige, once said, “Education is the only business still debating the usefulness of technology. Schools remain unchanged for the most part, despite numerous reforms and increased investments in computers and networks (U.S. Department of Education, 2004, p. 22).”
CHAPTER 3: RESEARCH METHODOLOGY

The purpose of this study is to explore the technology skills that school administrators considered important for the creation of a technology-rich school community. This research study employed a mixed-method approach using both qualitative and quantitative data. The purpose of using quantitative survey data and qualitative interviews was to provide an inclusive examination of the types of technology and leadership skills that acting district and school-based administrators felt were necessary to create a technology-rich school community. In order to review the breadth and depth of this topic, the use of a mixed methodological approach was deemed necessary by the researcher. Details of this methodology is outlined in the following sections: (1) research questions, (2) rationale for methodology, (3) data collection procedures, (4) data analysis, (5) reliability and trustworthiness, (6) timeline, and (7) conclusion.

Research Questions

The following questions, derived from current literature and the researcher’s experience, will serve as a guide to this research study.

(RQ1) What are the technology skills, both operational and theory-based, that administrators consider vital to the development of themselves as an effective e-leader?

(RQ2) Based upon the International Society for Technology Educators’ National Technology Standards for Administrator (ISTE NETS-A), what productivity, integration, and leadership skills do administrators view as essential in others?

(RQ3) What leadership skills are necessary for the e-leader to possess in order to create a technology-rich school community?
(RQ4) What cognitive changes are needed in order to obtain the global perspective necessary for administrators to recognize and address all aspects of technology integration and incorporation into schools?

**Rationale for Methodology**

Mixed methodology allowed the researcher to incorporate the strengths of both quantitative and qualitative data. According to Johnson and Onwuegbuzie (2004), by utilizing both qualitative and quantitative data together, it produces a more complete knowledge that is necessary to inform both theory and practice. Creswell (2003) described this research method as one in which the researcher collects, analyzes, and integrates both forms of data into a single study or in multiple studies through a sustained program of inquiry.

According to Biesta and Burbules (2003), all social research deals with assertions about human beings and the environments in which they live and evolve. By utilizing a mixed method approach, the researcher was able to collect multiple forms of data using different strategies, approaches, and methods in order to understand the full intent of the participant’s views on ways in which to create a technology-rich school community. By using qualitative data, the researcher was able to more fully understand the mindset and experiences of the participants. Furthermore, the quantitative data will determine a set of skills participants identify as crucial by analyzing descriptive statistics.

**Data Collection Procedures**

**Quantitative**

Quantitative data allowed the researcher to operate under an assumption of objectivity and assumed that there was an external reality to observe (Johnson & Christensen, 2004). A researcher-created survey was used in order to obtain quantifiable data about needed technology skills and professional development.
**Pilot Study.** A small pilot study of the researcher-created survey was completed prior to the study. During the pilot study phase, the survey was administered to 10 district administrators, school principals, and assistant principals. Participants were asked to complete the survey as well as provide comments and suggestions concerning the design of the survey.

After the administration of the pilot study, the survey results were placed into Microsoft Excel and SPSS for analysis. The results of the analysis indicated that the survey consisted of five factors. These factors clustered around ISTE NETS-A, which the survey was designed around. These factors include:

1) leadership and vision;
2) learning and teaching;
3) productivity and professional practice;
4) support, maintenance, operations, and finance; and
5) assessment and evaluation.

The following factors or indicators that became outliers were that of social, legal, and ethical issues.

Corrections and adjustments were made to the survey as a result of this analysis. Outliers were removed and adjustments to the wording of several questions were made. The questions were reorganized in order to streamline the survey into a more cohesive document. An additional reorganization of the survey was completed with the assistance of the dissertation committee during the proposal meeting.

**Leadership Survey.** The updated survey is titled the *K-12 Technology Leadership: A Survey of Professional Development Needs for Technology Leaders* (Appendix D) and was administered for the first time to Region II Louisiana public school administrators via the Internet. In the first emailing, a total of 444 surveys were sent to district and school
administrators across Region II of Louisiana (City of Baker, City of Bogalusa, East Baton Rouge, East Feliciana, Iberville, Livingston, Pointe Coupee, St. Helena, St. Tammany, Tangipahoa, Washington, West Baton Rouge, West Feliciana, and Zachary Community Schools). In order to obtain more responses, a second mailing was completed, and 678 additional surveys were sent out to all school and district administrators in Louisiana. Both of these cycles were through email invitation. A total of 116 administrators responded, but fifteen of these surveys were incomplete and were removed from the sample. This meant that a total of 101 administrators from a sample of 982 (valid email invitations) completed the web-based survey over a forty-four day collection period. This represents a 10.3% return rate from across the state of Louisiana.

Table 3.1
Frequency Table of Years of Experience of Survey Respondents (N=101)

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 Years</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>11-15 Years</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>15 or more Years</td>
<td>81</td>
<td>80%</td>
</tr>
</tbody>
</table>

All respondents were either school or district administrators. Of the 101 respondents, 95% were school administrators. Data were analyzed based upon years of experience as well. Table 3.1 shows the distribution of respondents based upon their years of experience in the field of education.

Table 3.2  Survey Demographics

<table>
<thead>
<tr>
<th>Survey Demographics</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Emailing</td>
<td>444 surveys</td>
</tr>
<tr>
<td>2nd Emailing</td>
<td>678 surveys</td>
</tr>
<tr>
<td>Total Valid Survey Invitations</td>
<td>982 surveys</td>
</tr>
<tr>
<td>Number of Undeliverable Surveys</td>
<td>105 surveys</td>
</tr>
<tr>
<td>Rejected Email Invitation</td>
<td>3 surveys</td>
</tr>
<tr>
<td>Opted Out of Survey</td>
<td>32 surveys</td>
</tr>
<tr>
<td>Incomplete Surveys</td>
<td>15 surveys (deleted)</td>
</tr>
<tr>
<td>No Survey Policy</td>
<td>Caddo Parish, Central School District, and Rapides Parish</td>
</tr>
</tbody>
</table>
Several factors may have affected the return rate of the surveys (Table 3.2). For example, the researcher received several emails from respondents indicating that their district had a policy against answering surveys. Additionally, the email database received from the Louisiana Department of Education had email addresses that were either undeliverable or incorrect. Of the survey invitations emailed, 105 addresses were undeliverable, three rejected the email invitation, and 32 opted out of the survey. Of the 101 respondents, the vast majority of administrators that responded had fifteen or more years experience. This represents 80% of the total respondents. By examining the individual factor of years experience, professional developers may utilize these findings to create professional development opportunities for groups of administrators based upon years of experience and/or school configuration.

In order to further understand the population that these administrators served, data were collected concerning what grades they represented. Figure 3.1 illustrates the schools’ configuration of the survey respondents. The majority of the respondents, 39%, worked in elementary school, while 29% were in middle schools and 23% in high schools. District administrators, 9%, represented the smallest population of respondents.

![Figure 3.1 Percentage of Respondents School Configuration](image_url)
Qualitative research has been defined in a variety of ways. Strauss and Corbin (1998) defined it as:

Any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It can refer to research about persons’ lives, lived experiences, behaviors, emotions, and feelings as well as organizational functioning, social movements, and cultural phenomena (p. 10-11).

Strauss and Corbin (1998) further noted that qualitative research was best used when the methods are complementary to the preferences and personal experience of the researcher, congruent with the nature of the problem, and when it was employed to explore areas about which little is known. Qualitative research is a practice requiring both personal skills and techniques (Shank, 2002). By utilizing qualitative research methods in this study, the researcher was able to obtain a deeper understanding of technology and leadership in a K-12 setting.

**Interviews.** In addition to the completed surveys, seven qualitative interviews were conducted during this study. These seven administrators were from Region II in Louisiana. Table 3.3 identifies each interviewee, their job title, and self-identified technology proficiency level. Interviewees identified their technology proficiency level as novice or beginning tech, moderate or developing tech, and advanced tech. An interview protocol (Appendix C) was used for all interviews.

<table>
<thead>
<tr>
<th>Administrator</th>
<th>Title</th>
<th>Identified Technology Proficiency Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laurie Lee</td>
<td>District Supervisor</td>
<td>Novice</td>
</tr>
<tr>
<td></td>
<td>Human Resources and Staff Development</td>
<td></td>
</tr>
<tr>
<td>Grant Green</td>
<td>High School Principal, 9-12</td>
<td>Novice</td>
</tr>
<tr>
<td>Sally Sands</td>
<td>Assistant Middle School Principal, 6-8</td>
<td>Novice</td>
</tr>
<tr>
<td>Natalie Miller</td>
<td>Middle School Principal, 6-8</td>
<td>Moderate</td>
</tr>
<tr>
<td>Myra Mouch</td>
<td>Elementary School Principal, PreK-1</td>
<td>Novice</td>
</tr>
<tr>
<td>Amy Honore</td>
<td>Elementary School Principal, PreK-1</td>
<td>Advanced</td>
</tr>
<tr>
<td>Georgette Agnes</td>
<td>Elementary School Principal, PreK-2</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Interviewees were randomly selected from participants in the Louisiana Department of Education’s LEADTech online course. These participants were members of a former cohort. According to the Louisiana Department of Education, the participants are divided into cohorts, or groups for the administration of the course during both the fall and spring semesters. Each cohort works together for the duration of the course including the face-to-face introduction, the online portion, and the final face-to-face portfolio presentation.

Interviews were conducted at the convenience of the interviewee. Each face-to-face interview lasted approximately thirty minutes. As stated previously, interviewees were provided with the protocol (see Appendix C) prior to the interviews. In addition to the face-to-face interviews, participants provided the researcher with written responses to each question.

Data Analysis

Quantitative Data Analysis

The purpose of this study was to offer a good representation of K-12 administrative views to examine an overall set of skills that these administrators felt were needed in order to create technology-rich school communities. Thus, consequently, respondents were asked to answer a 35-question survey in terms of importance and understanding. A copy of the researcher developed survey; *K-12 Technology Leadership Survey: A Survey of Professional Development Needs for Technology Leaders* is included in Appendix D. The survey questions were developed using the National Educational Technology Standards for Administrators (NETS-A). The pilot survey was reorganized in order to assist in the analysis of data. Survey questions were first labeled as either theory-based or operational skills-based. Secondly, the questions were sorted into four categories. By organizing the questions into four categories, this allowed the researcher to pinpoint specific skills and theories that administrators indicated were of the most importance.
Additionally, this categorization allowed the researcher to examine specific technology skills that administrators felt required additional professional development.

Questions were first grouped in terms of those that are theory-based. These questions concentrated upon topics such as culture, support, evaluation, and understanding. Survey questions 1-8 and 15-22 were labeled as theory-based.

In addition to theory-based questions, the remaining questions were based upon technology skills. These questions concentrated strictly on technology skills such as word processing, spreadsheets, and databases. Survey questions 9-10 and 23-35 were labeled as skills-based.

After grouping the questions as either theory-based or skills-based, the questions in these two groups were then divided into four categories based upon the aspects that K-12 administrators deal with on a daily basis as part of their administrative duties. These four categories were used for data analysis. The four categories are:

- concepts of technology in schools;
- perceptions of theory;
- skills acquired; and
- skills needed.

The first category or concepts of technology in schools was designed to obtain data concerning what technology skills administrators perceived to be essential to their school and how technology fits into the entire school culture. The second category, perception of theory, questioned the administrators on their perceptions of how technology should be utilized within the school for both productivity and instruction. The third category, skills acquired, examined the technology skills that administrators possessed and the final category, skills needed, obtained data on what specific skills were needed by the school administrators.
For each of the thirty-five questions on the survey, respondents were asked to respond two ways: (1) What importance do you feel these skills hold in terms of technology integration in schools? and (2) How do you rank your understanding of this technology-based concept? The scale design for the first question was: 1 = Not Important, 2 = Somewhat Important, 3 = Essential. The scale design for the second question was: 1 = No Understanding, 2 = Understand Somewhat, 3 = Expert Understanding. Table 4.1 (see Appendix E) presents the means (M) and standard deviations (SD) for all survey items in each category.

Survey data were analyzed utilizing Microsoft Excel and the add-in package Xlstat2008 software. In addition, the researcher analyzed survey data using both percentages and means. Data were examined through the creation of graphs and charts in order to investigate results. During the analysis process themes emerged allowing the researcher to view the findings based upon several categories.

The survey findings are presented in terms of both importance and understanding. Additionally, the findings are presented in order of critical importance. Data were finally analyzed based on four categories:

- importance;
- understanding;
- importance versus understanding; and
- administrator’s experience.

For the purpose of this analysis, the term “administrator” refers to both K-12 school-based principals and district administrators serving all schools within a given educational district.

**Qualitative Data Analysis**

The qualitative portion of this study concentrated upon the analysis of interviews. Data analysis of qualitative data was more analytic and deductive than quantitative. Creswell (2003,
described typical qualitative data analysis as:

- preparing and organizing the data for analysis;
- exploring the data;
- describing and developing themes from the data;
- representing and reporting the findings; and
- validating the accuracy and credibility of the findings.

Patton (1990) outlined four types of interview formats that are often utilized during the data collection period. For this study, individual interviews utilizing a standardized open-ended interview format was used. The researcher used an interview protocol (see Appendix C) for all interviews.

In order to analyze interview data, a constant comparative method was used (Glaser & Strauss, 1967). Data were organized into categories based upon content analysis. Patterns and themes emerged from this analysis and thus were used for the examination of the interview data.

Reliability and Trustworthiness

This study used a mixed methodology format. Therefore, quantitative and qualitative issues of internal and external validity were addressed. In terms of the qualitative data, the issues of credibility, transferability, dependability and conformability were addressed. By using a mixed-method approach, this provided a strengthening of the quality and verification of the study by the use of multiple data points, including survey data and interviews.

Survey Reliability

Limitations to this study included the use of a researcher-created survey. The small percentage of respondents may not be representative of all school and district administrators. Additionally, inherent limitations when dealing with survey data include the validity and
reliability of the responses. Responses can not always be taken as accurate descriptors of the respondents views on the given subject (Creswell, 2003).

In order to minimize the effect of survey limitations, several steps were taken by the researcher. Attention was given to the writing and revision of the study’s questions. The survey was revised using both a pilot study and by committee during the proposal meeting. Additionally, the researcher participated in the LEADTech course presented by the Louisiana Department of Education. This allowed the researcher to understand exactly what types of professional development was being provided to administrators as well as the types of technology they were being exposed to on a daily basis. This knowledge was used when designing survey questions.

**Trustworthiness**

Creswell (2003) defined credibility as the degree in which inferences of the phenomena match the realities of the phenomenon. The purpose of this study was to create a rich, thick description that would allow others to understand what skills acting administrators consider to be essential to the creation of a technology-rich school community.

Lincoln and Guba (as cited by Tashakkori & Teddlie, 1998) introduced the concept of “trustworthiness.” In order to determine the trustworthiness of a qualitative investigation, the four criteria of credibility, transferability, dependability, and confirmability must be addressed. For this study, member checks of the participants were gathered to confirm the interpretation of the interview results. Additionally, all interviewees remained anonymous throughout the study.

A peer debriefer, with a Master’s Degree in Administration and Supervision, was utilized to review both quantitative and qualitative data. By employing a peer debriefer, the researcher was able to review the data in order to provide solid substantiation of the explanations and conclusions.
### Timeline

The following timeline was used for the implementation of this study:

Table 3.4  Study Timeline

<table>
<thead>
<tr>
<th>PROJECT PHASE</th>
<th>TIMELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete survey and administer pilot study</td>
<td>February 2007</td>
</tr>
<tr>
<td>Submit proposal to committee</td>
<td>May 2007</td>
</tr>
<tr>
<td>Complete and submit IRB</td>
<td>November 2007</td>
</tr>
<tr>
<td>Obtain participant consent</td>
<td>May - November 2007</td>
</tr>
<tr>
<td>Conduct one-on-one interviews</td>
<td>June – September 2007</td>
</tr>
<tr>
<td>Administer survey</td>
<td>November - December 2007</td>
</tr>
<tr>
<td>Analyze and interpret data</td>
<td>December 2007 – April 2008</td>
</tr>
<tr>
<td>Write results and discussion section of final paper</td>
<td>April – September 2008</td>
</tr>
</tbody>
</table>

This study was completed in September, 2008.

### Conclusion

This research project was designed to gather information about what skills K-12 administrators considered essential to the creation of a technology-rich school community. The research examined for the literature review surveyed leadership and supported issues from the administrator’s point of view. This project provided information on what acting administrators’ recognized as important thus contributing to the current literature. This research project will be a springboard for other areas of investigation, collaboration, and instructional development.
CHAPTER FOUR: QUANTITATIVE RESULTS

This study was designed to uncover the skills that acting district and school administrators view as important when creating a technology-rich learning environment at their schools. The study was guided by the following questions:

(RQ1) What are the technology skills, both operational and theory-based, that administrators consider vital to the development of themselves as an effective e-leader?

(RQ2) Based upon the International Society for Technology Educators’ National Technology Standards for Administrator (ISTE NETS-A), what productivity, integration, and leadership skills do administrators view as essential in others?

(RQ3) What leadership skills are necessary for the e-leader to possess in order to create a technology-rich school community?

(RQ4) What cognitive changes are needed in order to obtain the global perspective necessary for administrators to recognize and address all aspects of technology integration and incorporation into schools?

Both quantitative and qualitative data were gathered and analyzed. Data from the quantitative survey were first analyzed for descriptive statistics. Secondly, qualitative interview data from seven administrators were coded, categorized, and analyzed. Qualitative results will be discussed in Chapter 5.

The results of the survey are reported in the following subsections of this chapter, which are divided into four areas:

• importance;
• understanding;
importance versus understanding; and

administrator’s experience.

**Importance**

Results indicated specific technology skills that administrators viewed as essential. Analysis indicated an apparent relationship between technology theory and both acquired and needed skills for administrators.

**Areas of Critical Importance**

Five areas of critical importance are discussed in this section in order from highest to lowest as administrators viewed its importance in terms of their jobs. These areas include:

- standardized test data;
- communication;
- professional learning communities;
- technology and evaluation; and
- security issues.

**Standardized Test Data.** Administrators indicated that the area of most importance was that of understanding how to use data to make leadership decisions in terms of student achievement (M = 2.98, SD=.14). This skill includes the utilization of software such as *Microsoft Excel* to analyze standardized test data and *Microsoft PowerPoint* to present results. Administrators also considered that the ability to collect and analyze data to make decisions that effect the overall operation of the school and/or district to be extremely important (M = 2.92, SD=.27). Technology, in coordination with data analysis, was the most essential skills that survey respondents considered vital.

**Communication.** If you asked a roomful of educators to define technology integration you would probably find a multitude of responses. Everyone has their view of what proper
technology integration is and how to go about accomplishing its integration into the curriculum. Administrators must have the skills to effectively communicate the proper vision of technology integration into the curriculum for their teachers. Respondents noted that the second most important skill was the ability to communicate the importance of meaningfully engaged learning to their teachers and what role technology plays in this process. Survey results indicated that administrators recognized the importance of having the knowledge needed to communicate how technology can assist with curriculum-related issues (M = 2.9, SD=.30).

**Professional Learning Communities.** Administrators indicated supporting professional learning communities with technology (M=2.93, SD=.26) as the third most important skill. As noted by Dufour and Eaker (1998), professional learning communities permit the school to develop shared missions and values, collective inquiry, collaborative teams, and improvement. Technological innovations such as the Internet and online course management systems assist administrators in establishing professional learning communities. Administrators indicated that technology was an essential component to the establishment of these communities.

**Technology and Evaluation.** Respondents indicated that teacher evaluation was the fourth most important skill and an essential job responsibility for administrators. It is a vital component of quality control and is an important element of effective leadership for school administrators (Creighton, 2003). The evaluation process is two-fold: the use of technology as an effective way in which to record the results of an evaluation, as well as the actual evaluation of technology integration. Administrators recognized and realized the role that technology can play in the evaluative process. Survey results appeared to indicate that the administrators recognized the importance of utilizing technology for evaluation purposes (M = 2.91, SD=.32).

**Security Issues.** Issues of privacy, security, and online safety are three of the most intricate and challenging issues administrators face. These issues become increasingly complex
as technology is further embedded into the school culture. Administrators ranked security issues as the fifth most important skills ($M = 2.91, SD=.29$). They acknowledged the need to identify, promote, and enforce safe and healthy practices within the school community.

**Areas of Less Importance**

Survey results indicated a variety of areas administrators felt were of less importance. These areas, ranked from least important, included:

- the utilization and understanding of databases ($M = 2.36, SD=.64$);
- understanding the technology needs of the school ($M = 2.44, SD=.50$);
- the utilization and understanding of spreadsheet ($M = 2.51, SD=.58$); and
- general knowledge of digital equipment ($M = 2.51, SD .54$).

**Databases.** The utilization of databases ($M = 2.36, SD=.64$) includes the collection of data that has been organized in a way that may be best accessed, updated, and managed by the user. For example, administrators must contend with the management of student demographic data. Survey results appeared to indicate that administrators do not recognize these skills as excessively important.

**Technology Needs.** The integration of technology into schools involves a great deal of planning and understanding to successfully implement. The development of a shared mission and vision is essential to understanding the technology needs of the school just as a regular school improvement plan. Survey results appeared to indicate that administrators do not view this skill as being of great important ($M = 2.51, SD=.58$).

**Spreadsheets.** Also, administrators did not recognize the use of spreadsheets ($M = 2.51, SD=.58$) as a top priority. A spreadsheet allows one to organize data in terms of rows and columns in order to process information, usually numbers. Such software packages allow the user to graphically represent data in a visual format.
**Digital Equipment.** Additionally, survey results appeared to indicate that a general knowledge of digital equipment was not a top priority for administrators (M = 2.51, SD = .54). Digital equipment includes such items as digital cameras, camcorders, projectors, laptops, printers, personal digital assistants (PDA’s), and scanners. This result was surprising considering that equipment such as this is used in schools everyday.

**Understanding**

Survey results also indicated a specific subset of technology skills where administrators either had an understanding of the skill or a lack of knowledge. This element of the survey asked administrators to rank their understanding of the same skills they ranked in terms of importance.

**Areas of Understanding**

This component examined the overall understanding that administrators indicated for each survey question. The scale design for this question was: 1= No Understanding, 2 = Understand Somewhat, 3= Expert Understanding.

The following section will describe the areas of greatest understanding for administrators. These areas, ranked in order from most to least understanding, include:

- privacy and security issues;
- communication;
- effective technology usage;
- word processing; and
- professional development.

**Privacy and Security Issues.** Administrators recognized the importance of privacy and security (M = 2.91, SD=.29) as the factor from which they held the most understanding. They also indicated that they had a better awareness of privacy and security issues (M = 2.65, SD=.44) such as acceptable use policies, copyright issues, Internet security, and related issues.
Communication. Additionally, administrators indicated that they had the greatest ability to use email to communicate with teachers, parents, and the community (M = 2.78, SD=.41). Home-to-school communication has been an issue for teachers and administrators since the conception of schools. It is essential that the lines of communication remain open between the school and the home. With the innovation of technology, teachers and administrators are provided with email and websites that assist in keeping these lines of communication open. Results appear to indicate an understanding of how to utilize technology for administrator-teacher communication.

Effective Technology Usage. Recognizing effective technology usage (M = 2.69, SD=.46) within their schools as well as how administrators evaluate technology was ranked the third most area of understanding by respondents. It is extremely important that administrators have the ability to recognize when teachers are utilizing technology successfully. The goal of a meaningfully engaged learning environment is one that administrators appear to understand and recognize as important.

Word Processing. In terms of skill-based questions, the survey results noted that word processing (M = 2.63, SD=.52) was the area of greatest understanding to administrators. This is the creation, input, editing and formatting of text and other objects using software on a computer.

Professional Development. The survey noted that administrators recognized this need to provide professional development opportunities (M = 2.56, SD=.52) to their faculties. The goal of a professional development program is to inform and change the behavior of an individual through the presentation of new information. In order for schools to utilize technology effectively, professional development is crucial.
Areas of Less Understanding

Finally, data indicated the four utmost areas of need for administrators in terms of technology skills. These areas ranked in order of least understanding include:

- database utilization;
- knowledge of spreadsheets;
- the awareness of emerging technologies; and
- understanding of technology needs.

Database Utilization. The area of highest need or least understanding was that of database utilization (M = 2.01, SD=.66). Results indicated that administrators had the least amount of understanding in terms of using databases for administrative purposes. A database is a structured collection of records that are stored in a computer system.

Knowledge of Spreadsheets. Administrators indicated that the knowledge of spreadsheets was also an area of less understanding (M = 2.23, SD=.53). As stated earlier, spreadsheets allow one to organize data in terms of rows and columns in order to process information, usually numbers. Administrators can utilize spreadsheets for the analysis of standardized test data.

The Awareness of Emerging Technologies. Survey results indicated that administrators did not have an understanding of emerging technologies (M = 2.28, SD=.49) and how they effect the school community. Emerging technologies are new technologies that are reshaping the nature of education. These technologies include personal digital assistants (PDA’s), podcasts, wikis, and weblogs.

Understanding of Technology Needs. Administrators indicated difficulty in understanding technology needs (M = 2.39, SD=.50), which included understanding how to
evaluate and assess the technology needs of the school community. Administrators must be able to develop and implement technology plans for their school and/or district.

**Importance vs. Understanding**

A comparison of skills that administrators deemed important versus their understanding appeared to indicate several areas where technology skills were important, but according to results there is also a lack of knowledge of the skill. These skills ranked in order of the most important include:

- using data for leadership decisions;
- communication about integration;
- standardized test data;
- supporting student learning; and
- privacy, security, and online safety.

![Comparison of Importance and Understanding](image)

**Survey Questions**

12. An administrator must have the skills to participate in discussions with teachers about how various technologies can support teaching and learning goals.
15. An administrator must understand how to use available data to make leadership decisions which will impact student achievement.
17. An administrator must be able to evaluate how effective technology is being utilized to support student learning.
22. An administrator must understand and support the issues of privacy, security, and online safety to teachers and students.
33. An administrator must be able to collect and analyze data to make decisions that affect the overall operation of the school and/or district.
Figure 4.1 illustrates a comparison of five areas of greatest importance in comparison to the level of understanding by administrators. In these five areas, survey results indicated a comprehension of the importance of these five areas, but also indicated a low understanding. This data may be utilized in order to create professional development opportunities for administrators as they work on gaining important technology skills.

**Using Data for Leadership Decisions**

The first area of difference was that of utilizing available data to make leadership decision. Survey results indicated an insight into how administrators viewed this skill’s importance (M = 2.98). Although administrators indicated that this skill is of great importance, they also indicated less understanding (M = 2.5) of how to accomplish this at the school level.

**Communication about Integration**

Secondly, administrators appeared to feel that it was important (M = 2.9) to be able to communicate with teachers, but did not have the skill-level or understanding (M = 2.55) to accomplish this deed. It is vital that administrators have the ability to communicate information concerning the proper way in which to integrate technology into the classroom to teachers. By doing this, administrators develop a shared vision with the entire school community. Survey results indicated that in terms of an administrator’s ability to communicate with teachers in order to support teaching and learning there was a gap between importance and understanding.

**Standardized Test Data**

Results indicated a difference between importance and understanding in terms of the collection and analysis of data to make decisions that effect the overall operation of the school community or district. In terms of importance (M = 2.92), this skill was ranked high whereas in terms of understanding (M = 2.51), it was the lowest indicating a greater dissimilarity.
Supporting Student Learning

As stated previously, administrators noted the importance (M = 2.91) of understanding how to effectively evaluate technology utilization to support student learning. In contrast, the same administrators did not feel their understanding (M = 2.5) of this concept was as great. The results of this survey appear to indicate that administrators need more professional development on how to evaluate technology in a meaningfully engaged learning environment.

Privacy, Security, and Online Safety

The last area of greatest inconsistency involved the understanding of how to support the issues of privacy, security, and online safety for both teachers and students. Survey results indicated that in terms of importance (M = 2.91), administrators recognized that this issue as an essential skill. In comparison, their understanding (M = 2.65) of how to achieve this at the school level was much lower.

Administrator Experience

In addition to analyzing data from the entire administrative population (N = 101), it was additionally evaluated based upon the administrator’s experience level. The analysis of data indicates a parallel to the number of years experience and the perceived skill level of the administrator. The older the administrator (determined by a greater number of years experience) the less assured they were in their technology skill level.

Data indicated ten areas of greatest interest by respondents. These areas, ranked in no particular order, include:

- understanding technology needs of the school;
- understanding and supporting privacy, security, and online safety;
- awareness of emerging technologies;
- general technology knowledge;
- providing professional development opportunities;
- providing technology opportunities;
- Internet knowledge;
- word processing knowledge;
- knowledge of spreadsheets; and
- knowledge of databases.

Table 4.2 illustrates these ten areas and the means of the four areas of experience:

(1) 0-5 years, (2) 6-10 years, (3) 11-15 years, and (4) 15 or more years.

<table>
<thead>
<tr>
<th>Question</th>
<th>0-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>15 or more years</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. An administrator must understand the technology needs of their school: both hardware and software.</td>
<td>3</td>
<td>2.3</td>
<td>2.6</td>
<td>2</td>
</tr>
<tr>
<td>22. An administrator must understand and support the issues of privacy, security, and online safety to teachers and students.</td>
<td>3</td>
<td>2.8</td>
<td>2.7</td>
<td>2</td>
</tr>
<tr>
<td>23. An administrator must maintain an awareness of emerging technologies and their potential for use within the curriculum.</td>
<td>3</td>
<td>2.3</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>24. An administrator must have a general knowledge of how computers operate and how they may be utilized in the classroom.</td>
<td>2</td>
<td>2.5</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>25. An administrator must provide professional development opportunities for staff members that are based in effective practices and uses of technology.</td>
<td>2</td>
<td>2.8</td>
<td>2.7</td>
<td>2</td>
</tr>
<tr>
<td>26. An administrator must understand and provide technology opportunities that will meet the needs of diverse learners.</td>
<td>2</td>
<td>2.3</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>27. An administrator must have knowledge the Internet and how it may be utilized for productivity purposes and the incorporation into the classroom.</td>
<td>3</td>
<td>2.6</td>
<td>2.6</td>
<td>2</td>
</tr>
<tr>
<td>28. An administrator must have knowledge of how to utilize word processing packages such as Microsoft Word for productivity purposes and incorporation into the classroom.</td>
<td>3</td>
<td>2.6</td>
<td>2.6</td>
<td>2</td>
</tr>
<tr>
<td>29. An administrator must have knowledge of how to utilize spreadsheet packages such as Microsoft Excel for productivity purposes and incorporation into the classroom.</td>
<td>3</td>
<td>2.3</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td>30. An administrator must have knowledge of how to utilize database packages such as Microsoft Access for productivity purposes and incorporation into the classroom</td>
<td>3</td>
<td>2.1</td>
<td>2.1</td>
<td>1.8</td>
</tr>
</tbody>
</table>
As indicated in Table 4.2, as administrators increase their years of experience their skill level begins to diminish. In other words, the older the administrator, the fewer technology skills were present. Attention was given to these ten indicators in order to show the overall relationship between the years of experience and skill level. Readers should note at this point, the total population of each experience level. Eighty percent of all respondents fell within the 15 or more years experience category.

A further examination of survey results revealed skills that were considered best skills for older administrators and those that were their worst skills. Theses skills are outlined in terms of strengths and weaknesses below.

**Strengths**

In terms of importance, six survey questions showed similarities. Questions 3, 15, and 17, categorized as theory-based questions, all demonstrated a sense of importance across the four levels of experience (0-5 years, 6-11 years, 11-15 years, and 15 or more years.) These questions addressed the promotion of effective practices of technology integration, the use of available data to make leadership decisions, and how to use technology to support learning, all reveal high means (M = 2.9 or 3.0) or a belief that these skills are essential to educators.

Questions 4, 10, and 33 all exhibit a sense of importance or reveal high means (M= 2.9 or 3.0). These questions referred to using technology to promote higher order thinking skills, the ability to recognize the effective use of technology, and analyzing data to make leadership decisions. Results indicated that all administrators, no matter their experience level believe these skills are important.

In terms of technology understanding, the results are more varied based on experience levels. Questions 10, 11, and 12, all skills-based questions, had the highest levels of
understanding across all experience levels. These questions illustrate the three skill levels that administrators felt most comfortable with across all experience levels. They are:

- Recognizing the effective use of technology, question 10, showed a level of understanding at all experience levels: 0-5 years ($M = 3$); 6-11 years ($M = 2.8$); 11-15 years ($M = 2.6$); and 15 or more years ($M = 2.7$).

- Communicate via email and online, question 11, revealed the greatest understanding at all levels: 0-5 years ($M = 3$); 6-11 years ($M = 2.8$); 11-15 years ($M = 3$); and 15 or more years ($M = 2.8$).

- Participate in discussions with teachers about technology, question 12, also uncovered a high level of understanding: 0-5 years ($M = 3$); 6-11 years ($M = 2.6$); 11-15 years ($M = 2.68$); and 15 or more years ($M = 2.5$).

**Weaknesses**

In order to determine exactly where administrators felt that they needed assistance, a comparison of importance and understanding at each level of experience was conducted. Results suggested several areas that showed an awareness of the importance of the skill, but in turn they did not understand that skill. In other words, they know the skill is important, but they do not have the knowledge to successfully accomplish said skill.

For example, question 22 is theory-based, concerning what an administrator must understand in order to support the issues of privacy, security, and online safety for teachers and students. In terms of importance, administrators with 15 or more years of experience felt that this was a very important skill ($M = 2.9$), but when asked about their understanding of this same skill it was very low ($M = 2.0$). Therefore, the older the administrator recognizes the importance of having these technology skills to be an effective leader, but they do have the knowledge or ability necessary to utilize these skills.
Noted Differences

Of the 35 questions on the survey, there were 16 questions where administrators, mostly with 15 or more years experience, had noted differences in what was deemed important and what they indicated as their skill level. These 16 areas include:

• understanding how to promote effective practices;
• supporting technology to develop higher-order thinking skills;
• understanding how to seek out technology to improve efficiency;
• evaluating technology effectiveness;
• understanding the technology needs of the school;
• understanding and supporting issues of privacy, security, and online safety;
• maintaining an awareness of emerging technologies;
• obtaining a general knowledge of computer operations;
• providing professional development opportunities;
• providing technology opportunities for diverse learners;
• knowledge of the Internet;
• knowledge of word processing;
• knowledge of spreadsheets;
• knowledge of databases;
• establishing a technology learning culture; and
• collecting and analyzing data to make leadership decisions.

Table 4.3 illustrates these 16 skills and their mean responses. This table presents data for the 16 skills based upon results from administrators participating in the survey (N = 101).
Table 4.3 Importance versus Understanding
Mean Response Comparison (Not Imp/No Understanding = 1; Somewhat Imp/Understand Somewhat = 2; Essential/Expert Understanding =3)

<table>
<thead>
<tr>
<th>Question</th>
<th>0-5 years N = 1</th>
<th>6-10 years N = 8</th>
<th>11-15 years N = 11</th>
<th>15 or more years N = 81</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. An administrator must understand how to promote the effective practices of technology integration into the curriculum.</td>
<td>3.0/3.0</td>
<td>3.0/2.6</td>
<td>2.9/2.5</td>
<td>2.9/2.4</td>
</tr>
<tr>
<td>4. An administrator must support the use of technology to develop higher-order thinking, decision, making, and problem-solving skills.</td>
<td>3.0/3.0</td>
<td>3.0/2.6</td>
<td>2.9/2.6</td>
<td>2.9/2.4</td>
</tr>
<tr>
<td>13. An administrator must have the skills to seek out new ways that technology may be used to improve the efficiency of the school and to improve student achievement.</td>
<td>3.0/3.0</td>
<td>2.9/2.6</td>
<td>2.8/2.7</td>
<td>2.9/2.4</td>
</tr>
<tr>
<td>17. An administrator must be able to evaluate how effective technology is being utilized to support student learning.</td>
<td>3.0/2.0</td>
<td>2.9/2.4</td>
<td>2.9/2.5</td>
<td>2.9/2.4</td>
</tr>
<tr>
<td>21. An administrator must understand the technology needs of their school: both hardware and software.</td>
<td>3.0/3.0</td>
<td>2.4/2.3</td>
<td>2.8/2.6</td>
<td>2.7/2</td>
</tr>
<tr>
<td>22. An administrator must understand and support the issues of privacy, security, and online safety to teachers and students.</td>
<td>3.0/3.0</td>
<td>2.9/2.8</td>
<td>2.9/2.7</td>
<td>2.9/2</td>
</tr>
<tr>
<td>23. An administrator must maintain an awareness of emerging technologies and their potential for use within the curriculum.</td>
<td>3.0/3.0</td>
<td>2.8/2.3</td>
<td>2.5/2.5</td>
<td>2.8/2</td>
</tr>
<tr>
<td>24. An administrator must have a general knowledge of how computers operate and how they may be utilized in the classroom.</td>
<td>3.0/2.0</td>
<td>2.8/2.5</td>
<td>2.8/2.8</td>
<td>2.8/2</td>
</tr>
<tr>
<td>25. An administrator must provide professional development opportunities for staff members that are based in effective practices and uses of technology.</td>
<td>3.0/2.0</td>
<td>2.9/2.8</td>
<td>2.8/2.7</td>
<td>2.9/2</td>
</tr>
<tr>
<td>26. An administrator must understand and provide technology opportunities that will meet the needs of diverse learners.</td>
<td>3.0/2.0</td>
<td>2.8/2.3</td>
<td>3.0/2.8</td>
<td>2.8/2</td>
</tr>
<tr>
<td>27. An administrator must have knowledge the Internet and how it may be utilized for productivity purposes and the incorporation into the classroom.</td>
<td>3.0/3.0</td>
<td>2.8/2.6</td>
<td>2.7/2.6</td>
<td>2.8/2</td>
</tr>
<tr>
<td>28. An administrator must have knowledge of how to utilize word processing packages such as Microsoft Word for productivity purposes and incorporation into the classroom.</td>
<td>3.0/3.0</td>
<td>2.9/2.6</td>
<td>2.7/2.6</td>
<td>2.8/2</td>
</tr>
<tr>
<td>29. An administrator must have knowledge of how to utilize spreadsheet packages such as Microsoft Excel for productivity purposes and incorporation into the classroom.</td>
<td>3.0/3.0</td>
<td>2.5/2.3</td>
<td>2.4/2.4</td>
<td>2.8/1.9</td>
</tr>
<tr>
<td>30. An administrator must have knowledge of how to utilize database packages such as Microsoft Access for productivity purposes and incorporation into the classroom.</td>
<td>3.0/3.0</td>
<td>2.1/2.1</td>
<td>2.2/2.1</td>
<td>2.4/1.8</td>
</tr>
<tr>
<td>32. An administrator must have the skills to establish a technology learning culture in their school or district.</td>
<td>3.0/3.0</td>
<td>2.8/2.4</td>
<td>2.7/2.5</td>
<td>2.8/2.4</td>
</tr>
<tr>
<td>33. An administrator must be able to collect and analyze data to make decisions that affect the overall operation of the school and/or district.</td>
<td>3.0/3.0</td>
<td>2.9/2.5</td>
<td>2.9/2.7</td>
<td>2.9/2.5</td>
</tr>
</tbody>
</table>

A closer inspection of the 16 skills indicated that generally the administrators understood the importance of having the knowledge of these skills in order to establish a technology-rich learning community, but they were lacking in the needed ability level. Of the 16 skills in question, 5 are theory-based and 11 are skilled-based. Theory-based skills include questions 3,
4, 17, and 21, and 22. Skills-based skills include questions 13, 23-30, and 32, and 33.

Furthermore, in terms of experience level those with 15 or more years experience or 80% of the respondents indicated an understanding level between 1 (no understanding) and 2 (understand somewhat). The results appear to indicate that older administrators felt they lack the appropriate technology knowledge. Consequently, these same administrators displayed an understanding of the importance of needing these skills, but they did not have the abilities.

In terms of theory-based skills, the survey indicated that administrators with 15 or more years experience showed an inconsistency between their levels of importance and understanding. Specifically in the areas described below:

- Administrators noted the importance (M = 2.9) of knowing how to promote effective technology integration practices into the curriculum, but did not have the skills to accomplish this skill (M = 2.4).

- An awareness of the importance (M = 2.9) of supporting the use of technology to develop higher order thinking skills was in contrast to the skill level administrators had (M = 2.4).

- The importance of utilizing technology for evaluating teachers (M = 2.9) is in contrast to their perceived understanding (M = 2.4).

- Administrators appreciated the need to understand both hardware and software (M = 2.7), but only somewhat understood the concept (M = 2).

- Finally, administrators felt it was important to understand and support the issues of privacy, security, and online safety for teachers and administrators (M = 2.9), but lacked the skills (M = 2) needed to ensure this would occur at the school-level.
Furthermore, the survey revealed 11 skills-based questions that demonstrate a difference between their knowledge level and what was deemed important. Some of the greatest discrepancies emerged from these skills. Those that should be noted include:

- Maintaining an awareness of emerging technologies (Importance M = 2.8; Understanding M = 2);
- Obtaining general computer knowledge (Importance M = 2.8; Understanding M = 2);
- Providing professional development opportunities (Importance M = 2.8; Understanding M = 2);
- Knowledge of the Internet (Importance M = 2.8; Understanding M = 2);
- Utilization of word processing packages (Importance M = 2.8; Understanding M = 2);
- Utilization of spreadsheet packages (Importance M = 2.8; Understanding M = 1.9);
- and
- Utilization of database packages (Importance M = 2.4; Understanding M = 1.8).

![Figure 4.2](Figure%204.2_15%20or%20More%20Years%20Experience%20(Importance%20vs.%20Understanding).jpg)

**Survey Questions**

21. Understanding technology needs  
22. Understanding issues of privacy, security, and online safety  
23. Emerging technology  
24. General computer knowledge  
25. Provide professional development opportunities  
26. Technology for needs of diverse learners  
27. Internet knowledge  
28. Word Processing  
29. Spreadsheets  
30. Databases

Figure 4.2 15 or more Years Experience (Importance vs. Understanding)  
Mean Response Comparison (Not Imp/No Understanding = 1; Somewhat Imp/Understand Somewhat = 2; Essential/Expert =3)
As stated in the earlier discussion, the survey results suggest that older administrators, with 15 or more years of experience, showed a greater discrepancy between the concepts of importance and understanding as it relates to particular technology skills. Figure 4.2 illustrates the top ten skills where the greatest discrepancies occurred for administrators with 15 more years of experience.

**Summary of Quantitative Data**

Survey results indicated that:

- administrators had a better understanding of theory-based technology skills than operational skills;
- the older the administrator, in terms of educational experience, the less assured they were in their technology skills;
- administrators understood the importance of both theory and operational skills, but survey results indicated that they did not have the knowledge necessary to communicate and support these skills at their schools; and
- administrators had difficulty with the evaluation and assessment of technology needs at their school.
CHAPTER FIVE: QUALITATIVE RESULTS

Qualitative data were collected to inform and confirm the quantitative findings. Therefore, interviews of seven administrators were conducted.

**Qualitative: Interview Data Analysis**

Interviewees were chosen from a pool of candidates who participated in the Louisiana Education Advancement and Development with Technology, LEADTech, professional development program. This is an intensive professional development program for school and district administrators that provide examples of effective leadership models and technology-based strategies. These candidates were selected due to their experience with this program and the exposure to both theory and skills-based technology knowledge. Since all surveys remained anonymous, there is no way of knowing if these seven administrators were among those who had completed the survey.

The researcher contacted the Louisiana Department of Education in order to obtain information on administrators who participated in the LEADTech program from Region II in Louisiana (City of Baker, City of Bogalusa, East Baton Rouge, East Feliciana, Iberville, Livingston, Pointe Coupee, St. Helena, St. Tammany, Tangipahoa, Washington, West Baton Rouge, West Feliciana, and Zachary Community Schools). Email invitations were sent to LEADTech participants requesting a possible interview. A positive response was received from seven principals. Interviews were scheduled with each principal and the Individual Interview Question Protocol (Appendix C) was provided to the interviewees prior to the interviews.

Upon scheduling interviews, all interviewees were mailed a study consent form (Appendix G) and the Individual Interview Question Protocol (Appendix C) with a self-addressed stamped envelope. All consent forms were signed by the participants and were returned to the researcher. The purposeful sampling, defined as a non-random method of
sampling where the researcher selects information-rich cases for in-depth study, formed a group of seven individuals: 6 females and 1 male. The group consisted of one district administrator and six school administrators. Additionally, these individuals represent a range of experience from 3 years to more than 15 years.

**Data Collected**

All interviews were conducted at the convenience of the interviewees. The questions from the Individual Interviews Question Protocol (Appendix C) were asked during the interview. In addition, the seven administrators provided written responses to the questions on the Individual Interviews Question Protocol (Appendix C). This provided the researcher with written responses in addition to the notes taken during the interviews. Each interview provided valuable information and lasted approximately 35 minutes. The written responses provided by the administrators as well as interviewer notes were compiled. The interviews and notes were printed along with the protocol questions for analysis.

**Participants**

Pseudonyms were assigned to the seven interview participants in order to protect their anonymity.

Administrator 1, Laurie Lees, is a human resources district administrator who is in charge of staffing and professional development. She has been in the education field for over 30 years and has extensive experience with providing professional development, but is a self describe technology novice.

Administrator 2, Grant Green, has been a high school principal at both a parochial and public school. His current school’s population is 545 and houses regular education, special education, and alternative students. He is also a self-proclaimed technology novice who recently participated in LEADTech and several locally-supported technology trainings. He feels that his
knowledge of technology has improved over the last several years and he is beginning to actively promote the use of technology in the classrooms at this school.

Administrator 3, Sally Sands, is a middle school assistant principal at a small, rural school. She has recently become involved in a district initiative to work with teachers on the incorporation of technology into the curriculum. In addition to her administrative duties, she works with sixth grade students on a daily basis in an English/Math lab and thus feels that she has first-hand knowledge of what teachers are facing in terms of technology integration.

Administrator 4, Natalie Mack, is a middle school principal in a school which houses approximately 435 students. She is a younger principal, with seventeen year experience, 11 years of classroom experience, 2 years as an assistant principal and 3 years as principal. She has a good vision of technology use at all levels of the school culture. She recently completed the LEADTech program and is currently working on ways in to improve the communication between the home and the school through technology.

Administrator 5, Myra Mouch, is a principal at a PreK through 1st grade school. She has 22 years experience as a kindergarten teacher and has recently become an administrator. She is just beginning her own technology professional development and the LEADTech course was her first online course. She supports technology use in her school, but has admittedly not modeled technology usage at her school. The technology committee at her school makes most of the technology decisions.

Administrator 6, Amy Honore, is an elementary school principal at a PreK through 1st grade school. She has 20+ years experience and has been actively involved in several literacy programs at her school including Success for All Reading and Reading First. She is very adept at using technology and has analyzed data to make leadership decisions for several years. She was a runner-up for Louisiana Elementary Principal of the Year during the 2007-2008 school
year. She is actively involved in professional development and openly promotes the use of technology in her school.

Administrator 7, Georgette Agnes, is an elementary school principal at a PreK through 2nd grade school which houses over 450 students. She actively promotes the use of technology at her school and personally participates in technology professional development. She has approximately 15 years experience in education and has been a principal for over 5 years. She enthusiastically utilizes technology to communicate with teachers, parents, and the extended school community.

The seven administrators represent an enormous amount of experience as well as a vast array of skills. Due to the variety of interviewees, the responses to the interview questions are diverse and informative. For the following discussion, the term administrator refers to both principal and district administration.

**Qualitative Findings**

The interviews were analyzed within the framework of the study to substantiate the findings from the survey analysis. Emergent themes were noted and coded appropriately. Using an interpretive approach (Gall, Borg, & Gall, 1996), the interview data were categorized utilizing emerging constructs and themes. An initial examination of the interview data produced a multitude of original codes that were utilized to segment the data. Further analysis resulted in more organized data with 8 categories remaining after the categories were collapsed. The eight categories that emerged, in rank order, from most responses to least were:

- staff development,
- communication,
- effective technology users,
- technology integration,
• technology vision,
• student skills,
• student achievement, and
• data interpretation.

Table 5.1 illustrates these eight categories and their coding frequencies. These eight categories were created from the responses and were grouped based upon common characteristics. The professional development (PD) category referred to all responses which involved the process of increasing professionals’ capabilities in the area of technology integration and basic skills. The communication (COMM) category includes the utilization of both email and online resources to correspond with the home. The effective technology users (EU) category references discussions pertaining to administrator, teacher, and student use of technology in effective ways.

The technology integration (TI) category, referred to the skills and actions which teachers take in order to integrate technology into the curriculum. Technology vision (TV) referred to the vision which administrators had in reference to how they viewed the role that technology played in the schools. This category included discussions of current and future visions of technology. The student skills (SS) category, referred to how administrators recognized the skill level of students versus that of teachers.

Table 5.1 Interview Coding Frequencies

<table>
<thead>
<tr>
<th>Codes</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development (PD)</td>
<td>101</td>
</tr>
<tr>
<td>Communication (COMM)</td>
<td>35</td>
</tr>
<tr>
<td>Effective Technology Integration Users (EU)</td>
<td>17</td>
</tr>
<tr>
<td>Technology Integration (TI)</td>
<td>50</td>
</tr>
<tr>
<td>Technology Vision (TV)</td>
<td>32</td>
</tr>
<tr>
<td>Student Skills (SS)</td>
<td>7</td>
</tr>
<tr>
<td>Student Achievement (SA)</td>
<td>19</td>
</tr>
<tr>
<td>Data Interpretation (DI)</td>
<td>19</td>
</tr>
</tbody>
</table>
The student achievement (SA) category referred to the use of technology to improve student achievement as well as to monitor and advance knowledge. The final category, data interpretation, (DI), included discussion relative to how data are used to not only analyze student achievement, but to improve the administrator’s ability to make leadership decisions based upon data. It was decided to categorize the data into these eight categories due to their direct connection to both the research questions and the survey.

Professional development was the most prevalent topic which emerged from the data. The second most prevalent area was that of technology integration. Each code will be discussed in a separate section which follows.

Professional Development

The most dominant area of interest in terms of technology to the administrators was how to successfully train themselves and their teachers on the proper uses of technology in the classroom. Laura Lees, head of district professional development, noted that it was important to “Seek ways to provide meaningful staff development that improves and encourages the use of technology.” She stated, “Teachers must have access to ongoing professional development that prepares them to effectively use and integrate technology into the curriculum to enhance standard-based teaching and learning.” Ms. Lees acknowledged the need for technology professional development for both teachers and administrators, and her statements reflected this.

Several comments related directly to the administrators’ roles as professional development leader. Georgette Agnes said, “By allowing teachers the opportunity to choose the path, the learning is more meaningful and more likely to be internalized and applied to other learning situations.” Consequently, in terms of leadership, several administrators noted the importance of their role as technology leader. Natalie Mack stated, “I act as the medium in making sure the teachers are informed of the professional development each month that they can
attend.” Georgette Agnes, a PreK – 2nd grade principal concurred and stated, “As principal it will be my job to encourage and support these efforts in the classroom” is another example of this area of interest.

In terms of technology in schools, administrators stated the need for a shared vision in order to be successful. Georgette Agnes aptly stated:

We have to be lifelong learners to keep up with our ever-changing world. We can not settle, but push our thinking which will in turn push our students further than they ever thought they could.

Furthermore, Natalie Mack noted, “We have to be committed to attending to professional development that will increase student performance through the use of technology.” Additionally, Sally Sands noted that in order to provide effective professional development, it is necessary to “constantly revamp to provide up-to-date information relative to new software, products, uses, and resources.”

Most respondents also noted the importance of providing educators with professional development opportunities that are not considered traditional in order to accommodate our changing technological world. Natalie Mack, a middle school administrator, stated, “As lifelong learners, members of the school community should take advantage of the non-traditional methods such as online and offline [traditional] technology related professional development.” A related comment from Sally Sands, a middle school assistant principal, recognized the importance of online learning. She noted that, “Online [there] are excellent opportunities that educators can have access to in their homes as well as in the school setting.”

**Technology Vision**

In terms of technology vision, administrators noted the importance of ensuring that the school had a shared vision for technology skills and integration. Myra Mouch summed it up with the following statements,
We [administrators] must learn everything we can about 21st century skills. We must lead by example. We must be lifelong learners too. We [administrators] must demonstrate that we can do advance features including hyperlinks, movies, and online collaboration and we need to continue to improve our skills and learn everything that we can about aspects of technology that are evolving and have relevance, not only to the students and our instructional programs, but to our classroom management skills, as well.

Others noted the challenges that face them as educators in terms of a vision for technology in their schools. Amy Honore, a PreK through 1st grade principal noted “Keeping the focus and using technology to improve teaching and learning is a challenge, but having these characteristics in place will definitely increase the impact on student achievement.” Additionally, Laurie Lees stated, “Although change may be slow, in some areas, we, as teachers and staff, are attempting to take those steps that will help us provide effective technology opportunities for our students.”

The idea of a technology vision for a school was met with the reality of the challenges and opportunities that it brings to the classroom. Natalie Mack aptly summed up this idea by noting, “Administrators and teachers must be willing to try new strategies and overcome any obstacles, so their personal journey can truly have meaning and change the way lessons are developed for the curriculum.” The opinion that administrators and teachers alike must have a shared technology vision both personally and professionally was shared by all interviewed administrators.

**Technology Integration**

It was an underlying belief that in order for teachers and administrators to effectively integrate technology into their classrooms and schools there needed to be some type of change in terms of curriculum and standards. Myra Mouch, a PreK – 1st grade administrator, noted “Technology must be an integral to standard-based student learning and school improvement.” Moreover, Laura Lees stated, “Teachers will use technology not only as a support mechanism,
but also as a means of providing meaningful approaches to group interaction and enhanced
lesson design.”

Administrators also noted how technological advances have changed the way in which
educators address their daily lesson planning. Georgette Agnes fittingly noted:

The day of creating a lesson with the thought to use it for several years to come,
got away a long time ago! It depends on the needs of our students. There is not
one size fits all!

Additionally, Natalie Mack noted that educators must, “Evaluate where we are in technology use
as an instructional tool and where we envision our school’s use of technology in the future.”

The topic of technology integration also elicited responses about the challenges that
current educators are facing. Natalie Mack stated that “Teachers need to venture out of their
comfort zone, and use technology as a tool to design activities that are meaningful to digital
natives.” The idea that technology forces an educator to reach beyond their comfort zone is one
that was noted by several respondents. Grant Green, a high school principal, summed the
trepidation that educators possess in terms of technology integration in schools in this way, “A
developed expertise by teachers will enhance not only the teacher’s integration of technology,
but that of colleagues who are eager to join in on the technology training.” Grant Green, a high
school principal, noted how his school was facing this technology integration apprehension
directly. Myra Mouch concurred by noting that, “Our strength is that we are investing in our
future by providing technology in the classrooms and providing the professional development to
make sure our students get the most up-to-date education possible.”

**Effective Technology Integration Users**

Technology integration and the professional development needed to accomplish its
successful incorporation into the curriculum seemed to be a matter shared by several
interviewees. Several administrators noted the strengths and weaknesses evident at their schools
and districts in order to illustrate this issue. For example, Natalie Mack stated, “Educators have to make an effort to move past using technology as a substitute for old methods of teaching.” The overreaching idea of creating effective technology integration users is best summed up by Laurie Lees who stated, “It is vitally important that teachers become effective instruction technology users themselves.”

**Communication**

One overwhelming area of comfort in terms of technology for administrators was its use as a communication tool. A number of respondents noted how email and other forms of electronic communication have transformed their schools. Natalie Mack noted that, “I communicate with my faculty and supervisors through the use of email daily. This allows us access to each other through a quicker and more efficient means of communication.” Sally Sands summed up the thoughts of most interviewee when she noted, “Memos are sent out electronically” and “daily emails to teachers, staff, and colleagues have provided clear and rapid dissemination of information”

**Student Skills and Student Achievement**

Responses concerning communication, integration, and professional development led to a further discussion with interviewees on student technology skills and achievement. Several noted the fact that students today present challenges to many veteran teachers who did not grow up with technology. Grant Green, a self proclaimed technology novice, noted “Our tech-savvy students out number us by quite a large margin, so its time to conform and become not just part of the crowd of natives, but a leader of natives.” In order to accomplish this thought, Sally Sands noted that it was important that “Technology should be used by educators in ways that impact student performance.”
The importance of using technology to further student achievement was a widely discussed issue. Georgette Agnes noted that by using technology, educators would, “motivate students and make learning more meaningful for them.” Amy Honore commented:

I have established an important climate and attitude for all of my staff to take on the idea that everyone is responsible for the learning and well-being of every student. We have a motto of doing “whatever it takes” to make sure all of our students are cared for and learning no matter what. Establishing a collective efficacy that we can make a difference no matter the socio-economic level or academic level of the students. This has made a huge impact on student achievement and I know it will transfer over to the technology vision because we know it can be done.

Data Interpretation

Another area which respondents naturally connected to technology was that of data interpretation. Natalie Mack noted that her school spends time, “Interpreting last year’s results in order to see what our strengths and weaknesses are in our curriculum” or “analyzing subgroup data” were very similar comments among all administrators. The use of technology in order to make their job easier was also an underlying idea. Natalie Mack noted that, “Assessing the data is a wonderful way to plan for the implementation of technology into our classrooms.”

Summary of Qualitative Data

Several themes emerged from the interview data.

- There was a clear statement of support for technology professional development at all educational levels.
- The successful incorporation of technology into daily lesson plans was viewed as a way in which to improve student interest and achievement.
- Technology as a communication tool was considered one of the most effective uses for technology at this point.
• Administrators should be both technology supporters and users in order to get buy-in from their faculty members.

• Administrators must lead by example if they are going to have their districts/schools become effective technology integration environments.

• Ongoing professional development utilizing non-traditional methods are important in order to train new and veteran educators on the proper way in which to incorporate technology.
CHAPTER SIX: DISCUSSION AND CONCLUSIONS

The goal of this study was to investigate which technology skills acting school and district administrators considered important for the creation of technology-rich school communities. Additionally, this study aims to contribute to the current body of knowledge pertaining to technology proficiency for school administrators.

The research within this study employed the use of both quantitative and qualitative methods in order to provide a variety of data to analyze. Results from this analysis allowed the researcher to draw conclusions based upon these findings and to offer future researchers with suggestions for additional research in this area.

This chapter will address: (1) a discussion of the findings, (2) research questions revisited, (3) recommendations for K-12 institutions, (4) description of professional development module, (5) implications for future research, and (5) conclusions.

Findings

Throughout this study, relevant data were gathered in order to assist with answering the proposed research questions. The survey provided quantitative data that illuminated descriptive characteristics of both operational and theory-based technology skills. The data suggested that current district and school administrators understand the importance of possessing particular technology skills and understand the theory associated with what is needed to be an effective e-leader, but they do not possess these skills themselves.

Theory-based

The survey revealed a variety of both operational and theory-based skills that administrators viewed as essential. Survey participants noted the importance of possessing knowledge in a variety of areas in order to be effective leaders. In terms of theory-based skills, the following were determined to be essential. Administrators must have the ability to:
• establish and support learning communities that stimulate and nurture technology;
• understand how to promote the effective practice of technology integration into the curriculum;
• have the skills to participate in discussions with teachers about how various technologies can support teaching and learning goals;
• understand how to effectively use technology for the assessment and evaluation of teachers and students;
• understand the technology needs of their school: hardware and software; and
• understand and support the issues of privacy, security, and online safety to teachers and students.

As noted by the six skills listed above, school administrators understand the importance of technology as a factor in school performance. They understand that it is more important for students to be exposed to technology as a supplement to the curriculum rather than the use of technology just for the sake of using technology. This finding is supported by the work of Brooks-Young (2002), who noted six guidelines (leadership and vision; learning and teaching; productivity and professional practice; support, management, and operations; and social, legal, and ethical issues) that administrators should follow in order relate school reform to technology.

**Supporting Learning Communities.** Kleinman (2001) noted the importance of having a clear vision of goals and a well developed plan in order to maximize a school’s technology investment. The survey results plainly demonstrate that this message is getting across to current school and district administrators. Survey participants noted the importance of recognizing and supporting technology integration in classrooms. This is supported by the findings that 92% of
the administrators surveyed noted the importance of supporting learning communities to stimulate and nurture technology.

DuFour and Berkey (1995) noted that the best way for administrators to facilitate meaningful change at their schools is to promote the growth and development of their teachers. The acting administrators surveyed noted the importance of promoting effective practices, supporting technology use, and understanding both hardware and software. All of this can be accomplished through the use of learning communities at the school level.

**Technology Vision and Integration.** Additionally, the administrators interviewed noted the importance of creating a technology vision for their school. Through interviews, one administrator noted the importance of committing to the growth and education of both administrators and teachers in order to successfully integrate technology into the classroom. In order to accomplish this, it is essential that administrators understand what is important technologically as well as educationally. Surveyed administrators certainly appear to understand the importance of understanding a variety of theory-based technology approaches.

**Operational Skills**

In addition to exploring skills that administrators have learned are important and needed, this study also examined which operational skills were considered weak and in need of more understanding. The data appear to support the idea that administrators understand the importance of having particular skills, although they may not be able to use the skills themselves. The areas where the administrators felt they needed the most assistance or training are as follows:

- maintaining an awareness of emerging technologies and their potential for use within the curriculum;
• obtaining a general knowledge of how computers operate and how they may be utilized in the classroom;
• providing professional development opportunities to staff members that are based in effective practices and uses of technology;
• understanding and providing technology opportunities that will meet the needs of diverse learners;
• having knowledge of the Internet and how it may be utilized for productivity purposes and the incorporation into the classroom;
• having knowledge of how to utilize word processing packages, spreadsheet packages, and database packages;
• obtaining skills to establish a technology learning culture in their school or district; and
• the ability to collect and analyze data to make decisions that effect the overall operation of the school and/or district.

This research implies a need for additional professional development for administrators in order for them to obtain the skills necessary to have the confidence needed in the noted areas. Furthermore, the study revealed a variety of implications in terms of technology leadership at both the school and district level.

**Basic Needs and Skills.** The implementation of professional development opportunities that address the establishment of technology-rich learning communities, ways in which technology can support student learning, and the ability of administrators to participate in discussions concerning technology and integration with teachers are revealed in this study. Administrators noted the importance of understanding how to make leadership decisions using data in order to promote the use of integration skills and higher order thinking skills. The data
appear to support the consideration that administrators would value the acquisition of knowledge in these operational skills in order to be more effective leaders.

**Technology Culture and Integration.** The data also seem to suggest that administrators are aware of what they need to do in order to develop a culture of learning and support with their faculty members. Additionally, the results imply that administrators are looking for ways in which to obtain these skills personally and for their faculties.

Trends in the interview data also suggest that administrators are aware of the cognitive changes necessary to obtain a global perspective necessary for proper technology integration and incorporation in schools. Administrators recognized the importance of their buy-in for technology integration. Additionally, the importance of educators continuing to grow and learn about technology emerged. This study noted that administrators and teachers must be willing to try new strategies and overcome obstacles so that their personal journey has true meaning and changes the way that daily lessons are developed for the curriculum.

**Administrator Experience**

Analysis of study data revealed the need for additional professional development at both the administrative and teacher level. This data appear to support the notion that administrators must make a commitment to continue to grow and educate themselves in the successful integration of technology across all areas of the school. Furthermore, this study illuminated the difference in technology skill levels of administrators based upon their years of experience.

Those administrators, with 15 or more years of experience, showed a lack of understanding in the area of operational skills. They indicated that they were in need of further professional development in a variety of areas including knowledge of emerging technologies, word processing, spreadsheets, databases, and the Internet. In comparison to the administrators with fewer years of experience, these individuals felt the need for additional professional
development. Consequently, it should be noted that 95% of the survey participants were school administrators and of these respondents, 80% had over fifteen years of experience. If these statistics hold true to the general population, then it should be noted that most of the administrators are in need of more professional development in the area of operational skills.

**Research Questions Revisited**

Based upon the findings of this study, the following section will contain conclusions for each research question. Findings from survey data and qualitative interviews are included.

Research Question 1: What are the technology skills, both operational and theory-based, that administrators consider vital to the development of themselves as an effective e-leader?

All of the results of this study indicate a clear need for administrators to obtain more professional development on operational technology skills. Administrators appear to understand the importance of such theory-based issues as supporting technology use, promoting effective practices, and supporting privacy, security, and online safety issues. Results indicate that they fall short in the area of operational skills and additional training is needed in this area. These skills include, but are not limited to, word processing, spreadsheets, and databases. Interview data collaborate with these results. Similar findings were noted by Johnson (2003), who concluded that specific basic needs must be met before total technology integration can occur.

Research Question 2: Based on the ISTE NETS-A, what productivity, integration, and leadership skills do administrators view as essential in others?

Administrators noted a variety of essential skills including using data to make leadership decisions, promoting technology integration, recognizing effective technology usage, and promoting higher order thinking skills. Through survey and interview data, administrators noted the need for obtaining these skills and the necessity to possess them in order to support their teachers in the daily integration of technology in the classroom. Furthermore, interview data
suggest that administrators are aware of a variety of professional development delivery methods and have researched ways in which to further provide training to themselves and teachers through online delivery, webinars, study groups, and traditional face-to-face delivery. Similar findings were noted by Coley, Cradler, and Engel (1997) who suggested a need for a new paradigm of professional development and understanding that would gradually become a reality within the classroom.

Research Question 3: What leadership skills are necessary for the e-leader to possess in order to create a technology-rich school community?

Survey and interview data revealed the importance that administrators placed upon the obtainment of leadership skills in terms of technology. Participants noted the importance of understanding how to make informed decisions based upon data analysis. Furthermore, study results indicate that administrators understand and are willing to obtain the skills necessary to lead by example in terms of technology integration. They understood the importance of having the ability to work with teachers for the proper integration of technology and recognize the importance of encouraging and supporting these efforts in the classroom. Interviewed administrators understood the importance of technology in supporting the improvement of student performance at their schools and felt that this ever-changing society dictated the use of such initiatives in their schools. Similar findings by Scribner (2000) and Vojteck & Vojteck (1997) noted that administrators must be presented with the proper staff development in order to understand how to successfully integrate technology into the teaching and learning process.

Research Question 4: What cognitive changes are needed in order to obtain the global perspective necessary for administrators to recognize and address all aspects of technology integration and incorporation into schools?
This study revealed the need for a paradigm shift in all aspects of technology at the school level. Results noted that administrators understood the need to allow their teachers the opportunity for risk-taking in terms of technology integration and student performance. Administrators understand the need for additional growth and knowledge obtainment both personally and for their faculty members. Buy-in by the administration was noted as essential and is integral to the development of a technology-rich school community. These findings are supported by the conclusions of Wilmore & Betz (2000) who suggested that administrators should be the head learners at their schools. Additionally, Creighton (2003) stated that principals must stay focused on the individual needs of the teachers and students in order to be successful.

This study gathered data concerning skills and shifts in understanding necessary for administrators at both the district and school level. The most significant conclusion of this study is that administrators recognize the importance of obtaining both theory-based and operational technology skills, but do not currently possess these skills. Administrators appear to understand the theory-related skills necessary to create a technology-rich learning community, but do not have the skills they need in order to accomplish this feat.

**Recommendations for K-12 Institutions**

Based on the results of this study, the following summarizes the recommended practices to ensure that administrators continue to obtain the skills necessary to be an effective technology leader at their school or district. Administrators must be able to:

1) establish and communicate a collaborative technology vision for their school and/or district;

2) establish a learning community at their school(s) which supports and promotes learning communities that nurture the use of technology in the educational setting to improve student achievement and overall productivity;
3) continue to attend leadership-based professional development opportunities such as LEADTech (Louisiana Educational Advancement and Development with Technology) which provide administrators with theory-based knowledge;

4) offer technology instruction on how to successfully implement word processing, spreadsheets, databases, emerging technologies, and the Internet into schools in order to increase productivity and student achievement;

5) offer professional development on how to obtain, gather, and analyze data in order to make effective leadership decisions; and

6) offer online professional development opportunities to obtain operational skills at their convenience and in order to accommodate their ever-changing schedules.

(Described below.)

These recommendations are based on this study’s conclusion that administrators have obtained the theory-based skills necessary to be effective e-leaders, but are in need of additional training in the area of operational skills.

**Description of Professional Development Module**

E-learning opportunities allow the learner, in this case school administrators, the flexibility to participate in professional development experiences. Technology brings the world of learning to educators rather than the educators being required to go to the learning (NSDC, 2001). One recommendation from this study’s results is for K-12 institutions to provide learning opportunities for administrators.

This learning opportunity must provide the administrators with the flexibility necessary for their busy schedules while staying true to the content being presented. In order to accomplish this task, an online professional development course should be developed. This course should
contain modules based upon specific skills indicated by this study as being ones that acting administrators’ viewed as being of utmost need.

An example of this course would include seven modules based upon this study’s results. These modules should be self-paced and include the following seven modules:

- Module 1: The Internet;
- Module 2: Word Processing;
- Module 3: Spreadsheets;
- Module 4: Databases;
- Module 5: Data Analysis to Make Leadership Decisions;
- Module 6: Emerging Technologies; and
- Module 7: Technology Integration.

Each module should contain materials that school administrators would be able to work on at their own pace in order to obtain the skills necessary to establish a technology-rich school community.

A sample of module 5 is outlined in Table 6.1. The goal of this module is to assist in the analysis and understanding of relevant school data. These activities were designed to address the needs outlined by the results of this study. Specifically, results indicated that administrators noted the importance of understanding how to use standardized test data in order to make leadership decisions (M=2.98). Consequently, in terms of understanding, the administrators stated their level of understanding was lower (M=2.51). Therefore, the module outlined in Table 6.1 would assist administrators in obtaining needed skills. Furthermore, results indicated that administrators had a lower level of understanding in terms of spreadsheets (M=2.23). An activity in this module explicitly addresses this issue. Additional resources for this module have been developed and can be found in Appendix F.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Objective</th>
<th>Description</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 4: Inspiration</td>
<td>To brainstorm forms of data analysis available to administrators.</td>
<td>Participants complete an Inspiration activity where they identify different types of data that is used for student improvement</td>
<td>Executive Summary Graphic Organizers: A Review of Scientifically Based Research <a href="http://www.inspiration.com/sites/default/files/documents/Executive-Summary.pdf">http://www.inspiration.com/sites/default/files/documents/Executive-Summary.pdf</a></td>
</tr>
<tr>
<td>Activity 6: Read Article</td>
<td>To understand how data analysis can assist with school reform.</td>
<td>Participants read the article, School Reform by the Numbers, from Changing Schools in Louisville</td>
<td>School Reform by the Numbers, from Changing Schools in Louisville (Spring 2000, Volume 4, Number 1, available at <a href="http://www.middleweb.com">www.middleweb.com</a>.)</td>
</tr>
<tr>
<td>Activity 7: PowerPoint</td>
<td>To understand how to analyze data.</td>
<td>Participants will view a PowerPoint presentation, <em>Data Analysis 101</em>.</td>
<td>Qualitative versus Quantitative Research: Key Points in a Classic Debate <a href="http://wilderdom.com/research/QualitativeVersusQuantitativeResearch.html">http://wilderdom.com/research/QualitativeVersusQuantitativeResearch.html</a> LEAP and GEE Interpretive Guide iLEAP Interpretive Guide</td>
</tr>
</tbody>
</table>
| Activity 8: Data Analysis Activity | To understand how to use current data to make leadership decisions. | Participants will use standardized test data.  
  - Achievement Level Assignment Worksheet  
  - Scaled Score Assignment: Student vs. School | Qualitative versus Quantitative Research: Key Points in a Classic Debate http://wilderdom.com/research/QualitativeVersusQuantitativeResearch.html LEAP and GEE Interpretive Guide iLEAP Interpretive Guide |
| Activity 9: Data Analysis | To understand how to use current data to make leadership decisions. | Participants will use an Excel Template to analysis subgroup data.  
  - Subgroup Data Analysis Template | LEAP and GEE Interpretive Guide iLEAP Interpretive Guide |
Implications for Future Research

As this study moved beyond research on current administrative technology skills and into specifics areas of professional development needs, further research is needed in the area of the most effective and efficient ways in which to provide administrators with these operational skills.

Additionally, this research specifically targeted acting administrators in order to gauge what skills these individuals felt were necessary for them to either have or obtain in order to be effective technology leaders. As noted previously, this study revealed the difference in the skill level of younger administrators in comparison to those with more experience. Thus, further research in the areas of administrators with fifteen or more years of experience is suggested. This would provide a more specific overview of what these administrators need both in theory and in operational skills.

An additional theme for further research is in the area of professional development. What is the most effective way in which to present administrators with knowledge on lacking operational skills? The development of both traditional and online professional development opportunities in the areas of word processing, spreadsheets, databases, emerging technologies, and the Internet are needed.

Additional insight in effective professional development practices for administrators would aid future individuals who find they are struggling to become effective e-leaders. Administrators must be provided with the tools they need in order to be successful. This research is a step in the direction of exactly how to accomplish this task. Further research will provide more detailed steps in how to achieve this goal.

Conclusions

According to Creighton (2003), school leadership practiced by administrators today is outdated unless it helps their faculties to meet the great challenges presented by technology in
schools. But are school administrators to blame? Without the proper professional development that provides administrators with needed technology skills, how can we expect them to be able to lead effectively? Schools of today are beyond trying to decide whether or not they will accept technology. Technology is here to stay. The question now is what should be done to ensure that our school administrators have what it takes to create a technology-rich school community with student achievement at the forefront.

Administrators must work towards figuring out how to implement technology effectively into their schools. This study provides a springboard for both future research and professional development opportunities for administrators. Today’s rapidly changing school environment demands that school administrators continue to obtain the skills necessary to lead effectively. Thus, they must be willing to participate in continued learning in order to assist in obtaining said skills. This paradigm shift is not about boxes and wires, but about ensuring that all stakeholders have the tools they need to create an educational foundation that is rich in technology, but more importantly ones that focus on conceptual knowledge and student learning.
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National Education Technology Standards for Administrators (NETS-A)

1. **LEADERSHIP AND VISION**
   Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision.
   Educational leaders:
   A. facilitate the shared development by all stakeholders of a vision for technology use and widely communicate that vision.

   B. maintain an inclusive and cohesive process to develop, implement, and monitor a dynamic, long-range, and systemic technology plan to achieve the vision.

   C. foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology.

   D. use data in making leadership decisions.

   E. advocate for research-based effective practices in use of technology.

   F. advocate on the state and national levels for policies, programs, and funding opportunities that support implementation of the district technology plan.

2. **LEARNING AND TEACHING**
   Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching.
   Educational leaders:

   A. identify, use, evaluate, and promote appropriate technologies to enhance and support instruction and standards-based curriculum leading to high levels of student achievement.

   B. facilitate and support collaborative technology-enriched learning environments conducive to innovation for improved learning.

   C. provide for learner-centered environments that use technology to meet the individual and diverse needs of learners.

   D. facilitate the use of technologies to support and enhance instructional methods that develop higher-level thinking, decision-making, and problem-solving skills.

   E. provide for and ensure that faculty and staff take advantage of quality professional learning opportunities for improved learning and teaching with technology.

3. **PRODUCTIVITY AND PROFESSIONAL PRACTICE.**
   Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others. Educational leaders:

   A. model the routine, intentional, and effective use of technology.
B. employ technology for communication and collaboration among colleagues, staff, parents, students, and the larger community.

C. create and participate in learning communities that stimulate, nurture, and support faculty and staff in using technology for improved productivity.

D. engage in sustained, job-related professional learning using technology resources.

E. maintain awareness of emerging technologies and their potential uses in education.

F. use technology to advance organizational improvement.

4. SUPPORT, MANAGEMENT, AND OPERATIONS.
Educational leaders ensure the integration of technology to support productive systems for learning and administration. Educational leaders:

A. develop, implement, and monitor policies and guidelines to ensure compatibility of technologies.

B. implement and use integrated technology-based management and operations systems.

C. allocate financial and human resources to ensure complete and sustained implementation of the technology plan.

D. integrate strategic plans, technology plans, and other improvement plans and policies to align efforts and leverage resources.

E. implement procedures to drive continuous improvement of technology systems and to support technology replacement cycles.

5. ASSESSMENT AND EVALUATION.
Educational leaders use technology to plan and implement comprehensive systems of effective assessment and evaluation. Educational leaders:

A. use multiple methods to assess and evaluate appropriate uses of technology resources for learning, communication, and productivity.

B. use technology to collect and analyze data, interpret results, and communicate findings to improve instructional practice and student learning.

C. assess staff knowledge, skills, and performance in using technology and use results to facilitate quality professional development and to inform personnel decisions.
D. use technology to assess, evaluate, and manage administrative and operational systems.

6. SOCIAL, LEGAL, AND ETHICAL ISSUES.
Educational leaders understand the social, legal, and ethical issues related to technology and model responsible decision-making related to these issues. Educational leaders:

A. ensure equity of access to technology resources that enable and empower all learners and educators.

B. identify, communicate, model, and enforce social, legal, and ethical practices to promote responsible use of technology.

C. promote and enforce privacy, security, and online safety related to the use of technology.

D. promote and enforce environmentally safe and healthy practices in the use of technology.

E. participate in the development of policies that clearly enforce copyright law and assign ownership of intellectual property developed with district resources.
APPENDIX B

A MODEL OF A TECHNOLOGY-RICH SCHOOL COMMUNITY:
A Model of a Technology-Rich School Community

Based on NETS-A

I. Leadership and Vision
1. Has a shared vision
2. Collaborative, technology-rich school improvement plan
3. Promotes highly effective technology integration practices

II. Learning and Teaching
1. Uses data to design and implement student instruction
2. Collaborative professional development for effective technology integration for all.

III. Productivity and Professional Practice
1. Uses technology for personnel and student records
2. Uses a variety of media and formats

IV. Support, Management, and Operations
1. Campus wide staff development
2. Technology funding
3. Advocates technology support

V. Assessment and Evaluation
1. Technology used across campus to improve student learning.
2. Implements evaluation procedures based upon technology standards.

VI. Social, Legal, and Ethical Issues
1. Technology resources for all teachers
2. Adheres to acceptable use, security, and copyright policies.
3. Has a developed facility plan that supports and focuses on health and environmental safety using technology.
Individual Interviews Question Protocol

1. What skills do you feel are necessary for school administrators to possess in order to create a technology-rich school community?

2. What do you view as a technology-rich school community?

3. When is it appropriate for teachers to use technology-based instruction in your view?

4. What do you feel is the job of the school and district administrator in terms of technology integration in the classroom?

5. What leadership skills are necessary for administrators to possess when it comes to technology in the K-12 environment?

6. What types of professional development do you feel administrators could use in terms of technology?
APPENDIX D
K-12 TECHNOLOGY LEADERSHIP:
A SURVEY OF PROFESSIONAL DEVELOPMENT NEEDS FOR TECHNOLOGY LEADERS
Based on ISTE Standards
1. K-12 Technology Leadership Survey

This survey is being conducted as a means of gathering data for a dissertation being written to fulfill the requirements for a doctorate degree in Educational Technology at Louisiana State University.

The objective of this survey is to gather information on areas of needed professional development for current and future technology leaders. The data gathered from this survey will be used to create a self-guided online technology training module for school and district administrators.

The survey will take about 20 minutes to complete and will remain completely anonymous. The results will be tabulated electronically.

Thank you for your cooperation and participation!

1. What type of position do you hold?
   - School Administrator
   - District Administrator

2. Please check which category below that best describes your current position.
   - Elementary School (PreK-5)
   - Middle School (6-8)
   - High School (9-12)
   - District Administrator (K-12)
   - Other (please specify)

3. How many years experience do you have in the educational field?
   - 0-5 years
   - 6-10 years
   - 11-15 years
   - More than 15 years
Please select an answer from the drop-down menu for all questions.

<table>
<thead>
<tr>
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<th>What importance do you feel that these skills hold in terms of technology integration in schools?</th>
<th>How do you rank your understanding of this technology-based concept?</th>
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<tbody>
<tr>
<td>1. An administrator must understand how to foster and nurture a risk-taking culture that promotes the use of innovative technology strategies in the classroom.</td>
<td>Not Important</td>
<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>Somewhat Important</td>
<td>Understand Somewhat</td>
</tr>
<tr>
<td></td>
<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>2. An administrator must establish and support learning communities that stimulate and nurture the use of technology.</td>
<td>Not Important</td>
<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>Somewhat Important</td>
<td>Understand Somewhat</td>
</tr>
<tr>
<td></td>
<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>3. An administrator must understand how to promote the effective practices of technology integration into the curriculum.</td>
<td>Not Important</td>
<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>Somewhat Important</td>
<td>Understand Somewhat</td>
</tr>
<tr>
<td></td>
<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>4. An administrator must support the use of technology to develop higher-order thinking, decision, making, and problem-solving skills.</td>
<td>Not Important</td>
<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>Somewhat Important</td>
<td>Understand Somewhat</td>
</tr>
<tr>
<td></td>
<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>5. An administrator must support and develop the delivery of curriculum that utilizes technology.</td>
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<td>No Understanding</td>
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<td>Understand Somewhat</td>
</tr>
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<td></td>
<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>9. An administrator must have the skills necessary to manage school technology resources including purchasing, maintenance, and inventory.</td>
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<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>Somewhat Important</td>
<td>Understand Somewhat</td>
</tr>
<tr>
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<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
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<td>No Understanding</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
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<td>Essential</td>
<td>Expert Understanding</td>
</tr>
<tr>
<td>11. An administrator must be able</td>
<td>Not Important</td>
<td>No Understanding</td>
</tr>
<tr>
<td></td>
<td>What importance do you feel that these skills hold in terms of technology integration in schools?</td>
<td>How do you rank your understanding of this technology-based concept?</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>to communicate with teachers, parents and the community via email and online communication.</td>
<td>Somewhat Important Essential</td>
</tr>
<tr>
<td>2.</td>
<td>12. An administrator must have the skills to participate in discussions with teachers about how various technologies can support teaching and learning goals.</td>
<td>Not Important Somewhat Important Essential</td>
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<td>3.</td>
<td>13. An administrator must have the skills to seek out new ways that technology may be used to improve the efficiency of the school and to improve student achievement.</td>
<td>Not Important Somewhat Important Essential</td>
</tr>
<tr>
<td>4.</td>
<td>14. An administrator must have technology skills that will support and promote productivity throughout the school and/or district.</td>
<td>Not Important Somewhat Important Essential</td>
</tr>
<tr>
<td>5.</td>
<td>15. An administrator must understand how to use available data to make leadership decisions which will impact student achievement.</td>
<td>Not Important Somewhat Important Essential</td>
</tr>
<tr>
<td>6.</td>
<td>16. An administrator must understand how to effectively use technology for the assessment and evaluation of teachers and students.</td>
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</tr>
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<td>7.</td>
<td>17. An administrator must be able to evaluate how effective technology is being utilized to support student learning.</td>
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<tr>
<td>8.</td>
<td>18. An administrator must be able to provide teachers with classroom examples of effective technology usage.</td>
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</tr>
<tr>
<td>9.</td>
<td>19. An administrator must be able to effectively collaborate and plan for technology-use.</td>
<td>Not Important Somewhat Important Essential</td>
</tr>
<tr>
<td>10.</td>
<td>20. An administrator must utilize technology to further their personal job-related professional learning.</td>
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</tr>
<tr>
<td></td>
<td>What importance do you feel that these skills hold in terms of technology integration in schools?</td>
<td>How do you rank your understanding of this technology-based concept?</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>21. An administrator must understand the technology needs of their school: both hardware and software.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>22. An administrator must understand and support the issues of privacy, security, and online safety to teachers and students.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>23. An administrator must maintain an awareness of emerging technologies and their potential for use within the curriculum.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>24. An administrator must have a general knowledge of how computers operate and how they may be utilized in the classroom.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>25. An administrator must provide professional development opportunities for staff members that are based in effective practices and uses of technology.</td>
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<tr>
<td>26. An administrator must understand and provide technology opportunities that will meet the needs of diverse learners.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>27. An administrator must have knowledge of the Internet and how it may be utilized for productivity purposes and the incorporation into the classroom.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>28. An administrator must have knowledge of how to utilize word processing packages such as Microsoft Word for productivity purposes and incorporation into the classroom.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>29. An administrator must have knowledge of how to utilize spreadsheet packages such as Microsoft Excel for productivity purposes and incorporation into the classroom.</td>
<td>Not Important Somewhat Important Essential</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
<tr>
<td>30. An administrator must have knowledge of how to utilize</td>
<td>Not Important Somewhat Important</td>
<td>No Understanding Understand Somewhat Expert Understanding</td>
</tr>
</tbody>
</table>
What importance do you feel that these skills hold in terms of technology integration in schools? | How do you rank your understanding of this technology-based concept?
---|---
database packages such as Microsoft Access for productivity purposes and incorporation into the classroom. | Essential | Expert Understanding

31. An administrator must have knowledge of how to utilize presentation packages such as Microsoft PowerPoint for productivity purposes and incorporation into the classroom. | Not Important Somewhat Important Essential | No Understanding Understand Somewhat Expert Understanding

32. An administrator must have the skills to establish a technology learning culture in their school or district. | Not Important Somewhat Important Essential | No Understanding Understand Somewhat Expert Understanding

33. An administrator must be able to collect and analyze data to make decisions that affect the overall operation of the school and/or district. | Not Important Somewhat Important Essential | No Understanding Understand Somewhat Expert Understanding

34. An administrator must have the skills to monitor student use of technology throughout the school and/or district in order to ensure equitable use by all students. | Not Important Somewhat Important Essential | No Understanding Understand Somewhat Expert Understanding

35. An administrator must have knowledge of digital equipment such as digital cameras, handhelds, scanners, etc. | Not Important Somewhat Important Essential | No Understanding Understand Somewhat Expert Understanding

Thank you for your participation in completing this survey!
Your contribution is valuable to this research study and your efforts are greatly appreciated.
Contact Information: Tammy S. Seneca, Louisiana State University, tsenec1@lsu.edu

Survey References


APPENDIX E
TABLE 4.1
MEAN (M) AND STANDARD DEVIATION (SD) OF SURVEY INDICATORS
Table 4.1
Mean (M) and Standard Deviation (SD) of Survey Indicators

<table>
<thead>
<tr>
<th>Perceptions of Theory (Based on ISTE NETS-A)</th>
<th>M (Q1)</th>
<th>SD (Q1)</th>
<th>M (Q2)</th>
<th>SD (Q2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 = Importance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 = Understanding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. An administrator must understand how to foster and nurture a risk-taking culture that promotes the use of innovative technology strategies in the classroom.</td>
<td>2.79</td>
<td>.43</td>
<td>2.46</td>
<td>.50</td>
</tr>
<tr>
<td>2. An administrator must establish and support learning communities that stimulate and nurture the use of technology.</td>
<td>2.93</td>
<td>.26</td>
<td>2.52</td>
<td>.50</td>
</tr>
<tr>
<td>3. An administrator must understand how to promote the effective practices of technology integration into the curriculum.</td>
<td>2.88</td>
<td>.33</td>
<td>2.46</td>
<td>.50</td>
</tr>
<tr>
<td>4. An administrator must support the use of technology to develop higher-order thinking, decision, making, and problem-solving skills.</td>
<td>2.89</td>
<td>.31</td>
<td>2.49</td>
<td>.50</td>
</tr>
<tr>
<td>5. An administrator must support and develop the delivery of curriculum that utilizes technology.</td>
<td>2.86</td>
<td>.35</td>
<td>2.44</td>
<td>.50</td>
</tr>
<tr>
<td>6. An administrator must have the skills necessary to discuss the role of technology in teacher lesson plans and instructional strategies.</td>
<td>2.81</td>
<td>.39</td>
<td>2.5</td>
<td>.50</td>
</tr>
<tr>
<td>7. An administrator must have the skills to communicate technology expectations for the effective uses of technology to all staff members.</td>
<td>2.84</td>
<td>.37</td>
<td>2.56</td>
<td>.50</td>
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<tr>
<td>8. An administrator must identify technology needs and propose strategies for continually improving technology systems.</td>
<td>2.82</td>
<td>.38</td>
<td>2.46</td>
<td>.50</td>
</tr>
<tr>
<td>Concepts of Technology in Schools (Based on ISTE NETS-A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. An administrator must have the skills necessary to manage school technology resources including purchasing, maintenance, and inventory.</td>
<td>2.64</td>
<td>.50</td>
<td>2.48</td>
<td>.52</td>
</tr>
<tr>
<td>10. An administrator must be able to recognize the effective uses of technology in the classroom.</td>
<td>2.95</td>
<td>.22</td>
<td>2.69</td>
<td>.46</td>
</tr>
<tr>
<td>11. An administrator must be able to communicate with teachers, parents and the community via email and online communication.</td>
<td>2.84</td>
<td>.37</td>
<td>2.78</td>
<td>.41</td>
</tr>
<tr>
<td>12. An administrator must have the skills to participate in discussions with teachers about how various technologies can support teaching and learning goals.</td>
<td>2.9</td>
<td>.30</td>
<td>2.55</td>
<td>.52</td>
</tr>
<tr>
<td>13. An administrator must have the skills to seek out new ways that technology may be used to improve the efficiency of the school and to improve student achievement.</td>
<td>2.85</td>
<td>.36</td>
<td>2.45</td>
<td>.50</td>
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<tr>
<td>14. An administrator must have technology skills that will support and promote productivity throughout the school and/or district.</td>
<td>2.82</td>
<td>.38</td>
<td>2.48</td>
<td>.52</td>
</tr>
<tr>
<td>Skills Acquired (Based on ISTE NETS-A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. An administrator must understand how to use available data to make leadership decisions which will impact student achievement.</td>
<td>2.98</td>
<td>.14</td>
<td>2.53</td>
<td>.52</td>
</tr>
<tr>
<td>16. An administrator must understand how to effectively use technology for the assessment and evaluation of teachers and students.</td>
<td>2.81</td>
<td>.39</td>
<td>2.48</td>
<td>.50</td>
</tr>
<tr>
<td>17. An administrator must be able to evaluate how effective technology is being utilized to support student learning.</td>
<td>2.91</td>
<td>.32</td>
<td>2.5</td>
<td>.50</td>
</tr>
<tr>
<td>18. An administrator must be able to provide teachers with classroom examples of effective technology usage.</td>
<td>2.78</td>
<td>.41</td>
<td>2.47</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Q1 = Importance</td>
<td>Q2 = Understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
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<td>--------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M (Q1)</td>
<td>SD (Q1)</td>
<td>M (Q2)</td>
<td>SD (Q2)</td>
</tr>
<tr>
<td>19. An administrator must be able to effectively collaborate and plan for technology-use.</td>
<td>2.77</td>
<td>.44</td>
<td>2.49</td>
<td>.50</td>
</tr>
<tr>
<td>20. An administrator must utilize technology to further their personal job-related professional learning.</td>
<td>2.84</td>
<td>.37</td>
<td>2.54</td>
<td>.50</td>
</tr>
<tr>
<td>21. An administrator must understand the technology needs of their school: both hardware and software.</td>
<td>2.69</td>
<td>.50</td>
<td>2.39</td>
<td>.51</td>
</tr>
<tr>
<td>22. An administrator must understand and support the issues of privacy, security, and online safety to teachers and students.</td>
<td>2.91</td>
<td>.29</td>
<td>2.65</td>
<td>.44</td>
</tr>
<tr>
<td><strong>Skills Needed (Specific Operational Skills)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. An administrator must maintain an awareness of emerging technologies and their potential for use within the curriculum.</td>
<td>2.78</td>
<td>.41</td>
<td>2.28</td>
<td>.49</td>
</tr>
<tr>
<td>24. An administrator must have a general knowledge of how computers operate and how they may be utilized in the classroom.</td>
<td>2.77</td>
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<td>25. An administrator must provide professional development opportunities for staff members that are based in effective practices and uses of technology.</td>
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<tr>
<td>29. An administrator must have knowledge of how to utilize spreadsheet packages such as Microsoft Excel for productivity purposes and incorporation into the classroom.</td>
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<td>.58</td>
<td>2.23</td>
<td>.53</td>
</tr>
<tr>
<td>30. An administrator must have knowledge of how to utilize database packages such as Microsoft Access for productivity purposes and incorporation into the classroom.</td>
<td>2.36</td>
<td>.64</td>
<td>2.01</td>
<td>.66</td>
</tr>
<tr>
<td>31. An administrator must have knowledge of how to utilize presentation packages such as Microsoft PowerPoint for productivity purposes and incorporation into the classroom.</td>
<td>2.75</td>
<td>.43</td>
<td>2.55</td>
<td>.54</td>
</tr>
<tr>
<td>32. An administrator must have the skills to establish a technology learning culture in their school or district.</td>
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<td>.39</td>
<td>2.43</td>
<td>.57</td>
</tr>
<tr>
<td>33. An administrator must be able to collect and analyze data to make decisions that effect the overall operation of the school and/or district.</td>
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<td>.27</td>
<td>2.51</td>
<td>.52</td>
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<td>34. An administrator must have the skills to monitor student use of technology throughout the school and/or district in order to ensure equitable use by all students.</td>
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<td>35. An administrator must have knowledge of digital equipment such as digital cameras, handhelds, scanners, etc.</td>
<td>2.55</td>
<td>.54</td>
<td>2.49</td>
<td>.54</td>
</tr>
</tbody>
</table>

**Note:**

Question 1 = Importance  
Question 2 = Understanding

For the purpose of data analysis, these questions were categorized into four groups after the survey was administered.

All questions are based upon ISTE Standards for Administrators (NETS-A). Questions 23-33 are skills-based and designed to obtain data on specific operational skills.
Module 5: Data Analysis to Make Leadership Decisions
This module has been designed to assist in the analyzing and understanding relevant school data.

- Participants partake in an online discussion concerning ways in which to use data for making leadership decisions.
- Participants complete an *Inspiration* activity where they identify different types of data that is used for student improvement.
- Participants partake in an online discussion concerning their *Inspiration* template and the different types of data that is analyzed for school improvement.
- Participants read the article, School Reform by the Numbers, from Changing Schools in Louisville (Spring 2000, Volume 4, Number 1, available at www.middleweb.com.
- Participants will view a PowerPoint presentation, Data Analysis 101.
- Participants will use standardized test data.
  - Achievement Level Assignment Worksheet
  - Scaled Score Assignment: Student vs. School
- Participants will use an Excel Template to analysis subgroup data.
  - Subgroup Data Analysis Template
- Participants partake in a discussion on how they might use the data generated from the activities above to make leadership decisions at their school.
Module 5 Materials

Data Analysis 101 PowerPoint

<table>
<thead>
<tr>
<th>Slides 1-6</th>
<th>Slides 7-12</th>
<th>Slides 13-15</th>
</tr>
</thead>
</table>

What Do All Those Numbers Mean?

What type of data do we need to look at?
- Quantitative
  - This type of data includes numbers or figures and can be measured or counted.
  - Examples include height, weight, or test scores.
- Qualitative
  - This type of data includes words, descriptions, or categories and cannot be measured or counted.
  - Examples include opinions, attitudes, or behaviors.

What is a Standard Score?

National Percentile Rank

Finding Trends...

For example, what trends do you see among the students?

What Do All Those Numbers Represent?

National Percentile Rank

What is a Standard Score?

National Percentile Rank

Finding Trends...

For example, what trends do you see among the students?

Resources

Additional resources for learning about data analysis and interpretation.
**Achievement Level Assignment**

Pick a grade level that you teach or feed to at your school. Conduct the following **Student Performance (same cohort of students)** analysis.

Grade _____

How many students are at each achievement level in each subject area? Name the student that scored the highest and lowest at each achievement level. (Remember: 1 = Unsatisfactory; 2 = Approaching Basic; 3 = Basic; 4 = Mastery; 5 = Advanced)

**ELA:**

**What was the average score for ELA? _____**
**How many students scored average or above? _____**
**How many students scored below average? _____**

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Number of Students</th>
<th>Student’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Basic</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Approaching Basic</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td></td>
<td>High Low</td>
</tr>
</tbody>
</table>

**Math:**

**What was the average score for ELA? _____**
**How many students scored average or above? _____**
**How many students scored below average? _____**

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Number of Students</th>
<th>Student’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Basic</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Approaching Basic</td>
<td></td>
<td>High Low</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td></td>
<td>High Low</td>
</tr>
</tbody>
</table>
Science:

What was the average score for ELA? _____
How many student’s scored average or above? _____
How many student’s scored below average? _____

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Number of Students</th>
<th>Student’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>High</td>
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<td>Low</td>
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<tr>
<td>Basic</td>
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<td>High</td>
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<td></td>
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<td>Low</td>
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<tr>
<td>Approaching Basic</td>
<td></td>
<td>High</td>
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<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td></td>
<td>High</td>
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<td></td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

Social Studies:

What was the average score for ELA? _____
How many student’s scored average or above? _____
How many student’s scored below average? _____

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Number of Students</th>
<th>Student’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>High</td>
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<td>Approaching Basic</td>
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<tr>
<td>Unsatisfactory</td>
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<td>High</td>
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<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

What teaching strategies would help to move students from one achievement level to another?
Scaled Score Assignment: Student vs. School

1. Pick the grade level you teach or feed to at your school. Conduct the following **Student Performance** *(same cohort of students)* analyses.

   Grade: ______

   What is the classes’ scale score for the previous testing cycle
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

   What achievement level is this? *(See A3 Manual, pages 88-92)*
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

   How many scale score points is this group from the next achievement level
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

2. Pick the grade level you teach or feed to at your school. Conduct the following **School Performance** *(same grade, different students)* analyses.

   Grade: ______

   What is the classes’ scale score for the previous testing cycle
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

   What achievement level is this? *(See A3 Manual, pages 88-92)*
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

   How many scale score points is this group from the next achievement level
   - in ELA? ______
   - in Math? ______
   - in Science? ______
   - in Social Studies? ______

3. What conclusions can you draw?
### Subgroup Data Analysis Template

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</thead>
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<td>All Students</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>African American/Black</td>
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<tr>
<td>American/Native Alaskan</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
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<td>Hispanic</td>
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<tr>
<td>White</td>
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<tr>
<td>Students with Disabilities</td>
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<tr>
<td>Limited English Proficient</td>
<td></td>
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<td></td>
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<tr>
<td>Economically Disadvantaged</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 4 AMO
APPENDIX G
INSTITUTIONAL REVIEW BOARD CONSENT FORM
AND
DOCTORAL STUDY CONSENT FORM
Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This form helps the PI determine if a project may be exempted, and is used to request an exemption.

1) Principal Investigator: Tammy S. Seneca
   Dept.: ELRC
   Ph: 225-343-3685
   E-mail: t.seneca@lsu.edu
   Rank: 

2) Co Investigator (s): please include department, rank and e-mail for each
   None

   The Principal is Technology Leader: The Skills E-Learners Consider Essential to the Creation of a Technology-Rich School Community

3) Project Title: 

4) LSU Proposal? (yes or no) ______ If Yes, LSU Proposal Number
   Also, if YES, either C This application completely matches the scope of work in the grant OR C More IRB Applications will be filed later

5) Subject pool (e.g. Psychology Students).e.g., K-12 Public Schools & District Administrators
   Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, etc.). Projects with incarcerated persons cannot be exempted.

6) PI Signature ** Date 
   "I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

   ***Effective August 1, 2007, all Exemptions will expire three years from date of approval, unless a continuation report, found on our website, is filed prior to expiration date***

   Screening Committee Action: Exempted Not Exempted Category/Paragraph
   Reviewer: Signature Date

Institutional Review Board
Dr. Robert Mathews, Chair
203 B-1 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8682
F: 225.578.6792
irb@lsu.edu | lsu-edu/irb

Student*? YIN Yes

Exemption Expires: 

Dr. Robert C. Mathews, Chairman
Louisiana State University
203 B-1 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8682
F: 225.578.6792
irb@lsu.edu | lsu-edu/irb
Doctoral Study Consent Form (For Interviewees)

Researcher: Tammy S. Seneca
tesene1@lsu.edu or tesenea@webk12.slo.k12.la.us
330 Avenue E
Port Allen, Louisiana 70767
225-343-3885

Thank you for agreeing to allow your responses from our interview to be utilized in my research study, K-12 Technology Leadership: The Skills E-Learners Consider Essential to the Creation of a Technology-Rich School Community. This form outlines the purposes of the study and provides a description of your involvement and rights as a participant.

The purposes of this project are:
1) to fulfill a partial fulfillment of the requirements for the degree of Doctor of Philosophy at LSU;
2) to gain insight and data on the topic of school-based and district-level administrator’s technology skills and leadership in K-12 institutions;

The methods to be used to collect information for this study are explained below. From this information, I will write a study about K-12 Technology Leadership needs.

1. The responses provided via the survey, K-12 Technology Leadership: A Survey of Professional Development Needs for Technology Leaders will remain anonymous throughout the data analysis and reporting process.
2. Any and all responses provided via face-to-face interviews will remain anonymous. (All interviews will be electronically recorded in order to be transcribed. This interview will remain private and will not be utilized for anything other than for its intention in this study.)

You are encouraged to ask any questions at any time about the nature of the study and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the email address or phone number listed above.

I guarantee that the following conditions will be met:
1) Your real name will not be used at any point of information collection, or in the written case report; instead, you and any other person and place names involved in your case will be given pseudonyms that will be used in all verbal and written records and reports.
3) Your participation in this research is voluntary; you have the right to withdraw at any point of the study, for any reason, and without any prejudice, and the information collected and records and reports written will be turned over to you.
4) You will receive a copy of the final report before it is handed in, so that you have the opportunity to suggest changes to the researcher, if necessary.
5) You will receive a copy of the study.

Do you grant permission to be quoted directly?

Yes____ No____

I agree to the terms

Respondent __________________________ Date ______________

I agree to the terms:

Researcher __________________________ Date ______________

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8924 | www.lsu.edu/irb
Exemption Expires: 01-01-2010

To Contact the:
Institutional Review Board
(225) 578-8924
203 B-1 David Boyd Hall
Louisiana State University and A&M College
FAX: 578-6792
Baton Rouge LA 70803
APPLICATION FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT

Unless they are qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

Instructions: Complete this form.

Exemption Applicant: If it appears that your study qualifies for exemption send:

(A) Two copies of this completed form,
(B) a brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts A & B),
(C) copies of all instruments to be used. If this proposal is part of a grant proposal include a copy of the proposal and all recruitment material.
(D) the consent form that you will use in the study. A Waiver of Written Informed Consent is attached and must be completed only if you do not intend to have a signed consent form.
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project (including students who are involved with testing or handling data) at http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp. (Unless already on file with the IRB.)

to: ONE screening committee member (listed at the end of this form) in the most closely related department/discipline or to IRB office.

If exemption seems likely, submit it. If not, submit regular IRB application. Help is available from Dr. Robert Mathews, 578-8692, irb@lsu.edu or any screening committee member.

Principal Investigator: Tammy S. Seneca
Student? Yes

Ph: 225-343-3685 E-mail: tsenec1@lsu.edu Dept/Unit: ELRC

If Student, name supervising professor: Dr. Janice Hinson

Ph: 225-578-2280

Mailing Address: College of Education, 113D Peabody Hall

Ph:

Project Title: The Principal as Technology Leader: The Skills E-Learners Consider Essential to the Creation of a Technology-Rich School Community

Agency expected to fund project: none

Subject pool (e.g. Psychology Students): K-12 Principals and District Administrators from Region II in Louisiana
Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted.

PI Signature ___________________________________________ Date ________________ (no per signatures)
=================================================================
Screening Committee Action: Exempted ____ Not Exempted ____ Category/Paragraph ________

Reviewer ___________________ Signature ___________________________ Date __________

Part A: DETERMINATION OF "RESEARCH" and POTENTIAL FOR RISK

This section determines whether the project meets the Department of Health and Human Services (HSS) definition of research involving human subjects, and if not, whether it nevertheless presents more than "minimal risk" to human subjects that makes IRB review prudent and necessary.

1. Is the project involving human subjects a systematic investigation, including research, development, testing, or evaluation, designed to develop or contribute to generalizable knowledge?

(Note some instructional development and service programs will include a "research" component that may fall within HSS’ definition of human subject research).

X YES

□ NO

2. Does the project present physical, psychological, social or legal risks to the participants reasonably expected to exceed those risks normally experienced in daily life or in routine diagnostic physical or psychological examination or testing? You must consider the consequences if individual data inadvertently become public.

□ YES Stop. This research cannot be exempted--submit application for IRB review.

X NO Continue to see if research can be exempted from IRB oversight

3. Are any of your participants incarcerated?

□ YES Stop. This research cannot be exempted--submit application for IRB review.
NO Continue to see if research can be exempted from IRB oversight.

4. Are you obtaining any health information from a health care provider that contains any of the identifiers listed below?
   A. Names
   B. Address: street address, city, county, precinct, ZIP code, and their equivalent geocodes. **Exception for ZIP codes:** The initial three digits of the ZIP Code may be used, if according to current publicly available data from the Bureau of the Census: (1) The geographic unit formed by combining all ZIP codes with the same three initial digits contains more than 20,000 people; and (2) the initial three digits of a ZIP code for all such geographic units containing 20,000 or fewer people is changed to ‘000’. (Note: The 17 currently restricted 3-digit ZIP codes to be replaced with ‘000’ include: 036, 059, 063, 102, 203, 556, 692, 790, 821, 823, 830, 831, 878, 879, 884, 890, and 893.)
   C. Dates related to individuals
      i. Birth date
      ii. Admission date
      iii. Discharge date
      iv. Date of death
      v. And all ages over 89 and all elements of dates (including year) indicative of such age. Such ages and elements may be aggregated into a single category of age 90 or older.
   D. Telephone numbers;
   E. Fax numbers;
   F. Electronic mail addresses;
   G. Social security numbers;
   H. Medical record numbers; (including prescription numbers and clinical trial numbers)
   I. Health plan beneficiary numbers;
   J. Account numbers;
   K. Certificate/license numbers;
   L. Vehicle identifiers and serial numbers including license plate numbers;
   M. Device identifiers and serial numbers;
   N. Web Universal Resource Locators (URLs);
   O. Internet Protocol (IP) address numbers;
   P. Biometric identifiers, including finger and voice prints;
   Q. Full face photographic images and any comparable images; and
   R. Any other unique identifying number, characteristic, or code; except a code used for re-identification purposes; and
   S. The facility does not have actual knowledge that the information could be used alone or in combination with other information to identify an individual who is the subject of the information.

YES Stop. This research cannot be exempted--submit application for IRB review.

NO Continue to see if research can be exempted from IRB oversight.

Part B: EXEMPTION CRITERIA FOR RESEARCH PROJECTS
Research is exemptable when all research methods are one or more of the following five categories. Check statements that apply to your study:

1. In education setting, research to evaluate normal educational practices.

2. For research not involving vulnerable people [prisoner, fetus, pregnancy, children, or mentally impaired]: observe public behavior (including participatory observation), or do interviews or surveys or educational tests:

   The research must also comply with one of the following:
   either that
   a) the participants cannot be identified, directly or statistically;
   or that
   b) the responses/observations could not harm participants if made public;
   or that
   c) federal statute(s) completely protect all participants' confidentiality;
   or that

3. For research not involving vulnerable people [prisoner, fetus, pregnancy, children, or mentally impaired]: observe public behavior (including participatory observation), or do interviews or surveys or educational tests:
   • all respondents are elected, appointed, or candidates for public officials.

4. Uses only existing data, documents, records, or specimens properly obtained.

   The research must also comply with one of the following:
   either that:
   a) subjects cannot be identified in the research data directly or statistically, and no-one can trace back from research data to identify a participant;
   or that

   b) the sources are publicly available
5. Research or demonstration service/care programs, e.g. health care delivery.

The research must also comply with all of the following:

a) It is directly conducted or approved by the head of a US Govt. department or agency.

and that

b) it concerns only issues under usual administrative control (48 Fed Reg 9268-9), e.g., regulations, eligibility, services, or delivery systems;

and that

c) its research/evaluation methods are also exempt from IRB review.

6. For research not involving vulnerable volunteers [see “2 & 3” above], do food research to evaluate quality, taste, or consumer acceptance.

The research must also comply with one of the following:

either that

a) the food has no additives;

or that

b) the food is certified safe by the USDA, FDA, or EPA.

NOTE: Copies of your IRB stamped consent form must be used in obtaining consent. Even when exempted, the researcher is required to exercise prudence in protecting the interests of research subjects, obtain informed consent if appropriate, and must conform to the Ethical Principles and Guidelines for the Protection of Human Subjects (Belmont Report), 45 CFR 46, and LSU Guide to Informed Consent; (Available from OSP or http://www.lsu.edu/irb)

HUMAN SUBJECTS SCREENING COMMITTEE MEMBERS can assist & review:

COLLEGE OF ARTS AND SCIENCES:  MASS COMMUN/SOC WK/AG:

Dr. Noell  * (Psych)  578-4119 Dr. Nelson  (Mass C) 578-6686
Dr. Geiselman  * (Psych)  763-2695 Dr. Keenan* (Hum Ecol) 578-1708
Dr. Beggs  (Socio)  578-1119 Dr. Belleau (Hum Ecol) 578-1535
Dr. Honeycutt(Comm.Stu.)  578-6676 Dr. Osborne  (Mass C) 578-9296
Dr. Dixit (Comm Sc./Dis)  578-3938 Dr. Timothy F. Page (Soc Wk) 578-1358
Dr. Copeland*  (Psych)  578-4117

ED/LIBRARIES/INFO SCI  BUSINESS

Ms. Phillips (LSU Libraries)  578-6552 Dr. McKee  (Marketing) 578-8788
Dr. Landin* (Kinesiol)  578-2916
Dr. MacGregor (ELRC)  578-2150
Dr. Gansle (Curric & I) 578-7213
Dr. Ann Trousdale* (Curric & I) 578-2330

(* = IRB member)
DOCTORAL STUDY CONSENT FORM (FOR INTERVIEWEES)

Researcher: Tammy S. Seneca
tsenec1@lsu.edu or tseneca@wbrschools.k12.la.us
330 Avenue E
Port Allen, Louisiana 70767
225-343-3685

Thank you for agreeing to allow your interview responses to be utilized in my research study, K-12 Technology Leadership: The Skills E-Learners Consider Essential to the Creation of a Technology-Rich School Community. This form outlines the purposes of the study and provides a description of your involvement and rights as a participant.

The purposes of this project are:

1) to fulfill a partial fulfillment of the requirements for the degree of Doctor of Philosophy at LSU;
2) to gain insight and data on the topic of school-based and district-level administrator’s technology skills and leadership in K-12 institutions;

The methods to be used to collect information for this study are explained below. From this information, I will write a case study about your LEADTech 7.2 cohort.

1. Any and all responses provided via face-to-face interviews will remain anonymous. (All interviews will be electronically recorded in order to be transcribed. This interview will remain private and will not be utilized for anything other than for its intention in this study.)

You are encouraged to ask any questions at any time about the nature of the study and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the email address/phone number listed above.

I guarantee that the following conditions will be met:

1) Your real name will not be used at any point of information collection, or in the written case report; instead, you and any other person and place names involved in your case will be given pseudonyms that will be used in all verbal and written records and reports.

3) Your participation in this research is voluntary; you have the right to withdraw at any point of the study, for any reason, and without any prejudice, and the information collected and records and reports written will be turned over to you.
4) You will receive a copy of the final report before it is handed in, so that you have the opportunity to suggest changes to the researcher, if necessary.

5) You will receive a copy of the study.

Do you grant permission to be quoted directly?

Yes ______  No ______

I agree to the terms

Respondent ___________________________ Date ____________

I agree to the terms:

Researcher ___________________________ Date ____________
VITA

Tammy Sue Seneca was born in December 1969, in Baton Rouge, Louisiana. She was raised by her parents, Johnny and Laurie Seneca, in Addis, Louisiana. She graduated from Brusly High School in 1988. Tammy graduated in 1993 with a Bachelor of Arts degree in elementary education and in 1999 with a master’s degree in curriculum and instruction from Southeastern Louisiana University in Hammond, Louisiana. Prior to entering the doctoral program in educational technology at Louisiana State University, she taught for six years at Brusly Middle School in West Baton Rouge Parish and served as a middle school curriculum facilitator in the same parish. Most recently, Tammy has worked as the Supervisor of Information Systems and Educational Technology for West Baton Rouge Parish. During the course of her studies, she earned a Plus 30, the Educational Technology Facilitator, Educational Technology Leader, Supervisor of Student Teachers, and Parish/City School Supervisor of Instruction endorsements. Tammy completed her Doctor of Philosophy degree at Louisiana State University in the fall of 2008. She currently resides in Port Allen, Louisiana.