Summer 2007

TECHNOLOGICAL LEADERSHIP PROFICIENCY AMONG SCHOOL ADMINISTRATORS IN THE TWENTY-FIRST CENTURY SCHOOLS (21S) INITIATIVE

Alan Jennings Oubre
University of Southern Mississippi

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by

Alan Jennings Oubre

A Dissertation
Submitted to the Graduate Studies Office
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Approved:

August 2007
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2007
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ABSTRACT

TECHNOLOGICAL LEADERSHIP PROFICIENCY AMONG SCHOOL ADMINISTRATORS IN THE TWENTY-FIRST CENTURY SCHOOLS (21S) INITIATIVE

by Alan Jennings Oubre

August 2007

This study examined school and district administrator proficiency in technology leadership based on the National Educational Technology Standards for Administrators (NETS-A), a set of standards which are used by administrators to model their behavior in regard to the integration of educational technology into the classroom. Most states and educator licensing agencies have adopted NETS-A, and colleges of education utilize the NETS-A standards as a basis for academic education and sustainment training.

Even while a widespread demand for increased use of technology in K-12 classrooms has steadily grown, implementation of the professional standards has been uneven. In this study, many administrators believed that their formal training did not prepare them well for technology leadership. Currently-serving administrators recognized the necessity for improving their proficiency in this increasingly urgent new dimension of administrator behavior.

Technology leadership has been shown by several researchers to bear a strong relationship to the ability to lead change among teachers and staff. Although change leadership theories and behaviors are well-documented, leading change remains a difficult task to fully master. Because of the shared
difficulty in full implementation of change leadership and technology leadership, it is important to study levels of proficiency among administrators in the task of leading technology implementation. This study showed a relationship between proficiency in change leadership and in technology leadership.

The participants in this study consisted of 130 practicing school and district-level administrators in two Gulf South states, all selected from the 33 school districts participating in the Twenty-First Century Schools (21S) Initiative sponsored by CISCO Systems, Inc. Results of the study determined a baseline level of proficiency in NETS-A, and revealed no statistically significant relationships between NETS-A proficiency and age, academic training, professional development, employment history, and attitudes. In addition, there was no statistically significant relationship found between NETS-A proficiency and administrator belief in the efficacy of using technology as a medium for instructional delivery. There was a significant relationship found between administrator proficiency in change leadership and NETS-A proficiency, which would imply a need to emphasize training in the leadership of change. Statistical analysis techniques used included descriptive statistics, multiple linear regression, and Pearson product moment correlation. The results of this study are important because of the link between change and technology leadership, as well as the identification by administrators that their college years did little to prepare them to be educational technology leaders.
ACKNOWLEDGEMENTS

The author wishes to thank the International Society for Technology in Education (ISTE) for permission to adapt and use material from the publication National Educational Technology Standards for Administrators, © 2002, ISTE ® iste@iste.org, www.iste.org. Adapted materials appear as items 19 through 34 in the School Leader Technology Proficiency (SLTP) survey instrument.

Grateful thanks are also due to this doctoral committee, all of whom contributed unique talents: Dr. Michael Ward, Chair, for true professionalism equaled only by great human warmth and caring demeanor; Dr. Thelma Roberson, Advisor, for encouragement and consistently excellent counsel; Dr. Kyna Shelley, Statistician, for sound logic and willingness to share her vast knowledge of the mysteries of statistics; and Dr. David Lee, for his unflagging optimism, sense of humor, and deep insights into personality and leadership.

Thanks to Dr. Peg Maddocks, a sterling representative of Cisco Systems, Inc. Thanks to Dr. Perrin Lowrey for his decades of dedication to the children of Hattiesburg Public Schools, and for encouraging me in this process.

I thank also two school district superintendents who have mentored, supported, and encouraged me during the last few years: Dr. James R. Davis, for his great experience, his confident expertise, and willingness to offer me a great professional opportunity; and Dr. Annie P. Wimbish, for her vision of excellence, her energetic determination to lead her district to greatness, and the consistently superb example she sets by not only doing things right, but by doing the right things (and expecting no less from others).
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CHAPTER I
INTRODUCTION

The purpose of this study was to examine the level of technological leadership proficiency among a group of practicing school district administrators in two specific geographical areas in the Gulf South, and to determine relationships among the levels of proficiency and a variety of demographic and educational factors. Those administrators were selected from schools and districts included in a technology-enhancement grant called the Twenty-First Century Schools (21S) Initiative, sponsored by Cisco Systems, Inc. The measurement used to determine proficiency was a survey instrument adapted from the Technology Standards for School Administrators (TSSA), also known as National Educational Technology Standards for Administrators (NETS-A). The study also explored how technology leadership relates to principal/administrator leadership in general, and to change leadership specifically.

• Background

School principals, through their expertise in a broad spectrum of proficiencies, are generally acknowledged to shoulder the heaviest load of responsibility and leadership for their schools. By the nature of the job, principals are expected to know something about their physical plant, relations with parents and the community, child development, pedagogy, and leadership and supervision of both semi-skilled and professional employees. As their most important responsibility, principals are increasingly expected to be the instructional leaders of their schools by setting standards, supervising, and
providing personal interest and professional support to teachers of varying ages, levels of experience, personal expertise, temperaments, and teaching styles (Trail, 2000).

In order to guide and assist principals in successfully accomplishing their daunting series of tasks, the K-12 system of education has moved over the years toward establishing standards of professional leadership behavior. Without standards, supervisors, schools of education and state educational agencies are limited in their ability to assist principals in gaining proficiency, or in gauging success in their activities.

Tyack and Cuban (1995) explained that the United States and most of the world experienced a digital revolution in the last two decades of the twentieth century, as the personal computer became an integral tool for workplaces as different as heavy industry, medicine, white-collar offices, retail establishments, and government. Computers have also come “home” and have changed the daily lives of families, leading to a broad-based appeal to the schoolhouse to ensure that students are furnished with the requisite computer skills to succeed in the brave new binary world. “No public urgency compelled such attention to the media previously used in schools” (pp. 124-125).

As the personal computer and the increasing digitalization of daily life have revolutionized the world, there has been a steady move toward using the schoolhouse and the curriculum as the means by which students are taught proficiency in technology. There has also been a trend toward incorporating technology in all its forms as another teaching tool, as a primary method of
instructional delivery. Although technology implementation in the classroom is both ongoing and uneven, principals, other school district administrators, and superintendents are expected to incorporate technical expertise into their repertoire of behaviors.

In accordance with the trend toward accountability and standardization, the Technology Standards for School Administrators (TSSA) Collaborative, a consortium of educational agencies, developed in the late 1990's a set of standards that “define what school administrators should know and be able to do in order to contribute to the effective use of technology in schools” (Bosco, 2001, How Can Library Media Specialists Help? section, ¶ 1). These TSSA standards, which closely follow the tone, format, and intent of the general Standards for School Leaders developed by the Interstate School Leaders Licensure Consortium [ISLLC], have been adopted or adapted by most state educational agencies and colleges of educational leadership as a guide for school administrator preparation and professional development in the area of technological leadership.

Because the introduction of technological innovation into schools represents a change from traditional methods of teaching and learning, many researchers closely associate technology leadership with change leadership. Valdez (2004) grouped administrator response to change along with effective use of technology as a primary theme of academic leadership. Merkley, Bosik, and Oakland (1997) proposed that proficiency in change leadership is a prerequisite for successful technology leadership.
In 2005, a natural disaster, followed soon after by an extraordinary example of corporate philanthropy, provided a rare opportunity to the administrators of several schools and districts in southern states to practice their technological leadership skills. As school districts throughout the Gulf South were struggling to regain normalcy after a historically destructive hurricane season, unexpected help arrived for several selected districts in the form of the Twenty-First Century Schools Initiative (21S), a forty million dollar grant by Cisco Systems, Inc. This project was intended to aid Gulf Coast schools in post-hurricane rebuilding activities:

In the first phase of 21S [Twenty-First Century Schools], Cisco has committed $20 million specifically . . . to rebuild, improve and expand the learning opportunities for students in select schools . . . , which will include educational technology, on line curriculum materials, and professional development to facilitate innovative and effective teaching and learning.

(Cisco, 2005, ¶ 2)

As President and Chief Executive Officer of Cisco Systems, Inc., John Chambers underscored the requirement for a certain standard of proficiency among the school leaders associated with the grant, as follows: “Cisco recognizes that the ultimate success of the 21S program depends on the knowledge, expertise, and commitment of the school and education leaders with whom we are partnering (“From Recovery to Transformation,” 2006, p. 1).

As principals and administrators associated with the 33 21S schools began planning for the grants and how best to implement the corporate largesse,
they were faced with a demand for a high level of technological leadership. Since the TSSA/NETS-A standards are the *de facto* national standards for administrator technological proficiency, these standards are appropriately viewed as the gauge by which this leadership measure should be assessed. This study examined proficiency levels in the TSSA standards in the context of a variety of demographic factors, as well as administrator preparation programs and professional development opportunities. The study respond in part to the recommendation of Dawson and Rakes (2003), who stated, “Researchers should determine what percent of United States principals are receiving [technology] training and what types of training they are receiving” (p. 46).

**Statement of the Problem**

At the beginning of the twenty-first century, the commonly accepted standard for school administrator proficiency in the burgeoning area of technology integration into schools is the set of standards called Technology Standards for School Administrators (TSSA), also referred to as National Educational Technology Standards for Administrators (NETS-A) (International Society for Technology in Education, 2006). The preponderance of literature shows that technology integration is of major importance in the classroom (National Educational Technology Plan, 2004), (although there is a smaller but significant set of dissenting opinions, exemplified by the works of Larry Cuban (2001). Educators normally agree that the school principal is key to teaching and learning in his/her school (‘instructional leader’ has become a *de facto* label for the principal); that standards for leadership accountability are the accepted norm.
(Cross & Rice, 2000); and that the TSSA standards are a fair, balanced, and complete set of guidelines by which the principal and the profession of educational leadership can chart the potential for success or failure in this major subset of principal proficiencies (ISTE, 2006).

As a matter of common knowledge, all school district administrators do not share equal levels of proficiency in their many areas of responsibility. It is likely that administrators may exhibit uneven levels of NETS-A expertise for several reasons:

1. State educator licensing agencies, the regulatory and chartering bodies for principal certifications, are not unanimous in accepting the standards, promoting them with professional development or in supporting them with corresponding state guidelines, or in working with administrator training facilities to ensure that NETS-A standards are imbedded in the programs of study leading to the appropriate degree programs.

2. Colleges and universities may provide inconsistent NETS-A emphasis in their coursework.

3. School districts may not often provide meaningful and effective technology-enabling professional development to existing administrators, many of whom are years away from formal higher education (Dawson & Rakes, 2003; Valdez, 2004).
Purpose of the Study

This study examined the levels of TSSA/NETS-A proficiency among a selected group of school and school district administrators, and explored possible relationships between demographic, attitudinal and educational factors and the proficiency levels. The study also investigated a possible relationship among administrators' attitude toward change in schools, their perceived proficiency in change leadership, and technological proficiency. The data gained could be used to improve professional development programs, or to refine coursework and practicum experiences in graduate educational leadership curricula.

Research Questions

1. What are the levels of proficiency (self-reported) on the NETS-A standards among principals and school district administrators participating in the 21st Century Schools Initiative?

2. Are there differences in NETS-A proficiency based on age, academic training, professional development opportunities, employment history and attitudes?

3. Is there a relationship between school administrator proficiency in NETS-A standards and administrator attitudes toward the efficacy of using technology in the classroom as a primary means of instructional delivery?

4. Is there a relationship between school administrator attitude toward change in schools, proficiency in change leadership, and proficiency in NETS-A standards?
Definitions

Administrator (K-12): A person who is certified or licensed by a state department of education or other regulatory agency to serve in one of several positions within a public school district, to include principal or assistant principal; superintendent or assistant superintendent; or an equivalent position having to do with the education of K-12 public school students, or with various types of support provided for that educational process.

Cisco Systems, Inc.: The leader in networking for the internet through the supplying of networking equipment & network management. Cisco Systems, Inc., is also a major philanthropic partner with educational institutions and governments worldwide that encourages the betterment of education and improvements to the human condition through technology (Cisco, 2005).

Educational Technology: Also known as e-learning, instructional technology and learning technology, is the use of technology to support the learning process; usually used to talk specifically about digital computer technology (USDE, 2004)

National Educational Standards for Administrators (NETS-A): TSSA standards as above, adopted and adapted as national standards by the International Society for Technology in Education to include specific provisions for administrators in three job roles:

--superintendent and executive cabinet

--district-level leaders for content-specific or other district programs

--campus-level leaders including principals and assistant principals (ISTE, 2006)
Technology Leadership Tasks: Role-specific tasks keyed to principals, district administrators, and superintendents which, if performed properly, exemplify adherence to and proficiency in the six Technology Standards for School Administrators (TSSA) also known as National Educational Technology Standards for Administrators (NETS-A) (TSSA, 2001)

Technology Standards for School Administrators (TSSA): a set of standards defining what K-12 school administrators should know about, and be able to do with, educational technology, developed by a collaborative team of national school leaders (TSSA, 2001)

Twenty-First Century Schools Initiative (21S): A multi-phase education initiative directed at school districts in [the Gulf South] that were affected by hurricane(s). The program, which is a blueprint for reconstructing and improving schools, is intended to help build a world-class education system that can be replicated across the country. The initiative is built upon a coalition of public, private and non-profit organizations to provide a holistic approach to rebuilding and improving the local schools with a "21st century" educational approach (Cisco, 2005).

Delimitations

This study concerned itself with a strictly circumscribed set of school administrators, numbering about 130. The study population is intentionally small, in that it is drawn from one discrete group of administrators, comprising two subsets: seven districts in one southern state, and one school district in another.
The survey instrument depended completely on self-reporting of data. This includes both demographic data and personal assessments of proficiency.

Criteria for selection of 21S Schools: In collaboration with state and local educational agencies, certain representatives from the Cisco Corporation selected school districts which had received significant hurricane damage, but which were not so decimated that there was nothing to build upon. Districts were selected with the intent of being able to produce replicable results as an outcome of a substantial technology grant.

Timeframe for conduct of the Study: Survey instruments were mailed in late January 2007, with March 9 considered the cutoff date for return.

Assumptions

Since the data in this study was obtained from self-reporting, it must be assumed that respondents reported honestly. Survey instruments are always subject to the vagaries of the participant's memory, as well as their desire to choose the 'right' answer.

This study also assumes that the NETS-A standards and the accompanying Technology Leadership Tasks (TLT) are accurate and legitimate representations of the types of behaviors which, if adopted, will tend to enhance administrator performance in a positive way.

Justification

There is general acknowledgement among researchers that school administrators have difficulty in maintaining complete proficiency in all areas of
their complex spheres of influence. This shortfall is particularly true in a specialized area such as educational technology, which demands the leader's best efforts not only in technological expertise, but in traditional leadership and leadership of change. Dawson and Rakes (2003) investigated how technology training received by principals translated into integration of technology into schools, and found significant shortfalls. Slowinski (2000) noted that the increasing dialogue on how to integrate computer technology in the curriculum has not typically included the roles that school administrators should play. Creighton (2003) wrote of a gap between administrator training on the rapid changes in educational technology and the oncoming reality of technology in schools. This study addresses levels of administrator proficiency, and provides information of value to those who plan and implement school administrator training.

Conclusion

This study surveyed a limited group of school administrators about their proficiency in NETS-A standards; their perceptions of the efficacy of technological innovation in schools; their attitude toward change in schools; and their perception of their ability as a change leader, along with data dealing with demographics, formal education, and professional development. The survey and subsequent statistical analysis assist in understanding how well principals and administrators understand their roles as leaders of technological innovation, as well as how change leadership relates to technology leadership.
CHAPTER II
REVIEW OF LITERATURE

Introduction

The review of literature related to the topic of technological leadership proficiency among school administrators begins with an examination of the theoretical framework of learning as enhanced by digital technology, followed by a brief overview of the history of technological innovations in education. Next are three closely related topics of principal leadership in general, technology-specific leadership, and change leadership. The final section of the literature review focuses on matters of standards, policy, and the education of school leaders.

Theoretical Framework

Although the stated subject matter deals with administrator proficiencies in national technology standards, the underlying and unifying factor is how adherence to those standards enables school administrators to achieve their primary goal, that of increasing student achievement. Proficiency in a set of standards is not an end unto itself, but serves as the foundation for administrators to fulfill the role of instructional leaders. The primary theories examined here are those which represent the enhancement of pedagogy through instructional technology. "Without an appropriate pedagogy, computer use cannot provide for any planned, significant learning outcomes in students" (Regalado, 2004, p. 53). Creighton (2003) stated that hardware and software are only the means to the end of the issue of education in technology. The 'box with wires' will not in itself improve education; the only thing that will bring about
meaningful change will be proven classroom techniques augmented by technology. The key to successful technological implementation is "change in pedagogical thinking toward student-centered classrooms with lots of constructivist, project-based activities, with opportunities for social discourse and collaboration between teacher and student, and student and student" (p. xiii).

Constructivism, which presupposes that "learners (young and old) build knowledge structures in their minds rather than have the knowledge implanted by the teacher," can be robustly supported by technology in the classroom (Creighton, 2003, p. 44). Tools such as computers which provide almost unlimited power for students to conceptualize and interact can certainly assist in the construction of knowledge.

What are the methods by which electronic media affect or improve the educational process? Kearsley and Shneiderman (1999) developed a theory of Engagement as "a conceptual framework for technology-based learning and teaching (¶ 1)." Engagement theory is derived from the authors’ study of electronic-based learning and distance education, and combines attributes of several other learning theories.

For example, with its emphasis on meaningful learning, [Engagement theory] is very consistent with constructivist approaches. Because it emphasizes collaboration among peers and a community of learners, it can be aligned with situated learning theories. Because it focuses on experiential and self-directed learning, it is similar in nature to theories of adult learning (i.e., andrology [sic])." (Kearsley & Shneiderman, 1999, ¶ 2)
As a synthesis of three emerging and dynamic learning models, Engagement theory focuses on educational technology as a method to garner the attention of students and promote authentic, realistic learning. Kearsley and Shneiderman explain how technology functions in this regard. "The role of technology in the theory is to facilitate all aspects of engagement" (Conclusions section, ¶ 2). "Technology provides an electronic learning milieu [sic] that fosters the kind of creativity and communication needed to nourish engagement" (Conclusions section, ¶ 3).

Creighton (2003) listed several roles that students could assume in the engaged learning aspect of technology. They are able to explore and interact; serve as apprentices of learning; and develop their own learning products. "Connecting learning and technology in this way helps us monitor the appropriate use of technology to improve student learning. We must move away from technology skills taught in isolation and closer to purposive integration of technology across the entire curriculum and learning environment" (p. 73).

According to Regalado (2004), computers in the classroom may be used in a variety of ways to augment or supplement traditional teaching methods. As an electronic blackboard, the computer builds upon earlier concepts as basic as the original slate board, continuing through modern projection systems. All of these systems have the purpose of centering attention and assisting the teacher to share knowledge, illustrate, and explain. Computers with self-paced software can function as surrogate teachers; computers can also display tools for
cognition and manipulation, allowing activity enrichment and extension of student thinking processes.

Regalado (2004) listed a range of learning concepts and associated theories for which the computer serves as a supplemental pedagogical model. Prominent among these uses is harnessing the computer as a cognitive tool or electronic blackboard, a technique which supports theories and concepts as follows:

<table>
<thead>
<tr>
<th>Learning Theory</th>
<th>Associated Learning Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situated learning</td>
<td>Context and situation</td>
</tr>
<tr>
<td>Behaviorism</td>
<td>Feedback and reinforcement; scaffolding</td>
</tr>
<tr>
<td>Multiple Intelligences</td>
<td>Imagery</td>
</tr>
<tr>
<td>Learning Styles</td>
<td>Learning strategies</td>
</tr>
<tr>
<td>Constructivism</td>
<td>Memory</td>
</tr>
<tr>
<td>Piaget's theory</td>
<td>Mental models</td>
</tr>
<tr>
<td>Social cognition</td>
<td>Problem-solving (Regalado, 2004, p. 57)</td>
</tr>
</tbody>
</table>

History of Educational Technology

Early American education, in the period from colonial times until the middle 18th century, reflected the slow pace of technological innovation. Students wrote with pens made from goose-quills, using ink that was prepared by hand. The hornbook, imported from England and used extensively, gradually gave way to primitive textbooks, while visual representations of the world in the form of maps and globes became more commonplace. The blackboard was a significant technological advance, allowing an entire class to view and share a
lesson or concept. Near the time of the American Civil War, photographs appeared in some textbooks. In the late 19th century, blackboards became widespread and the magic lantern, an early projection device, was introduced. The 20th century was a time of increasing technological innovation, as the magic lantern was followed by film, radio, television, and the personal computer into the classroom (Regalado, 2004, pp. 38-39).

Technological advances in education have traditionally been accompanied by extravagant claims. Tyack and Cuban (1995) quote Bumstead (1841) about an early educational innovation: “The inventor or introducer of the system deserves to be ranked among the greatest benefactors of mankind” (p. 121). This ‘system,’ also described as “the MIRROR reflecting the workings, character and quality of the human mind,” (p. 121), was the standard classroom blackboard. Tyack and Cuban described a cycle accompanying educational technology reforms which began with “hyperbolic claims about how a new invention would transform education; then research showing that the technology was generally no more effective than traditional instruction and sometimes less; and finally, disappointment as reports came back . . . about the imperfections of the reform” (pp. 121-122).

After cataloging the rise and fall of film, radio and television as failed attempts to revolutionize education through technology, Tyack and Cuban explained how computers may be different. Computers are becoming not an adjunct to daily life, but an integral feature of workplace and home. The public generally agrees that computers have become an appropriate aspect of K-12
education, due not only to the ubiquitous nature of computers, but also to the impact and utility of computers in instruction and administration (pp. 124-125).

Technology in the schools received a tremendous legislative boost with the 2002 passage of the federal law commonly known as ‘No Child Left Behind (NCLB).’ The last two decades of the twentieth century saw a tremendous increase in personal computer use, along with significant enhancements in electronic computer products. This trend continues in schools, and fuels a significant movement for transformation and reform of teaching to utilize the new equipment and concepts. NCLB contained specific directives concerning the need for schools to incorporate technology into curriculum, echoing a general consensus among the citizenry and among the educational establishment that schools have a responsibility to encourage and foster technological proficiency in the use of computers, along with “a range of technologies not yet anticipated in 1983—to communicate, to locate and manage information, and . . . to use these tools effectively to support learning the content of ‘the other basics’” (Culp, Honey, & Mandinach, 2003, p. 1).

Principal Leadership

The role of the principal has changed considerably through the twentieth century and into the twenty-first. The traditional view that held sway until the publication of A Nation at Risk in 1983 was that of an “industrial model of school leadership, which emphasized the uniform and efficient delivery of resources” (Valdez, 2004, Section I, ¶ 3). Although the managerial and utilitarian aspects of school leadership have not diminished significantly since that time, the principal
is now generally acknowledged to be the primary instructional leader for the school. Since the early 1980’s, there has emerged a widespread belief that “American education could not continue with business as usual; educational leaders could not just be managers but were expected to be leaders in curriculum, instruction, and assessment” (Section I, ¶ 3).

Goodwin (2003) cataloged an exponential rise in stress levels as principals in the late 20th century attempted to cope with the many demands placed on them, with resulting conflicts, both internal and external. Principals are typically required to be multipurpose leaders in many disparate areas: strategic leader, instructional leader, organizational leader, political and community leader, change leader, and technology leader. It would be unreasonable to suggest that principals could fulfill all of those roles, sometimes simultaneously, without conflicts and stress.

Pierce (2000) outlined the three areas that consume the time of the average principal: supervision of personnel; management of student behavior; and supervision of other student interactions. Significantly, instructional supervision is not listed among those three major areas, even though that duty is touted by Goodwin (2003). “Since the 1980s, instructional leadership has been asserted as the primary responsibility of the principal, and this study confirmed that principals accept that claim” (Role Conflict section, ¶ 2).

Pierce (2000) proposed a solution to the competing demands placed on principals—having two leaders at each school; one who focuses on curriculum and instruction and another, subordinate to the ‘principal-teacher,’ who
administers the physical plant and administrative workload. As a practical matter, this solution is actually in effect wherever districts can afford to have assistant principals. Assistant principals normally are delegated all of the essential tasks necessary for schools to function, but which detract from the focus the primary instructional leader.

Technology Leadership

The topic of school technology leadership is the central focus of Gilbert Valdez in a 2004 edition of *Critical Issues*, a series of articles sponsored by the North Central Regional Education Library. Valdez directly addresses topics that are the focus of this dissertation, including "leadership qualities of superintendents and principals, responses to change, and effective uses of technology as major themes associated with technology leadership" (Issues section, ¶ 2).

Valdez explored the transformational leadership behaviors of Lashway, Mazzarella, and Grundy (1995), in which leadership, vision, and perspective are key factors, as well as the harnessing of group goals and missions in the quest to define a school culture (Transformational Leadership section, ¶ 1). He also quoted Zaccaro (2001) who explored executive leadership, which can be viewed through an individual perspective, as well as that of group leadership dynamics (Transformation Leadership section, ¶ 3).

In order to summarize how the evolving nature of leadership theory is usually expressed in school leadership best practices, Valdez (2004) noted the collaboration necessary among administrators, faculty, community members, and
students. The organization itself becomes the primary area of concern, as each stakeholder fulfills his or her responsibility to meet current needs and ensure the continued success of the school or district as the major focus of all (Relationship Building section, ¶ 2). Collaboration is only possible when the individuals involved have the sort of relationships which will permit this. Building bridges of personal interconnectedness becomes another leadership task which can lead to “building knowledge, analyzing systems and problem solving, and generating creative responses to the future” (Valdez, 2004, Relational Leadership section, ¶ 1).

Anderson and Dexter (2005) provided a capsule description of a national survey that captures a portrait of school leadership in technology implementation. From that viewpoint, technology leadership derives its strength more from consensus than individuality. The authors constructed an educational leadership taxonomy which reflects that unique stance. The taxonomy listed six functions which are reflective of areas that usually require technology policy decisions for appropriate implementation: “strategic planning and goal setting, budgeting and spending, organization, curriculum, evaluation, and external relations” (Introduction, ¶ 2). The ‘decisions’ are closely analogous to the NETS-A Standards discussed throughout this study, and relate very closely to the administrator proficiencies that will be measured in the present study.

The strategic planning decision discussed by Anderson and Dexter included vision and goals, particularly in the context of instructional alignment and expected learning results. Budgeting and spending require careful
administrative attention primarily because of the relatively high cost of initial technology expenditures. The school structure must have a specific organization for technology implementation, which can take several forms. One method to ensure that the organizational structure is properly constructed is to include a technology coordinator (particularly if other administrators are weak in their personal grasp of technology proficiencies). Anderson and Dexter mentioned the need for a technology committee, which includes a cross section of stakeholders, as a way to share the decision-making, and to assist in all of the six technology decisions. Curriculum is mentioned in terms of two primary aspects; first, in what technological skills students are expected to master, and second, in terms of how technology will be used to improve the delivery of instruction. Evaluation is key to learning from the experience of technology implementation, and also to understand how student outcomes are affected. External relations, the term used for school-community involvement, deals with the importance of good relations between school and the community, and how the school deals with matters of ethics and the safeguarding of intellectual property.

Anderson and Dexter identified a potential shortcoming in research of this type, in that “each of the different actions or decisions identified as characteristic of technology leadership may potentially have measurable outcome in terms of the degree of technology integration in the school or the degree to which the school has accomplished other goals” (Modeling Technology Leadership Decisions section, ¶ 1). The study included assumptions about other factors that
could also influence the data, and concluded that most of the other factors are affected by technology leadership.

As a measure of effectiveness, Anderson and Dexter used a School Technology Leadership index. "Eight dichotomous indicators were selected to best represent the construct of school technology leadership and they are described below (Technology Leadership section, ¶ 1). These indicators, which have become somewhat dated in the six years since this study, are:

1. Presence at the school of a technology committee
2. Separate school budget for technology
3. Principal having spent more than five days in the past year strictly devoted to technology issues
4. Regular principal use of e-mail to communicate
5. District technology support rated higher than other districts
6. Receipt of a grant in the past three years with a percent devoted to computer cost
7. Regular technology professional development
8. Presence of a policy on intellectual property

Another, more concise index of three major technology outcomes used by Anderson and Dexter, and constructed as a composite of several other indicators, were:

1. Integration—degree of computer incorporation into teacher administration and instruction
2. Net Use—measure of email and web use by teachers and others
3. Student Tool-Use—student use of computers for learning activities

Anderson and Dexter’s findings in the area of overall technology leadership aligned the eight leadership characteristics in order of frequency with technology policy matters more firmly in place than technology actions by the school leader. Just over half of the principals reported devoting five or more days in the past year to technology, and only 29% used email to communicate with two or more groups of school personnel on a regular basis (Findings on Policies and Overall Technology Leadership section, Figure 3.).

Implications reported by Anderson and Dexter confirmed the importance of traditional leadership, as well as technology-specific leadership attributed to principals. The study did not examine all aspects of technology leadership, and cannot account for a complex interplay of other factors which affect leadership and decision making, but “the results show that leadership has great impact on the outcomes or success of technology programs” (Implications section, ¶ 2). The authors opined that although an individual leader may possess charisma in his leadership style and be proficient in technology integration, it is more important that the school becomes a community of learners, a “technology learning organization,” where administrators, teachers, students and parents together work on how best to adapt new technologies to improve learning” (Implications section, ¶ 3).

Three years after the Anderson and Dexter study, Dawson and Rakes (2003) published a study with great applicability to Anderson and Dexter, wherein the investigation of technology training received by principals translated into
integration of technology into schools. The authors introduced the subject with a key point about organizational resistance to change, which has thus far hindered technology integration. How principals manage change may well be seen as at least as important as their technological prowess. Several key points are introduced by Dawson and Rakes:

1. Several research studies support the claim that teachers must be trained in technology use in order to effectively implement it into the curriculum (Akins, 2000; Casey & Rakes, 2002; Martin & Lundstrom, 1988; Smith, 1998).

2. Principals must also undergo training in technology in order to effectively lead the school in this area (Holland and Moore-Steward, 2000).

3. The principal must be adept at managing and leading change in order to be a successful technology leader (Merkley, Bosik, & Oakland, 1997).

The purpose of Dawson and Rakes' study, "whether technology training received by principals influences the integration of technology into classrooms" (p. 32), deals directly with the issues of change leadership, instructional leadership, and technology leadership. As in Anderson and Dexter, this study looks at relationships between "amounts and types of technology training received by K-12 school principals" and "levels of technology integration into the schools' curricula" (p. 32). In addition to specific technology training received, the
study examines the possible influence of demographics on the technology integration.

Dawson and Rakes’ one dependent variable, the level of integration of technology into the curriculum, was measured by the School Technology and Readiness (STaR) Chart Assessment, developed by the CEO Forum. This measurement was based on a composite of assessments of Internet access; availability of computer hardware; student use of internet and hardware; training received by the faculty; pattern and amount of student and teacher use of digital media, internet, and computers. Independent variables included demographic data on principals and schools, along with two questions about level of technology training received by principals in the last 12 months (p. 33).

Limitations in Dawson and Rakes’ study are particularly pertinent because many of the same factors are difficult to control and remain in effect for those who attempt research in this area. Examples of these limitations include:

1. Much of the data is derived from self-reporting, which is always subject to problems with memory, as well as the halo-effect of respondents shading their answers in the direction they believe will be considered desirable.

2. There are always complex interactions of factors in school settings, some or all of which could have influenced the variable measured in this study.
3. Studies of this type are inherently exploratory and describe relationships, at best, not attempting to establish cause and effect. (p. 36).

Dawson and Rakes' conclusions indicated that, while 68% of principals are receiving significant amounts of technology professional development, "nearly one-third of the principals in this study are still not receiving the type of training that prepares them to lead their schools in the technology integration process" (p. 42). While the age of the administrator was significant in influencing technology integration, years of experience as an administrator seemed to be of no significance, nor was sex of the administrator a factor (p. 43). The question of most interest concerned the amount of technology training received within the past 12 months, and the relationship between that training and school technology implementation. Results were grouped in amounts of hours of training received within the past 12 months: fewer than 13; 13-25; 26-38; 39-51; more than 51. Findings indicated that "principals who receive as little as 13-25 hours of technology training in a year begin to comprehend technology's worth" (p. 44). The finding can be summarized that as the number of hours of training received increased, the measures of technology integration in schools increased accordingly. From this study's findings, a logical conclusion that may be reached is "the more sustained the principal's training experiences and the more those experiences are tied to the school's curriculum and to the principal's needs, the more progress the school is likely to make toward technology integration" (p. 45).
School and district administrators should become proficient not only in traditional methods of leadership, but should also prepare themselves for the specific types of leadership necessary to ensure success with technology-infused education. That type of leadership peculiar to technology includes a combination of many leadership qualities and the ability to manage resourcing, change implementation, professional development, and evolving techniques, hardware, and methods (Valdez, 2004, Section III, ¶ 14).

Creighton (2003) presented a similar outlook on the necessity for conjoining principal leadership and technology leadership. “Without appropriate connection between leadership and technology implementation, potential exists for a mishmash of effects ranging from acceptance to resistance to rejection” (p. 87). Creighton proposed that leadership of schools is not static—that it will continue to change; technology in schools will accelerate those changes; and that technology leadership by school principals has as much or more importance in its absence as in its presence. Technology is firmly with us, and will affect the education of children for better or worse. The lack of adequate principal leadership will compound the potential for damage in this context.

Change Leadership

Former U. S. Secretary of Education Rod Paige noted in 2002 that in spite of innumerable reforms, the introduction of information technology, and enhanced infrastructure, education institutions are highly resistant to change. Schools still look much the same as they did in the last century, and the century
before that. “We still educate our students based on an agricultural timetable, in an industrial setting, yet tell students they live in a digital age” (Paige, 2002).

According to Creighton (2003), however, the introduction of computer technology in schools has introduced a change cycle unlike any seen before. Previous devices (filmstrip, overhead projector, television) were brought into the classroom at a more leisurely pace, and did not bring with them the sense of urgency that follows computer technology. This change cycle is more comprehensive, requiring participation by everyone—students, parents, teachers, and administrators (pp. 90-91).

Since technology in schools represents a major change in established methods of school operation, strong leadership in general, with particular emphasis on leadership of change, is critical to success. Principals and administrators do not automatically possess the skills necessary to manage this change environment.

Holland and Moore-Steward (2000) stated that the principal is the key person who can affect technology infusion within a school. As a result, they believe technology training for principals is as important as training for teachers. Principals are not able to adequately support technology integration if they do not fully understand it (Cypert, 2004, Importance of Administrative Support in Technology Integration section, pp. 8). Merkley, Bosik, and Holland, quoted in Dawson and Rakes (2003), stated that the literature has shown that “leadership that promotes change is the missing factor when it comes to merging technology and instruction” (p. 30).
Change theories are ubiquitous; some of the leading practitioners over the past half-century include Karl Lewin; Lippit, Watson, and Westley; and Prochaska and DiClemente. Lewin's early force field analysis theory is still widely used in change management and can be used to help understand most change processes in organizations (Lewin, 1951). Planned change refers to a premeditated intervention, managed by an executive, intended to modify organizational functioning for a more favorable outcome (Lippit, Watson, and Westley, 1958). The concept of planned change remains quite valid for today's principal; implementation techniques have continued to evolve. Prochaska and DiClemente's writings about the stages and process of change revolutionized the study of institutional change and brought acceptance to the idea of change as a process which must involve not only passive acquiescence but active participation from organizations and all those involved (Prochaska & DiClemente, 1982.) The increasing complexity of managing change continues to evolve, and requires close examination by educational professionals, for whom the management of change remains a constant.

Cisco Systems Inc., recognizing that resistance to change is ingrained in human nature, built into its Twenty-First Century Initiative grant application questions designed to promote the recognition of resistance to change. The company included methods by which grantees can enhance the leadership of change in its grant planning process. One such method in the 21S Initiative is training provided through the IBM Change Toolkit, based on the 1999 work of
Rosabeth Moss Kanter, an authority on change leadership, primarily in the business sector.

Change has become a major theme of leadership literature for a good reason. Leaders set the direction, define the context, and help produce coherence for their organizations. Leaders manage the culture, or at least the vehicles through which that culture is expressed (p. 20). Dawson and Rakes chose a theoretical framework by Crandall and Loucks (1982) that focuses on the change management aspect of technology leadership. Much research backs up the practical experience of veteran educators everywhere who recognize that profound change must be grounded in careful education, skillful implementation and substantial follow-up. Crandall and Loucks emphasize the parallel nature of training which must be conducted at all levels of a school—in order for teachers to significantly change their behavior, the instructional leader must become an integral part of the change process, as well as its leader. Dawson and Rakes propose to explore how well principals are prepared to lead the technological change.

"Change," according to Valdez, "is not entirely predictable" (Section II, ¶ 1). Change itself is a leadership challenge for which many leaders are not prepared. According to Fullan (2001), "change cannot be managed. It can be understood and perhaps led but it cannot be controlled . . . leadership does make a difference" (pp. 33-34). Although it is difficult to capture how best to lead or manage change, those reasons for a failure of organizational change are much simpler to cite. According to Fullan and Stiegelbauer (1991), the reasons are:
unclear purpose; uninvolved participants; ignorance of established work-habits; poor communications; fear of failure; too much pressure to succeed; too high a cost or too poor a reward; satisfaction with present situation; and lack of respect for the change leader (p.156).

Valdez postulated that “leadership, change, and technology can interface to maximize the potential for effective use of technology” (Section III, ¶ 1). He proposed three reasons why it is important for educational leaders to be proficient in technological leadership:

1. the need to prepare students to function in an information-based, Internet using society;
2. the need to make students competent in using tools found in almost all work areas; and
3. the need to make education more effective and efficient (Section III, ¶ 2).

Valdez recognized the possibility of leadership failure in the promotion of educational technology in several distinct but related areas: lack of inclusion and buy-in; lack of metrics by which achievement is measured; poorly-conceived implementation plan; and failure to communicate. In addition to these generic factors which are problematic in all areas of change management, Valdez recognizes the necessity for specific training for both teachers and administrators in the technology implementation process (Implementation Pitfalls section, ¶ 1-2).

It is clear that principal and superintendent leadership is vital to the success of technology in the schoolhouse. Leaders of change should be part of
the procedure, providing continuous explanations, anticipating questions, and justifying the institutional trauma in terms of ultimate benefit to the organization.

"Administrators need to encourage and support professional development opportunities related to technology" (Valdez, 2004, Implementation Pitfalls section, ¶ 3).

Spillane and Regnier (1998) also articulated their understanding of the interrelatedness of change leadership and technology implementation. Embracing technology in all its forms as a tool of change allows educators to radically alter the learning situation in the context of school-reform initiatives. “Whether we talk about it as restructuring, reform, or transformation . . . schools are not being as successful as they need to be in preparing students, and therefore, they must be changed” (p. 244). “Educational change is not, and should not be, technologically driven -- but it is, and always has been, technologically enabled” (A Strategic Plan for Educational Leadership, A Program of Practice section, 2004, ¶ 2).

In a consistently cautionary voice, Tyack and Cuban (1995) put forth a conservative opinion relative to school reforms and institutional change. In their viewpoint, real and sustainable change is extremely difficult to implement, pointing to a century of failed initiatives which were usually heralded as can’t-miss reforms. Tyack and Cuban shared the firm conviction that important change must include teachers as change agents and instruments, must include parents, must take into account actualities of each location, and incorporate what currently works into a practical plan for improvement and innovation (p. 10).
Policy, Standards, and Leader Education

Creighton (2003) stated succinctly a problem with technology integration in schools: "Studies show that school administrators' training and knowledge base have not kept pace with the rapid changes in both education and technology, causing a lack of authentic support for the integration and implementation of technology beyond a basic level" (p. x). By assessing current administrator proficiency in an established set of standards, the present study proposes to address this disparity in professional technology competence.

Creighton described university educational leadership programs as severely deficient in preparing principals to become technology leaders, addressing this critical issue only superficially in terms of the principal's own personal expertise in the use of technology. "Rarely . . . are principals-in-training provided any education related to the importance of creating a school environment conducive to maximizing the use of technology in the curriculum" (p. 3).

The National Education Technology Plan (2004) contained a set of seven Action Steps, accompanied by official recommendations. First among the seven concerns is strengthening educational leadership: "For public education to benefit from the rapidly evolving development of information and communication technology, leaders at every level—school, district, and state—must not only supervise, but provide informed, creative, and ultimately transformative leadership for systemic change" (Strengthen Leadership section, ¶ 1). These recommendations echo the proficiencies of the NETS-A standards:
1. Invest in leadership development programs to develop a new generation of tech-savvy leaders at every level.

2. Retool administrator education programs to provide training in technology decision making and organizational change.

3. Develop partnerships between schools, higher education and the community.

4. Encourage creative technology partnerships with the business community.

5. Empower students’ participation in the planning process (Strengthen Leadership section, ¶ 2).

Nance (2003) focused exclusively on the policy-making responsibilities of school administrators, especially as those policies dealt with matters of educational technology. He noted the significance of standards sponsored by the Interstate School Leaders Licensure Consortium (ISLLC), one of which states that a proficient school leader should “promote the success of all students by understanding, responding to, and influencing the larger political, social, economic, legal and cultural context” (ISLLC, 1996). The International Society for Technology in Education (ISTE) echoed this call for involvement in policy-making with the technology-specific standards for administrators adopted as the National Educational Technology Standards for Administrators (NETS-A): Administrators should “advocate, on the state and national levels, for policies, programs and funding opportunities that support implementation of the district technology plan” (ISTE, 2006).
Nance (2003) constructed his study based on his belief that there is scant evidence as to whether administrators consider educational policymaking an issue that they should be promoting, and whether they actually participate in policymaking as a professional activity. Nance’s work is similar to the present study, which addresses proficiency in all of the NETS-A standards; Nance’s methodology, however, is narrowly focused on the policy-making standard only (p. 435).

The reasoning proposed by Nance for the narrow focus on educational policy is in many ways applicable to the present study. He noted the tremendous increase in federal and state spending on educational technology in the decade prior to his 2003 article, and the widespread efforts to harness the power of digital technology as a meaningful teaching tool. The various states have implemented practices designed to assist with technology implantation, and incorporated knowledge of technology into teacher certification requirements (p. 435-436).

According to Nance, the nation’s educational establishment has reached a point where most schools have hardware, software, and teachers with at least some expertise in educational technology. The area which is lagging is a comprehensive system for how to use the technology in an educationally sound, legal, and financially prudent manner: “Having access to technology necessitates the creation of policies to regulate its use, thus possibly providing recent opportunities for many principals to become involved in policy making at various levels” (p. 437).
Nance’s discussion section contained a key phrase which will likely apply to administrator proficiency in all areas of technology standards: “Increasing principals’ knowledge of the policy process [italics added] may be one of the most feasible and practical ways to increase administrators’ involvement” (p. 460). He stated that changes in principal preparation programs, as well as increased emphasis in the licensure process may accomplish this goal.

Brooks-Young (2006) summarized research which shows that “administrative leadership has a direct impact on all successful school reform, including the quantity and quality of technology use in schools” (p. 2). She pointed out the necessity for administrators to become proficient in educational technology requires adherence to standards, the National Educational Technology Standards for Administrators, which can be learned through professional development, as well as through formal education (p. 2).

Jim Bosco (2001), the chairperson of the collaborative which wrote the Technology Standards for School Administrators, stated that school district administrators are tremendously influential in the success or failure of technology in schools. Not only are they a force for change in a positive way, they can be, distressingly, stumbling blocks for teachers who are technologically literate and capable of making good use of technology (¶ 1).

Bosco emphasized the four minimum necessities which much exist in order for technology to be of value to schools and students. Computers themselves are first on the list; they must be present in the correct conditions and quantity to make a difference. Secondly, teaching programs, software, and
Internet access must be in place. Thirdly, the teachers have to be able to use equipment to teach with, to bring the full capabilities of the computer to bear on their profession. The final basic element, and one which can determine the success of the whole package, is the leadership of the school principal or district superintendent. Recognition of this fourth critical element led to the development of a collaborative of experts which created the document now known as TSSA (The Critical Necessities section, ¶ 1-8).

Valdez (2004) endorsed the Technology Standards for School Administrators, adopted by the International Society for Technology in Education (ISTE) as the National Educational Technology Standards for Administrators, as a leader preparation tool: “these technology standards require serious consideration by educational administrators who are working to make use of technology in schools more effective” (Section III, ¶ 16).

Creighton (2003) agreed: “This author strongly recommends that all school leaders become familiar with, and utilize, the set of standards developed by the Technology Standards for School Administrators Collaborative (TSSA Collaborative, 2001)” (p. 7).

Summary

The history of technological innovation in education has been widely uneven. The early, rural phase of American education was marked by a slow and measured rate of change. As the country became more urbanized and mass communication evolved in the 20th century, the pace of innovation quickened in the schools at a rate not previously experienced. At the turn of the century,
adoption of educational technology became policy, institutionalized in No Child Left Behind Legislation.

Another trend which accelerated parallel with and eventually coincided with widespread implementation of digital educational technology has been an emphasis on grounding and justifying this expensive trend with sound educational theory. Researchers have shown that personal computers and other electronic devices can be powerful adjuncts to teaching and learning, through methods which are substantiated through accepted pedagogical theories.

The participants in the present study, school district administrators at school and district office levels, face the task of combining three distinct but interrelated leadership dimensions in order to successfully incorporate digital electronic technology into the primary mission of increasing student achievement. School principals and district administrators will not have the luxury of dropping tasks to add to their ongoing responsibilities—they must learn to incorporate technology leadership and change leadership into the ongoing flow of school leadership responsibilities. Technology leadership has much in common with change leadership, as computers are often introduced as a version of school reform. School leaders must be strong instructional leaders to make the process work—in order to gain buy-in for the change called technology, the leader must be able to demonstrate that the change is necessary (in terms of student achievement) and that the change instrument (digital technology) is a legitimate and scientifically proven instrument for teaching and learning.
In a standards-based educational environment, a consortium of educational agencies developed the Technology Standards for School Administrators, adopted as National Educational Technology Standards for Administrators (NETS-A). This set of policies, intended as a comprehensive guideline for technological policy implementation for leaders, complements previously developed standards for teachers (National Educational Technology Standards for Teachers [NETS-T]) and students (National Educational Technology Standards for Students [NETS-S]). Although there is no unanimity about the effectiveness of these standards, most state departments of education have adopted or adapted the standards as certification guidelines, and have provided some forms of professional development to achieve proficiency. Colleges of educational administration have also tended to incorporate NETS-A standards into their leadership programs.

The current study provides a snapshot of administrator proficiency in the NETS-A standards, and examines relationships between the self-reported proficiency and a series of demographic, attitudinal, and educational factors. Assuming that proficiency in the standards is a positive indicator of success in incorporating technological innovations, this examination of relationships could lead to increased leader proficiency.
CHAPTER III

METHODOLOGY

Introduction

Chapter III provides a description of the study method. It includes information about the subjects of the study including a description of the population, selection procedures, characteristics, and size. The survey instrument (School Leader Technology Proficiency Survey) is described, along with a rationale for its use, its reliability and validity, and the procedure for its implementation.

Purpose

The purpose of this study was to examine self-reported proficiency in educational technology leadership of selected school leaders. The benchmarks for technological leadership proficiency adopted for this research are the Technology Standards for School Administrators, also called National Educational Technology Standards for Administrators (NETS-A). The results of this study provide information of value to several different institutions. State educator licensing agencies may gain a viewpoint on how well their practicing administrators are assimilating the required standards. University educational leadership departments will be able to tailor courses to ensure that graduates have some level of proficiency in technological aspects of educational leadership. Practicing K-12 educational leaders, to include superintendents, principals, and local school boards will gain a new perspective on how well their peers understand technology leadership, and will gain understanding on how well or
how poorly professional development and university education programs are preparing administrators for leading educational technology. This study will be of value to anyone interested in improving technology related leadership strategies that address current technology leadership deficiencies while improving upon technology leadership skills currently being employed. The results of the study will be provided to Cisco Systems, Inc., for their use in the ongoing evaluation of 21S.

Participants

Participants in this study were 130 K-12 educational administrators in two Gulf Coast states, namely those districts chosen to participate in 21S, a Cisco Systems Inc.-sponsored grant. The group population consisted of district-level administrators (superintendents; assistant superintendents, and central office program administrators), and school-level administrators (principals and assistant principals); all associated with schools selected for 21S.

Research Questions

1. What are the levels of proficiency (self-reported) on the NETS-A standards among principals and school district administrators participating in the 21st Century Schools Initiative?

2. Are there differences in NETS-A proficiency based on age, academic training, professional development opportunities, employment history and attitudes?
3. Is there a relationship between school administrator proficiency in NETS-A standards and administrator attitudes toward the efficacy of using technology in the classroom as a primary means of instructional delivery?

4. Is there a relationship between school administrator attitude toward change in schools, proficiency in change leadership, and proficiency in NETS-A standards?

Data Collection

In order to collect data for the study, each participant received an envelope containing these items:

1. The first enclosure was a Letter to Participants (Appendix A) explaining that the study would serve two major purposes. The primary purpose was to measure administrator proficiency in technology leadership. Secondarily the study would become an integral part of the overall evaluation plan for 21S, an aspect that could affect future grants and initiatives that promote educational technology. Included in the cover letter was an explanation that the study was endorsed by Cisco Systems.

2. Approval from the University of Southern Mississippi Institutional Review Board (Appendix B) was enclosed.

3. The survey instrument (School Leader Technology Proficiency Survey-Appendix C) was enclosed.

4. A stamped self-addressed envelope to return the completed survey was also enclosed.
As the letters were mailed, each superintendent received an email with a summary of the information above, asking him or her to anticipate arrival of the letter and requesting his/her participation and encouragement of participation among the district administrators.

**Instrumentation Design**

The School Leader Technology Proficiency (SLTP) survey instrument assessed administrators' self-reported levels of proficiency in relation to nationally adopted NETS-A technology standards, and also gathered data relative to the participants' demographic, educational, and employment history. The survey instrument is constructed in three sections, arranged as Demographic Information, Attitudes and Opinions, and NETS-A Proficiency Items.

**Demographic Information**

The first eight items gathered demographic information to include educational level and professional development experiences, any of which may be significant in terms of technology proficiency. Respondents were asked to circle the correct choice on the survey instrument, which were converted to numeric codes for statistical processing. Question numbers and information gathered include:

1. Gender
2. Highest degree
3. Current position
4. Years since college coursework in educational administration
5. Days of educational technology professional development within last three years

6. Age range

7. Number of years as K-12 teacher

8. Number of years as administrator

**Attitudes and Opinions**

This section contained seven items which deal with beliefs and personal knowledge relating to the efficacy of educational technology, administrator attitude toward change in schools, and familiarity with theories of learning related to technology integration, and with the NETS-A standards. Three of the seven items (numbers 11, 14, and 15) were worded as negative statements, in an effort to prevent patterning or repetitive responses down one side of the answer scale. Scoring for items 11, 14, and 15 was done by changing the negative to positive statements; then rearranging the responses as follows: 1 to 5; 2 to 4; 3 remains 3; 4 to 2; and 5 to 1. Responses were arranged on a Likert-type scale from 1 through 5, as follows:

1: Not true at all

2: Mostly untrue

3: Neither true nor untrue

4: Mostly true

5: Very true

Question numbers 9 through 14, with a short description of its intended content included:
9. Statement of personal familiarity with NETS-A standards
10. Statement of belief in the value of college courses in educational technology training
11. Statement of belief in the value of professional development in educational technology training
12. Belief in effectiveness of educational technology as a teaching tool
13. Comfort in leading change in teaching methods
14. Belief in a certain technique of leading change in teaching methods

**NETS-A Technology Leadership Tasks**

The final 19 survey items (items 16-34) were adapted from a publication provided by the Collaborative for Technology Standards for School Administrators (TSSA Collaborative, 2001), which listed several Technology Leadership Tasks (TLTs), that would be performed by an administrator who was following the NETS-A standards. Permission for the use of the NETS-A Standards was obtained from the International Society for Technology in Education (Appendix E).

Although separate Technology Leadership Tasks are listed in the TSSA publication for principal/assistant principals; central office program directors; and superintendents, the decision was made to use only one group of tasks (principal/assistant principal TLTs) in order to maintain consistency in results. Examination of the tasks associated with principals showed that they are broadly applicable to all school district administrators, particularly those in smaller districts.
NETS-A addresses six dimensions of technology leadership, and the Technology Leadership Tasks adapted for this study were reflective of those dimensions. NETS-A leadership dimensions, and the survey item numbers which address each dimension were as follows:

<table>
<thead>
<tr>
<th>Technology Leadership Dimension</th>
<th>Survey Item Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership and Vision</td>
<td>24, 25, 28</td>
</tr>
<tr>
<td>Learning and Teaching</td>
<td>16, 21, 33</td>
</tr>
<tr>
<td>Productivity and Professional Practice</td>
<td>18, 26, 34</td>
</tr>
<tr>
<td>Support, Management, and Operations</td>
<td>19, 27, 29</td>
</tr>
<tr>
<td>Assessment and Evaluation</td>
<td>22, 30, 32</td>
</tr>
<tr>
<td>Social, Legal, and Ethical Issues</td>
<td>17, 20, 23, 31</td>
</tr>
</tbody>
</table>

Since the 19 TLT’s associated with the NETS-A standards were originally published in groups with the intent of illustrating and explaining each dimension of technology leadership, these tasks form a pattern which would likely be discernible to the subject. Because of this probability, and because all of the items were originally written as positive statements, the researcher adapted the original format as follows:

1. Markings that identified tasks as associated with a specific dimension, e.g. Leadership and Vision, were not included in the survey instrument.

2. The numbers 16 through 34 (the Technology Leadership Task items) were entered into a random number generator which randomized those numbers; the randomized arrangement was used as the order for the survey items (www.randomizer.org, 2006).
3. Seven of the total of 19 original tasks, all of which were written as positive statements, were changed to negative statements with the intent of encouraging careful reading, and reducing the subject tendency to choose the socially correct response. Those items changed to a negative format were items 16, 18, 21, 25, 29, 31, and 34, as explained in Chapter IV (Results).

Validity

Survey instrument validity measures focused on the final 19 survey items (Technology Leadership Tasks), all of which were designed and published by the staff of the International Society for Technology in Education (ISTE), in conjunction with the Technology Standards for School Administrators (TSSA) Collaborative. The TSSA Collaborative was composed of a formidable array of professional organizations, a fact which lends a great deal of expert validity to the project, and the portion thereof which was selected as measurement items for this survey instrument. Some of the organizations included in the TSSA Collaborative include the American Association of School Administrators, the National Association of Secondary School Principals, the National Association of Elementary School Principals, the National School Boards Association, and others, to include regional educational consortiums, universities, and state departments of education.

The 19 Technology Leadership Tasks in the survey instrument were then adapted and validated in consultation with two separate groups, whose members provided valuable advice on wording and item construction. Group 1 consisted of three school district superintendents from the same geographical area as the
21S districts, but whose districts were not involved in 21S. The three had all been superintendents in excess of eight years each, and were all experienced educators with similar educational experiences and backgrounds as the 21S administrator population. Each of the three superintendents provided perspective and suggestions which were incorporated into instrument design. Group 2 consisted of three professors from a major state university, all of whom have doctorate degrees, with backgrounds in geosciences, meteorology, biology, education, and educational technology, along with extensive experience in a variety of research projects and methods. All three professors are currently conducting research into various aspects of instructional technology, as well as working with teachers and administrators in several K-12 school districts on technology integration projects. This group provided expert advice in item construction, and approved the final instrument design.

Reliability

The reliability of the survey instrument's Technology Leadership Task items (16-34) was assessed using Cronbach's Alpha, a measure of the internal consistency between and among survey items (Santos, 1999). The Cronbach's Alpha value derived was .846, which is within the acceptable range as a measure of reliability.

Data Analysis

Research questions were first analyzed using descriptive statistical methods. Data analysis also consisted of computing descriptive statistics for responses to demographic information (Section 1) of the survey instrument.
Descriptive statistics were performed to generate means, standard deviations, frequencies and percentages of respondents based on the responses to the survey instrument. Information from the 19 Technology Leadership Tasks in Section 3 were used to calculate an overall NETS-A proficiency level. In addition, proficiency levels for each of the six technology leadership dimensions were calculated and compared to both demographic and attitudinal data in order to analyze the research questions. A preset alpha of .05 was used in analyzing research questions.

Further analyses explored the relationships between and within the overall proficiency level, the six dimensions of leadership expressed in NETS-A, and various leader characteristics, demographics, and attitudes. Research Questions 2 and 4 were analyzed using simultaneous multiple linear regression; Research Question 3 was analyzed using Pearson Correlation.

Post Hoc Analysis

After examination of the research questions, the researcher further explored relationships among variables which were not analyzed originally. Correlational analysis was performed to determine if there were statistically significant relationships between the NETS-A proficiency variable and three untested variables: Belief in Personal Knowledge of NETS-A; Belief that Professional Development was Good Preparation for Use of Technology; and Gender.
CHAPTER IV

RESULTS

Discussion of Results

The purpose of this study was to examine levels of technology leadership proficiency among school administrators participating in the Twenty-First Century Schools (21S) Initiative; to evaluate relationships between certain demographic variables and technology leadership proficiency; to examine relationships between attitudes toward change and technology leadership proficiency; and to examine relationships between belief in the efficacy of educational technology and technology leadership proficiency.

Data were collected using a School Leader Technology Proficiency (SLTP) survey instrument. Data analysis consisted of computing descriptive statistics based on the responses to the items in the instrument. Descriptive statistics were performed to generate means, standard deviations, frequencies, and percentages for Research Question 1. Multiple Linear Regression (MLR) analysis was used to examine Research Questions 2 and 4. A Pearson correlation was used to evaluate Research Question 3.

In order to lessen the likelihood of patterned responses, several questions in the survey were phrased in a negative manner. As responses were received and prior to data input into statistical analysis tools, all responses to negatively phrased questions were transposed from their place on the Likert-type scale of answers as follows:

Response marked 1 became 5.
Response marked 2 became 4.
Response marked 3 remained 3.
Response marked 4 became 2.
Response marked 5 became 1.

This transposition assumes that each item written in a negative format would, if rephrased as a positive statement, produce a response as indicated above. All statistical examinations of data were then performed with each survey item considered to be written in a positive format, with responses producing results as above. Survey Items which were treated in this manner as listed in Table 1.

Table 1

*Survey Items Transposed from Negative to Positive Format*

<table>
<thead>
<tr>
<th>Item</th>
<th>Information Gathered</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Value of professional development activities since college</td>
</tr>
<tr>
<td>14</td>
<td>Familiarity with learning theories of educational technology</td>
</tr>
<tr>
<td>15a</td>
<td>Belief in a certain style of change leadership</td>
</tr>
<tr>
<td>16</td>
<td>Support of professional development in educational technology</td>
</tr>
<tr>
<td>18</td>
<td>Use of technology in management systems to access records</td>
</tr>
<tr>
<td>21</td>
<td>Tendency to use data to evaluate student performance</td>
</tr>
<tr>
<td>25</td>
<td>Participation in district shared vision including technology</td>
</tr>
<tr>
<td>29</td>
<td>Belief in funding the district technology plan</td>
</tr>
<tr>
<td>31</td>
<td>Belief in importance of enforcing copyright and security issues</td>
</tr>
<tr>
<td>34</td>
<td>Personal use of digital communication systems to communicate</td>
</tr>
</tbody>
</table>
Item 15 does not follow the description above of items appearing as negative statements changed to positive. Rather, Item 15 as stated reflects support of a change management philosophy which can be described as autocratic or top-driven. The reversal of responses to Item 15 would reflect that respondents who chose low numbers, reflecting that the philosophy described was not typical of them personally would then be surmised to agree with a change management philosophy that embraced inclusion and buy-in.

Descriptive Analyses

Survey instruments were mailed to 130 practicing K-12 administrators in two southern states between January and March 2007. All of the administrators were chosen from the seven school districts currently participating in the Twenty-First Century Schools Initiative sponsored by Cisco Systems, Inc. Total number of returns was 80, for a return rate of 62%. Respondent data were entered into a statistical software package to produce descriptive analyses, and to perform the statistical tests necessary to test the research questions.

Survey Instrument Section 1

Section 1 consisted of items 1 through 8, eliciting information about demographics, professional experience, and educational background. Table 2 portrays specific data from Section 1 of the survey instrument. Items that were used as predictor variables include 2, 3, 4, 5, 6, and 8.

Table 2

Section 1 of SLTP Survey Instrument: Response Percentages
<table>
<thead>
<tr>
<th>Item and Number</th>
<th>Response &amp; Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Percentage</td>
<td>38.7</td>
</tr>
<tr>
<td>2. Highest Degree</td>
<td>Masters</td>
</tr>
<tr>
<td>Percentage</td>
<td>61.3</td>
</tr>
<tr>
<td>Percentage</td>
<td>38.7</td>
</tr>
<tr>
<td>4. Years Since College</td>
<td>0-5</td>
</tr>
<tr>
<td>Percentage</td>
<td>49.3</td>
</tr>
<tr>
<td>5. Days of Professional Development in 3 years</td>
<td>0-9</td>
</tr>
<tr>
<td>Percentage</td>
<td>50.7</td>
</tr>
<tr>
<td>6. Age</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Percentage</td>
<td>4.0</td>
</tr>
<tr>
<td>7. Years Taught</td>
<td>&lt;6</td>
</tr>
<tr>
<td>Percentage</td>
<td>16.0</td>
</tr>
<tr>
<td>8. Years as Administrator</td>
<td>&lt;6</td>
</tr>
<tr>
<td>Percentage</td>
<td>41.3</td>
</tr>
</tbody>
</table>

**Survey Instrument Section 2**

Section 2 (items 9 through 15) consisted of seven belief and attitude statements relative to academic preparation, professional development, technology proficiency, and change leadership. Each item asked the respondent to indicate his or her personal proficiency or belief by marking a number from 1...
through 5 on a Likert-type scale as indicated previously. Table 3 provides information on responses to Section 2.

Table 3

*Section 2 of SLTP Survey Instrument: Means and SD*

<table>
<thead>
<tr>
<th>Number</th>
<th>Item Description</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Belief that Educational Technology is Proven/Effective</td>
<td>4.43</td>
<td>.60</td>
</tr>
<tr>
<td>13</td>
<td>Comfort with Leading Change in Teaching Methods</td>
<td>4.11</td>
<td>.86</td>
</tr>
<tr>
<td>15</td>
<td>Belief in Leading Change as Consensus Process</td>
<td>3.25</td>
<td>1.37</td>
</tr>
<tr>
<td>14</td>
<td>Familiarity with Learning Theories of Educational Tech</td>
<td>3.15</td>
<td>1.15</td>
</tr>
<tr>
<td>11</td>
<td>Belief that Professional Development was Good Prep</td>
<td>2.95</td>
<td>1.21</td>
</tr>
<tr>
<td>9</td>
<td>Personal Familiarity with TSSA NETS-A</td>
<td>2.83</td>
<td>1.22</td>
</tr>
<tr>
<td>10</td>
<td>Belief that College was Good Preparation for Tech Use</td>
<td>2.28</td>
<td>1.21</td>
</tr>
</tbody>
</table>

*Survey Instrument Section 3*

Section 3 of the survey instrument (items 16 through 34) was designed to elicit self-reported proficiency levels on the six components of NETS-A, from which an overall NETS-A proficiency level was calculated, as shown in Table 4:

Table 4

*Section 3 of SLTP Survey Instrument: Means and SD*
### Statistical Analyses

Research Question 1: What are the levels of proficiency (self-reported) on the NETS-A standards among principals and school district administrators participating in the 21st Century Schools Initiative?

Answers to the first research question were derived from an examination of responses to nineteen Technology Leadership Tasks, representing the six components of the NETS-A Standards. Respondents provided a rating for themselves for each of the nineteen Technology Leadership Tasks on a Likert-type scale of 1 to 5, representing a range from “Not True at All” to “Very True.” The overall mean for NETS-A proficiency was 4.18, with a standard deviation of .53. The categorical means and standard deviations for each NETS-A component are detailed in Table 4.

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Dimension of NETS-A Standard</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>18, 26, 34</td>
<td>Productivity and Professional Practice</td>
<td>4.48</td>
<td>.64</td>
</tr>
<tr>
<td>19, 27, 29</td>
<td>Support, Management, and Operations</td>
<td>4.28</td>
<td>.62</td>
</tr>
<tr>
<td>17, 20, 23, 31</td>
<td>Social, Legal, and Ethical Issues</td>
<td>4.24</td>
<td>.60</td>
</tr>
<tr>
<td>16, 21, 33</td>
<td>Learning and Teaching</td>
<td>4.23</td>
<td>.70</td>
</tr>
<tr>
<td>24, 25, 28</td>
<td>Leadership and Vision</td>
<td>4.02</td>
<td>.81</td>
</tr>
<tr>
<td>22, 30, 32</td>
<td>Assessment and Evaluation</td>
<td>3.79</td>
<td>.79</td>
</tr>
<tr>
<td>Overall NETS-A Mean</td>
<td></td>
<td>4.18</td>
<td>.53</td>
</tr>
</tbody>
</table>
Research Question 2. Are there differences in NETS-A proficiency based on age, academic training, professional development opportunities, employment history and attitudes?

A simultaneous multiple regression analysis was conducted to determine which predictor variables (age, academic training, professional development opportunities, employment history, and attitudes), alone or in combination, were significant predictors of NETS-A proficiency. Data screening confirmed no elimination of data. Regression results indicated that none of these predictors in the model significantly predicted NETS-A proficiency, in combination accounting for only 7.1% of the variance in NETS-A. $R^2 = .071$, $R^2_{Adj} = -.011$, $F(6,68) = .865$, $p = .525$.

Research Question 3. Is there a relationship between school administrator proficiency in NETS-A standards and administrator attitudes toward the efficacy of using technology in the classroom as a primary means of instructional delivery?

A Pearson product-moment correlation analysis was conducted to evaluate the prediction of NETS-A proficiency from administrator attitudes toward the efficacy of using technology in the classroom as a primary means of instructional delivery. The analysis resulted in no significant relationship, $r (N = 75) = .064$, $p = .05$.

Research Question 4. Is there a relationship between school administrator proficiency in change leadership [Comfort with Leading Change], attitude toward
change in schools [Belief in Change as Consensus Process], and proficiency in NETS-A standards?

A simultaneous multiple regression analysis was conducted to determine which predictor variables (Comfort with Leading Change and Belief in Change as Consensus Process), alone or in combination, were significant predictors of NETS-A proficiency. Data screening confirmed no elimination of data. Regression results indicated a model with one predictor (Comfort with Leading Change) that significantly predicted NETS-A proficiency. $R^2 = .144$, $R^2_{Adj} = .120$, $F(2,72) = 6.051$, $p = .004$. This model accounted for 14.4% of the variance in NETS-A.

Post Hoc Analysis and Ancillary Findings

The researcher discovered additional items of interest that were not addressed in the statistical analyses of the four original research questions. Three previously untested variables on the School Leader Technology Survey Instrument proved to be statistically significant when correlated with the NETS-A proficiency variable. These three variables are Belief in Personal Knowledge of NETS-A; Belief that Professional Development was Good Preparation for Use of Technology; and Gender.

Belief in Personal Knowledge was measured with a statement on the survey instrument that asked the respondent to mark a choice of the relative truth of the statement that he or she was "very familiar with TSSA/NETS-A standards." The greatest number of participants (46.6%) indicated that this statement was either not true or mostly untrue for them. Only 9.3% chose the neutral response,
and the remaining 44% indicated true or very true as their personal level of familiarity with these standards. When analyzed as a simple correlation, the two variables showed a significant relationship at the .05 level, \( r = .237 \).

Belief that Professional Development was Good Preparation for Technology Use was measured with a statement worded in much that way. Responses were very evenly divided along positive and negative lines. A fairly large number (16%) marked the neutral (neither true nor untrue) category; the not true/mostly untrue side of the scale garnered 44%, and the mostly/very true answers totaled 40%. A correlation with NETS-A proficiency resulted in significance at the .01 level, \( r = .392 \).

Gender percentages were 38.7% male and 61.3% female. The overall NETS-A mean proficiency score was 4.18. For males in our study, the mean score was 4.02. For females, the mean NETS-A proficiency score was 4.28. Correlating gender with NETS-A resulted in significance at the .05 level, \( r = .240 \).

Summary

In Chapter IV, the purpose of the study and the methods of data analysis were discussed. The School Leader Technology Survey (SLTP) instrument was examined, and detail given about the makeup of several survey items, and a method of transposition or items from a negative format to positive statements. Section 1 (Demographics and Personal Experience) was displayed by variable of response percentages. Section 2 (Beliefs and Attitudes) was examined in terms of mean and standard deviation, as was Section 3 (NETS-A Proficiency). Research Questions 1 through 4 are addressed in terms of statistical analysis.
and/or significance. The chapter concludes with a discussion of ancillary findings based on a post hoc analysis of variables.
CHAPTER V
DISCUSSION
Review of Results

The movement toward accountability in all aspects of K-12 education increases the responsibility of school administrators to manage people and information in ways previously unimagined. This new spectrum of tasks brings with it leadership challenges that require increased personal proficiency for all school leaders, and also holds out the potential for achieving the lofty goals of No Child Left Behind Legislation. "That potential is dramatically enhanced by school administrators' abilities to link technology, pedagogy, professional development, and leadership to student achievement" (Glickman, 2003).

This study was conducted to examine proficiency of certain school administrators in a set of nationally-adopted standards of technology leadership proficiency, the National Educational Technology Standards for Administrators (NETS-A). These standards address administrator performance in the areas of:

1. Leadership and Vision
2. Learning and Teaching
3. Productivity and Professional Practice
4. Support, Management, and Operations
5. Assessment and Evaluation
6. Social, Legal, and Ethical Issues

Four research questions were examined in the study; question one was analyzed using descriptive statistical data; questions two and four were analyzed...
using multiple regression; and question three was analyzed with a Pearson product moment correlation.

This chapter reviews and discusses the results of the study, addressing each of the four research questions, and addressing implications and recommendations for future study.

Research Question 1

What are the levels of proficiency (self-reported) on the NETS-A standards among principals and school district administrators participating in the 21st Century Schools Initiative?

Nineteen of the 34 items on the School Leader Technology Proficiency Survey were adapted from Technology Leadership Tasks (TLT), produced by the International Society for Technology in Education to show specific school administrator leadership tasks related to the six standards of NETS-A. Each of the standards was represented by three TLTs except for Social Legal, and Ethical Issues, which had four TLTs. The nineteen TLTs were randomly arranged in order to minimize patterning in the responses, and six of them were reworded as negative statements. Responses were limited to numbers on a Likert scale of one through five, representing a spectrum of agreement with the statements, as follows: 1=Not true at all; 2=Mostly untrue; 3=Neither true nor untrue; 4=Mostly true; 5=Very true.

The overall NETS-A proficiency mean score of 4.18 appears to be somewhat inflated and represents a self-reported level of expertise that may or may not reflect the true ability levels of a typical group of school administrators in
this rather specialized category. The mean falls between the levels of “True of Me” and “Very True of Me,” and would indicate, taken at face value, that this group of administrators was functioning at a very high level of self-reported proficiency across the board on each of the six standards of NETS-A.

The relatively high mean scores for NETS-A are likely due to the halo effect inherent in respondents’ answers to items which purport to describe their behavior. Although the survey instrument introductory material contained two statements asking for unbiased responses and guaranteed anonymity, it is apparently to be expected that the conscious or unconscious desire to select the socially desirable answers would affect the responses.

Examining the mean scores for each of the six NETS-A standards provides a more in-depth view of the overall NETS-A mean score. Respondents clearly rated themselves highest in the category of Productivity and Professional Practice. This standard, described as one where “educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others” (TSSA, 2001), may be reflective of the high level of personal productivity and personal work ethic normally associated with principals and other school administrators. These high-functioning men and women very likely see themselves as using all the latest technological advantages to perform better personally, to increase their own output level, and to improve their supervisory abilities.

Mean scores for Learning and Teaching; and Support, Management, and Operations were 4.22 and 4.26, respectively. The Learning and Teaching
Standard, designed to "integrate appropriate technologies to maximize learning and teaching" (TSSA, 2001) goes to the very mission of educational administrators. This standard applies to all of our respondents, and particularly to the building principals. We can only hope that the level reported is an accurate representation of actual performance. Support, Management, and Operations is more about maintaining the system itself, of ensuring compatibility of technologies; of allocating resources to support the network; of integrating plans and policies to ensure alignment of efforts; to continuously improve the systems; and to replace technology appropriately (TSSA, 2001). This standard speaks to the aspects of the physical layout of technology networks, and to its maintenance as another utilitarian system. Our respondents, by answering this item as very near the overall NETS-A Mean, show themselves to be good stewards of the resources required to support technology.

Mean scores for three of the standards fall below the overall mean score. Social, Legal, and Ethical Issues, at 4.06, and Leadership and Vision, at 4.04, are very near the overall mean score of 4.18. The standard of Social, Legal and Ethical Issues requires perhaps the least personal proficiency in the use of technology to be considered proficient. This standard addresses issues of equity of access; promotion of legal and ethical practices in conjunction with technology use; enforcing privacy, security, and safety issues; and safeguarding copyrights and intellectual property (TSSA, 2001). Leadership and Vision as a technology standard appears to be a reworking of Standard 1 of the Standards for School Leaders endorsed by the Interstate School Leaders Licensure Consortium.
(ISLLC). This standard reflects the same sort of language as that used in the ISLLC standard, and is a suitable reflection of harnessing the power of technology to assist school leaders in achieving their goals of promoting consensus; developing long-range plans; nurturing a responsible culture; and advocating for improvements to technology specifically and to education in general (TSSA, 2001).

The NETS-A standard with the lowest mean score (3.81), is Assessment and Evaluation. This standard, described as the “use [of] technology to plan and implement comprehensive systems of effective assessment and evaluation” (TSSA, 2001), addresses the use of data to improve the performance of staff, students, and systems. This standard addresses the ongoing evaluation of appropriate technology use; the use of technology itself to gather data for the purpose of improving teaching and learning; conducting evaluations of staff proficiency in order to plan the appropriate professional development; and using technology to increase efficiencies in administrative and operational systems (TSSA, 2001). The relatively low mean score here could reflect a problem with the demanding schedules of school administrators, where many in the profession understand the need to gather data in order to evaluate and plan for improvement, but do not feel that they have the time to assess, but must continuously move forward, driven by the rush of events.

Research Question 2
Are there differences in NETS-A proficiency based on age, academic training, professional development opportunities, employment history and attitudes?

Respondents were asked to identify their age by group category (<30, 30-39, 40-49, 50-59, 60+). The measure of academic training was taken with two items; one asking for highest degree (masters, specialist, and doctorate), and another asking how many years have elapsed since the respondent attended college, with responses grouped in categories. Professional development opportunities were measured with an item asking for the identification, in blocks of days, how many days of professional development he or she had experienced within the past three years. Employment history was measured by asking respondents to identify their number of years as administrator. Measurement of attitude was derived from an item asking for the respondent's belief that their college experience provided good preparation for the use of technology in schools. Multiple regression analysis showed no significant relationships between any of the variables listed and NETS-A proficiency.

The assumption that there could be value in determining trends in the administrators' age, academic background, job experience, or professional development while serving as an administrator, was not borne out in the statistical analysis. The age ranges of respondents were every evenly distributed across the decades, thus virtually eliminating the possibility of this variable resulting in a significant measure when compared with an overall NETS-A score. In terms of academic background, the majority had masters' degrees. Nearly half
of the respondents had at least one college course in the past five years, but this statistic apparently made no impact on NETS-A proficiency. The professional development variable showed a result that about half of the respondents answered in the lowest category (0-9) of the number of days in the last three years. Of all the variables in this research question, this one came closest to providing any sort of impact on NETS-A proficiency, leading to a possibility that with a more precise measurement of professional development, this variable could be shown to have a significant impact on the technological leadership proficiency of school administrators. Of the respondents in this study, 41.3% responded that they have less than six years of service as administrators. Although this variable showed no significant relationship with the NETS-A proficiency index, it is worthy of note that the population of administrators in this study are a relatively inexperienced group. The final variable in this question, based on the respondent’s belief that their college education was good preparation for the use of technology, although again statistically non-significant, has a powerful message to colleges of education: The largest single response block answered “not true at all” to the statement that college was good preparation for them in terms of technology use; and an additional quarter of the sample felt that statement was mostly untrue. This majority negative response to the value of their college training deserves further exploration.

Dawson and Rakes (2003) explored the level of technology integration in schools and relationships between many of the same variables addressed in the present study. Where the present study found no significant relationship
between age and technology proficiency, Dawson and Rakes found a significant relationship between age and technology integration. As with the present study, the number of years as an administrator was not a predictor of proficiency in technology leadership. Dawson and Rakes did not find a significant relationship based on the sex of the administrator; gender differences in this study will be discussed here in the Post Hoc Analysis section (p. 43).

Dawson and Rakes also found a significant relationship between the amounts of technology professional development and the measures of technology integration in schools. Although the present study found no statistical significance between the amounts of technology professional development and NETS-A proficiency, there did seem to be a very weak tendency for the professional development variable to have an effect on proficiency levels.

Research Question 3

Is there a relationship between school administrator proficiency in NETS-A standards and administrator attitudes toward the efficacy of using technology in the classroom as a primary means of instructional delivery?

Variables analyzed for this research question included the overall NETS-A mean, and the mean of a statement designed to measure administrator belief in the value of educational technology as “proven and effective.” This research question was analyzed using a Pearson product-moment correlation, and showed no statistically significant relationship between the variables.

Based upon the expansive nature of the NETS-A standards, administrators would appear to need a deep level of personal commitment and
buy-in to report a high level of proficiency in those standards. NETS-A, reflective of other administrator standard templates such as the ISSLIC standards, requires not only knowledge of the nuts and bolts of classroom computer use, but levels of planning skill, operational functionality, visionary thought, and dedication to a new way of teaching and learning. The researcher theorized that administrators with a strong belief in the efficacy of educational technology as a means of instructional delivery would also tend to have a higher NETS-A score. This assumption was not borne out by the statistical analysis.

This lack of statistical significance could be based on the wording of the predictor variable, or the fact that only one variable was used to measure this particular administrator attitude.

*Research Question 4*

Is there a relationship between school administrator attitude toward change in schools, proficiency in change leadership, and proficiency in NETS-A standards?

School administrator attitude toward change in schools was measured using a statement designed to measure personal belief in leading change as a consensus process versus a more autocratic approach. Proficiency in change leadership was measured with responses to a statement about the respondent’s personal comfort with leading changes in teaching methods. These two change variables, taken together, provided a statistically significant relationship with the NETS-A measure. The analysis of this question shows that only one of the two change variables (proficiency in change leadership/comfort in leading change)
provided the significant result. The responses to the change comfort statement indicated that the great majority of the respondents answered positively, with only 8% replying in a negative manner. This large majority response must be leavened with the possibility of a halo effect as mentioned earlier in this study, but clearly shows a significant relationship with the overall NETS-A proficiency score.

Several researchers (Anderson & Dexter, 2005; Valdez, 2004; Merkley, Bosik, & Oakland, 1997) have equated change leadership with technology leadership, building a strong case that proficiency in one is closely tied to success in the other. This finding is reinforced by the finding of a statistically significant relationship between change variables and the NETS-A proficiency measure in this study. Anderson and Dexter's conclusions describe successful technology implementation in much the same language that one would choose to describe any positive move toward change implementation, where those with the most to gain, the students, teachers and other stakeholders become a cohesive group working with a common goal of adopting technology in new ways to improve learning (Implications section, ¶3).

Valdez (2004) closely links technology leadership with principal leadership in general and change leadership in particular. School leadership has always been about managing change, and technology implementation appears to be the latest incarnation of that change cycle. Technology implementation, with its greatly circumscribed replacement cycle for hardware and software, promises to be the major change catalyst for the future of education.
Limitations

The study resulted in a NETS-A proficiency measurement which suffers the limitation of being self-reported, and which does not objectively measure behaviors which could perhaps more accurately reflect proficiency.

The population of potential study respondents was very small (130).

The geographical area from which respondents were drawn was very circumscribed, with the possible result that many of the respondents had attended the same educational institutions and professional development sessions, thereby possibly limiting a variety of attitudes and opinions.

Post Hoc Analysis

Three previously untested variables (Belief in Personal Knowledge of NETS-A; Belief that Professional Development was Good Preparation for Use of Technology; and Gender) were all found to have some levels of statistically significant relationships in an analysis performed after the stated Research Questions were examined.

The fact that Belief in Personal Knowledge of NETS-A was significant when correlated with NETS-A proficiency seems to be actually reasonable on its face. It is rational to expect that those who tended to state that they were actually proficient or knowledgeable about a set of standards, such as NETS-A, would then go on to self-report corresponding levels of proficiency in a subset of items purporting to measure that proficiency. Belief that Professional Development was Good Preparation for Technology Use appears to reflect that these are the persons who had the greatest number of days of recent professional
development, or perhaps whose professional development experiences were most meaningful. A significant correlation with Gender and NETS-A proficiency is a somewhat unique finding, and runs counter to one of the results of Dawson and Rakes' 2003 study, which showed no gender differences in their measure of technology integration in schools.

Implications for Policy and Practice

Informed school leadership is the key to successful implementation of technology into the public education system. School leaders, who are already expected to manage change in all its manifestations, and to efficiently administer both physical plant and a curricular kaleidoscope, must somehow master the greatest change initiative yet—instructional technology. The current (2004) National Educational Technology Plan published by the United States Department of Education proposes the strengthening of leadership as its primary recommendation in support of educational technology.

For public education to benefit from the rapidly evolving development of information and communication technology, leaders at every level—school, district, and state—must not only supervise, but provide informed, creative, and ultimately transformative leadership for systemic change. (USDE, 2004)

This study was initiated with the belief that educational leadership is the most important factor in successfully harnessing the power of education technology in K-12 educational institutions. Although several of the study's data analyses did not show statistical significance in pinpointing relationships between
one measure of educational leadership, there were several findings which appear to support the recommendation for strengthening leadership. Two specific recommendations from the National Education Technology Plan can be addressed with information gained in this study.

Recommendation one calls on states, districts, and individual schools to implement professional development programs designed to reach a higher level of technological proficiency among school leaders. The respondents in our study were receiving considerable amounts of professional development on educational technology. Although the amounts of professional development did not significantly predict NETS-A proficiency, a question dealing with personal belief in the effectiveness of professional development did correlate significantly with NETS-A proficiency.

Recommendation two calls on formal administrator education programs in colleges and universities to upgrade their course offerings related to technological decision-making and also change leadership. Although over two-thirds of the respondents of this study had been in college at some point within the past 10 years, the mean answer to the belief statement that college was good preparation for technology use reflected very little belief in that statement. Only a quarter of the respondents provided a positive response to this statement, with all the rest being negative or neutral. The examination of the response to this one statement affirms the call to upgrade and retool administrator education programs in the area of educational technology.
Three remaining recommendations designed to strengthen leadership in technology include the development of partnerships between schools, higher education, and the community; encouraging technology partnerships with the business community; and including student input into the planning process, are all sound policy proposals which are rooted in the Twenty-First Century Schools (21S) program on which this study was based. These proposals echo the mission and standards statements accompanying 21S, and are all being actively pursued throughout the planning, execution, and evaluation phases.

One emerging technology leadership idea which is gaining adherents in larger school districts is the inclusion of a chief technology officer (CTO) or chief information officer (CIO) on the superintendent’s staff, usually reporting directly to the superintendent. Although the normal duties of this person lean more toward the networking and purely technical side of the issue, the position as described by the Consortium for School Networking (CoSN) should be filled by a person with “skills in everything from budgeting to systems management, from business leadership to education and training” (Salpeter, 2006, p. 3).

CoSN has also formulated a Skills Framework for the CTO which is closely aligned with NETS-A standards as outlined in this study:

1. “Leadership and Vision
2. Planning and Budgeting
3. Team Building and Staffing
4. Systems Management
5. Information Management
6. Business Leadership

7. Education and Training

8. Ethics and Policies

9. Communication Systems

According to CoSN, the CTO must be a "skilled administrator, a knowledgeable educator, an effective communicator, and a technologically-savvy individual who can work with all district staff at all levels within the organization" (Consortium for School Networking, 2004).

Suggestions for Future Research

Future research in this area should explore several assumptions:

1. Technology integration in schools has the potential to raise student achievement. Although a large majority of educators and researchers appear to support this statement, actual and substantiate results continue to be elusive.

2. Administrators need a set of realistic standards to use as a behavioral template to achieve success in technology integration. This study explored the current set of technology leadership standards and found it difficult to definitively match them with results.

3. The current NETS-A standards are sufficient to meet the needs of school administrators. Again, this study’s look at NETS-A standard showed the relative ambiguity of these standards as leadership preparation.

4. Administrator preparation programs in colleges prepare administrator candidates properly for leadership in technology integration. Most school leaders in this study did not agree with this statement.
5. Professional development programs are available to update administrators on technology leadership, and are utilized accordingly. Administrators in this study had decidedly mixed opinions about the effectiveness of their professional development.

6. School administrators are proficient in change leadership. Change leadership was found to be closely related to technology leadership; exploring both types of leadership in concert would be interesting research.

7. School administrators understand how to manage the planning, operational, financial, and support challenges of technology implementation. Administrators in this study reported fairly high levels of proficiency in this task; more research should be constructed to objectively measure proficiency.

8. School administrators understand how to manage and translate technology integration into increased student achievement through improvements in pedagogy.

9. School administrators understand how theories of learning are implemented, enhanced and augmented by particular types, methods, and uses of educational technology. For Suggestions 8 and 9, the present study only appeared to show that administrators by and large self-report expertise in managing learning through technology. Further research is needed to objectively measure and relate technological and pedagogical leadership proficiency to student achievement.

10. There should be a means of determining actual proficiency in NETS-A standards through objective analysis. This study was limited by dependence on
self-reporting. Other studies in the literature selected school-based indicators as measures of administrator proficiency which may have had nothing to do with a current administrator. Under the assumption that a knowledge of NETS-A proficiency among school leaders would be of value to a broad section of the K-12 educational establishment, genuine measures of NETS-A proficiency would contribute to the profession.

Conclusions

The stated purpose of this study was to examine levels of technological leadership proficiency among a group of practicing school district administrators in specific school districts in two Gulf South states, and to explore relationships between proficiency levels and a variety of demographic and educational factors, and personal beliefs and attitudes. This purpose was accomplished by adapting several Technology Leadership Tasks (TLT) associated with the National Educational Technology Standards (NETS-A) into a survey instrument format which gathered data to translate into numerical proficiency levels on each NETS-A standard, as well as an overall NETS-A standard.

The study found no statistical significance between several variables and the NETS-A proficiency measurement. Those variables include age, academic training, professional development opportunities, employment history, and attitudes. The study did find a statistically significant relationship when comparing two variables related to change leadership to NETS-A proficiency, with one of the variables providing the preponderance of the relationship.
Several areas of note became clear during the background research for this study, one of which is the need for administrators to understand the relationships between three interrelated forms of school leadership. These leadership components are:

1. Instructional Leadership, which is increasingly defined as the form of leadership that principals, in particular, are assumed to master as their primary mission. Although they are beset with managerial and disciplinary tasks without end, the overriding purpose of the job of the principal has become to focus the efforts of the entire staff on increasing student achievement.

2. Change Leadership: Although our systems of primary and secondary education remain frustratingly similar to the classrooms of a century ago in organization and format, there has never been a shortage of changes and innovations brought to bear at the school site. School leaders without change leadership skills can succeed only in an environment where change does not occur. Change has always been a way of life for school leaders, and will continue to represent a real challenge to our best leadership efforts.

3. Technology Leadership: Technology represents the most significant change in the method of educating students that has occurred in decades. This is not an innovation that will “come to pass,” so it must be dealt with for the long term. Technology leadership, as has been discussed herein, is a melding of instructional leadership and change leadership. Although some leaders will naturally have greater skills than others, technology leadership is not strictly intuitive—it must be learned and practiced to guarantee proficiency.
Another dimension of elementary and secondary education which may be addressed by continual inquiry of this type is the Standards and Accountability Movement and the relationship of that movement to administrator standards such as NETS-A. The standards movement in American education has become a corollary factor to the influx of technology integration into schools, occurring at approximately the same time. Standards mean many things to many people, but the definite trend is to incorporate standards for students, for teachers, for administrators, and for every aspect of K-12 education. Schools would be well served to advocate for adequate and accurate standards of behavior in all aspects, including those explored in this study.
APPENDIX A

LETTER TO PARTICIPANTS

February 4, 2007

Dear Colleague:

I am a doctoral student working on a research study in conjunction with Drs. Michael Ward and Thelma Roberson in the Department of Educational Leadership and Research at the University of Southern Mississippi. In the study, we intend to measure the proficiency of a group of school and district administrators on the National Educational Technology Standards-Administrators (NETS-A), and compare this self-reported proficiency with education, experience, and professional development opportunities. You have been chosen to participate based on your district’s inclusion in the Twenty-First Century Schools (21S) program sponsored by Cisco Systems, Inc. This project is endorsed and supported by Dr. Peg Maddocks, a Cisco Systems Fellow who is spearheading the assessment of 21S. The research results will be provided to the assessment management team as part of their overall evaluation of 21S.

Since the total population of school district administrators who are participating in this program is quite small, your personal involvement is very important to the success of the project. Your participation is completely voluntary and your anonymity will be protected; you may withdraw from the study at any time.

Please complete the enclosed School Leader Technology Proficiency survey form and return to me in the enclosed self-addressed envelope. Your completion and return of the survey instrument indicates your understanding of the process and your willingness to participate. If you have any questions concerning the study, please contact me at ______.

This project has been reviewed by the Human Subjects Protection Committee, which ensures that research involving human participants follows all federal regulations. The Director of the Human Research Committee may be reached at The University of Southern Mississippi.

The results of this research will benefit our schools and students, as well as promoting a more complete education of school administrators in the area of educational technology. Thanks so much for your cooperation.

Sincerely,

Alan Oubre
Doctoral Student
The University of Southern Mississippi
APPENDIX B

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE APPROVAL

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 27010402
PROJECT TITLE: Technological Leadership Proficiency Among School Administrators in the Mississippi Education Initiative and the Louisiana Education Initiative
PROPOSED PROJECT DATES: 10/01/06 to 05/01/07
PROJECT TYPE: Dissertation or Thesis
PRINCIPAL INVESTIGATORS: Alan Oubre
COLLEGE/DIVISION: College of Education & Psychology
DEPARTMENT: Educational Leadership & Research
FUNDING AGENCY: N/A
HSPRC COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 01/04/07 to 01/03/08

Lawrence A. Hosman, Ph.D.
HSPRC Chair
1-05-07 Date
**APPENDIX C**

**SURVEY INSTRUMENT**

*School Leader Technology Proficiency (SLTP) Survey Cover Sheet:*

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>How long is this survey instrument?</td>
<td>34 short-answer items</td>
</tr>
<tr>
<td>How long will it take to complete?</td>
<td>About 10 minutes or less</td>
</tr>
<tr>
<td>Who will see my answers?</td>
<td>No one will ever be identified by name or other personally identifying information. When the research is complete, all user input forms will be destroyed, leaving only anonymous statistical data. The power and value of this survey will not be based on individual answers, but in the statistical analysis of all responses.</td>
</tr>
<tr>
<td>Are there right and wrong answers?</td>
<td>No. All honest responses are correct.</td>
</tr>
<tr>
<td>Should I answer what I <em>believe to be the right thing, or what I actually do</em></td>
<td>Please respond with your actual behavior or opinion.</td>
</tr>
</tbody>
</table>
### Section 1: Please read each statement below, then circle the appropriate response to the right of the statement.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My gender is:</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2</td>
<td>The highest academic degree I have earned is:</td>
<td>Masters</td>
<td>Specialist</td>
</tr>
<tr>
<td>3</td>
<td>My current position is:</td>
<td>Principal</td>
<td>Asst Principal</td>
</tr>
<tr>
<td>4</td>
<td>Number of years since last college coursework in educational administration.</td>
<td>&lt;5</td>
<td>5-9</td>
</tr>
<tr>
<td>5</td>
<td>Within the last three years, how many days of professional development dealing with educational technology have you had?</td>
<td>&lt;10</td>
<td>10-19</td>
</tr>
<tr>
<td>6</td>
<td>My age range is:</td>
<td>&lt;30</td>
<td>30-39</td>
</tr>
<tr>
<td>7</td>
<td>I was a K-12 school teacher for ____ years.</td>
<td>0-5</td>
<td>6-10</td>
</tr>
<tr>
<td>8</td>
<td>I have been an administrator for ____ years.</td>
<td>0-5</td>
<td>6-10</td>
</tr>
</tbody>
</table>

### Section 2: Read each statement below, then circle the number which most closely describes your personal knowledge, beliefs, and attitudes.

<table>
<thead>
<tr>
<th></th>
<th>Not true at all</th>
<th>Mostly untrue</th>
<th>Neither true nor untrue</th>
<th>Mostly true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>I am very familiar with Technology Standards for School Administrators (TSSA), also known as National Educational Technology Standards for Administrators (NETS-A)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>My college education prepared me very well for proficiency in leadership of educational technology.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Professional development activities since college have not prepared me well for proficiency in leadership of educational technology.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I believe that educational technology is a proven, effective means of increasing student achievement.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>I am very comfortable with leading significant changes in teaching methods and practices in my school or district.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>I am unfamiliar with theories of learning associated with educational technology.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>I believe the best method of introducing change in teaching methods is to announce the change, then follow up to ensure compliance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Section 3: Read each statement below, then circle the number which most closely describes your behavior as an administrator.

<table>
<thead>
<tr>
<th></th>
<th>Not true at all</th>
<th>Mostly untrue</th>
<th>Neither true nor untrue</th>
<th>Mostly true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>I am not a supporter of teacher professional development that promotes integration of technology as a method of improving student learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>I participate in the development of facility plans that support healthy, environmentally safe practices related to the use of technology.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>I do not normally use current technology-based management systems to access and maintain personnel and student records.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>I provide campus-wide staff development for sharing work and resources across commonly used formats and platforms.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>I adhere to and enforce among staff and students the district's acceptable use policy (AUP).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>I rarely or never assist teachers in using technology to access, analyze, and interpret student performance data.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>I model the use of technology to analyze and interpret student data to focus efforts for improving student learning and productivity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>I allocate technology resources to enable teachers to better meet the needs of all learners on campus.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24</td>
<td>I promote highly effective practices in technology integration among faculty and other staff.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>I seldom participate in a district process with stakeholders to form a shared vision which includes high technology expectations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>26</td>
<td>I use email, voicemail, text messaging, and the website to communicate and interact with parents, community members, and other education stakeholders.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>27</td>
<td>I advocate for adequate, timely, and high-quality technology support services.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>I help to develop a technology-rich school improvement plan, grounded in research and aligned with the district strategic plan.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>I believe that funding and resourcing the district technology plan is a poor use of school district resources.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>I implement teacher evaluation procedures that assess individual growth toward established technology standards and guide professional development planning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>I do not believe it important to enforce policies and procedures related to security, and technology use.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>I include effectiveness of technology use in the learning and teaching process as one criteria in assessing performance of instructional staff.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>33</td>
<td>I help to evaluate student performance data to appropriately design, assess, and modify student instruction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>34</td>
<td>I rarely use email, voicemail, text messaging, and the website to communicate and interact with teachers and my peers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX D

NOTIFICATION TO DISTRICT SUPERINTENDENTS

Subject: 21S Administrator Survey

Ladies and Gentlemen:

I have been working with the Cisco 21S grants for our school district, and I know that you all share my hope that the 21S program will be of lasting benefit to our students and communities. As a doctoral student at the University of Southern Mississippi, I am researching how well our administrators are prepared to accomplish the daunting task of translating the technology infusion into student achievement. This week, I am mailing to each of you and to many of your administrators a short survey instrument which will examine proficiency in the National Educational Technology Standards for Administrators (NETS-A). An analysis of the results will become the research basis for my dissertation. I have coordinated this research with Dr. Peg Maddocks, and I will provide the results to the Cisco assessment team.

I thank each of you in advance for the prompt return of the survey, and for encouraging your administrators to do likewise. Please call on me if you have any questions or if I may ever be of assistance to you.

Alan

Alan Oubre
Executive Director of Support Services
Hattiesburg Public School District
601-582-5531; 601-297-2254
APPENDIX E
PERMISSION TO USE NETS-A STANDARDS

Dear Alan,

Thank you for your request to use ISTE materials.

You have ISTE's permission to use the NETS for Administrators, as described in your email message below and attached. This permission is granted for no charge, as long as there is no monetary gain from the use of our material and used in print format only. Should you request the materials for electronic use, your request must be reconsidered. This permission is granted for educational use only. Please use the following credit statement to reference our materials:

Adapted and used with permission from National Educational Technology Standards for Administrators, © 2002, ISTE ® (International Society for Technology in Education), iste@iste.org, www.iste.org, All rights reserved.

Please let me know if I can help in any other way.

Best regards,

Diane Durrett
ISTE, web: www.iste.org
P: (541) 434-8925
F: (541) 302-3780
E: ddurrett@iste.org

-----Original Message-----
From: Alan Oubre [mailto:aoubre@hpsd.k12.ms.us]
Sent: Tuesday, August 08, 2006 6:16 AM
To: permissions@iste.org
Subject: NETS-A Permission Request

Name: Alan Oubre
Member #: 260476
Mailing Address: PO Box 1569, Hattiesburg MS 39403-1569

I am writing to request permission to use the NETS-A standards as an integral part of my proposed doctoral dissertation at the University of Southern Mississippi, entitled Technology Proficiencies among School Administrators in the Mississippi Education Initiative and Louisiana Education Initiative. If permitted, the standards will be used in an instrument of my design to survey a group of school administrators.
The proposed survey instrument will not contain the NETS-A standards themselves, but will list each of the numbered statements under the standards on the pages which state: "(Principals/District Program Directors/Superintendents) who effectively lead the integration of technology typically perform the following tasks." In order to make each task a complete sentence in the context of the Likert scale which follows, I will add the pronoun "I" before each task, so that the survey respondent will be rating his/her personal response to each task. I have enclosed a draft of this section of the instrument.

The survey will contain other questions which will capture demographic data and the types of training that each administrator has received in technology integration.

Thanks.
Alan Oubre

Alan Oubre
Executive Director of Support Services
Hattiesburg Public School District
601-582-5531; 601-297-2254
REFERENCES


