EXAMINING THE EFFECT OF LEADERSHIP PRACTICES ON SUSTAINING A TECHNOLOGY INNOVATION

A Dissertation
by
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Abstract

EXAMINING THE EFFECT OF LEADERSHIP PRACTICES
ON SUSTAINING A TECHNOLOGY INNOVATION

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Although a great deal of research has been conducted on sustainability, technology initiatives and practices and their individual connection with leadership, very little research has been conducted on identifying the leadership practices within a technology innovation and the effect those practices have on sustainability. Leaders need to be facilitators of change and supporters of teaching and learning, they also need to understand the relationships between schools, systems, staff, students and school culture (Huber, 2004). Effective leadership practices can assist leaders in effectively sustaining innovations. Leadership needs to be flexible and adaptable within the culture of a district or school.

This study examined leadership practices in four high schools that had implemented and sustained IMPACT as an innovation. The study utilized existing data gathered from IMPACT schools by the Friday Institute for Educational Innovation at North Carolina State University and the North Carolina Department of Public Instruction.

Data were gathered in surveys, site visits and year end reports. The purpose of this study was to examine how leadership practices can assist leaders in sustaining innovations. The primary question of this study was: What set of leadership practices is important to the successful sustainability of an innovation? A complementary mixed method research design was used to inform this study (Yauch & Steudel, 2003). This method utilized quantitative and qualitative methods gathered concurrently. The intent of this research design was to use qualitative data to elaborate, enhance, illustrate, explain or clarify the quantitative findings in order to provide a more complete understanding of the findings (Greene, Caracelli, & Graham, 1989; Martinez et al., 2006; Tang & Solomon, 2001). The principal advantage with a complementary design is that it will create a more complete view of leadership practices within a sustainable innovation by integrating the qualitative data with the quantitative.

The analyses of the findings from this study identified leadership practices in the sustaining schools were the same leadership practices identified in the literature. Leadership practices were anchored in the culture of the school, which is supported by the fact that none of the three sustaining schools had exactly the same predominant leadership practices. Resources, professional development and shared decision making appeared in the three sustaining schools and were correlated to visioning in those schools.

Dedication

I dedicate this work to my husband, Troy, who has always believed and supported me. Without his love and encouragement, this would never have happened. He is my rock and the love of my life; with him all things are possible.

I dedicate this to my son Wes who has bestowed upon me the greatest honor of being a mother. You are my greatest accomplishment.

Thank you to both of you for understanding when I needed to laugh, be alone, ride around the lake or sit by the fire. I love both of you with all my heart; it just comes natural.

I dedicate this work to my parents, Louana Duckworth-Cooper and Robert Lee Duckworth (deceased), who laid the foundation that showed me how hard work and perseverance can pay off.

Finally, I hope that Robert Lee Duckworth, Troy Honeycutt Sr. and Wilson Cooper are proud of this accomplishment and enjoying the view from heaven.

Acknowledgements

I would like to acknowledge my chair, Dr. Krista Terry, for supporting, encouraging and being there for me throughout the process. Your unfailing guidance and composure have been an inspiration as I have worked to achieve this goal. I would also like to thank my committee members Dr. Nita Matzen, Dr. Robert Sanders and Dr. Jenifer Corn for your time, feedback and guidance as I have navigated through this.

I am grateful to Dr. Jenifer Corn and her team for sharing IMPACT data and expertise during the writing of this dissertation. I am also grateful to my team at NCDPI for sharing their IMPACT data and for being supportive and understanding throughout the process. Without the collaboration of these two teams this work could not have happened. A heartfelt thank you goes out to the schools as well; thank you for assisting and allowing me the opportunity to examine leadership within your schools and districts.

Finally, thank you to my cohort 16 colleagues who have been supportive and encouraging throughout the process. Most importantly thank you to my dear friend Danielle Madrazo, who has continued to encourage, support, listen, read and be there for me; I am blessed to have such a friend.

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Chapter 1

Introduction

In 2003 the North Carolina Department of Public Instruction (NCDPI) created a competitive grant process for high need, low performing schools. The grant was called IMPACT. It was aligned with the American Library Association's 1998 *Information Power: Building Partnerships for Learning* and the national standards for media and technology programs. IMPACT set forth guidelines for district and school media and technology programs and called upon leaders to be advocates for promoting digital resources and technology for educational purposes. The school principals and district-level administrators actively participate in the implementation and overall support of IMPACT.

I have worked for NCDPI for the past ten years as a consultant for media and technology programs. During my tenure I have been closely involved with the leadership teams and staff at 10 of the 51 schools that have benefited from the IMPACT grant. Over the course of ten years I have seen changes in administration and key positions in each of these 10 schools. The question that continually seemed to surface during this time was how one school can sustain IMPACT during changes in leadership, teacher turnover, depletion of resources and funding but other schools cannot. In the schools that I worked closely with, only 40% were able to sustain IMPACT after the funding was gone. Each of those schools as observed by NCDPI consultants continued to maintain IMPACT at least 4 years after the grant was completed. What was different about these schools? What

were the influences in the schools that sustained IMPACT and the ones that did not? Research had shown IMPACT to be a positive influence on student and teacher outcomes (Mollett, Overbay, Corn, Townsend, & Townsend, 2012). So why were schools unable to sustain and make IMPACT part of the school culture?

The grant is now in its tenth year and, according to NCDPI site visits, only 14 schools have been able to sustain IMPACT once grant funding is over. IMPACT schools were awarded over 16 million dollars in grant money over the past 10 years. IMPACT money has been spent to equip schools, staff and students with digital resources and technology for educational purposes as part of the grant. Prior research/evaluation efforts indicated that there were positive findings for IMPACT in relation to teacher retention, instructional activities, and student achievement; however, educating district and school leaders on IMPACT prior to implementation was identified as an area of need (Overbay, Osborne, Grable, Vasu, & Seaton, 2007).

To create a better opportunity for successful implementation and long-term sustainability, IMPACT was redesigned to concentrate on district and school leader professional development. NCDPI added this series of professional development opportunities for district and school leadership in 2006. The leadership professional development was designed to include strategies for leaders to use in their districts and schools to help build capacity, vision and support for IMPACT.

Sustaining IMPACT

The ability to sustain IMPACT is important because of the improved outcomes for students and staff. The Digital Teaching and Learning Division at NCDPI assumed at the state level that leadership had some type of influence on sustainability, but we just did

not know what that influence might be. Findings from the IMPACT evaluation identified leadership as an influence on sustaining the model; therefore, data gathered from the survey instruments used in IMPACT included examining school and district level leadership practices. Although leadership data has been gathered, the relationship of those leadership practices and sustainability has not been examined. NCDPI wanted to know what leadership practices were important to the successful implementation and sustainability of an innovative program like IMPACT.

With over 16 million dollars being used to add resources to these schools, it was important to learn which schools were sustaining IMPACT and why. Sustainability of IMPACT is important because of the amount of money expended on resources, improvements in student achievement, teacher retention, and improved instructional practices. IMPACT research has shown that continuous improvement in student and teacher outcomes is achieved as the model becomes part of the school culture (Mollett, Overbay, Corn, Townsend, & Townsend, 2012). Schools are being challenged to improve student achievement. Federal, state and local budgets are being scrutinized continuously. Schools that experience a large influx of funding are monitored to see if the resources are being used to improve student and teacher outcomes. IMPACT sustainability can meet these challenges. By moving from implementation to sustainability IMPACT becomes a part of the school culture which allows for student and teacher outcomes to continually improve.

Therefore, this study will examine four IMPACT schools that have implemented the IMPACT along with "1:1," which is one computing device for every student. These schools were chosen because of these factors along with the fact that both quantitative

and qualitative data on leadership gathered from 2009-2011. The schools' administration, district central office staff and selected school staff members from these four schools went through an extensive leadership training prior to receiving funding for implementing IMPACT. Examining leadership practices in these four schools will assist in discerning what practices had an impact on the sustainability of IMPACT as an innovation.

Problem Statement

Leadership in education is about sharing, collaborating and empowering all, so that everyone is involved in the educational process (Bush, 2009; Fullan, 2004, 2005, 2009; Hargreaves & Fink, 2006). Leadership is about looking at more than the numbers; it is about perception, listening, and being a change agent within the school environment. Marzano and McNulty (2005) ask us to consider the traditions and beliefs surrounding leadership and to understand its relationship with a successful school. The authors of *School leadership that works* identified several studies in which aspects of a school were linked to school leadership (Marzano & McNulty, 2005). These included clear mission and goals, climate of school and classroom, teacher attitudes, classroom practices, curriculum and instruction, organization and student opportunities to learn.

Past research has shown that student achievement and teacher retention can be improved in schools where IMPACT is implemented (Mollett, Overbay, Corn, Townsend, & Townsend, 2012). According to the IMPACT Continuation Final Summative Report for 2010-11, data from the collection process showed that program planning and leadership were issues that emerged at all school levels as having an impact on the sustainability of the innovation (Mollett, Overbay, Corn, Townsend, & Townsend,

2012). Even though leadership has emerged as an issue in sustaining IMPACT, research of IMPACT has not explored the relationship of leadership practices and sustainability. Much can be learned by analyzing the data that have been gathered throughout the implementation of IMPACT. This analysis can inform other innovations on how leadership practices impact the sustainability of innovative programs or initiatives.

Innovations like IMPACT are being developed throughout the state of North Carolina. One of the goals of the North Carolina State Board of Education is that leadership will guide innovation in NC public schools. Leaders are called upon to facilitate change, create 21st Century learning and promote continuous improvement.

IMPACT schools were awarded monetary grants to assist them with implementing and sustaining the innovation. When studying the sustainability of IMPACT, leaders may want to consider the perspective of Gartner's Hype Cycle (Gartner, 2012). The Hype Cycle (figure 1) was created by Gartner, an IT research and advisory firm, to assist in identifying key trends in emerging technologies. The Hype Cycle identifies five phases of social reaction to new technologies or initiatives. Considering IMPACT in relation to these five phases could assist leaders in understanding how implementing and sustaining the model might flow within the school and staff.

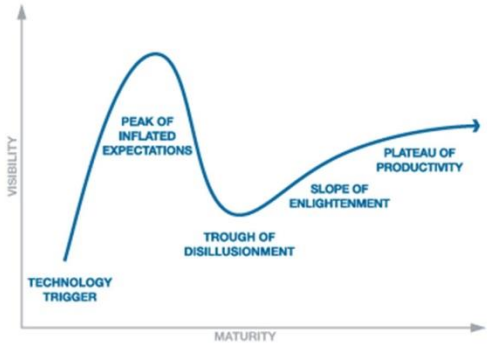
The first phase is the 'Technology Trigger.' This phase is the influx of equipment and staff development that accompanies the beginning implementation of IMPACT. The second phase, the 'Peak of Inflated Expectations' is where staff are at the height of using the equipment and applying the staff development practices. Phase three, 'Sliding into the Trough of Disillusionment,' is where the newness of the innovation and equipment has

worn off. This may also be a phase in which the staff are feeling overwhelmed by the professional development activities and the new technologies. This could also be the phase where leaders may be analyzing whether the money has been wasted on the innovation because of the disillusionment of the staff. Phase four, the 'Slope of Enlightenment', is where staff may begin to realize how to utilize the technology as a tool to enhance teaching and learning. This is also the beginning stage of sustainability. Phase five, the 'Plateau of Productivity', is where IMPACT has become a part of the school culture, and at this stage true sustainability has been achieved. The Hype Cycle has multiple timelines during each of the phases. It may take only a couple of months for some staff to achieve phase five, but it could take several years for the whole school.

Figure 1

The Hype Cycle

(Gartner, 2012)



Providing staff development and the technology is a start, but culture change to support it is the responsibility of leadership. Casson et.al. (1997) found that monetary resources are important for acquiring technology but effectively using the educational technologies had more to do with leadership and change.

Purpose of the Study

As previously stated, the need to determine which leadership practices had an effect on the sustainability of the IMPACT initiative was important. Therefore, the purpose of this study was to examine how leadership practices assist leaders in building their knowledge base in order to sustain innovations. The study utilized existing data gathered from IMPACT schools by the Friday Institute for Educational Innovation at North Carolina State University and the North Carolina Department of Public Instruction. The data from surveys, site visit protocols, and annual evaluation reports were triangulated to offset the strengths and weaknesses of each instrument. The Site Visit Protocols and IMPACT Year End Reports were used to identify changes in leadership and other issues that have affected the sustainability of the model. The IMPACT Rubric and the IMPACT Administrators Checklist were used to identify districts that had sustained the model. The primary question of this study was: What set of leadership practices is important to the successful implementation and sustainability of an innovation? The operational research questions were:

1. What leadership practices are evident in these schools using the SAI and STNA instruments?
2. To what extent are the leadership practices correlated?
3. What is the relationship between leadership practices and sustainability of IMPACT?

The hypothesis was that leadership practices have a positive influence on the sustainability of an innovation.

Methodology

This study used existing data gathered from IMPACT schools by the Friday Institute for Educational Innovation at North Carolina State University and the North Carolina Department of Public Instruction (NCDPI) to explore the relationship of leadership to the sustainability of the IMPACT Model. The data from each of the four schools were gathered from 2009-2012. The surveys were administered to school personnel once a year. Additional data from site visit protocols and annual evaluation reports were coded and used to assist in the identification of the relationship of leadership practices to the sustainability of IMPACT. The IMPACT Rubric and the IMPACT Administrators Checklist will be used to identify districts that have sustained the model.

Significance of the Study

The motivation for this study was the need for a better understanding of leadership and its relationship to the sustainability of innovations. In order for school innovations to take hold and be sustainable, district and school leaders must agree on leadership's purpose and how it will sustain innovative programs and initiatives. Innovation demands a new type of leader: one who can meet the needs of the learning environment and can also understand the social relationship involved in technology initiatives (Casson, et al., 1997).

Leaders must be able to communicate and integrate the innovation into the school's culture; therefore, it is imperative that we better understand what leadership looks like (Leithwood & Riehl, 2003). As stated earlier, the IMPACT Continuation Final Summative Report for 2010-11 showed that leadership was a construct that had an impact

on all factors within the IMPACT Model, including technology innovation (Mollett, Overbay, Corn, Townsend, & Townsend, 2012).

Although the leadership construct was shown to have an impact on all factors, the relationship of leadership practices on the sustainability of IMPACT has not been explored in previous research. Leaders need to be facilitators of change and supporters of teaching and learning, they also need to understand the relationships between schools, systems, staff, students and school culture (Huber, 2004). Leadership is about building relationships and success in leadership stems from how well we work and play with others (Kouzes & Posner, 2007).

This study will contribute to the body of literature that has focused on IMPACT. The additional research on leadership practices will add depth to the knowledge base of findings within IMPACT. This study will also contribute to the larger body of knowledge on leadership practices and sustainability of innovations. Current findings within the research of the IMPACT model have centered on student and teacher level outcomes. Findings from this study will provide information on leadership practices for districts that wish to sustain IMPACT or other innovations that have already been identified as having positive effects on student and teacher level outcomes.

Definition of Terms

1. Sustainability: the ability of a district or school to maintain project goals and outcomes and institutionalizes those into the everyday practices and operations of the district or school. For the purpose of this study, the IMPACT Administrator Checklist and the IMPACT District/School Rubric will be used to identify schools that have sustained the model.

2. IMPACT: Guidelines for School Library Media Coordinators and Technology Facilitators in North Carolina. This document provides a step by step guide on how to implement IMPACT in schools and districts. It includes recommendations on personnel, budgets, policies, resources and facilitates so that media and technology programs can support technology enabled learning.
3. NCDPI: The North Carolina Department of Public Instruction for k-12 education
4. LEA: Local Education Authority are school districts
5. IMPACT Schools: Schools that receive competitive federal grant funding to implement IMPACT.
6. Friday Institute for Educational Innovation at North Carolina State University: The Friday Institute is part of North Carolina State University's Centennial Campus. It is the division of the university which conducts research, provides professional development, and develops resources for K-12 and Higher Education.
7. STNA: School Technology Needs Assessment Survey tool
8. SAI: Standards Assessment Inventory Survey tool
9. NC 1:1 Survey: North Carolina 1:1 Survey tool
10. NCLB: Reauthorization of the Elementary and Secondary Education Act that supports standards-based education reform with high standards and measurable goals to improve student outcomes
11. Title One: Title One funds are supplemental funds provided to school districts to assist in meeting the needs of at-risk and low-income students
12. 1:1: One computing device per student

13. Innovation: A process for change that introduces a new idea, practice, or object that plays an important role in redesigning educational programs.

Organization of the Study

The study uses the traditional five chapter arrangement. The research from this study examines the relationship of leadership practices to sustaining innovations. Chapter 1 provides an introduction to the issue, the research problem and a brief history of IMPACT. Key terms, purpose and significance of the study are also included in Chapter 1.

Chapter 2 reviews and summarizes the existing body of literature that is relevant to leadership and innovation. The review of the literature includes leadership practices, leadership in school reform and technology initiatives, and the relationship between leadership and sustainability. Chapter 3 describes the methodology used to understand the relationship of leadership practices and sustainability of innovations. Chapter 4 shares the findings of the study. The presentation of the findings is by individual school. Chapter 5 discusses the findings including the limitations, implications and suggestions for further research.

Chapter 2

Review of Literature

The purpose of this chapter is to review and summarize the existing body of literature that relates to leadership practices, technology initiatives, and sustainability. The review of the literature is divided into sections that will examine leadership in general terms, identify leadership practices, and address the influence of leadership on sustaining initiatives.

Leadership

Leadership is a vague word, which is open to more than one interpretation. It can be defined by styles, behaviors, practices and positions within an organization. Bass (1990) suggests that leadership definitions fall into three groups: leadership as the focus of group processes, which is the leader's ability to sway groups of people towards a common goal; leadership from a personality perspective, which is aligned with leadership styles or native characteristics in leaders, and finally leadership as an act or practice that brings about change, which is a leader's ability to adapt their practices to the context of the situation.

Leaders must be able to communicate and integrate innovation into the school's culture. It is imperative that we understand what leadership looks like and how it works (Leithwood, Louis, Anderson and Wahlstrom, 2004). Leithwood and Riehl (2003) define leaders as providing direction and working with others to achieve shared goals. Leaders work with their teams to create a shared vision, to establish relationships and to build

capacity. Leaders need to be constant learners and work to create learning organizations so that the innovation can be carried on even through staff turnover (Fullan, 2005). Leadership shapes the culture and goals of a school. Leaders who institutionalize the process for building leadership capacity create a strong system of sustainability (Gardner, 2007).

In order for innovations to take hold and be sustainable, district and school leaders must agree on leadership's purpose and how it will sustain an innovation. Looking at leadership through the lens of an act or practice offers an opportunity to grow leaders in the context of innovations as well as assist in sustaining initiatives. Looking at the role of leadership in school reform can give us insight into how leadership practices may look like in sustaining an innovation.

Leadership in school reform. In "The big ideas behind whole system reform," Michael Fullan (2009) identifies leadership as one of seven big ideas for whole system reform. Leadership should remain focused especially during the initial implementation of the idea, and what is required to sustain and build on the initiative. Leaders involved in whole system reform listen, understand, identify and work to address the objections individuals may have to reform. "They pay attention to building relationships – even with those who are not so enthusiastic" (Fullan, 2010, p.1). According to Fullan (2009) in "Large scale reform comes of age," the late 1950s and 1960s were the 'adoption era' of reform, where educational systems were inundated with outside ideas that would hopefully bring about improvement. By the 1970s, research was showing that large scale reform was not expanding. Innovations were adopted in language and structure but not in teaching. From 1960-1996, very little progress was made within large scale reform even

though a renewed interest appeared in the 1980s due to accountability changes. Some efforts for large scale reform were made from 1997-2002 but they were not systemic. Large scale reform was initially successful but the reform did not become part of the context or culture of schools (Fullan, 2009). Although No Child Left Behind (NCLB) has highlighted highly qualified teachers and focuses on student achievement, it has still failed to bring about large scale reform. NCLB does little in the way of capacity building for leadership (Fullan, 2009). Changes in leadership paradigms are emerging as well as movements towards a national curriculum, the Common Core, and Smarter Balanced Assessments. Fullan articulated several of his findings within "The big ideas behind whole system reform" and "Large scale reform comes of age" and on the joint findings from "Strategic leadership for large scale reform," which was a four year study conducted by Leithwood, Jantzi, Earl, Watson, Levin and Fullan (2004) of England's National Literacy and Numeracy Strategy for large reform. The study provided evidence for strategic leadership in large scale reform. It included observational and interview data from ten schools over four years. These schools varied in demographics and performance data. Survey data were also gathered from two representative samples of five hundred schools.

The results of this study showed that both vision and expectations need to be set at the national level. At the regional and Local Education Authority (LEA) level, the study identified strengthening organizational cultures and building collaborative processes as key practices. On the local level, individualized support and goal setting were key practices. Intellectual stimulation or professional development was also key at the regional and local level (Leithwood, Jantzi, et al., 2004).

Evidence from the four-year study also indicated that in the early stages clear directives were set to be followed. A change in national leadership brought about a change in leadership styles; however, most participants felt that the new approach was appropriate for implementing the reform. Following the implementation stages, leadership centered on meeting local needs and integrating the new literacy reforms into local initiatives (Leithwood, Jantzi, et al., 2004). This study indicates that leadership needs to be the foundation for all initiatives. Large-scale reforms like the aforementioned call for leadership to be scaled up in order for the reform to be successful. By looking at this type of reform we can possibly make the connection between leadership in large-scale reform and technology innovations.

Leadership in technology initiatives. Technology is in a constant state of change with new technologies emerging daily. A technology leader needs to be able to navigate through this changing environment (Courville, 2011; Fullan, 2001). In an-ever changing technology environment, leadership plays a key role by providing a vision, communicating the vision and expectations of integrating technology into classroom instruction, and by ensuring resources of all types are available for teachers and students to access in order to sustain an initiative. Instruction and curriculum need to be the driver and technology is simply the vehicle. Educational technology leaders focus on collaboration, technology resources, and goals for improving instruction. Leadership in a technology initiative requires an understanding of change (Courville, 201; Schrum & Levin, 2009). Leaders need to be aware of the social and emotional needs of their staff. The leader needs to deal with disagreements and negative emotions because these can affect the implementation of the technology initiative as well as the relationship between

the leaders and staff (Courville, 2011). Leaders in educational technology initiatives need to be advocates promoting technology for educational purposes (Courville, 2011). An educational technology leader promotes the integration of technology to assist in improving student learning. The leader should also have technical expertise, be aware of new technologies, and be knowledgeable of the change process. Educational technology leaders, like all effective leaders, adjust their leadership practices based on the context and focus on the emotional aspects of leading others to accept new technologies. Educational technology leaders "must be able to understand and adapt to changing technologies and guide an organization towards accepting and implementing that change" (Courville, 2011, p. 16).

The leader needs to understand the relationship between technology, content, and pedagogy and must be able to assist the staff who may be having difficulty adapting to the integration. This can be accomplished by bringing together multiple leadership practices and using them to achieve effective technology use (Courville, 2011). According to Dikkers, Hughes and McLeod (2005), k-12 educators have few avenues to help them understand the rapid changes in technological innovations. Leadership is important to successful integration of technology. Leadership for technology initiatives must have context and be distributed among the people involved in the initiative (Cowie, Jones, & Harlow, 2011).

In "School leadership and management," Cowie, Jones and Harlow (2011) examined evidence from a six-year national evaluation on the impact of laptops on teachers' professional lives in New Zealand. The study included school case studies, focus groups and surveys. The authors argue the case that leadership for sustained and

systematic use of the technology is multi- faceted. They examined the leadership relationship with government, school boards, principals, technology leaders, department heads and classroom teachers (Cowie, Jones and Harlow, 2011). Key issues that emerged around leadership in this initiative were the role and interaction of leadership policies in teaching and learning. The sharing of best practices, while encouraged by all levels of leadership, lacked focus on how to identify, develop and share these practices among schools and teachers. Cowie, Jones and Harlow (2011) found that an innovation which requires funding, infrastructure and professional development needs leadership that is anchored in the context and shared with others.

In "Implementing technology in Flowing Wells schools" Hamilton (1998) studied a district of ten schools in Tucson, Arizona who used their core values to create and implement the district's technology initiative. Their core values were: all decisions will be student driven; every employee will model the values and operate with integrity; all work will be quality focused, and the district will respect the decisions everyone makes to maintain balance in their life.

A team of leaders comprised of teachers, parents and administrators was brought in to develop the district's technology initiative including a vision with benchmarks for success. Committees were formed to address the curriculum, partnerships, management/funding, connectivity, administrative software, staff development and training modules. The district leaders empowered others within the schools to become a part of the process and decision making for this initiative. The district communicated the need for technology to the staff and community. The district encouraged collaboration and communication with all stakeholders. Problems and concerns were addressed by the

committee who stayed focused on the core values of the district. In this study, leadership effectively communicated the need for technology and worked to ensure that professional development and hardware delivery occurred simultaneously. Concerns and problems were identified and addressed. The team maintained a clear vision and continuously evaluated their measures of success. In order for the school to continue with the initial success, Hamilton (1998) concluded that they would have to continue to evaluate each component of the plan for relevancy to ensure student success. To sustain the initiative, the school will continually examine and redefine the initiative as students become more confident in their use of computers. Leadership practices engaged in this initiative were creating a vision and empowering others.

Identified Leadership Practices

If people want to improve their skill level in any aspect of their life, they practice the identified skill until they have mastered it. The same can be said for leadership. Once practices are identified as ways to sustain initiatives, leaders can work to develop those practices.

"Challenge 98: Sustaining the work of a regional technology integration initiative" (Billig, Sherry, & Havelock, 2005), was a six year grant that focused on leadership in technology innovation. The grant intended to assist teachers in the integration of technology into the curriculum to improve student achievement. Nine factors were explored in this study to decide if there was a relationship between the factors, technology integration and sustainability. The following nine factors were identified from the study: strong leadership, strong infrastructure, support structures, incentives, visibility, credibility, partnerships, macro-culture development, and funding.

Not all nine factors are necessary for technology infusion. Challenge 98 had five of the nine factors identified earlier in place before funding ended. They were: leadership, infrastructure, resource allocation, culture and climate transformation and incentives. For the leadership factor, Challenge 98 involved leaders in the university, regions, school districts and schools in meetings and professional development. As grant funding began to close out district leadership added to their budgets line items to continue funding for continued technology growth (Billig, Sherry, & Havelock, 2005). Challenge 98 leaders set high expectations for the use of technology and continuing the grant; however, where local administrative support was not prevalent, the impact of technology integration was rarely experienced school wide. This seems to indicate that sustainability cannot be fully realized without the leadership support. Funding can be allocated but sustaining the initiative as a whole does not happen with leadership support.

In "Re-Culturing the profession of education leadership," Murphy (2001) examined a new understanding of leadership through the use of three metaphors. The first metaphor is a leader as a moral steward who is directed by beliefs and values tied to justice, community and schools. The second metaphor is educator, which moves the leader from manager to educator where emphasis is placed on instruction, teaching and knowledge of supporting research. The third metaphor is community builder. In this role, the leader allows for parent and stakeholder input, fosters professional learning communities/networks, and creates personalized learning environments for students. Murphy (2001) states that these three metaphors can assist in redesigning educational leadership by offering a framework for the concept of leadership (Murphy, 2001). The

three metaphor framework discussed by Murphy (2001) offers a perspective on leadership that centers on leadership theory rather than practice.

The three metaphors identified by Murphy (2001) are labels indicating different styles or approaches to leadership and are similar to other labels for leadership like transformational, moral, instructional, strategic and transactional. However, Leithwood, Louis, Anderson and Wahlstrom (2004) suggest that we look beyond the descriptive words to truly understand the themes common to successful leadership. Leithwood narrowed leadership to three core sets of practices that leaders use to address each situation they are in. Leithwood, Jantzi, et al (2004) and Leithwood and Riehl (2003) identified three sets of core practices, which are: setting directions, developing people and redesigning the organization. Successful leaders have these basic sets of leadership practices (Leithwood, Harris, & Hopkins, 2008). They can be performed by multiple people in varying roles throughout the school (Leithwood & Riehl, 2003). "Leadership is not at all about personality; it's about practice" (Kouzes & Posner, 2007, p. 13).

Leithwood, Jantzi, et al (2004) described setting directions as creating and communicating a vision with group goals and high performance expectations. The main purpose of a leader is to set a vision with a plan to get there and to convince the staff to follow the steps to achieve the vision. Developing people includes providing support and opportunities to increase knowledge, along with modeling best practices and beliefs that support the vision. Redesigning the organization includes aligning, strengthening, modifying and building cultures, structures and processes that support the teachers, students and vision of the school. Each of these practices can be found in technology innovations. The search for a single best model or style for leadership needs to be adapted

to create a core set of practices allowing for flexibility in leadership practices depending on the organizational context of the school or district (Leithwood, Louis, Anderson, & Wahlstrom, 2004; Leithwood & Riehl, 2003).

Four years later, Leithwood, Harris and Hopkins (2008) extended the three core sets of practices to include managing teaching and learning in their study, "Seven strong claims about successful school leadership," They shared that leaders use these core practices based on the context or situation. Context is important and successful leaders understand that each context does not require a different practice; it simply requires that they apply contextually sensitive combinations of the practices to the context (Leithwood, Harris, & Hopkins, 2008). According to these researchers "leaders in highly diverse contexts help identify and implement forms of teaching and learning that are appropriate and effective for the populations they serve" (Leithwood & Riehl, 2003, p. 8).

Using the framework of Leithwood and Riehl (2003), Jacobson, Johnson, Ylimaki and Giles (2005) conducted a leadership study of seven schools from five different districts in western New York. The study consisted of five elementary, one middle and one high school. Three were from a large urban district, two from small city districts, one from a suburban district and one from a rural district. The principals from these schools were diverse with five women, two men, three African Americans, and four Caucasians. Two held doctoral degrees, five had 30 years of experience, and there were three with 19 or more years' experience as well as four new principals.

The study examined the three core practices of setting direction, developing people, and redesigning the organization. The study indicated that each school had varying success in improving school performances and each principal was using the core

practices in some form. The practices, however, were neither linear nor formulaic in how they interrelated throughout the study. Each principal adapted their core practices to meet the contextual conditions and constraints of their respective schools in order to enable school improvement. The seven principals created safe, nurturing environments and high expectations. They also nurtured and developed staff to build capacity for school improvement. The principals modeled the behaviors and practices they expected from their staff. At each of the schools, student learning was the central purpose for school improvement. The study, however, could not readily generalize its findings due to the small sample size. Even though the sample size was small the study did show that leadership adapted their practices to meet the needs of their schools and staff to ensure the sustainability of the school improvement initiative.

It is imperative that leaders adapt their practice to the context of the situation. According to Kouzes and Posner (2007) there are five core practices for leaders. They state that leaders should: model the way, share vision, challenge the process, enable others to act, and encourage the heart. Leaders model the way by ensuring that their actions and words are reflective of their guiding principles. Leaders inspire a shared vision by seeing the possibilities and opportunities that an initiative can open for a school or district. Leaders understand the intrinsic and extrinsic needs of their staff. They know how to inspire passion for the vision in others, and state that "leadership is a dialogue not a monologue" (p. 17). In *The Leadership Challenge,* Kouzes and Posner (2012b) share the five practices of leadership. These five practices were developed from research starting in the early 1980s conducted by Kouzes and Posner. The five practices identified above came from analyzing thousands of experiences of leaders and although the context

of leadership has changed in the past thirty years, the content is very much the same. Over thirty years of research researchers continue to see the same fundamental behaviors and actions of exemplary leaders. They found that leaders who use these five practices frequently are more effective than ones who do not. They drew this conclusion by analyzing nearly two million people's responses to the Leadership Practice Inventory (Kouzes & Posner, 2012a) and questions on demographics and organization size. Engaging in these five practices makes a difference, even though these practices are not the complete picture of why leaders are successful (Kouzes & Posner, 2012b).

Exemplary leaders create shared visions, establish relationships and build capacity. Leaders are appreciative of the contributions of staff and are genuine in their encouragement (Kouzes & Posner, 2007). Leadership within school reform or technology integration initiatives needs to accomplish the above listed practices in addition to setting expectations for the technology initiative. Exemplary leaders empower others by engaging all team members and creating leaders to sustain the progress of the initiative (Fullan, 2004). Leaders provide resources, encourage professional learning communities, recognize good teaching practices and form partnerships with parents and community. The literature suggests that when leaders exhibit these practices, whole system change happens and initiatives are sustained.

Sustainability

Leadership has an influence on building capacity and sustaining an initiative. Cowie, Jones and Harlow (2011) found that an innovation needs leadership that is anchored in the context and shared with others. Setting direction and developing people are important to sustainability. These two factors create an environment in which

individuals can bond and strive for the common goal of redesigning the organization or sustaining the initiative.

Keys to sustainability are identified as leadership stability, collaboration with all stakeholders, communication on all levels and coaching for new leaders (Davis, Darling-Hammond, LaPointe, & Meyerson, 2005). Sustainability must be measured in the long-term throughout the district and across multiple personnel changes (Hargreaves, 2009). Fullan (2005) states that educational sustainability of innovations is "the capacity of a system to engage in the complexities of continuous improvement consistent with deep values of human purpose" (p. ix). Hargreaves and Fink (2006) expand on that by saying "sustainable educational leadership and improvement preserves and develops deep learning for all that spreads and lasts, in ways that do no harm to and indeed create positive benefit for others around us, now and in the future" (p. 224). In order to sustain an initiative within a school or district, leaders must commit, participate, and allow for self-reflection. Leadership must be viewed as a concept not as an individual's role (Williams, 2009). Leadership that focuses on sustainability creates policies that support the initiative, sets up plans to secure funds that will sustain the initiative, develops resources to support and builds capacity within the entire school or district (Hargreaves & Fink, 2003). In "Leadership and Sustainability: System Thinkers in Action," Fullan (2005) identifies eight elements that need to be present in leadership for sustainability to occur, each of the following eight elements must exist on some level.

1. Public service with moral purpose which is just as important as outcomes
2. Commitment to changing context at all levels. Change has to happen in structure and culture. The school culture needs to accept, nurture and embrace change.

3. Lateral capacity building through professional learning communities and networks must exist on all levels.
4. Intelligent accountability and vertical relationships which encompass both capacity building and accountability. Programs and initiatives need to be aligned and evaluated to prevent fragmentation and overload.
5. Deep learning must occur in order for districts to ensure that schools are focusing on the long term goals and the group needs. For deeper learning to occur districts must ensure that the data collected is qualitative, quantitative and relevant to the core business of the district. Deeper learning also requires a collaborative culture that can solve difficult programs.
6. Dual commitment to short-term and long-term goals is imperative. Short-term successes work to build trust and ownership so that long term goals are supported and funded.
7. Cyclical energizing needs to occur throughout the initiative with goals and strategies systematically revisited and redesigned to address changes during the process.
8. Long lever of leadership should work to empower others to lead; this will help to create sustainability. When a leader leaves a position, if they have empowered others to lead the initiative can continue to evolve in that school or district. (Fullan, 2005)

Leaders need to exist on all levels within the system with strategies, practices, and experiences being shared so that sustainability can be a part of the context of school and district culture. According to Fullan (2005), "sustainability is a team sport and the team is

large" (p. 29). To create this team sport, leaders need to coach their teams through the process of change. Leaders need to build relationships with others and be open to staff ideas. This, in turn, allows staff to take risks within the implementation of an initiative.

Coaching and Sustainability. A leader who uses coaching as part of leadership practice moves leadership beyond theory to developing actual leadership capacity within the school. Coaching allows a leader to concentrate on others and be open to their ideas and needs. By using coaching as part of leadership practices, leaders could build capacity for leadership in the organization. Building leadership capacity with coaching assists in creating an effective sustainable initiative (Boyatzis, Smith, & Blaize, 2006).

In 2005, the Pennsylvania Department of Education along with the Annenberg Foundation, designed and implemented the Pennsylvania High School Coaching Initiative (PAHSCI). The PAHSCI coaches guided the implementation of research based literacy rich strategies across all content areas. The role of school based coaches was to support and mentor teachers. The goals of PAHSCI were to improve student performance and to build capacity. This was a three-year process which included yearly evaluations that noted where the schools were in moving towards achieving the two goals of the PAHSCI. By year three of the initiative the researchers were looking at indicators of sustainability which included changes in classroom practice, extended opportunities for students to read, write, listen and talk, focus on students performing tasks, problems and activities, assessment of student learning and students being allowed to take risks and have opportunities to be successful. Findings supported a new understanding of student engagement and learning which included teachers allowing students to struggle with the material, collaborating with students to increase ownership, teachers' creating

assessments that meet student needs, aligning instruction with the assessments, and providing students were given opportunities to extend their learning outside of the classroom (Brown, Reumann-Moore, Hugh, Christman, & Riffer, 2008). Therefore, coaching and professional learning networks were found to be essential to sustainable instructional change.

Findings based on the aforementioned indicators showed that there was evidence of sustainable instructional change in the classroom, collaboration on all levels, continuation of professional learning networks and continued school based professional development which the researchers believed would lead to increased chances to sustain the initiative. The researchers did identify a major challenge as being the ability to continue offering the resources provided by the PAHSCI grant. Other challenges to the sustainability identified by this study were changes in leadership, technical assistance, administrative ownership, time and expanding the skills of coaches to meet new challenges (Brown, Reumann-Moore, Hugh, Christman, & Riffer, 2008).

In "Leadership capacity: A key to sustaining lasting improvement," Williams (2009) conducted a limited study of twelve teachers in a school administration program and eleven principal interns from k-12 schools. Eleven of the teachers and nine of the interns completed the Association of Supervision and Curriculum Development (ASCD) survey entitled Leadership Capacity. The survey examined five constructs with twenty-nine items on a five point scale. The five constructs are based on the work of Linda Lambert (2003) and included broad-based, skillful participation in the work of leadership, inquiry based use of information to inform shared decisions and practices, roles and responsibility that reflect broad collaboration, reflective practice and innovation and high

student achievement (Williams, 2009). Findings in this study showed no statistical significant difference in any of the five factors between the teachers in the administrative program and the principal interns. According to the researcher this could mean that leaders were already involving personnel in all of the five factors of leadership capacity building. Williams (2009) suggests that the perception of leadership must be broadened in order to sustain change. Building leadership capacity must be embedded in the school environment. Sustaining school improvement initiatives suggest that leadership is not the role of one, but the responsibility of many.

To maintain leadership capacity there must be a sustained sense of purpose, planning and selection, mentoring and coaching, an understanding of change, and finally a conversion of practice into policy (Lambert, 2003). Sustainability asks leaders to move beyond theory and practice and into action understanding the relationship between culture and context of an initiative.

Lambert (2007) studied fifteen high leadership capacity schools based on her leadership capacity matrix. According to the matrix, high leadership capacity schools have a high degree of participation and skill. High leadership capacity schools also exhibit these traits: they have skillful leaders, employ a shared vision, and inquiry based use of data to inform decisions. They also demonstrate involvement, collaboration and collective responsibility which are reflected in roles and actions. Reflective practice leads consistently to innovation and high or steadily improving student achievement (Lambert, 2007).

The fifteen schools were in the United States and Canada and had met state and national standards for performance for four to ten years. The schools were diverse in size,

grade level, race and economic status. The study was conducted to ascertain how the schools arrived at the high leadership capacity phase. Lambert (2003) assumed that each of the fifteen schools began in one of the three or a combination of the archetype roles identified below:

1. Low participation and skill: principal as autocratic manager, one way flow of information, codependent relationships, norms of compliance and blame, little innovation in teaching and learning and poor student achievement
2. High participation and low skill: principal as laissez faire manager, fragmented information, no collective responsibility, undefined roles and responsibilities, spotty innovation and static overall student achievement
3. Low participation and high skill: principal and key teachers on leadership team, limited use of school wide data, polarized staff with pockets of strong resistance, efficient designated leaders strong innovation, reflection and teaching and student achievement is static or only a slight improvement. (p. 5)

This study showed that the school principals in each of the schools were very similar in characteristics and understanding the school climate, even though they were different in personality and management styles. Principals within these schools shared roles and responsibilities with the teachers. Both the principals and the teachers identified critical questions and ways to solve issues. This created a more balanced relationship. Inside these fifteen schools personnel, students, and parents were viewed as a collective, roles were blended, resources for professional development were provided, and staff were involved in professional learning networks beyond the school (Lambert, 2007). For initiatives to be successful, districts must work to empower leadership to consider the

sustainability of initiative and how their leadership practices can increase the chances of success.

Conclusion

This review of current literature addresses leadership practices and the role they play in school reform and sustainability of innovations. Spillane, Halverson and Diamond (2001) suggest that leadership is a dynamic interaction between multiple leaders and followers and their situational and social contexts. The premise of the study is that leadership practices are a strong influence on school reform, technology innovations and sustainability. The literature review has depicted the conceptualization of leadership practices with the aim of pinpointing the practices related to sustainability of an innovation. The predominant leadership practices seen throughout the leadership literature are vision, resources/infrastructure, professional development, evaluation and shared decision making. The literature has also noted that technology-enabled teaching and learning is a social process in which leaders must understand not only the context of the school culture but also the context of staff adoption of the innovation.

Although a great deal of research has been conducted on sustainability, technology initiatives and practices and their individual connection with leadership, very little research has been conducted on identifying the leadership practices within a technology innovation and the effect those practices have on sustainability. We realize that leaders need to be facilitators of change and supporters of teaching and learning; they also need to understand the relationships between schools, systems, staff, students and school culture (Huber, 2004). This study examined how leadership practices can assist leaders in building their knowledge base of effective practices to sustain innovations.

Chapter 3

Methodology

This chapter provides an overview of the methodology that was used in the study, including research design, demographic information on the schools, qualitative and quantitative instruments, and analyses.

The purpose of this study was to examine how leadership practices can assist leaders in sustaining innovations. The primary research question of this study was: What set of leadership practices is important to the successful sustainability of an innovation? The operational research questions were:

1. What leadership practices are evident in these schools using the SAI and STNA instruments?
2. To what extent are the leadership practices correlated?
3. What is the relationship between leadership practices and sustainability of IMPACT?

The hypothesis was that leadership practices have an influence on the sustainability of the innovation using the IMPACT School/District Rubric and the IMPACT Administrators Checklist

Research Design

A complementary mixed method research design was used to inform this study (Yauch & Steudel, 2003). This method utilized quantitative and qualitative methods gathered concurrently. The complementary mixed method research design uses

qualitative data to elaborate, enhance, illustrate, explain or clarify the quantitative findings to provide a more complete understanding of the findings (Greene et al., 1989; Martinez, et al., 2006; Tang & Solomon, 2001). The primary research objective was to define leadership practices that influenced the sustainability of a technology innovation. In this study, quantitative data from the two survey instruments were merged with qualitative data, collected simultaneously from site visits and year end reporting.

Participants

The four schools in the study are located in different counties across the state of North Carolina. Schools 1, 2 and 4 are located in the piedmont area of the state, while School 3 is in the coastal area. According to the 2011 US Census, the unemployment rate for the four counties range from 9.5% to 10.1% and businesses/firms within the counties range from 936 to 2,450. The four counties range in population from 13,487 to 43,242 with a range of 73% to 86% of the population having obtained a High School Diploma or higher. Table 1 provides demographic information on the four schools. Table 2 provides information on certified teachers within each school.

Table 1

Demographic Information on IMPACT High Schools

Category	School 1	School 2	School 3	School 4
Enrollment	1378	1251	483	681
Racial	>1% Indian	>1% Indian	>1% Asian	>1% Indian
Subgroups	1.44% Asian	2.27% Asian	2.03% Hispanic	1.39% Asian
	16.73% Hispanic	24.14% Hispanic	35.49% Black	16.92% Hispanic
	36.43% Black	18.13% Black	62.11% White	57.98% Black
	45.32% White	55.16% White		23.30% White
Free & Reduced Lunch	40.75%	38.01%	57.50%	78.26%

Table 2

Information on certified teachers in IMPACT High Schools

Category	School 1	School 2	School 3	School 4
Teachers	104	83	35	50
Advanced Degrees	28%	28%	26%	12%
National Board Certified	26	20	11	3
Turnover Rate	15%	13%	24%	17%

Instruments

Staff at the IMPACT Schools completed the SAI and STNA once a year from 2009-2011. Administrators at the schools completed the IMPACT Administrator Checklist once a year from 2009-2011. Site visit protocols were conducted quarterly at each of the schools using a field note template to report progress in implementing and sustaining IMPACT. From 2009-2011, each school completed the IMPACT Year End Report and IMPACT District/School Rubric.

Table 3

Summary of data collection

SAI	STNA	IMPACT Administrators Checklist	Site Visit Protocols	IMPACT Year End Reporting	IMPACT District School Rubric
Spring 2009	Spring 2009	Spring 2009	Quarterly 2009	June 2009	June 2009
Spring 2010	Spring 2010	Spring 2010	Quarterly 2010	June 2010	June 2010
Spring 2011	Spring 2011	Spring 2011	Quarterly 2011	June 2011	June 2011

Quantitative Instruments

School Technology Needs Assessment – STNA. The STNA was developed by the SERVE Center at the University of North Carolina at Greensboro in partnership with the Digital Teaching and Learning Division of NCDPI. This tool has been used as part of the evaluation process for all IMPACT grant schools. STNA is a Likert scale survey that collects data on school technology programs and outcomes by collecting data in four major constructs with 12 sub-constructs:

Table 4 -STNA

Supportive Environment for Technology Use	Professional Development	Teaching and Learning	Impact of Technology
Vision and Shared Leadership	Instruction	Instruction	Teaching Practices
Organizational Conditions	Planning	Planning	Student Outcomes
Flexible Scheduling	Professional Development Quality	Information and Communications Technologies	
Infrastructure			
Staff Support			
Media and Software			

(Corn, 2008)

STNA data are used to assist in data-driven decision making at the school level. STNA is completed by all staff members within the school. It analyzes the perceptions of the staff in relation to IMPACT implementation (SERVE, 2005). Analysis of the STNA constructs was conducted using exploratory and confirmatory factor analysis (Corn, 2010). STNA's instrument construct reliability was found to be consistent for 67 out of the 86 items that focused on technology program objectives. The data set included 1918 surveys from 32 elementary schools, 9 middle schools and 8 high schools. Findings from the study which included literature review, as well as exploratory and confirmatory factor analysis found that STNA is a high quality instrument. STNA has been used by IMPACT schools to assist in identifying how the staff perceives the implementation of IMPACT (Corn, 2008). According to Corn (2008), "Schools share findings of the STNA with their school and district staff to increase buy-in of evaluation efforts, improve project implementation and facilitate discussions around the purpose and status of the school technology program" (p. 6-7). STNA data assist schools in identifying areas of need

within the technology program by looking at infrastructure, resources, staff, professional development, current instructional and planning practices and the perceived impact of technology on teaching and learning. The research used to develop the STNA constructs in located in Appendix A.

Standards Assessment Inventory – SAI. The SAI is a scale survey developed by the National Staff Development Council in conjunction with the Southwest Educational Development Laboratory (SEDL). The survey consists of five questions for each of the twelve standards which are divided into three constructs: context standards, process standards and content standards. The twelve National Staff Development Council standards are: learning communities, leadership, resources, data-driven, evaluation, research-based, design, learning, collaboration, equity, quality teaching and family involvement (National Staff Development Council, 2007).

NSDC (2007) developed the SAI instrument and SEDL conducted the validity and reliability analysis. Instrument reliability was consistent and high across three pilot studies with a range of .71 to .98 in all 12 subscales. In the pilot studies content validity for all 12 subscales was supported by equivalent ratings from teachers and experts. Based on these findings the SAI is identified as a reliable measurement tool demonstrating good content and criterion related validity. For the purpose of this study, the 'Standard on Leadership' will be the construct used. The SAI constructs are located in Appendix B.

IMPACT Administrators Checklist. The IMPACT Administrators Checklist was administered three times from 2009-2011. The checklist is a survey tool based on a seven point Likert scale. This survey was completed by the administrators in each of the

four schools. The survey is based on a condensed list of items from the IMPACT District/School Rubric. The IMPACT Administrators Checklist assesses the implementation of the IMPACT Model based on the administrator's perception. The sixty-seven items analyze integration, differentiated instruction, literacy, application of tools, collaboration, assessment, evaluation, flexible scheduling, resources, personnel, long term instructional planning, communication and program development.

Qualitative Instruments

Site Visit Protocol. Each of the four schools was visited by NCDPI Digital Teaching and Learning Consultants at least twice a year. This visit was conducted with the IMPACT leadership team. The visit was documented using the IMPACT site visit protocol form designed by the Digital Teaching and Learning Division at NCDPI. The form addresses how the schools are progressing in their action plan. It includes areas on funding, professional development, hardware/infrastructure status, digital literacy, staffing, partnerships, collaboration, milestones and project status. The schools were visited from the fall of 2009 until the spring of 2011 for a total of thirty-six site visits. During these visits approximately one hundred and sixty pages of site visit data were collected. Data were coded based on organizational categories based on the SAI and STNA leadership items. This assisted in organizing, labeling and compiling the information to create a deeper analysis of the quantitative data. The IMPACT Site Visit Protocol is located in Appendix C.

Figure 2

Example of Site Visit Protocol Form

IMPACT Site Visit Protocol

http://it.ncwiseowl.org/UserFiles/Servers/Server_4500932/File/IMPACT/IMPACTrev1.31.08.pdf

School:	**Date:**
Principal:	**Consultant:**
	LEA Technology Director:
IMPACT Action Plan:	
Teaching and Learning	
Project Funds:	
Professional Development Status:	**List Current PD Activities:**
Needs:	

IMPACT Year End Report. This annual report contained evaluation of the school's essential questions from the previous year. The report also included next steps and resource needs that would be needed for the following year. Three annual evaluation reports were completed by each of the four schools for a total of one hundred and eighty two pages. This report is based on data gathered at the school level by the leadership teams. It also includes the perception of the leadership teams on where the schools are in the implementation of the IMPACT Model. The IMPACT Year End Report is located in Appendix D.

Figure 3

Example of IMPACT Year End Report

Evaluation Questions	Measures/Data Sources	Results
What do you need to know?	*How will you find out?*	*What were the results?*
To what extent can curriculum areas be enhanced by technology?	--Teacher Impact Evaluation Survey --Rubric scores for student products --Lesson plan sampling --Teknet schedule --AMTR	• 100% of respondents to the Teacher Impact Evaluation Survey indicated that the Impact grant activities made a significantly positive difference in student learning with their students this year. • According to the AMTR, 100% of classrooms in all subject areas were equipped with interactive whiteboards, projectors, document cameras, scanners, digital cameras, speakers, and multimedia presentation software. • The Teknet media retrieval system schedule documents that all subject areas used the handheld response systems to some degree.

IMPACT District/School Rubric. For this study, the IMPACT District/School Rubric was used to determine sustainability of the initiative. The IMPACT District/School Rubric is designed to evaluate where a school and district are at in the implementation and sustainability of the IMPACT Model. The eighteen page rubric is on a 4 point scale ranging from below minimum to outstanding. It is divided into two major areas: school and district. Within the school section there are three major constructs: teaching and learning, which examines meaningful instruction; collaboration and professional development; information access and delivery, which studies access to resources and facility design; and program administration, which deals with planning; media and technology committee design, policies and procedures, collection development, evaluation and staffing. The district section is also divided into three major constructs: teaching and learning, which studies curriculum involvement; collaboration and professional development; information access and delivery, which includes infrastructure and connectivity along with facilities, and program administration which attends to advocacy, policies and procedures, planning, budget, evaluation and staffing.

The rubric was administered at three stages during the IMPACT grant. Each IMPACT leadership team along with the schools' regional consultant completed one in 2009, 2010 and 2011.

Figure 4

Excerpt from IMPACT District/School Rubric

SYSTEM-LEVEL LEADERSHIP AND SUPPORT EVALUATION RUBRICS

NOTE: **"Most"** represents more than half and **"some"** represents less than half.
Terms designated with an asterisk* are defined at the end of the document.

TEACHING AND LEARNING (SYSTEM-LEVEL)

	OUTSTANDING	DEVELOPING	MINIMUM	BELOW MINIMUM
CURRICULUM INVOLVEMENT – Ensuring the integration of information and computer/technology skills				
PROMOTING BEST PRACTICE	Leadership continuously promotes a collaborative environment that incorporates **best practices*** for instruction, provides up-to-date resources, and shares information with others outside of the school system.	Leadership continuously promotes a collaborative environment that incorporates **best practices*** for instruction and provides up-to-date resources.	Leadership promotes a collaborative environment that incorporates **best practices*** for instruction.	Leadership does not promote a collaborative environment that incorporates **best practices*** for instruction.
INTEGRATION OF MEDIA AND TECHNOLOGY	Leadership supports curriculum integration of information and computer/technology skills across all curriculum areas and grade levels.	Leadership supports curriculum integration of information and computer/technology skills across most curriculum areas and grade levels.	Leadership supports curriculum integration of information and computer/technology skills across **core curriculum areas*** and some grade levels.	Leadership does not support curriculum integration of information and computer/technology skills across subject areas and grade levels.

Schools that are at the developing or outstanding stage are considered to be schools that can sustain the initiative. According to IMPACT Guidelines (NCDPI, 2008) "all North Carolina media and technology programs must have the expectation that they will be at least at the minimum level for successful teaching and learning to occur." (p. 186) For the purpose of this study, the developing stage will be considered as the sustainability stage.

At the developing stage of the rubric, schools have begun the process of changing the culture of their school. Sustainability as defined by the North Carolina Department of Public Instruction is when a district or school maintains project goals and outcomes and institutionalizes those into the everyday practices and operations of the district or school (NCDPI, 2008). The IMPACT District/School Rubric is located in Appendix E.

Data Analysis

Regression analysis was used to identify which items within two survey instruments were predictors for sustainability. The descriptive analysis was initially used to describe the data in relation to frequency rates. Secondly, a Pearson Correlation was run to examine the relationship between items identified on the survey instruments as leadership practices. Finally, a regression model was used to identify predictors for a sustainable innovation. The Site Visit Protocol and the IMPACT Year End Report were used to further understand the quantitative survey results and to identify changes in leadership and other outside issues that may have affected the sustainability of the innovation. This created a more in-depth analysis of leadership practices within a sustained program. During the analysis both the quantitative and qualitative sequencing fed back into one another (Schreier & Fielding, 2001). Quantitative research provided statistically significant data and qualitative research provided rich insights into the culture of the schools. By allowing the two to complement each other, meaning was added to the quantitative results and more clarity was given to the qualitative results (Schreier & Fielding, 2001, p. 29).

Quantitative Instruments:

SAI: The Standards Assessment Inventory (SAI) was taken each year by all certified staff other than principals. The response rate from each school varied from 33.3% to 100%. Table 6 below shows the response rate for each school from 2009-2011.

Table 5 – SAI Response Rate

School	Year	N=	Response Rate
1	2009	86	82.6%
1	2010	68	65.3%
1	2011	71	68.3%
2	2009	58	69.0%
2	2010	50	60.2%
2	2011	58	69.0%
3	2009	29	76.3%
3	2010	23	60.5%
3	2011	14	33.3%*
4	2009	42	82.4%
4	2010	49	90.7%
4	2011	43	86.0%

* Possible study limitation

STNA: The School Technology Needs Assessment was taken each year by certified staff except principals. The response rate from each school varied from 76.9% to 100%. Table 7 below shows the response rate for each school from 2009-2011.

Table 6- STNA Response Rates

School	Year	N=	Response Rate
1	2009	94	90.3%
1	2010	80	76.9%
1	2011	83	79.8%
2	2009	65	78.3%
2	2010	82	98.8%
2	2011	63	75.9%
3	2009	35	100.0%
3	2010	30	85.7%
3	2011	28	80.0%
4	2009	42	92.0%
4	2010	54	100%
4	2011	45	90.0%

The findings from the quantitative data were analyzed by Statistical Package for Social Sciences (SPSS) version 2. They were analyzed by schools and placed in the corresponding research question.

To extract the findings from the qualitative instruments, data were coded based on content analysis within a theory-driven approach. This allowed the researcher to use pre-identified constructs from the quantitative data to assist in analysis. An analysis plan was developed for eliminating data that was not relevant based on the pre-defined phrases identified by the quantitative data items. The leadership-focused constructs identified within the quantitative survey instruments were professional development, infrastructure, resources, leadership and vision. These were then applied to the analysis of the Site Visit Protocol and the IMPACT Year End Report.

Qualitative Instruments

Site Visit Protocol: Each of the four schools was visited by NCDPI Digital Teaching and Learning Consultants at least twice a year. This visit was conducted with

the IMPACT leadership team. The schools were visited from the fall of 2009 until the spring of 2011 for a total of 36 site visits. During these visits approximately 160 pages of site visit data were collected. Table 8 shows the number of site visits per school.

Table 7 – Site Visit Protocol

School Number	School Year	Number of Visits
1	2009	3
1	2010	3
1	2011	3
2	2009	2
2	2010	2
2	2011	2
3	2009	3
3	2010	3
3	2011	3
4	2009	4
4	2010	4
4	2010	3

IMPACT Year End Report. The IMPACT Year End Report was submitted by the schools from 2009-2011. These reports followed a predesigned format that included analysis of the school leadership team's evaluation of each of their defined goals towards implementation and sustainability of the IMPACT Model. All four schools submitted their reports in 2009, 2010 and 2011.

To extract the findings from the qualitative instruments, data were coded based on content analysis within a theory-driven approach. This allowed the researcher to use pre-identified constructs from the quantitative data to assist in analysis. An analysis plan was developed for eliminating data that was not relevant based on the pre-defined phrases identified by the quantitative data items. The leadership-focused constructs identified within the quantitative survey instruments were professional development, infrastructure,

resources, leadership and vision. These were then applied to the analysis of the Site Visit Protocol and the IMPACT Year End Report.

Limitations of the Study

Leadership is a complex issue. Analyzing the role leadership practices play in sustaining an innovation can be complicated. With this understanding, a mixed methods approach was utilized to assist in creating a deeper understanding of both the quantitative and qualitative data. The major limitation of this study is the small sample size of the IMPACT schools which can impact the generalizability of the study findings. In addition to the small sample size there is no comparison group, although internal validity is reduced, but external validity increases (Creswell, 2009). By utilizing data from only four high schools, the findings may be specific only in the context of leadership within IMPACT. However, depending on the findings, the leadership practices may be transferable to other schools and districts attempting to implement and sustain innovations.

Usually there are limitations in survey results like low response rate and access to electronic resources; however, each of these schools has one computer for every teacher and student so access is not an issue (Corn, 2008). Each school created a dedicated time for staff and students to access the SAI and STNA. Each school was also required to have their entire leadership team present for Site Visits and IMPACT Year End Reports. All of the surveys are self-report surveys, therefore, may contain bias like exaggeration, attribution and social context (Maxwell, 2005). Another limitation of this study is the objectivity of the NCDPI consultants. Each school had a different NCDPI consultant who conducted the Site Visit Protocol meetings. Each of these reports is written through the

perception lens of those consultants who brought their own beliefs and values into the report. The researcher is aware of these limitations, which is why the researcher is using multiple sources that are supported by the aforementioned research design frame. This design also requires the researcher to understand the difficulties in comparing results from two different forms. Use of this design may require further data collection or the development of a new research study to address the discrepancies (Creswell, 2009).

Chapter 4

Findings

This study was conducted to identify leadership practices that can assist in sustaining innovations. The primary question of this study was: What set of leadership practices are important to the successful sustainability of an innovation? The operational research questions were:

1. What leadership practices are evident in these schools using the SAI and STNA instruments?
2. To what extent are the leadership practices correlated?
3. What is the relationship between leadership practices and sustainability of the innovation?

This chapter reports the findings from the study. The data were gathered from existing quantitative survey data from IMPACT schools by the Friday Institute for Educational Innovation at North Carolina State University as part of a large-scale evaluation study and qualitative field notes from school site visits conducted by staff at NCDPI using the Site Visit Protocol and IMPACT Year End Report. The data from four high schools were gathered during the same three year period, from 2009-2011. The Friday Institute administered the surveys to school personnel, once a year. The qualitative data from the NCDPI Site Visit Protocol and IMPACT Year End Report was used to identify, elaborate, illustrate, clarify and explain changes in the quantitative survey findings. By combining the quantitative and qualitative results the researcher is able to

include different perspectives and provide detail of individual experiences behind the statistics. The IMPACT District/School Rubric and the IMPACT Administrators Checklist were used to identify districts that have sustained. The rubrics were completed by the schools' leadership teams and the regional consultants. The findings for this study are organized by schools within each research question.

Results for research question 1

The first research question asked: "What leadership practices are evident in the four schools using these instruments?" To determine what leadership practices are evident, a percentage frequency distribution analysis was performed. These analyses are useful in the organization and interpretation of the data. This will identify the items that experience fluctuation in scoring over the three years, both negative and positive. For the purpose of this question, percentage frequency distribution was conducted on the high end of the scale for both the SAI and STNA.

The SAI survey included ten items relating to leadership. Participants were asked to rate based on a 5 point Likert Scale. The frequency distributions and percentages of participants responding to "4" – *frequently* and "5" – *always* are included in the table 9. Each frequency analysis is broken down by year and school to examine the characteristics of the data over time and in different school cultures.

The STNA survey included sixteen items relating to leadership. Participants were asked to rate based on a 5 point Likert Scale. The frequency distributions and percentages of participants responding to "4" – *agree* and "5" – *strongly agree* are included in the table 10. Each frequency analysis is broken down by year and school to examine the characteristics of the data over time and in different school cultures.

Table 8 – SAI Frequency Distribution

SAI Leadership Item	% Always/Frequently School 1			% Always/Frequently School 2			% Always/Frequently School 3			% Always/Frequently School 4		
	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
School Goals	**87**	**82**	**62**	75	62	82	79	61	71	**69**	**78**	**100**
Instructional Practice	**73**	**52**	**43**	58	32	66	41	48	57	45	59	72
Collaborative Decision Making	62	48	42	20	15	38	35	22	36	31	53	47
Technology Enhanced Instruction	**66**	**38**	**43**	51	23	50	**38**	**61**	**36**	45	61	63
Opportunities to Improve Instruction	62	51	42	55	18	54	48	48	50	38	69	51
Human and Material Resources	40	31	30	**21**	**7**	**48**	35	26	29	12	29	33
Sharing Responsibility	**59**	**35**	**32**	33	20	38	38	30	43	45	43	44
Focused on Student Improvement	**71**	**51**	**39**	59	44	74	48	44	36	**50**	**6**	**67**
Empowering Leader	54	52	42	**26**	**24**	**52**	31	35	29	**21**	**51**	**65**
Allocation of Resources	42	40	30	29	12	32	31	21	29	24	35	33

Bold indicates significant changes

Table 9 – STNA Frequency Distribution

STNA Leadership Item	% Agree/Strongly Agree School 1			% Agree/Strongly Agree School 2			% Agree/Strongly Agree School 3			% Agree/Strongly Agree School 4		
	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
Vision for Technology	**100**	**100**	**98**	**97**	**93**	**92**	**89**	**100**	**86**	**98**	**95**	**100**
Vision Effectively Communicated	**95**	**90**	**96**	86	84	90	**94**	**93**	**79**	**97**	**80**	**98**
Administrators Model Technology	93	85	87	82	78	78	80	90	82	**74**	**82**	**89**
Administrators support change	**98**	**94**	**98**	98	96	82	98	97	89	**98**	**96**	**96**
Material Incentives	**68**	**59**	**43**	**45**	**25**	**34**	43	43	38	31	50	53
Non-Material Resources	89	70	73	75	50	64	**63**	**60**	**43**	**50**	**74**	**82**
Technology as Criteria	88	86	78	82	80	84	94	90	79	81	82	80
Technology Plan	**100**	**95**	**92**	**97**	**91**	**84**	**97**	**100**	**86**	**100**	**91**	**89**
Collaborative Planning	**99**	**94**	**95**	92	92	88	83	93	79	86	83	91
Resource Allocation Implementation	76	70	59	54	45	52	60	70	57	83	74	69
Resource Allocation Replacement	**70**	**60**	**46**	48	35	34	51	60	50	74	63	62
Sufficient Hardware	79	83	89	86	76	90	91	77	75	74	82	84
Human	**97**	**91**	**90**	**88**	**78**	**94**	89	90	75	**90**	**93**	**91**

STNA Leadership Item	% Agree/Strongly Agree School 1			% Agree/Strongly Agree School 2			% Agree/Strongly Agree School 3			% Agree/Strongly Agree School 4		
	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
Resources												
Professional Development is Timely	96	86	82	89	72	80	91	83	75	83	80	78
Professional Development is Relevant	96	86	83	97	73	80	80	83	79	83	74	80
Professional Development is ongoing	**99**	**94**	**92**	100	86	90	**97**	**97**	**96**	88	100	87

Bold indicates significant changes

School 1: In School 1, there was a continuous decline in participant ratings for SAI items 'school goals,' 'instructional practice,' 'sharing responsibility' and 'focused on student improvement.' In 'technology enhanced instruction,' the school experienced a drop of 28% in *always and frequent* responses in 2010 but began to climb back up in 2011. In their IMPACT Year End Report, School 1 supported the drop in 'technology enhanced instruction' by stating that classes had to share computer labs. Because the computer labs were not mobile they were being used mostly as research stations. Instructional time was being wasted in transition from classroom to computer lab which impacted technology instruction. Teachers were not utilizing the computers because of this transition time but in fall of 2010 the school gave out laptops to students, ensuring that transition time was not a concern for teachers.

Over three years, School 1 saw a decrease of 25% in *agree* and *strongly agree* responses on STNA item 'material incentives for teachers' and 'allocation of funding for

replacement of equipment'. The Media and Technology Advisory Committee expressed concern over sustaining the equipment once the IMPACT grant funding is gone according to Site Visit Protocol reports. One member from MTAC stated that maintaining a 1:1 school required funding that was being cut every year from the federal, state and local government budgets for education.

Although some SAI and STNA items experienced a decrease in School 1, STNA items 'vision for technology,' 'technology plan,' 'human resources,' 'vision effectively communicated,' 'administrators support change' and 'collaborative planning' were strong with very little instability in *agree* and *strongly agree* scores consistently scoring the 90 percentile across all three years. Site Visit Protocol reports shared that a focus on collaboration and planning in core curriculum areas had truly created a professional learning community with everyone understanding the vision and expectations of administration. Parents, teachers, students and the community are aware and supportive of the vision for School 1.

School 2: 'Empowering leader' and 'human/material resources' grew in School 2 by double over the course of three years. Site Visit Protocol documents indicated that the administration empowered the Media and Technology Advisory Committee to make the purchases necessary to meet the growing needs of the faculty and students. The school and district administration continually worked to access additional funding to purchase equipment and to send teachers to trainings. IMPACT Year End Report data support the SAI findings of 'human/material resources' by stating that teachers were given the time and resources to develop new strategies and instructional practices within the professional development trainings. Administrators ensured that policies, management

practices and resources were not a barrier to moving forward with 1:1 for students. Teachers felt they were supported in reshaping and updating teaching practices to take advantage of the available technology.

Although SAI item 'human/material resources' doubled over the three years STNA item 'material incentives for teachers' in School 2 witnessed a 14% decline in *agree* and *strongly agree* responses. Growing concern over budget cuts in professional development and other declining funding was shared by the leadership team in a Site Visit Protocol. One member expressed anxiety about trying to stay informed and aware of every changing technology without being given the opportunity to attend other schools, districts or conferences to learn.

STNA items 'vision for technology and 'technology plan' were strong with very little instability in *agree* and *strongly agree* scores consistently scoring the 90 percentile across all three years.

School 3: School 3 remained fairly steady in responses on the SAI, experiencing fluctuations of less than 1% to 7%, except in 'technology enhanced instruction'. This item displayed a 25% loss in *always and frequent* responses in 2011. School 3 shared that transforming classrooms towards a more student centered approach has been slow in the IMPACT Year End Report. School 3 moved from technology applications professional development design in 2010 to a more pedagogical design including sharing options for project/problem based learning in 2012 according to Site Visit Protocol reports.

STNA item 'non-material incentives' such as public recognition and special appreciations decreased by 20% in school 3 as well as 'effectively communicating the vision' which decreased by 15% in *agree* and *strongly agree* responses. From a different

perspective in School 3's IMPACT Year End Report, the point was made that staff had been recognized for their best practices in using technology in their content areas by offering them opportunities to present at conferences and to groups visiting the school. The report also explained that the success of the increased access to laptops led area community leaders to adopt resolutions supporting 1:1 in the other schools in the district. This is a contrast to the quantitative data in relation to incentives and vision for School 3.

STNA item 'professional development is ongoing' was strong with very little instability in *agree* and *strongly agree* scores consistently scoring the 90 percentile across all three years.

School 4: SAI item 'empowering leader' saw the largest continuous growth in school 4 over the course of three years starting at 21% in 2009 and growing to 65% in the *always and frequent* responses. SAI item 'focused on student improvement' dropped from 50% to 6% between 2009 and 2010, but in 2011 it was back up to 67%. In 2009 the school implemented a 1:1; this changed the face of teaching and could possibly explain the steep drop in the SAI item 'focused on student improvement'. According to Site Visit Protocol reports teachers felt overwhelmed with the technology. Leadership stated that the emphasis was on using the technology the first year. In the second year of implementation the focus moved to how technology can support instruction. A 31% increase was evident over the three years in SAI item 'school goals' for School 4. According to Site Visit Protocol reports, a further explanation of why these three SAI items saw such a large fluctuation could be due to changes in principals and curriculum lead in 2009 and 2010 at the school level.

School 4 can attest to a 32% growth in STNA item ‘non-material incentives’ from 2009-2011. Further investigation into the qualitative data shows that leadership sets the expectation that teachers will utilize the professional development to improve their instructional practices. According to School 4’s leadership team, if they observe a teacher doing a great job, they send other teachers down to watch and learn. Teachers at School 4 are encouraged to present at conferences. ‘Administrator models technology use’ rose 15% at School 4. A Media and Technology Advisory Committee member shared that the principal comes to the staff meeting with a laptop and expects all teachers to have their laptops. Leadership at School 4 consistently reminds the staff that the school is paperless, no handouts, everything is online, according to Site Visit Protocol reports.

STNA items ‘vision for technology’, administrator supports change’ and ‘human resources’ were strong with very little instability in *agree* and *strongly agree* scores consistently scoring the 90 percentile across all three years.

Results for research question 2

To what extent are the leadership constructs correlated? To determine the relationship between the leadership practices identified in the SAI and STNA, a Pearson’s correlation coefficient of the items was conducted to gain a greater understanding of the data. A correlation analysis was used to identify the extent of the relationship between SAI and STNA items in strength and direction. In the correlation analysis, data from all three years of the SAI and STNA were used. The correlation analyzed the ten items from the SAI and the sixteen items from STNA. A negative value between items indicates that when one item increases the other decreases in value. A positive value between items indicates that when one item increases the corresponding

item increases as well. A perfect correlation is represented by the value of +1.00, while a 0.00 indicates no correlation and a -1.00 indicates a perfect negative correlation. The correlation identified the relationship between the ten SAI items and the sixteen STNA items at the school level. Pearson correlation was used because the data were on an interval level, the distributions were similar and a linear relation existed.

Table 10 – School 1 Correlation of SAI and STNA N=225

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Vision for technology	**.584****	**.878****	**.570****	**.580****	**.502****	.498**	.463**	.482**	.457**	.461**
Vision effectively communicated	**.527****	**.520****	**.424****	.413**	.511**	.386**	.344**	.419**	.442**	.370**
Administrators model technology	.300**	.404**	.364**	.336**	.311**	.266**	.262**	.298**	.303**	.251**
Administrators support changes	.348**	.509**	.309**	.336**	.305**	.259**	.244**	.312**	.305**	.279**
Material incentives	.156*	.260**	.170*	.255**	.170*	.188**	.093	.189**	.215**	.157*
Non-material incentives	.286**	.400**	.265**	.343**	.188**	.199**	.151*	.259**	.194**	.177**
Technology as criteria	.293**	.333**	.222**	.245**	.247**	.131	.181**	.287**	.193**	.173**
Technology Plan	.427**	**.541****	.378**	.367**	.369**	.418**	.344**	.382**	.419**	.302**
Collaborative planning	.484**	**.589****	.370**	.422**	.385**	.403**	.323**	.384**	.360**	.327**
Resource allocation implementation	.245**	.252**	.205**	.211**	.261**	.201**	.165*	.240**	.274**	.178**

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Resource allocation replacement	.189**	.174**	**.170***	.175**	.243**	.168*	.188**	.205**	.233**	.126
Sufficient hardware available	.214**	.201**	.134*	.162*	.134*	.093	.062	.070	.140*	.108
Human resources	.274**	.465**	.317**	.338**	.288**	.172**	.206**	.297**	.284**	.166*
Professional Development is timely	.197**	.253**	.152*	.271**	.096	.099	.096	.163*	.168*	.082
Professional development is relevant	.316**	.388**	.286**	.298**	.237**	.190**	.163*	.275**	.258**	.068
Professional development is ongoing	.314**	.391**	.285**	.307**	.214**	.233**	.213**	.266**	.283**	.138*

***Correlation is significant at the .01 level (2-tailed)*
** Correlation is significant at the .05 level (2-tailed)*

School 1: At the school level only 7% of the items failed to show a significant linear relationship. Significant results are those in which the probability is unlikely to have happened by chance. At the .01 level a positive significant relationship exists between STNA item 'resource allocation replacement' and SAI item 'collaborative decision making' with a percentage variance of r^2= .028 or 2.8%; this is considered to be small effect according to Cohen (1983, pp. 79-81). School 1's highest positive significant relationship at the .05 level was between STNA item 'vision for technology' and SAI item 'instructional practice' with a percentage variance of r^2= .770 or 77% which is considered to be large effect (Cohen & Cohen, 1983). Nine other relationships between STNA and SAI items were also considered to have a large effect at r=.50-1.0. STNA item 'vision for technology' had a large effect on SAI items 'school goals' (.584), 'collaborative decision making' (.570), 'technology enhanced instruction' (.580) and 'opportunities to improve instruction' (.502). STNA item 'vision effectively communicated' showed a relationship with SAI items 'school goals' (.527), 'instructional practice' (.520), and 'opportunities to improve instruction' (.511). STNA items 'technology plan' and 'collaborative planning' also had a large effect on 'instructional practice' with .541 and .589 respectively. This analysis shows there is a strong correlation between vision, collaboration and instruction.

Collaboration across School 1 had a positive effect on increasing student engagement according to the IMPACT Year End Report. The entire school has been involved in collaboration and instructional practices have changed to include multiple teachers in the classroom.

Table 11 – School 2 Correlation of SAI and STNA N=167

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Vision for technology	.391**	.357**	.248**	.325**	**.438****	.280**	.336**	.251**	.209**	.278**
Vision effectively communicated	.422**	.283**	.263**	.252**	.324**	.330**	.331**	.257**	.330**	.230**
Administrators model technology	.164*	.110	.176*	.099	.319**	.240**	.163*	.140	.206**	.225**
Administrators support changes	.061	.082	.073	.172*	.172*	.111	.120	.088	.018	.129
Material incentives	.081	.121	.007	.105	.193*	.021	.042	.086	.111	.128
Non-material incentives	.184*	.135	.186*	.105	.162*	.112	.158*	.105	.109	.186*
Technology as criteria	.208**	.269**	.143	.169*	.168*	.059	.122	.187*	.241**	.058
Technology Plan	.154*	.124	.100	.194*	.175*	.104	.147	.133	.047	.111
Collaborative planning	.238**	.274**	.201**	.286**	.313**	.156*	.171*	.218**	.208**	.208**
Resource allocation	.227**	.246**	.178*	.137	.247**	.196*	.195*	.125	.163*	.208**

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
implementation										
Resource allocation replacement	.145	.194*	.049	.105	.217**	.001	.088	.113	.135	.060
Sufficient hardware available	.149	.181*	.148	.086	.197*	.129	.153*	.228**	.096	.162*
Human resources	.259**	.313**	.234**	.199**	.336**	.160*	.273**	.192*	.262**	.334**
Professional Development is timely	.171*	.190*	.095	.183*	.198*	.056	.123	.142	.093	.126
Professional development is relevant	.263**	.148	.010	.140	.196*	.046	.117	.082	.034	.103
Professional development is ongoing	.248**	.184*	.047	.164*	.259**	.123	.153*	.183*	.076	.155*

***Correlation is significant at the .01 level (2-tailed)*

** Correlation is significant at the .05 level (2-tailed)*

School 2: At the school level 40% of the items failed to show a significant linear relationship. These 67 nonlinear relationships show that change in one variable does not correspond with constant change in another variable. This could mean that the relationships are unpredictable or nonexistent. At the .01 level a positive significant relationship School 2 had 37 correlations ranging from .153 to .198. Although the items have a significant relationship, the correlations effects are small. School 2's highest positive significant correlation happened at the .05 level with STNA item 'vision for technology' and SAI item 'opportunities to improve instruction' with a percentage variance of r^2= .191 or 19%. The remaining 56 correlations have a positive significant relationship at the .05 level ranging from .199 to .422, which is a small to medium effect on the correlation of those items.

Leadership in School 2 has worked to prioritize training schedule dates and set expectations on the integration of technology into classroom instruction. Time is spent identifying effective technology integration strategies and examining research-based practices for effective small group collaboration. Leadership has worked to create a vision that stresses the importance of improving and redesigning instruction. Teachers are required to attend professional development trainings that concentrate on the integration of technology resources into core curriculum content areas.

Table 12 – Correlation School 3 N=66

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Vision for technology	**.674****	.485**	.454**	**.524****	**.543****	.436**	.487**	**.671****	**.629****	**.574****
Vision effectively communicated	**.554****	.398**	.189	.204	.328**	.198	.337**	.406**	.242	.223
Administrators model technology	.131	.295*	.074	.140	.126	.205	.250*	.357**	.248*	.215
Administrators support changes	.225	.347**	.164	.207	.278*	.384**	.217	.327**	.339**	.395**
Material incentives	.204	.298*	.177	.108	.135	.245*	.237	.221	.148	.137
Non-material incentives	.106	.312*	.169	.263*	.081	.242	.157	.210	.143	.169
Technology as criteria	-.047	.076	.053	.045	.100	.035	.005	.136	.022	.099
Technology Plan	.310*	.338**	.297*	.200	.325**	.103	.310*	.379**	.329**	.329**
Collaborative planning	.459**	.350**	.361**	.443**	.315*	.347**	.328**	.520**	.488**	.426**
Resource allocation implementation	.160	.217	.123	.003	.101	.196	.128	.172	.180	.185
Resource allocation replacement	.166	.245*	.148	.091	.109	.223	.089	.181	.187	.159

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Sufficient hardware available	.222	.206	.117	.108	.303*	.197	.174	.285*	.230	.201
Human resources	.399**	.378**	.378**	.262*	.348**	.389**	.348**	.470**	.432**	.384**
Professional Development is timely	.387**	.369**	.382**	.275*	.311*	.365**	.408**	.445**	.318**	.350**
Professional development is relevant	.414**	.383**	.290*	.227	.159	.349**	.306*	.403**	.420**	.354**
Professional development is ongoing	.285*	.233	.255*	.270*	.310*	.324**	.411**	.477**	.419**	.389**

***Correlation is significant at the .01 level (2-tailed)*

** Correlation is significant at the .05 level (2-tailed)*

School 3: At the school level 55% of the items failed to show a significant linear relationship. These 88 nonlinear relationships show that change in one variable does not correspond with constant change in another variable. This could mean that the relationships are unpredictable or nonexistent. School 3's highest positive significant correlation happened at the .05 level with STNA item 'vision for technology' and SAI item 'school goals' with a percentage variance of r^2= .454 or 45% which is considered to be large effect. STNA item 'vision for technology' also experienced a large effect with SAI items 'focused on student improvement' (.671), 'empowering leader' (.629), 'allocation of resources' (.574), 'opportunities to improve instruction' (.543) and 'technology enhanced instruction' (.524). A large effect was also seen between STNA item 'vision effectively communicated' and SAI 'school goal's at .554. Six positive significant correlations were at the .01 level with medium effect ranging from .303 to .312 in the areas of instructional practices, planning and professional development.

School 3's IMPACT Year End Report noted that 97% of the teachers felt that presentation equipment was effective in transforming teaching and learning. Teacher-created websites are being used daily to communicate and share resources with students and parents. Retreats provided teachers with the opportunity to identify specific strategies and professional development topics to meet 21st century teaching and learning. School 3's leadership team communicated expectations for teachers and established a requirement for attending professional development sessions every week.

Table 13 – Correlation – School 4 N=134

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Vision for technology	**.674****	**.670****	.477**	**.542****	.413**	.411**	.419**	.468**	.481**	.368**
Vision effectively communicated	**.544****	**.560****	.383**	.477**	.280**	.369**	.319**	.408**	.393**	.312**
Administrators model technology	.430**	.403**	.232**	.336**	.221*	.337**	.256**	.429**	.372**	.347**
Administrators support changes	.434**	.346**	.280**	.290**	.166	.181*	.140	.288**	.298**	.229**
Material incentives	.206*	.206*	.094	.180*	.122	.134	**.220***	.123	.202*	.076
Non-material incentives	.134	.185*	.092	.117	.114	.101	.138	.125	.182*	.095
Technology as criteria	.153	.293**	.231**	.206*	.172*	.232**	.153	.225**	.243**	.281**
Technology Plan	.235**	.239**	.148	.163	.045	.197*	.145	.211*	.155	.123
Collaborative planning	.454**	.377**	.237**	.352**	.265**	.289**	.294**	.207*	.250**	.229**
Resource allocation implementation	.314**	.270**	.153	.198*	.185*	.120	.150	.038	.131	.152

	School Goals	Instructional Practice	Collaborative decision making	Technology enhanced instruction	Opportunities to improve instruction	Human and Material resources	Sharing responsibility	Focused on student improvement	Empowering Leader	Allocation of resources
Resource allocation replacement	.271**	.202*	.071	.217*	.145	.167	.225**	.082	.120	.123
Sufficient hardware available	.337**	.224**	.247**	.236**	.092	.136	.023	.109	.262**	.103
Human resources	.169	.178*	.095	.204*	.164	**.220***	.106	.197*	.174*	.135
Professional Development is timely	.110	.142	.034	.054	-.022	.128	.029	.004	.057	.120
Professional development is relevant	.222**	.176*	.049	.173*	.064	.131	.069	.010	.088	.043
Professional development is ongoing	.299**	.294**	.209*	.223**	.249**	.172*	.153	.210*	.239**	.138

***Correlation is significant at the .01 level (2-tailed)*

** Correlation is significant at the .05 level (2-tailed)*

School 4: At the school level 40% of the items failed to show a significant relationship. These 64 nonlinear relationships show that change in one variable does not correspond with constant change in another variable. This could mean that the relationships are unpredictable or nonexistent. School 4's highest positive significant correlation happened at the .05 level with STNA item 'vision for technology' and SAI item 'school goals' with a percentage variance of r^2= .454 or 45% which is considered to be large effect. STNA item 'vision for technology' also experienced positive significant correlation with SAI items 'instructional practice' (.670) and 'technology enhanced instruction' (.542). STNA item 'vision effectively communicated' showed a large effect with SAI items 'school goals' (.544) and 'instructional practice' (.560). At the .01 level, School 4 had two correlations that were .220, STNA item 'human resources' and SAI item 'human and material resources' along with STNA item 'material incentives' and SAI item 'sharing responsibility'.

Leadership at School 4 has set expectations for staff to attend professional development once a week with an emphasis on tools, curriculum needs and resources. Personnel are in place to assist with technical support as well as instructional technology support. Quarterly half-day collaboration sessions are used to learn new tools and to analyze student achievement scores in classrooms where technology enhanced instruction has been observed by the leadership team. Leadership created school and district teams that focus on collaboration, integration and changing instructional practices. Student and teacher access to resources, including hardware, software and web-based application has increased over the past three years. Teachers using technology enhanced instruction have

the opportunity to be recognized by the school, district and community by being nominated for a district award.

Results for research question 3

What is the relationship between leadership practices and sustainability of the innovation? To examine the relationship between leadership practices and sustainability a multiple regression analysis was used to determine if leadership practices could predict sustainability of an innovation. This analysis allows the combining of multiple variables to create predictions of the dependent variable. A multiple regression is designed to create small errors of prediction. Multiple regression provides information on the strength of a relationship between variables. Multiple regression for explanation allows for the opportunity to explore relationships between multiple variables in order to understand leadership practices in an innovation. A series of multiple regression analyses was conducted for each school with each of the variables entered into the equation simultaneously. A multiple regression with the IMPACT District/School Rubric as the dependent variable was run for each of the four schools. The IMPACT District/School Rubric is designed to evaluate where a school and district is in the implementation and sustainability of the IMPACT Model. This document was completed by the IMPACT leadership team at the schools and NCDPI Staff. A multiple regression with the IMPACT Administrators Checklist as the dependent variable was also run for each of the four schools. The survey is based on a condensed list of items from the IMPACT District/School Rubric. The IMPACT Administrators Checklist assesses the implementation of the IMPACT Model based on the administrator's perception.

School 1: A multiple regression was conducted for School 1 to examine whether SAI and STNA items were predictors for sustainability with the IMPACT District/School Rubric scores as the dependent variable. The overall model explained 33.1% of the variance in sustainability, this was revealed to be statistically significant at $p<.001$. The model as a whole was significant, F (26, 198) = 5.25, $p<.05$. All items from the SAI and STNA were predictors of sustainability. Further analysis showed that 'focused on student improvement' (.280, $p=.002$), 'school goals' (.277, $p=.001$), and 'material incentives' (.231, p=.002) were positive significant predictors of sustainability indicating that those three were associated with higher scores on sustainability. 'Human and material resources' (-.288, $p=.001$), 'vision effectively communicated' (-.392, $p=.000$) and 'technology enhanced instruction' (-.239, $p=.003$) were negatively significant predictors.

Table 14 – Regression model School 1-IMPACT District/School Rubric

Predictor Variable	r^2	Adjusted r^2	F	Sig.	B	Beta
IMPACT District/School Rubric scores (Constant)	.408	.331	5.25	.000		
Material Incentives				.002	.089	.231
School Goals				.001	.206	.277
Focused on Student Improvement				.002	.168	.280
Vision Effectively Communicated				.000	-.232	-.392
Technology Enhanced Instruction				.003	-.147	-.239
Human/Material Resources				.001	-.136	-288

When conducting the regression with the IMPACT Administrators Checklist scores as the dependent variable with SAI and STNA items as the independent variables, the model explained 25.4 percent of variance in sustainability, this was revealed to be statistically significant at $p<.001$. The model as a whole was significant, F (26, 198) = 3.94, $p<.05$. 'Focused on student improvement' (.361, $p=.000$) was the highest and only positive significant predictor sustainability. 'Empowering leader' (-.303. $p=.001$) and

'vision effectively communicated' (-.261, p=.002) were negative predictors for sustainability for School 1. 'Focused on student improvement' was a significant predictor in both regression models for School 1.

Table 15 – Regression model School 1- IMPACT Administrators Checklist

Predictor Variable	r^2	Adjusted r^2	F	Sig.	B	Beta
IMPACT Administrators Checklist (Constant)	.341	.254	3.94	.000		
Focused on Student Improvement				.000	.143	.361
Empowering Leader				.001	-.090	-.303
Vision Effectively Communicated				.002	-.102	-.261

According to IMPACT Site Visit Protocol reports and IMPACT Year End Report, School 1stated that implementing the IMPACT model has provided their students with meaningful instruction. Leadership sets high expectations and works to see that those expectations are carried out by both teachers and students. Focus is always on student improvement at School 1 according to MTAC members. School 1 is identified in the IMPACT District/School Rubric as sustaining the IMPACT Model.

School 2: A multiple regression was conducted for School 2 to examine whether SAI and STNA items had an effect on sustainability with the IMPACT District/School Rubric scores as the dependent variable. The overall model explained 31.9% of the variance in sustainability, this was revealed to be statistically significant at p<.001. The model as a whole was significant, F (26, 140) = 3.99, p<.05. All items from the SAI and STNA were predictors within the model. Further analysis indicated that 'empowering leader' (.228 p<.005) was a positive significant predictor of sustainability with the IMPACT District/School Rubric. 'Administrators support change' (-.319, p<.001) was a negative significant predictor.

Table 16 – Regression model School 2-IMPACT District/School Rubric

Predictor Variable	r^2	Adjusted r^2	*F*	Sig.	B	Beta
IMPACT District/School Rubric scores (Constant)	.426	.319	3.99	.000		
Empowering leader				.005	.063	.228
Administrators support change				.001	-.129	-.319

School 2 saw a 30.4 percent of variance in sustainability; this was revealed to be statistically significant at p<.001 with the IMPACT Administrators Checklist scores as the dependent variable. The model as a whole was significant, *F* (26, 140) = 3.79, p<.05.The only positive significant predictor for School 2 was 'empowering leader' (.326, p<.005). 'Empowering leader' was a significant predictor in both regression models for School 2.

Table 17 – Regression model School 2- IMPACT Administrators Checklist

Predictor Variable	r^2	Adjusted r^2	*F*	Sig.	B	Beta
IMPACT Administrators Checklist scores (Constant)	.413	.304	3.79	.000		
Empowering Leader				.003	.090	.326

An empowering leader trusts you as a professional to do what you are suppose to do for students in School 2. It was emphasized in a Site Visit Protocol the importance of aligning all strategic plans, so that everyone knows what is expected and what they are responsible for. School 2 MTAC members feel that their school and district leadership empowered them to take risk and try new strategies. There is a level of trust in School 2 between staff and leadership. School 2 is identified in the IMPACT District/School Rubric as sustaining the IMPACT Model.

School 3: A multiple regression was conducted for School 3 to examine whether SAI and STNA items had an effect on sustainability with the IMPACT District/School

Rubric scores as the dependent variable. The overall model explained 17.9% of the variance in sustainability; this was revealed to not be statistically significant with a *p* value of .107. The model as a whole was not significant, *F* (26, 39) = 1.54, *p*=.107. All items from the SAI and STNA were predictors within the model. Further analysis indicated that only 'vision effectively communicated' (.625, *p*<.005) was a positive significant predictor of sustainability with the IMPACT District/School Rubric.

Table 18 – Regression model School 3-IMPACT District/School Rubric

Predictor Variable	r^2	Adjusted r^2	*F*	Sig.	B	Beta
IMPACT District/School Rubric scores (Constant)	.508	.179	1.54	.107		
Vision effectively communicated				.002	.210	.625

School 3 only saw a 5% of the variance when the IMPACT Administrator Checklist scores were used as the dependent variable and it is not statistically significant with a *p* value of .339. None of the SAI or STNA items were significant at either the .001 level or the .005 level. The model was not significant, *F* (26, 39) = 1.15, *p*=.339.

Table 19 – Regression model School 3- IMPACT Administrators Checklist

Predictor Variable	r^2	Adjusted r^2	*F*	Sig.	B	Beta
IMPACT Administrators Checklist scores (Constant)	.434	.057	1.15	.339		

School 3 saw a loss in personnel at the close of year three; key positions were not continued. According to Site Visit Protocol Reports, the team at School 3 is continuing with many of the aspects of IMPACT, the lack of human resources does exhibit a lack of support at the leadership level. School 3 is identified in the IMPACT District/School Rubric as not sustaining the IMPACT Model due to personnel resources.

School 4: A multiple regression was conducted for School 4 to examine whether SAI and STNA items had an effect on sustainability with the IMPACT District/School Rubric scores as the dependent variable. The overall model explained 29.9% of the variance in sustainability; this was revealed to be statistically significant at $p<.001$. The model as a whole was significant, F (26, 107) = 3.18, $p<.05$.All items from the SAI and STNA were predictors within the model. Further analysis indicated that 'school goals' (.405, $p<.001$) and 'empowering leader' (.477, $p<.001$) were positive significant predictors of sustainability with the IMPACT District/School Rubric.

Table 20 – Regression model School 4- IMPACT Administrators Checklist

Predictor Variable	r^2	Adjusted r^2	F	Sig.	B	Beta
IMPACT District/School Rubric scores (Constant)	.436	.299	3.18	.000		
School goals				.001	.163	.405
Empowering Leader				.000	.107	.477

School 4 only saw a 5.7% of the variance explained when the IMPACT Administrator Checklist scores were used as the dependent variable and it is not statistically significant, F (26, 107) = 1.31, $p<.05$. None of the SAI or STNA items were significant at either the .001 level or the .005 level.

Table 21 – Regression model School 4- IMPACT Administrators Checklist

Predictor Variable	r^2	Adjusted r^2	F	Sig.	B	Beta
IMPACT Administrators Checklist scores (Constant)	.242	.057	1.31	.169		

Changes in leadership and key personnel in School 4 did slow down the progress of implementation at the school according to Site Visit Protocol Reports. According to MTAC members, the changing of the guard did require some changes from staff and

students. It was also important that School 4 took the time to share information and training with the new administration. It was imperative that the staff at the school orientated the new staff on how important they thought the IMPACT model was to their school, staff, students and community. Staff members stated that this was the key to creating buy-in from a new staff. School 4 is identified in the IMPACT District/School Rubric as sustaining the IMPACT Model.

Conclusion

Analysis of the data results indicate that leadership practices varied from school to school. School 1 saw a continuous decline in frequency rates for 'school goals', 'instructional practice,' 'sharing responsibility,' 'focused on student improvement' and 'technology enhanced instruction' in SAI items. However, vision, change and collaborative planning frequency rates experienced very little variance in STNA. The highest positive correlation for School 1 existed between STNA item Vision for technology and SAI item Instructional practice. Two of the STNA items for vision had significant correlations with five other SAI items as well. Correlation between vision, collaboration and instruction were strong in School 1. When analyzing the SAI and STNA with the IMPACT District/School Rubric scores and the IMPACT Administrators Checklist scores as the dependent variable SAI item Focused on student improvement was the highest positive significant predictor of sustainability within School 1.

School 2 doubled their growth in 'empowering leader' and 'human/material resources' over three years in the SAI. Within the STNA School 2 witnessed a decline in 'material incentives for teachers'. School 2 had a positive significant relationship between SAI item 'opportunities to improve instruction' and STNA item 'vision for

technology.' When analyzing the SAI and STNA with the IMPACT District/School Rubric and the IMPACT Administrators Checklist scores as the dependent variable SAI item, 'empowering leader' was the highest positive significant predictor of sustainability within School 2.

SAI item 'technology enhanced instruction' was the only item for School 3 that experienced a decline of 25% in frequency rates. STNA items 'non material incentives' and 'effectively communicating the vision' also saw a decrease in frequency rates. School 3's highest positive significant correlation was between SAI item 'schools goals' and STNA item 'vision for technology.' 'Vision for technology' also experienced a large correlation effect with five other SAI items. When analyzing the SAI and STNA with the IMPACT District/School Rubric and the IMPACT Administrators Checklist as the dependent variable, neither regression model was statistically significant.

SAI item 'empowering leader' saw continuous growth in School 4 over the course of three years along with STNA items 'non-material incentives' and 'administrator models technology.' SAI items 'school goals,' 'instructional practice' and 'technology enhanced instruction' experienced a positive significant correlation with STNA item 'vision for technology.' When analyzing the SAI and STNA with the IMPACT District/School Rubric scores as the dependent variable, SAI items 'school goals' and 'empowering leader' were the highest positive significant predictors of sustainability within School 4. When analyzing the SAI and STNA with the IMPACT Administrators Checklist scores as the dependent variable, the regression model was not statistically significant.

All four schools sustained a decline in 'allocation of resources' falling to 45% or below on the high end of the scale. STNA item 'vision for technology' was the only item to have significant correlations with other leadership practices in all four schools. Vision is one of the predominant leadership practices seen throughout the literature along with resources/infrastructure, professional development, evaluation and shared decision making. 'Shared decision making' was exhibited in Schools 2 and 4 where SAI item 'empowering leader' had the highest positive significant predictor for sustainability.

There were some commonalities of correlations across schools, however the effect size ranged from small to large. The differences in size of the effect could be related to the context of the items within the school culture. STNA item 'vision for technology' was the only item that experienced a correlation with other items across all four schools. Schools 1, 3 and 4 'vision for technology' had a positive relationship with SAI items 'instructional practice,' 'school goals,' and 'technology enabled instruction.' In school 2 'vision for technology' had a positive relationship with SAI item 'opportunities to improve instruction.' 'Vision for technology' showed a high correlation for all schools in research question 2 and it was also strong, scoring consistently in the 90 percentile across Schools 1, 2 and 4 in research question 1.

Vision was predominant and had relationships with at least one other leadership practice in the sustaining schools. These schools were also consistently in the 90th percentile range for 'vision for technology,' and vision was also the highest correlated leadership practice for the sustaining schools. Predominant leadership practices in the

three sustaining schools connected with the predominant practices identified by the literature. Those leadership practices included vision, resources, professional development and shared decision making.

Chapter 5

Analysis and Implications

The hypothesis for this study was that leadership practices have an influence on the sustainability of an innovation. The goal of this study was to add to the literature on leadership practices in relation to the sustainability of an innovation. Examining leadership through the lens of an act or practice offers an opportunity to grow leaders in the context of innovative programs and initiatives, as well as assist in sustaining the innovation.

In an ever changing technology environment, leadership plays a key role by providing a vision, communicating the vision and expectations of integrating technology into classroom instruction, and by ensuring resources of all types are available for teachers and students to access in order to sustain an innovation (Courville, 2011). The search for a single best model for leadership needs to be adapted to create a set of practices allowing for flexibility in leadership depending on the organizational context of the school or district (Leithwood, Louis, Anderson, & Wahlstrom, 2004; Leithwood & Riehl, 2003). This study examined leadership practices in four high schools that had implemented IMPACT. The findings were analyzed based on the three research questions, and the discussion of those findings is presented in this chapter on a school-by-school basis. The mixed methods design of this study allowed for qualitative data to be used to further explain or confirm the quantitative data. Each school and leadership team adapted their practices to the contextual conditions and constraints of each of the schools;

therefore, discussion of the findings will be within the setting of the schools as opposed to by the research questions.

School 1

School 1 is located in the Piedmont area of the state with an enrollment of 1378 students. There are 104 teachers with 26 of them national board certified and 53% with 10+ years of teaching experience. From 2009 to 2011, School 1 had 9 IMPACT Site Visits and 3 IMPACT Year End Reports. Survey participation dropped during these three years by 10 to 14%. At the beginning of 2008 school leadership changed and at the close of 2009, district level leadership experienced a change as well.

School 1 was identified in both the IMPACT Administrators Checklist and the IMPACT District/School Rubric as sustaining the innovation. In School 1, all items from the SAI and STNA were predictors of sustainability at 33.1% variance with the IMPACT District/School Rubric as the dependent variable. Further analysis showed that SAI items 'focused on student improvement,' 'school goals' and 'material incentives' were positive significant predictors of sustainability indicating that those three were associated with higher scores on sustainability. With the IMPACT Administrators Checklist as the dependent variable, 'focused on student improvement' was the highest and only positive significant predictor with a 25.4% variance. 'School goals' had positive significant correlations with all of the STNA leadership practices and 'focused on student improvement' had positive significant correlations with all of the STNA leadership practices except for 'sufficient hardware available.' The Correlation between vision, collaboration and instruction was strong in School 1. Correlation does not imply causation, but it is interesting to note that two of the predictors in the regression also have

significant correlations with the other leadership practices. In "Strategic leadership for large scale reform" study the researchers found that vision and building collaborative processes were key practices for leadership in large scale reform (Leithwood, et al., 2004)

According to the IMPACT Year End Report, School 1 had a few desktop computers available for student use in labs or the media center and very few laptops. These resources had to be shared which created frustration on the teacher level, which led to little use of the equipment and very little integration. After IMPACT, staff and student access to and use of resources increased with 100% of the teachers integrating new hardware and software resources into their instruction somehow each day.

In studying the SAI survey data, 'focused on student improvement' experienced a 46% decline in *agree* and *strongly agree* frequency ratings and 'school goals' experienced a 29% decrease during the three years. Very little variance was shown in STNA survey items frequency ratings for 'vision for technology,' 'vision effectively communicated,' 'administrators support change' and 'collaborative planning.' Each of these consistently ranked in the 90 and above percentile. Even though there were changes in school and district administration during the grant, it would seem that School 1 continued to support the implementation and sustain the innovation. Maintaining a consistent vision and remaining focused on student improvement could be one explanation of how School 1 has continued with the innovation even with leadership changes.

Leadership plays a key role by providing a vision and communicating the vision (Courville, 2011; Schrum & Levin, 2009). School 1 defined leadership as "lighting a visionary fire so brightly before others that they cannot put it out" in the IMPACT Year

End Report. This school discussed how the leadership team met numerous times to define the new way of teaching and how it would look in School 1. Input from staff and experts were gathered to help form a more cohesive plan for IMPACT as their innovation. A visionary framework for teaching and learning was established in which student learning and engagement was foremost. School 1 staff members shared in their Site Visit Protocol report that returning to the traditional classroom environment was not an option for their school.

Within the context of the innovation in School 1, all SAI and STNA leadership practices were exhibited by the leaders. However, the strongest predictors and correlations were around leadership practices that centered on vision, collaboration and instruction. According to IMPACT Site Visit Protocol reports and IMPACT Year End Report, School 1 stated that implementing the IMPACT model has provided their students with meaningful instruction. Leadership sets high expectations and works to see that those expectations are carried out by both teachers and students. The focus is always on student improvement at School 1 according to MTAC members. Collaboration across School 1 had a positive effect on increasing student engagement according to the IMPACT Year End Report. The entire school has been involved in collaboration and instructional practices have changed to include multiple teachers in the classroom. In School 1, the hypothesis 'leadership practices have an influence on sustainability of an innovation' would hold true. The leadership for School 1 appears to have all of the leadership practices in place but concentrates on the practices that are most important to the context and culture of their school, which are related to vision, collaboration and instruction.

School 2

School 2 is located in the Piedmont area of the state with an enrollment of 1251 students. There are 83 teachers with 20 of them national board certified and 59% with 10+ years of teaching experience. From 2009 to 2011, School 2 had six IMPACT Site Visits and 3 IMPACT Year End Reports. Survey participation remained consistent throughout the three years. School 2 experienced no leadership changes throughout the innovation.

School 2 was identified in both the IMPACT Administrators Checklist and the IMPACT District/School Rubric as sustaining the innovation. In School 2, all items from the SAI and STNA were predictors of sustainability at 31.9% variance with the IMPACT District/School Rubric as the dependent variable. Further analysis indicated that 'empowering leader' was a positive significant predictor of sustainability with the IMPACT District/School Rubric. With the IMPACT Administrators Checklist as the dependent variable 'empowering leader' was the only positive significant predictor with a 30.4% variance. 'Empowering leader' had positive significant correlations with 7 of the 16 STNA leadership practices and the highest correlation existed with 'vision effectively communicated.' In School 2, 40% of the leadership practices failed to show a significant relationship, which could mean that the relationships are unpredictable or simply not there. The SAI survey data item, 'empowering leader' grew by 50% in the frequency ratings of *agree* and *strongly agree*. In STNA survey data, leadership practices 'vision for technology' and 'technology plan' were strong with very little instability in *agree* and *strongly agree* frequency ratings consistently scoring in the 90th percentile across all three years. School 2 worked to create a well-articulated vision and rationale for

implementing and sustaining IMPACT as an innovation. The district supplied resources and support to create and house a help desk area in the media center, including hiring additional personnel to support the technology.

Leadership in School 2 worked to set expectations on the integration of technology into classroom instruction. Leadership created a vision that stressed the importance of improving and redesigning instruction. Site Visit Protocol documents indicated that the administration empowered the Media and Technology Advisory Committee to make the purchases necessary to meet the growing needs of the faculty and students. It was also stated that school and district administration continually worked to access additional funding to purchase equipment and to send teachers to trainings. The planning and visioning of the innovation did not end with implementation. Teachers in School 2 realized that there was still a lot to learn in terms of adapting to a changing pedagogical model. Administration was supportive by providing resources for teachers to continue to attend professional development.

Within the context of the innovation in School 2, all SAI and STNA leadership practices were significant in the regression with the strongest predictor being 'empowering leader.' Teachers felt they were supported in reshaping and updating teaching practices to take advantage of the available technology because of leadership. School 2 MTAC members also felt that their school and district leadership allowed them the freedom to take risks and try new strategies. There is a level of trust in School 2 between staff and leadership according to Site Visit Protocols. It is interesting to note that 40% of the leadership practices failed to show any relationship, even though all leadership practices were indicated as predictors in the regression. This could mean that

within the context and culture of School 2, those correlations have no connection to how leadership functions in the school. In School 2, the hypothesis that 'leadership practices have an influence on sustainability of an innovation' would hold true. The leadership for School 2 appears to have most of the leadership practices in place, but concentrates on the practices that are most important to the context and culture of their school, which are empowering leader and vision.

School 3

School 3 is located in the coastal area of the state with an enrollment of 483 students. There are 35 teachers with 11 of them national board certified and 69% with 10+ years of teaching experience. From 2009 to 2011, school 3 had 9 IMPACT Site Visits and 3 IMPACT Year End Reports. SAI survey participation dropped to 33.3% in 2011. This could be a possible study limitation in regards to the findings for school 3. School 3 experienced school level leadership changes in 2009.

School 3 was identified in the IMPACT District/School Rubric as not sustaining the innovation, but as sustaining in the self-reporting IMPACT Administrators Checklist. This discrepancy could have occurred because the IMPACT District/School Rubric is scored by the school team and the NCDPI consultant but the IMPACT Administrators Checklist is a self reporting tool. In School 3, all items from the SAI and STNA were predictors of sustainability; however neither regression was statistically significant. The only leadership practice that was a positive significant predictor was 'vision effectively communicated.' None of the other leadership practices showed any significance in either regression. School 3 also had 55% of the leadership practices failing to show a significant relationship. 'Vision effectively communicated' and 'vision for technology' were the

largest statistically significant correlations with school 3. These two leadership practices saw a decline of 20% in the frequency ratings for STNA over the course of three years. School 3 experienced less than 1 to 7% of change in SAI frequency ratings of *agree* and *strongly agree*. School 3 consistently scored in the 90th percentile for 'professional development is ongoing' over the course of the three years.

Within the context of the innovation, School 3 saw a loss in personnel at the close of year three as key positions were not continued. According to Site Visit Protocol Reports, the team at School 3 was continuing with many of the aspects of IMPACT. The lack of human resources does exhibit a lack of support at the leadership level. These changes in personnel could have been part of the district's reaction to budget cuts instead of lack of support for the innovation.

It is also interesting to note that in school 3 leadership at the school level changed at the end of 2009. This could have contributed to the decline in survey participation and the decline of 83% in frequency ratings across both the SAI and STNA. In school 3, the hypothesis that leadership practices have an influence on sustainability of an innovation would hold true. The school has not sustained the innovation, a finding which is supported in the lack of significance of the regressions, the 55% of the leadership practices failing to show a significant relationship, and the decline of 83% in frequency ratings across both the SAI and STNA. These three examples could have contributed to leadership practices not being evident in context and culture of their school. This is also the only school that did not have another leadership practice paired with visioning in any of the three research questions.

School 4

School 4 is located in the Piedmont area of the state with an enrollment of 681 students. There are 50 teachers with 3 of them national board certified and 52% with 10+ years of teaching experience. From 2009 to 2011, School 4 had 15 IMPACT Site Visits and 3 IMPACT Year End Reports. Survey participation remained consistent between 82% and 100% during these three years. In 2008 school leadership changed and district leadership remained constant.

School 4 was identified in both the IMPACT Administrators Checklist and the IMPACT District/School Rubric as sustaining the innovation. In School 4, all items from the SAI and STNA were predictors of sustainability at 29.9% variance with the IMPACT District/School Rubric as the dependent variable. Further analysis showed that SAI items 'school goals' and 'empowering leader' were positive significant predictors of sustainability, indicating that those two were associated with higher scores on sustainability. With the IMPACT Administrators Checklist as the dependent variable, the regression was not statistically significant and none of the SAI or STNA leadership practices were significant. In School 4, the highest significant correlation occurred between 'school goals' and STNA leadership practices 'vision for technology' and 'vision effectively communicated.' In examining the SAI survey data, 'empowering leader' saw a 44% growth over the course of three years. STNA items 'vision for technology,' 'administrator supports change' and 'human resources' were strong with very little instability in *agree* and *strongly agree* scores consistently scoring the 90th percentile across all three years. Even though there were changes in school administration

during the grant, it would seem that School 4 continued to support the implementation and sustain the innovation.

Consistent vision and empowering leadership could be one explanation of how School 4 has continued with the innovation even with leadership and key personnel changes. Exemplary leaders create shared visions, establish relationships and build capacity (Kouzes & Posner, 2007). Changes in leadership and key personnel in School 4 did slow down the progress of implementation at the school according to Site Visit Protocol Reports. According to MTAC members, the changing of the guard did require some changes from staff and students. School 4 took the time to share information and training with the new administration. According to IMPACT Year End Reporting, participating in the Concerns Based Adoption Model activity the 'Change Game' by the leadership team assisted the district in recognizing that a plan for new staff and administrators needed to be in place to communicate the vision and sustain the innovation.

Leadership at School 4, according to IMPACT Site Visit Protocol, has set expectations for staff and students and provides the necessary tools to achieve those expectations. Teachers who are identified by leadership as improving their instructional practice are used as models for other teachers within the school and district. Leaders provide resources, encourage professional learning communities, recognize good teaching practices and form partnerships with parents and community (Fullan, 2004). A collaborative environment was developed and nurtured by administration. This collaboration was instrumental in building a foundation for all the work that happened throughout the innovation, according to Site Visit Protocol Reports.

Within the context of the innovation in School 4, the leaders exhibit all SAI and STNA leadership practices. However, the strongest predictors and correlations were around leadership practices that centered on vision and empowering leader. According to IMPACT Year End Report, School 4 shared that one of the most critical factors was leadership's involvement and leading of professional development. Leadership modeled a discussion forum, blogging and technology integration, which were often more effective for teachers than an hour-long workshop about the same topic. Staff at School 4 felt that the leadership was supportive of creating time to build teams and share instructional practices in a safe environment.

Leadership that focuses on sustainability creates policies that support the initiative, sets up plans to secure funds that will sustain the initiative, develops resources to support and builds capacity within the entire school or district (Hargreaves & Fink, 2003). The atmosphere at School 4 is about taking risks in instructional design, delivery and assessment according to leadership in the IMPACT Year End Report. In School 4, the hypothesis that leadership practices have an influence on sustainability of an innovation would hold true. The leadership for School 4 appears to have all of the leadership practices in place but concentrates on the practices that are most important to the context and culture of their school, which are related to vision and empowerment.

Implications - General

Spillane, Halverson and Diamond (2001) suggest that leadership is a dynamic interaction between multiple leaders (and followers) and their situational and social contexts. This study exhibits that leadership practices vary from school to school, but each of the practices identified by the SAI and STNA is present within those schools.

Each school is unique because of demographics, culture, staff, administration and location. Because of this, leaders need a set of leadership practices that are adaptable to their school environment. The literature review depicted the conceptualization of leadership practices with the aim of pinpointing the practices related to sustainability of an innovation. Predominant leadership practices seen throughout the leadership literature were vision, resources/infrastructure, professional development, evaluation and shared decision making (Fullan, 2009; Kouzes & Posner, 2012b; Leithwood & Riehl, 2003). The literature has also noted that technology-enabled teaching and learning is a social process in which leaders must understand not only the context of the school culture but also the context of staff adoption of the initiative (Courville, 2011; Cowie, Jones, & Harlow, 2011). With that in mind, it is understandable that each school would have a different significant predictor for sustainability.

There are commonalities in School 1, 2 and 4's leadership practices and relationships between variables. Based on the data these three schools scored consistently high in the 90 percentile for 'vision for technology.' It was also identified as the highest correlation for those schools. Findings in Schools 1, 2 and 4 indicated that several variables from the survey instruments were correlated. The leadership practices were 'resource allocation replacement,' 'collaborative decision making,' 'instructional practice,' 'school goals,' 'technology enhanced instruction,' 'opportunities to improve instruction,' 'vision effectively communicated,' 'technology plan' and 'collaborative planning.' Each of the aforementioned variables was predictors in the regression models for the three schools but none of them were significant predictors for the models. The significant predictor for Schools 2 and 4 was "empowering leader' and for School 1

‘focused on student improvement’, ‘school goals’ and ‘material incentives’ were significant. Because ‘empowering leader’, ‘focused on student improvement’, ‘school goals’ and ‘material incentives’ were the most effective predictors, it would be important to leaders within a innovation to consider these practices as they move towards sustainability.

School 3 was identified with the IMPACT District/School Rubric as not sustaining IMPACT due to the loss of personnel resources. Although the school has maintained parts of IMPACT, total sustainability includes maintaining personnel in key positions. Several findings stood out for School 3. It had the highest teacher turnover rate and the largest number of teachers with 10+ years of experience. School 3 also experienced a low response rate on the 2011 SAI with only 33.3% responding to the survey. These findings would seem to suggest that School 3 had no plan in place to train new staff and leadership on IMPACT. Low response rate on the 2011 SAI could indicate disillusionment with IMPACT. In the three sustaining schools vision was correlated with other leadership practices. This was not true for the non-sustaining school. This would seem to indicate that sustainability of an innovation cannot survive on vision. While vision provides the framework other leadership practices need to evident in order for sustainability to occur.

Implications – Schools

Each school is unique because of demographics, culture, staff, administration and location. Because of this, leaders need a set of leadership practices that are adaptable to their school environment. Departure of key personnel happened in Schools 1 and 4 but they still sustained the innovation. They had a plan in place to address the issue of new

leadership changes as well as other key staff changes. School 3, however, also lost personnel but they did not replace the personnel at the school level like Schools 1 and 4. The literature noted that technology enabled teaching and learning is a social process in which leaders must understand not only the context of the school culture but also the context of staff adoption of the initiative. With that in mind, it is understandable that each school would have a different significant predictor for sustainability. Schools that want to sustain a technology innovation need to understand the relationship of leadership practices with the staff and culture of the school.

Schools 1, 2 and 4 had achieved Phase Five in the hype cycle. The staff at those schools were utilizing technology as a tool to enhance teaching and learning. Those schools had made IMPACT a part of the school culture. Whereas School 3 had peaked at Phase Three where the newness had worn off and leaders were analyzing whether the funding to sustain IMPACT could be used on other school needs. Therefore, schools that wish to sustain innovative programs such as IMPACT should consider how leadership practices can be adapted to assist the schools in moving towards sustainability.

Implications – Districts

Planning for sustainability is important at the district level as well. District leaders need to be aware of each of the leadership practices and how those practices can assist in sustaining innovation. District-wide innovation needs to anticipate the departure of key staff and have a plan in place that will bring new staff into the innovation. Both Schools 2 and 4 had a plan in place to address new hires and changes in leadership, which helped with the sustainability of IMPACT in their districts. District leaders need to consider that

all leadership practices are adaptable within the context of the individual schools within the district.

Implications – State Agency

State Agencies need to understand that sustainable innovations have leaders who can adapt their practice to the culture of the district or school. State Agency innovations need to address leadership practices as part of the innovation. State Agencies also need to be aware that there is no standard design for leadership and that all leadership practices exist within the context and culture of the school and district. State agencies should consider offering state-wide professional development on leadership practices and their connection to sustaining innovations. This type of professional development could be accessible for all building and district level leaders.

Limitations of the Study

Leadership is a complex issue. Analyzing the role leadership practices play in sustaining an innovation can be complicated. Sustainability asks leaders to move beyond theory and practice and into action understanding the relationship between culture and context of an initiative. The major limitation of this study is the small sample size of the groups which can impact the generalizability of the study findings. Because the schools in this study received a grant to implement an innovation, it is possible to infer some observations about leadership practices in technology grant schools in North Carolina. By utilizing data from only four high schools, the findings may be specific only in the context of leadership within an innovation. However, depending on the findings, the leadership practices may be transferable to other schools and districts attempting to implement and sustain innovations.

Usually there are limitations in survey results like low response rate and access to electronic resources, however each of these schools are 1:1schools so access is not an issue (Corn, 2008). The SAI, STNA and IMPACT Administrators Checklist are self-report surveys therefore they may contain bias like exaggeration, attribution and social context (Maxwell, 2005).

Another limitation of this study is the objectivity of the NCDPI consultants. The Site Visit Protocol is conducted by the consultant for each of the schools. Each of these reports is written through the perception lens of the consultants who brings their own beliefs and values into the report. The mixed methods design required the researcher to understand the difficulties in comparing results from quantitative and qualitative data.

Further Research

The mixed methods design of this study offered more insight into the world of leadership practices; however, due to the sample size further research could be conducted to include schools or districts that are sustaining innovations. Replication of this study could be achieved on a broader scale and would increase the statistical power of the results. Expanding this study to include elementary and middle schools would help define what leadership practices are needed within those environments.

Conclusion

This study revealed that leadership practices vary from school to school and must be flexible to adapt to the context and culture of the school. In order for the innovation to take hold and be sustainable, district and school leaders had to agree on leadership's purpose and how it will sustain innovation. Studying leadership through the lens of an act or practice offers an opportunity to grow leaders in the context of innovations as well as

assist in sustaining the innovation. The literature review depicted the conceptualization of leadership practices with the aim of pinpointing the practices related to sustainability of innovation. The predominant leadership practices seen throughout the leadership literature were vision, resources/infrastructure, professional development, evaluation and shared decision making. Examining the findings from this study, the above mentioned leadership practices were identified in each of the sustaining schools. Cowie, Jones & Harlow (2011) found that an innovation needs leadership that is anchored in the context and shared with others. Leadership practices were anchored in the context of the school which is supported by the fact that none of the three sustaining schools had exactly the same predominant leadership practices. Resources, professional development and shared decision making appeared in the three sustaining schools and were correlated to visioning in those schools. Within the context of the three sustaining schools, it is reasonable to assume that the leadership practice of visioning must be paired with an additional leadership practice to move forward with sustaining an innovation.

The findings of this study are pertinent to increasing our understanding of how leadership practices can influence sustainability of an innovation. In the sustaining schools' vision, school goals, instruction and empowering leadership were statistically significant predictors whereas in the non-sustaining school there were no statistically significant predictors the sustaining the innovation.

Generally speaking, one could ascertain that all 26 of the leadership practices are important to sustainability of an innovation. To sustain an innovative program or initiative, a leader should find exactly which leadership practices fit within the context and culture of the district or school.

References

Allison, P. (1999). *Multiple regression: A primer.* Thousand Oaks, Calf.: Pine Forge Press.

Bass, B. M. (1990). *Bass and Stodgill's handbook of leadership: Theory, research, and managerial applications.* (3rd ed.). New York: Free Press.

Billig, S. H., Sherry, L., & Havelock, B. (2005). Challenge 98: Sustaining the work of a regional technology integration initiative. *British Journal of Educational Technology, 36*(6),987-1003.

Boyatzis, R. E., Smith, M. L., & Blaize, N. (2006 March). Developing sustainable leaders through coaching and compassion. *Academy of Management Learning & Education, 5*(1),8-24.

Brown, D., Reumann-Moore, R., Hugh, R., Christman, J. B., & Riffer, M. (2008). *Links to learning and sustainability.* Philadelphia: Research in Action.

Bush, T. (2009). Leadership development and school improvement: Contemporary issues in leadership development. *Education Review*, 375-389.

Casson, L., Bauman, J., Fisher, E. R., Lindblad, M., Sumpter, J. R., Tonatzky, L. G., & Vickery, B. S. (1997). *Making technology happen: Best practices and policies from exemplary k-12 schools for teachers, principals, parents, policymakers and Industry.* Souther Growth Policies Board. From http://www.southerngrowth.com/pubs/pubs_pdfs/mthappen.pdf

Century, J. R., & Levy, A. J. (2002). Sustaining your reform: five lessons from research. *Benchmarks: The Quarterly Newsletter of the National Clearinghouse for Comprehensive School Reform, 3*(3), 1-7.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). New York: Erlbaum.

Corn, J. (2008). Investigating the validity and reliability of the School Technology Needs Assessment (STNA) 3.0: a validity and reliability study. Raleigh NC: North Carolina State University. doi:10.1007/s11423-009-9140-y

Corn, J. (2010). Investigating the validity and reliability of the School Technology Needs Assessment (STNA) 3.0: a validity and reliability study. *Educational Technology Research and Development, 58*(4), 353-376.

Courville, K. (2011). Educational technology: effective leadership and current initiatives. *2011 Louisanna Computer Using Educator's Conference*, (pp. 1-19). New Orleans.

Cowie, B., Jones, A., & Harlow, A. (2011). The distribution of leadership as an influence on the implementation of a national policy initiative: the example of the Laptops for Teachers Scheme. *School Leadership and Management, 31*(1),47-63.

Creswell, J. W. (2009). *Research design: qualitative, quantitative and mixed methods approaches.* Thousand Oaks: Sage.

Davis, S., Darling-Hammond, L., LaPointe, M., & Meyerson, D. (2005). *School leadership study: developing successful principals.* Stanford University, Stanford Educational Leadership Institute, Stanford.

Dede, C. (1993). Leadership without Followers. In G. Kearsley, & W. Lynch, *Educational technology: leadership perspectives* (pp. 19-28). Englewood Cliffs, NJ: Educational Technology Publications.

Dikkers, A., Hughes, J., & McLeod, S. (2005). A bridge to success: STLI: in that no man's land between school technology and effective leadership, the University of Minnesota's school technology leadership initiative is a welcoming bridge. *T.H.E. Journal, 32*(11), 20.

Fullan, M. (2001). *Leading in a culture of change.* San Francisco, CA: Jossey-Bass.

Fullan, M. (2004). Leadership and sustainability. *Urban Leadership Community* (p. 14). England: University of Toronto.

Fullan, M. (2005). *Leadership and sustainability: system thinkers in action.* Thousand Oaks, California: Sage Publications.

Fullan, M. (2009). Large-scale reform comes of age. *Journal of Educational Change, 10*, 101-113.

Fullan, M. (2010). The big ideas behind whole system reform. *Canadian Education Association, 50*(3), 24-27.

Fullan, M., Hill, P., & Crevola, C. (2006). *Breakthrough.* Thousand Oaks, CA: Corwin; Toronto: Ontario Principals Council.

Gardner, J. W. (2007). The Nature of leadership. E*ducational leadership* (pp. 17-26). San Francisco: Jossey-Bass Reader.

Gartner. (2012). *Hype cycle.* From Gartner: http://http://www.gartner.com/technology/research/hype-cycles/

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*(3), 255-274.

Guskey, T. R. (2000). Evaluating professional development. Thousand Oaks, CA: Corwin Press, Inc.

Hallinger, P., & Heck, R. H. (2010 April). Collaborative leadership and school improvement: understanding the impact on school capacity and student learning. *School Leadership and Management, 30*(2), 95-110.

Hamilton, A. (1998). Implementing technology in Flowing Wells schools: an analysis of leadership. *Educational leadership*, 273-277.

Hargreaves, A. (2009). Leadership succession and sustainable improvement. *School Administrator, 66*(11), pp. 10-14.

Hargreaves, A., & Fink, D. (2003). Sustaining leadership. *The Phi Delta Kappan, 84*(9), 693-700.

Hargreaves, A., & Fink, D. (2006). *Sustainable leadership.* San Francisco, CA: Jossey-Bass.

Huber, S. G. (2004). School leadership and leadership development. *Journal of Educational Administration, 42*(6), pp. 669-684.

Jacobson, S. L., Johnson, L., Ylimaki, R., & Giles, C. (2005). Successful leadership in challenging U.S. schools: enabling principals, enabling schools. *Journal of Educational Administration, 43*(6), pp. 607-618.

Kouzes, J., & Posner, B. (2007). *The leadership challenge* (4th ed.). San Francisco, CA: Jossey Bass.

Kouzes, J., & Posner, B. (2012a). *Leadership Practices Inventory*. Retrieved 12 21, 2012, from Pfeiffer Assessments: http://www.pfeiffer.com/WileyCDA/Section/id-811878.html

Kouzes, J., & Posner, B. (2012b). *The leadership challenge: how to make extraordinary things happen in organizations.* San Francisco: Jossey-Bass.

Lambert, L. (2003). *Leadership capacity for lasting school improvement.* Alexandria: Association for Supervision and Curriculum Development.

Lambert, L. (2007). Lasting leadership: Toward sustainable school improvement. *Journal of Educational Change*, 311-322.

Leithwood, K. A., & Riehl, C. (2003). *What we know about successful school leadership.* Chicago: American Educational Research Association.

Leithwood, K., Harris, A., & Hopkins, D. (2008, February). Seven strong claims about successful school leadership. *School Leadership and Management, 28*(1), pp. 27-42.

Leithwood, K., Jantzi, D., Earl, L., Watson, N., Levin, B., & Fullan, M. (2004, February). Strategic leadership for large scale reform: the case of England's national literacy and numeracy strategy. *School Leadership and Management, 24*(1), pp. 58-79.

Leithwood, K., Louis, K. S., Anderson, S., & Wahlstrom, K. (2004). *Review of research: how leadership influences student learning.* New York: The Wallace Foundation.

Madrazo, D. R. (2011). *The effect of technology infusion on at-risk high school students' motivation to learn.* Boone, NC: Appalachian State University.

Martinez, A., Dimitriadis, Y., Gomez-Sanches, E., Rubia-Avi, B., Jorris-Abellan, I., & Marcos, J. A. (2006). Studying participation networks in collaboration using mixed methods. *Computer Support Collaborative Learning*, 383-408.

Marzano, R. J., & McNulty, B. A. (2005). *School leadership that works from research to results.* Alexandria, VA.: ASCD.

Maxwell, J. (2005). *Qualitative research design: an interactive approach* (Vol. 41). Thousand Oaks, CA: Sage.

Mollett, M. J., Overbay, A., Corn, J., Townsend, M., & Townsend, L. (2012). *IMPACT continuation annual report (2010-2011).* North Carolina State University, Friday Institute for Educational Innovation, Raleigh, NC.

Murphy, J. (2001). Re-culturing the profession of educational leadership: new blueprints. *National Commission for the Advancement of Educational Leadership Preparation* (pp. 1-15). Racine: The Johnson Foundation.

Murphy, J., Hallinger, P., & Mitman, A. (1983). Research on educational leadership: issues to be addressed. *Educational Evaluation and Policy Analysis, 5*(3), pp. 297-305.

National Staff Development Council. (2007). *NSDC introduces bold new purpose.* Retrieved from http://www.nsdc.org/standfor/nsdcpurpose.cfm

NCDPI. (2008). IMPACT: Guidelines for North Carolina Media and Technology Programs. Raleigh, NC: North Carolina Department of Public Instruction, Curriculum and Instruction Division, Instructional Technology Department. Retrieved from http://www.ncwiseowl.org/impact/

Overbay, A., Osborne, J. W., Grable, L. L., Vasu, E. S., & Seaton, A. C. (2007). *IMPACT Evaluation, Year Three.* NC DPI Technology Services Division Report, Raleigh, NC.

Schreier, M., & Fielding, N. (2001). Introduction: on the compatibility between qualitative and quantitative research methods. *Forum: Qualitative Social Research,* 10-46.

Schrum, L., & Levin, B. B. (2009). *Leading 21st century schools: harnessing technology for engagement and achievement.* Thousand Oaks, CA: Corwin.

SERVE. (2005). School Technology Needs Assessment 2.0. Greensboro, NC. From http://srvlive.serve.org/Evaluation/Capacity/EvalFramework/resources/STNA2.2c.pdf

Sindelar, P. T., Shearer, D. K., Yendol-Hoppey, D., & Liebert, T. W. (2006 Spring). The sustainability of inclusive school reform. *Council for Exceptional Children, 72*(3), pp. 317-331.

Spillane, J. P., Halverson, R., & Diamond, J. B. (2001). Investigating school leadership practice: a distributed perspective. *Educational Researcher, 30*(3), 23-28.

Tang, R., & Solomon, P. (2001). Use of relevance criteria across states of document evaluation: one the complementarity of experimental and naturalistic studies. *The American Society for Information Science and Technology, 52*(8), 676-685.

Wepner, S. B. (2004-May/June). *Technology run amok: the top ten technoblunders.* From Reading Online: http://readingonline.org/electronic/elec_index.asp?HREG=wepner2/index.html

Williams, H. S. (2009). Leadership capacity a key to sustaining lasting improvement. *Education, 130*(1), 30-41.

Yauch, C. A., & Steudel, H. J. (2003October). Complementary use of qualitative and quantitative cultural assessment methods. *Organizational Research Methods, 6*(4), 465-481.

Appendices

Appendix A

STNA Item Reference Matrices

Construct I. Supportive Environment for Technology Use

Reference Matrix for *Supportive Environment for Technology Use* Construct for STNA

Subconstruct	Item	Standard or Suggested Practice
Vision and Shared Leadership	1. A vision for technology has been developed through an effective collaboration among stakeholders, e.g., administrators, specialists, teachers, students, and community members.	▪ Educational leaders facilitate the shared development by all stakeholders of a vision for technology use and widely communicate that vision (International Society for Technology in Education, 2002). ▪ All stakeholders should be involved in creating the vision. The vision should be understood and committed to by the full range of stakeholders. School, district, and community leaders should be formally committed to implementing the vision (North Central Regional Educational Laboratory, 2000). ▪ The system should engage key stakeholders plus the broader community, in defining and clearly stating a compelling vision and expectations for technology in schools (Milken Exchange, 1998). ▪ The district and the schools should effectively communicate the vision to students, staff, and the community (North Central Regional Educational Laboratory, 2000). ▪ Advance a bold, forward-looking vision for tomorrow's schools. Build consensus around a compelling vision--tie it to economic growth. Create a sense of urgency about the vision among the community, private sector, and schools (Milken Exchange, 1998). ▪ Formal technology-related structures and processes should engage parents, community members, school faculty, and learners in meaningful exchanges, interactions, and partnerships that advance the vision (North Central Regional Educational Laboratory, 2000).
	2. The vision for technology use has been effectively communicated to the	▪ The district and the schools should effectively communicate the vision to students, staff, and the community (North Central Regional Educational Laboratory, 2000).

	community.	▪ Advance a bold, forward-looking vision for tomorrow's schools. Build consensus around a compelling vision--tie it to economic growth. Create a sense of urgency about the vision among the community, private sector, and schools (Milken Exchange, 1998). ▪ Key community stakeholders should be committed and involved in planning, implementing, and evaluating the system's use of learning technologies (Milken Exchange, 1998).
	3. Administrators model effective uses of technology.	▪ Administrators should model the effective use of technology; develop and support systemic change processes to maximize support for learning; and facilitate appropriate professional development processes (Milken Exchange, 1998). ▪ Administrators should be prepared to use technology effectively. They should be prepared to work with colleagues to guide their school system toward more effective uses of technology in teaching, learning, and managing (North Central Regional Educational Laboratory, 2000).
	4. Administrators support changes in school-level systems, policies, and practice related to technology.	▪ Administrators should be prepared to use technology effectively. They should be prepared to work with colleagues to guide their school system toward more effective uses of technology in teaching, learning, and managing (North Central Regional Educational Laboratory, 2000). ▪ Educational leaders foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology (International Society for Technology in Education, 2002).
	5. Teachers who are innovators with technology receive incentives or rewards for their hard work (e.g., funding, perks, waivers, special opportunities).	▪ Innovation--with and without technology--should be supported, encouraged, and actively developed through policies and informal action. Policymakers should use funding, perks, waivers, and special opportunities to provide incentives for schools and educators to innovate (North Central Regional Educational Laboratory, 2000).

	6. Teachers who are innovators with technology receive **non-material incentives**, e.g., public recognition, special appreciation.	▪ Educational leaders foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology (International Society for Technology in Education, 2002).The school culture should be one that encourages, enables, and rewards educators individually and collectively to improve the learning and teaching processes through the effective use of technology and communication networks (Milken Exchange, 1998). ▪ Multiple faculty incentives support technology integration and research (CEO Forum, 2000).
	7. When administrators are seeking or hiring teachers, they consider technology literacy and leadership for technology as criteria for selection.	▪ The school should seek college graduates with the highest standard of technology teaching expertise, who will become technology leaders in their schools (CEO Forum, 2000).
Organizational Conditions	8. An effective long-range school technology plan is in place.	▪ Educational leaders maintain an inclusive and cohesive process to develop, implement, and monitor a dynamic, long-range, and systemic technology plan to achieve the vision(International Society for Technology in Education, 2002). ▪ The system should develop a comprehensive, long-term plan, with alignment between the plan for technology in schools and existent policies and practices (e.g., rules and regulations, fiscal priorities, operating practices, allocation of resources, investment in human capital and accountability) (Milken Exchange, 1998).
	9. The school technology plan is developed through an effective collaboration among stakeholders, e.g., administrators,	▪ Technology and media staff play an ongoing and active role throughout the planning and construction phases of renovated or repurposed facilities (i.e., space, design, and furniture considerations) that focus on accessibility, flexibility, and efficiency necessary to provide opportunities for teaching and learning as well

	specialists, teachers, students, and community members.	as media and technology administrative needs (Public Schools of North Carolina, 2005). ▪ Form a media and technology advisory committee to include the media coordinator and the technology facilitator. The committee meets at least monthly to advocate for the technology and media programs within the school, assess needs and make decisions regarding budget allocations. A resource development plan is supported by an adequate yearly budget to maintain, update, and expand the school's resources. Short-term and long-term plans are developed for collection development and the integration of media and technology programs into the total school instructional program to enhance student learning (Public Schools of North Carolina, 2005).
	10. The school technology plan is monitored and updated at least once a year.	▪ Form a media and technology advisory committee to include the media coordinator and the technology facilitator. The committee meets at least monthly to advocate for the technology and media programs within the school, assess needs and make decisions regarding budget allocations. A resource development plan is supported by an adequate yearly budget to maintain, update, and expand the school's resources. Short-term and long-term plans are developed for collection development and the integration of media and technology programs into the total school instructional program to enhance student learning (Public Schools of North Carolina, 2005).
	11. Teachers and other staff members support the school technology plan.	▪ Technology and media staff play an ongoing and active role throughout the planning and construction phases of renovated or repurposed facilities (i.e., space, design, and furniture considerations) that focus on accessibility, flexibility, and efficiency necessary to provide opportunities for teaching and learning as well as media and technology administrative needs (Public Schools of North Carolina, 2005). ▪ Form a media and technology advisory committee to include the media coordinator and the technology facilitator. The committee

		meets at least monthly to advocate for the technology and media programs within the school, assess needs and make decisions regarding budget allocations. A resource development plan is supported by an adequate yearly budget to maintain, update, and expand the school's resources. Short-term and long-term plans are developed for collection development and the integration of media and technology programs into the total school instructional program to enhance student learning (Public Schools of North Carolina, 2005).
	12. The amount of money budgeted for technology resources is sufficient for implementing decisions arising from planning.	▪ Educational leaders allocate financial and human resources to ensure complete and sustained implementation of the technology plan (International Society for Technology in Education, 2002).
	13. The amount of money budgeted for technology resources is sufficient for continuously updating and replacing technology systems as they become outdated.	▪ Provide an adequate plan for growth and expansion that is supported by an adequate yearly budget to support the evolution of developments in state-of-the-art technology (Public Schools of North Carolina, 2005).
	14. Supplemental sources of funding are actively pursued to support technology (e.g., external grants, collaboration with community or parent groups, support from businesses).	▪ Building-level media and technology staff should secure additional funding by actively seeking out and writing grants, and soliciting funding from other sources such as PTA/PTOs, local community organizations, and businesses (Public Schools of North Carolina, 2005).
	15. Multiple sources	▪ Educational leaders use technology to plan and implement comprehensive systems of effective

	of data are used to evaluate the impact of technology programs.	assessment and evaluation (International Society for Technology in Education, 2002). ▪ Collaborative planning, evaluation, and instruction shows specific links between information literacy and content, and is a team effort between the technology facilitator, media coordinator, teachers, support personnel, pre-service interns, administrators, and students (Public Schools of North Carolina, 2005).
	16. Technology is used to communicate and collaborate with families about school programs and student learning. 17. Technology is used to communicate and collaborate with the community about school programs designed to enhance student learning.	▪ The telecommunications infrastructure should provide appropriate, robust communication from every learning setting. That access should extend beyond the school day and outside the school facility (North Central Regional Educational Laboratory, 2000). ▪ Teachers use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning (International Society for Technology in Education, 2000b). ▪ Mechanisms should be in place for ongoing communication among partners and the broader community for the purposes of celebrating successes, building awareness, monitoring progress, and encouraging wider participation (Milken Exchange, 1998). ▪ Create a communication plan to keep all stakeholders regularly informed of technology learning goals and progress toward those goals, and to engage all stakeholders in the process of continuous improvement (Milken Exchange, 1998).
Flexible Scheduling	18. The media center can be flexibly scheduled to provide equitable access to resources and instruction. 19. Computer labs can be flexibly scheduled for equitable access to resources and instruction.	▪ Building-level media and technology programs provide flexibly scheduled programs that provide equal and open access to resources and instruction that integrate with classroom goals and objectives at point of need (Public Schools of North Carolina, 2005).

	20. Mobile computers can be flexibly scheduled to provide equitable access to resources and instruction.	
Infrastructure	21. Teachers and students have sufficient computer hardware available for their use, e.g., computers, digital cameras, projection devices, scanners, printers.	▪ Educational leaders implement procedures to drive continuous improvements of technology systems and to support technology replacement cycles(International Society for Technology in Education, 2002). ▪ Schools should have an installed base of modern technology equipment (computers, calculators, digital cameras, projection devices, scanners, printers, etc.) to support the learning, communication, and administrative goals of the education system (Milken Exchange, 1998). ▪ Educational leaders develop, implement, and monitor policies and guidelines to ensure compatibility of technologies (International Society for Technology in Education, 2002). ▪ Provide access to state-of-the-art technology and resources on local and wide area networks (Public Schools of North Carolina, 2005).
	22. Electronic systems for communicating within the school are adequate, e.g., e-mail among teachers and staff, network drives to upload lesson plans and grades to the main office.	▪ The telecommunications infrastructure should provide appropriate, robust communication from every learning setting. That access should extend beyond the school day and outside the school facility (North Central Regional Educational Laboratory, 2000). ▪ Building-level media and technology staff continuously publicize the contributions and resources of media and technology programs through a broad range of vehicles such as Web pages, newsletters, board presentations, displays, and special events (Public Schools of North Carolina, 2005).
	23. Electronic systems for communicating with families and the community are adequate, e.g., e-mail, teacher, and/or school Web pages.	

	24. Reliability and speed of external connections are sufficient, e.g., connections to the Internet, online databases, and other resources.	▪ Provide access to state-of-the-art technology and resources on local and wide area networks (Public Schools of North Carolina, 2005). ▪ Provide an infrastructure and connectivity that meet current state technology plan and information resources management standards (Public Schools of North Carolina, 2005). ▪ The connectivity should be adequate to support current and rapidly growing demands created by the learning, communication, and administrative requirements of the education system (Milken Exchange, 1998). ▪ System level professional staff is provided to facilitate the standardization of resources and hardware (Public Schools of North Carolina, 2005). ▪ System level professional staff is provided to facilitate the planning for and overseeing of LEA infrastructure and connectivity (Public Schools of North Carolina, 2005).
	25. Students with disabilities have appropriate and adequate access to adaptive and assistive devices.	Assistive technology paper?
Staff Support	26. Adequate access to technical support is available (e.g., to troubleshoot hardware or software problems, maintain systems).	▪ School facilities should support connectivity and intensive technology use for learning. Consideration of such use should guide all facilities renovation and new construction (North Central Regional Educational Laboratory, 2000). ▪ Provide online support systems for educators to promote collegiality, access to resources, and continuous growth (Milken Exchange, 1999). ▪ The school and/or district should provide adequate and timely support for hardware, software, and instructional application (North Central Regional Educational Laboratory, 2000). ▪ Adequate technical support should provide timely, expert troubleshooting, technical assistance, ongoing maintenance, operation, and upgrades (Milken Exchange, 1998).

		▪ Tech support available 24/7 (CEO Forum, 2000). ▪ System level professional staff is provided to facilitate the standardization of resources and hardware (Public Schools of North Carolina, 2005). ▪ System level professional staff is provided to facilitate the planning for and overseeing of LEA infrastructure and connectivity (Public Schools of North Carolina, 2005).
	27. Library media coordinator and/or media assistant positions are adequately staffed.	▪ Building-level media and technology staff continuously foster interpersonal relationships with students and staff to encourage collaboration, communication, and the sharing of ideas and strategies that support the total instructional program (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 1-500 includes: 1 full-time library media coordinator, 1 full-time technology facilitator, 1/2 media assistant and 1/2 technology assistant (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 501-1000 includes: 1 full-time library media coordinator, 1 full-time technology facilitator, 1 full-time media assistant, and 1 full-time technology assistant (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 1001-1500 includes: 2 full-time library media coordinators, 2 full-time technology facilitators, 1 1/2 media assistants, and 1 1/2 full-time technology assistants (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 1501-2000 includes: 2 full-time library media coordinators, 2 full-time technology facilitators, 2 full-time media assistants, and 2 full-time technology assistants (Public Schools of North Carolina, 2005).

	28. Technology facilitator and/or technology assistant positions are adequately staffed.	▪ The recommended *minimum* staffing for schools with an average daily membership of 1-500 includes: 1 full-time library media coordinator, 1 full-time technology facilitator, 1/2 media assistant and 1/2 technology assistant (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 501-1000 includes: 1 full-time library media coordinator, 1 full-time technology facilitator, 1 full-time media assistant, and 1 full-time technology assistant (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 1001-1500 includes: 2 full-time library media coordinators, 2 full-time technology facilitators, 1 1/2 media assistants, and 1 1/2 full-time technology assistants (Public Schools of North Carolina, 2005). ▪ The recommended *minimum* staffing for schools with an average daily membership of 1501-2000 includes: 2 full-time library media coordinators, 2 full-time technology facilitators, 2 full-time media assistants, and 2 full-time technology assistants (Public Schools of North Carolina, 2005).
Media and Software	29. Teachers and students have ready access to productivity software, e.g., graphic organizer, word processing, slide presentation, or drawing applications.	▪ Materials are provided to support student representation of their own ideas (e.g., productivity tools such as Inspiration, MS Word, Powerpoint, spreadsheets, Web page software, and technology such as video and digital cameras) (Apple Computer Inc., 1995). ▪ Teachers and learners should have sufficient access to productivity tools, online services, media-based instructional materials, and primary sources of data in settings that enrich their learning goals (Milken Exchange, 1998).
	30. Teachers have ready access to a cataloging system they can use for searching and locating teaching	▪ Provide an organized collection of resources, including technology-based materials and equipment, accessible through a district-wide Union catalog and circulated through an automated system. Establish *annual* procedures for adding new materials and equipment to an

	materials.	accurate, automated inventory and for discarding outdated and worn items (Public Schools of North Carolina, 2005).
	31. Teachers and students have ready access to a good collection of print, multimedia, and electronic resources.	▪ Provide a balance of print, multimedia, and electronic resources, based on local board-approved selection policies that support the state curriculum and the needs of the student population (Public Schools of North Carolina, 2005). ▪ Building-level media and technology programs provide barrier-free access to the library media center's facility and its collection as well as access to building-level, national, state, and district-wide electronic resources, before, during, and after the instructional day to support learning (Public Schools of North Carolina, 2005).
	32. When educators are selecting resource media and software, they consider both the curriculum and the needs of learners.	▪ Provide a diverse collection that supports teaching and learning, students' personal interests, diverse learning styles, multicultural backgrounds, and physical challenges (assistive/adaptive devices, etc.) (Public Schools of North Carolina, 2005). ▪ Resources are selected and acquired by formally assessing needs (e.g., curriculum mapping) and following building-level selection policy based on the local board-approved model and established criteria for various media formats (Public Schools of North Carolina, 2005). ▪ Provide a diverse collection that supports teaching and learning, students' personal interests, diverse learning styles, multicultural backgrounds, and physical challenges (assistive/adaptive devices, etc.) (Public Schools of North Carolina, 2005). ▪ Equipment and digital resources should be strategically deployed and sufficient to meet the needs of learners and educators (North Central Regional Educational Laboratory, 2000).

Construct II. Professional Development

Reference Matrix for *Professional Development* Construct for STNA

Subconstruct	Item	Standard or Suggested Practice
Instruction	1. I would benefit from professional development on research-based practices I can use in my teaching.	▪ Staff development that improves the learning of all students prepares educators to apply research to decision making (National Staff Development Council, 2001a). ▪ Quality Teaching. Staff development that improves the learning of all students deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use the various types of classroom assessments appropriately (National Staff Development Council, 2001a). ▪ Educational leaders advocate for research-based effective practices in use of technology (International Society for Technology in Education, 2002). ▪ The vision for technology use should be grounded in sound research on how people think and learn and how technology influences and adds value to these processes (North Central Regional Educational Laboratory, 2000).
	2. I would benefit from professional development on identification, location, and evaluation of technology resources, e.g., websites, that I can use with my students.	▪ Teachers identify and locate technology resources and evaluate them for accuracy and suitability (International Society for Technology in Education, 2000b). ▪ Staff development that improves the learning of all students prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement (National Staff Development Council, 2001a).

Subconstruct	Item	Standard or Suggested Practice
	3. I would benefit from professional development on performance-based student assessment of my students.	▪Teachers apply technology in assessing student learning of subject matter using a variety of assessment techniques (International Society for Technology in Education, 2000b). ▪Traditional assessment is often norm-referenced and multiple-guess, while assessments in constructivist classrooms are more criterion-referenced and based on performance portfolios that illustrate what students can create with technology (Apple Computer Inc., 1995). ▪Develop new student performance measures to reliably assess the impact of technology on learning (Milken Exchange, 1999). ▪Use technology to provide more sensitive and cost-effective testing options (Milken Exchange, 1999). ▪Educators should be prepared to apply technology in support of the assessment process. They should be prepared to apply new forms of assessment to the products of technology-supported learning (North Central Regional Educational Laboratory, 2000).
	4. I would benefit from professional development on the use of technology to collect and analyze student assessment data.	▪Quality Teaching. Staff development that improves the learning of all students deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use the various types of classroom assessments appropriately (National Staff Development Council, 2001a). ▪Teachers apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity (International Society for Technology in Education, 2000b).

Subconstruct	Item	Standard or Suggested Practice
	5. I would benefit from professional development on learner-centered teaching strategies that incorporate technology, e.g., project-based or cooperative learning.	▪ Teachers use technology to support learner-centered strategies that address the diverse needs of students (International Society for Technology in Education, 2000b). ▪ Technology provides opportunities for students to use an inquiry-based, collaborative approach to solve meaningful problems (Apple Computer Inc., 1995). ▪ Technology provides opportunities for teachers to change their approach to teaching and learning from curriculum centered to learner-centered, from individual tasks to collaborative work, from passive to active learning (Apple Computer Inc., 1995). ▪ Teachers' fluency with technology should translate into unique and relevant learning opportunities for students (Milken Exchange, 1998). ▪ Educators should be prepared to use a variety of technology-supported strategies for teaching and learning to meet the needs of students (NCREL, 2000).
	6. I would benefit from professional development on online security and safety.	▪ Staff development that improves the learning of all students prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement (National Staff Development Council, 2001a). ▪ Teachers promote safe and healthy use of technology resources (International Society for Technology in Education, 2000b).
	7. I would benefit from professional development on the use of technology for differentiating instruction for students with special learning needs…	▪ Teachers use technology to support learner-centered strategies that address the diverse needs of students (International Society for Technology in Education, 2000b). ▪ Teachers design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners (International Society for Technology in Education, 2000b).

Subconstruct	Item	Standard or Suggested Practice
Planning	8. I would benefit from professional development on the uses of technology to increase my professional productivity.	▪ Teachers use technology to enhance their productivity and professional practice (International Society for Technology in Education, 2000b)
	9. I would benefit from professional development on ways to use technology to communicate and collaborate with families about school programs and student learning.	▪ Staff development that improves the learning of all students provides educators with knowledge and skills to involve families and other stakeholders appropriately (National Staff Development Council, 2001a). ▪ Teachers use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning (International Society for Technology in Education, 2000b). ▪ Mechanisms should be in place for ongoing communication among partners and the broader community for the purposes of celebrating successes, building awareness, monitoring progress, and encouraging wider participation (Milken Exchange, 1998).
	10. I would benefit from professional development on ways to use technology to communicate and collaborate with other educators.	▪ Teachers use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning (International Society for Technology in Education, 2000b). ▪ Educators should use technology and communication networks to advance their own professional practice and collegial interactions (Milken Exchange, 1998).
	11. I would benefit from professional development on alignment of lesson plans to content standards and student technology standards.	▪ Teachers facilitate technology-enhanced experiences that address content standards and student technology standards (International Society for Technology in Education, 2000b). ▪ Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning (International Society for Technology in

Subconstruct	Item	Standard or Suggested Practice
		Education, 2000b).
	12. I would benefit from professional development on use of research or action research projects to improve technology-enhanced classroom practices.	▪ Educators should be skilled in designing teaching strategies and learning environments that maximize the impact that technology has on learning (North Central Regional Educational Laboratory, 2000). ▪ Technology use should be based on both high-impact, research-based practice and field-based, best practices shown to add value to learning (North Central Regional Educational Laboratory, 2000). ▪ Collaborative efforts are based on the best available models of instruction, collaboration, and cooperative learning to develop strong instructional partnerships that lead to student development of critical thinking and problem-solving skills (Public Schools of North Carolina, 2005). ▪ Fund research to document the impact of technology on student learning under varied conditions (Milken Exchange, 1999).
	13. I would benefit from professional development on use of data for reflecting on my professional practices.	▪ Teacher development with the most impact provides opportunities to experiment and reflect on new experiences. Personal reflection, while participating in a group discussion or writing in a personal journal, helps teachers to question their own beliefs and to begin the process of change (Apple Computer Inc., 1995). ▪ Teachers continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning (International Society for Technology in Education, 2002).
	14. I would benefit from professional development on use of data to make decisions about the use of technology.	▪ Teachers apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity (International Society for Technology in Education, 2002) ▪ Create a well-designed data collection plan, including appropriate indicators of

Subconstruct	Item	Standard or Suggested Practice
		key implementation and outcome objectives. Analyze multiple measures to regularly assess progress toward goals (Milken Exchange, 1998). ▪ Data-driven decision making. Use results to inform all levels of planning and decision-making (Milken Exchange, 1998).
	15. I would benefit from professional development on use of technology to participate in professional development activities, e.g. online workshops, hands-on training in a computer lab.	▪ Educators should be prepared to use technology to increase professional productivity and gain enriched access to professional resources (North Central Regional Educational Laboratory, 2000). ▪ Teachers use technology resources to engage in ongoing professional development and lifelong learning (International Society for Technology in Education, 2000b).
Professional Development Quality	16. Educators in charge of professional development use data from teachers' needs assessments to determine technology professional development topics and activities.	▪ The staff development program is planned, delivered, and evaluated collaboratively by a committee with representatives from a variety of roles including the technology facilitator, media coordinator, teachers, administrators, students, IHE faculty, and support personnel. Staff development participants are involved in the evaluation process (Public Schools of North Carolina, 2005).
	17. Technology professional development is timely.	▪
	18. Technology professional development is relevant.	▪ Staff development offerings correlate to technology competencies for educators and meet licensure and renewal requirements (Public Schools of North Carolina, 2005). ▪ The school and district should provide comprehensive professional growth opportunities for teachers, administrators, and other staff that build their capacity to advance the vision (North Central

Subconstruct	Item	Standard or Suggested Practice
		Regional Educational Laboratory, 2000).
	19. Technology professional development is ongoing.	
	20. Teachers have an opportunity to evaluate technology professional development activities in which they participate.	▪ The staff development program is planned, delivered, and evaluated collaboratively by a committee with representatives from a variety of roles including the technology facilitator, media coordinator, teachers, administrators, students, IHE faculty, and support personnel. Staff development participants are involved in the evaluation process (Public Schools of North Carolina, 2005).
	21. The impact of technology professional development is tracked using data on **classroom practice**.	▪
	22. The impact of technology professional development is tracked using data on **student learning**.	▪ The effectiveness of professional development should be linked to student performance (North Central Regional Educational Laboratory, 2000). ▪ Assess the impact of professional development programs based on classroom practice and student learning (Milken Exchange, 1999). ▪ Uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement (National Staff Development Council, 2001b).

Construct III. Teaching and Learning

Reference Matrix for *Teaching and Learning* Construct for STNA

Subconstruct	Item	Standard or Suggested Practice
Instructional	1. I consult publications, online journals, or other resources to identify research-based practices in teaching with technology.	▪ Teachers apply current research on teaching and learning with technology when planning learning environments and experiences (International Society for Technology in Education, 2000b).
	2. I identify, locate, and evaluate technology resources (e.g., websites).	▪ Teachers identify and locate technology resources and evaluate them for accuracy and suitability (International Society for Technology in Education, 2000b)
	3. I apply performance-based student assessment to technology-enhanced lessons (e.g., student portfolios, student presentations).	▪ Teachers apply technology in assessing student learning of subject matter using a variety of assessment techniques (International Society for Technology in Education, 2000b). ▪ Traditional assessment is often norm-referenced and multiple-guess, while assessments in constructivist classrooms are more criterion-referenced and based on performance portfolios that illustrate what students can create with technology (Apple Computer Inc., 1995). ▪ Develop new student performance measures to reliably assess the impact of technology on learning (Milken Exchange, 1999). ▪ Use technology to provide more sensitive and cost-effective testing options (Milken Exchange, 1999). ▪ Educators should be prepared to apply technology in support of the assessment process. They should be prepared to apply new forms of assessment to the products of technology-supported learning (North Central Regional Educational Laboratory, 2000).

Subconstruct	Item	Standard or Suggested Practice
	4. I use technology to collect and analyze student assessment data.	▪Educators should be prepared to apply technology in support of the assessment process. They should be prepared to apply new forms of assessment to the products of technology-supported learning (North Central Regional Educational Laboratory, 2000). ▪Teachers use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning (International Society for Technology in Education, 2000b). ▪Use assessment results to allocate resources, refine implementation strategies, identify promising practices, and support continuous improvement (Milken Exchange, 1998). ▪Educators should be prepared to use a variety of technology-supported strategies for teaching and learning to meet the needs of students (North Central Regional Educational Laboratory, 2000).
	5. My lessons include technology-enhanced, **learner-centered teaching strategies** (e.g., project-based learning).	▪Teachers' fluency with technology should translate into unique and relevant learning opportunities for students (Milken Exchange, 1998). ▪Teachers use technology to support learner-centered strategies that address the diverse needs of students (International Society for Technology in Education, 2000b). ▪Teachers design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners (International Society for Technology in Education, 2000b).
	6. I apply policies and practices to enhance **online security and safety**.	▪Teachers promote safe and healthy use of technology resources (International Society for Technology in Education, 2000b).

Subconstruct	Item	Standard or Suggested Practice
	7. I use technology to differentiate instruction for students with special learning needs.	▪Teachers use technology to support learner-centered strategies that address the diverse needs of students (International Society for Technology in Education, 2000b). ▪Teachers design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners (International Society for Technology in Education, 2000b)
Planning	8. I use technology to support and increase teacher productivity.	▪Educators should be prepared to use technology to increase professional productivity and gain enriched access to professional resources (North Central Regional Educational Laboratory, 2000). ▪Teachers apply technology to increase productivity (International Society for Technology in Education, 2000b).
	9. I use technology to communicate and collaborate with families about school programs and student learning.	▪Teachers use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning (International Society for Technology in Education, 2000b).
	10. I use technology to communicate and collaborate with other educators.	▪Teachers use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning (International Society for Technology in Education, 2000b). ▪Educators should use technology and communication networks to advance their own professional practice and collegial interactions (Milken Exchange, 1998).
	11. My lesson plans refer to both content standards and student technology standards.	▪Revise academic learning standards for students to reflect technology (Milken Exchange, 1999). ▪Teachers facilitate technology-enhanced experiences that address content standards and student technology standards (International Society for Technology in Education, 2000b). ▪Teachers implement curriculum plans that include methods and strategies for applying

Subconstruct	Item	Standard or Suggested Practice
		technology to maximize student learning (International Society for Technology in Education, 2000b).
	12. I do research or action research projects to improve technology-enhanced classroom practices.	▪Teachers apply current research on teaching and learning with technology when planning learning environments and experiences (International Society for Technology in Education, 2000b). ▪Educators should be skilled in designing teaching strategies and learning environments that maximize the impact that technology has on learning (North Central Regional Educational Laboratory, 2000). ▪Teachers plan strategies to manage student learning in a technology-enhanced environment (International Society for Technology in Education, 2000b). ▪Educational leaders advocate for research-based effective practices in use of technology (International Society for Technology in Education, 2002). ▪Fund research to document the impact of technology on student learning under varied conditions (Milken Exchange, 1999).
	13. I use multiple sources of data for reflecting on professional practice.	▪Teachers continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning (International Society for Technology in Education, 2002).
	14. I use multiple sources of data to make decisions about the use of technology.	▪Teachers apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity (International Society for Technology in Education, 2002). ▪Create a well-designed data collection plan, including appropriate indicators of key implementation and outcome objectives. Analyze multiple measures to regularly assess progress toward goals (Milken Exchange, 1998). ▪Data-driven decision making. Use results to inform all levels of planning and decision-

Subconstruct	Item	Standard or Suggested Practice
		making (Milken Exchange, 1998). ▪ Building-level media and technology staff continuously monitor planning processes and results, prioritizing, and adapting long and short-term goals and strategies based on feedback and input. They utilize qualitative and quantitative measures to document and evaluate how media and technology resources and program initiatives meet the needs of students and teachers (Public Schools of North Carolina, 2005).
	15. I use technology to participate in professional development activities, e.g. online workshops, hands-on training in a computer lab.	▪ Educators should be prepared to use technology to increase professional productivity and gain enriched access to professional resources (North Central Regional Educational Laboratory, 2000). ▪ Teachers use technology resources to engage in ongoing professional development and lifelong learning (International Society for Technology in Education, 2000b).
Information and Communication Technologies	16. Students use a variety of technologies, e.g., productivity, visualization, research, and communication tools.	▪ Students use technology routinely and appropriately (Apple Computer Inc., 1995). ▪ Students should have opportunities to use a range of technologies (e.g., learning, productivity, visualization, research, and communication tools) to support their learning (North Central Regional Educational Laboratory, 2000). ▪ Students explore and represent information dynamically and in many forms (Apple Computer Inc., 1995).
	17. Students use technology during the school day to communicate and collaborate with others, beyond the classroom.	▪ Students communicate effectively about complex processes (Apple Computer Inc., 1995). ▪ Students use technology to communicate and to aid in collaborative work (Apple Computer Inc., 1995). ▪ Students expand their access to "experts" beyond their instructor, to include online experts, online sources of information, etc. (Apple Computer Inc., 1995). ▪ Students rely less on seat work and more on

Subconstruct	Item	Standard or Suggested Practice
		communication, collaboration, accessing information, and expressing their own ideas (Apple Computer Inc., 1995). ▪ Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences (International Society for Technology in Education, 2000a). ▪ Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences (International Society for Technology in Education, 2000a).
	18. Students use technology to access online resources and information as a part of classroom activities.	▪ Students use technology to locate, evaluate, and collect information from a variety of sources (International Society for Technology in Education, 2000a). ▪ Students utilize the same kinds of tools that are used by professional researchers, including databases, satellite photos, simulations, etc. (Apple Computer Inc., 1995).
	19. Students use the same kinds of tools that professional researchers use, e.g., simulations, databases, satellite imagery.	▪ Students utilize the same kinds of tools that are used by professional researchers, including databases, satellite photos, simulations, etc. (Apple Computer Inc., 1995). ▪ Increasing relevancy. Learners should use contemporary technologies, communication networks, and associated learning contexts to engage in relevant, real-life applications of academic concepts. Their work should parallel the way in which professionals in the workforce use technology (Milken Exchange, 1998).
	20. Students work on technology-enhanced projects that approach real-world applications of technology.	▪ Students should work on substantive projects, addressing issues that have meaning, reaching out beyond the classroom to real-world practice (North Central Regional Educational Laboratory, 2000). ▪ Teachers apply technology to develop students' higher-order skills and creativity (International Society for Technology in

Subconstruct	Item	Standard or Suggested Practice
		Education, 2000b). ▪ Building-level media and technology staff continuously plan with teachers to help students become independent learners who can solve problems, think critically, and evaluate information from a wide variety of resources (Public Schools of North Carolina, 2005).
	21. Students use technology to help solve problems.	▪ Building-level media and technology staff continuously plan with teachers to help students become independent learners who can solve problems, think critically, and evaluate information from a wide variety of resources (Public Schools of North Carolina, 2005). ▪ Students use technology resources for solving problems and making informed decisions (International Society for Technology in Education, 2000a).
	22. Students use technology to support higher-order thinking, e.g., analysis, synthesis, and evaluation of ideas and information.	▪ Building-level media and technology staff continuously plan with teachers to help students become independent learners who can solve problems, think critically, and evaluate information from a wide variety of resources (Public Schools of North Carolina, 2005). ▪ Developing higher-level proficiencies. Student use of technology should make it increasingly possible for the learner to engage in learning practices that lead to new ways of thinking, understanding, constructing knowledge, and communicating results (Milken Exchange, 1998)
	23. Students use technology to create new ideas and representations of information.	▪ Educators should establish a learning context and physical environment that require and enable students and student teams' use of contemporary tools to research issues, solve problems, and communicate results (Milken Exchange, 1998). ▪ Students use technology tools to enhance learning, increase productivity, and promote creativity (International Society

Subconstruct	Item	Standard or Suggested Practice
		for Technology in Education, 2000a).

Construct IV. Impact of Technology

Reference Matrix for *Impact of Technology* Construct for STNA

Teaching Practices	1. My teaching is more student-centered and interactive when technology is integrated into instruction.	▪ Shifts naturally occur in classrooms from teacher-centered and didactic to more learner-centered and interactive (Apple Computer Inc., 1995). ▪ Over time, teachers report their interaction with students is different with less lecture and more mentoring (Apple Computer Inc., 1995).
	2. My teaching practices emphasize teacher uses of technology skills to support instruction. (adoption)	▪ Adoption of technology by teachers takes time and is represented by different stages: entry (learning the basics), adoption (using technology to support traditional instruction), adaptation (integrating new technologies into classroom practice with an emphasis on student productivity with word processors, spreadsheets, etc.), appropriation (focus on cooperative, project-based, and interdisciplinary work), and invention (discovering new uses for technology and designing projects that use multiple technologies) (Apple Computer Inc., 1995).
	3. My teaching practices emphasize student uses of productivity applications, e.g., word processing, spreadsheet. (adaptation)	▪ Adoption of technology by teachers takes time and is represented by different stages: entry (learning the basics), adoption (using technology to support traditional instruction), adaptation (integrating new technologies into classroom practice with an emphasis on student productivity with word processors, spreadsheets, etc.), appropriation (focus on cooperative, project-based, and interdisciplinary work), and invention (discovering new uses for technology and designing projects that use multiple technologies) (Apple Computer Inc., 1995).
	4. My teaching practices emphasize student uses of technology as an	▪ Adoption of technology by teachers takes time and is represented by different stages: entry (learning the basics), adoption (using technology to support traditional instruction), adaptation (integrating new technologies into

	integral part of specific teaching strategies, e.g., project-based or cooperative learning. (appropriation)	classroom practice with an emphasis on student productivity with word processors, spreadsheets, etc.), appropriation (focus on cooperative, project-based, and interdisciplinary work), and invention (discovering new uses for technology and designing projects that use multiple technologies) (Apple Computer Inc., 1995).
Student Impact	5. Technology has helped my students become more socially aware, confident, and positive about their future.	▪ Students become socially aware and more confident (Apple Computer Inc., 1995). ▪ Students developed a positive orientation to the future (Apple Computer Inc., 1995).
	6. Technology has helped students become independent learners and self-starters.	▪ Students become independent learners and self starters(Apple Computer Inc., 1995).
	7. Technology has helped students work more collaboratively.	▪ Students worked well collaboratively (Apple Computer Inc., 1995).
	8. Technology has increased students' engagement in their learning.	▪ Students' behavior and attendance improved (Apple Computer Inc., 1995). ▪ Students' attitude toward themselves and learning improved (Apple Computer Inc., 1995).
	9. Technology has helped students achieve greater academic success.	▪ Student performance improved – test scores, writing, completed lessons more quickly (Apple Computer Inc., 1995).

Appendix B SAI Standards
The National Staff Development Council's Standards Assessment Inventory
Leadership Practices Factor 2 Only

Scale: 1=Never; 2=Seldom; 3=Sometimes; 4=Frequently; 5=Always

FACTOR 2 - SCHOOL LEADERSHIP
48. I would use the word, empowering, to describe my principal.
58. Our principal models effective collaboration.
47. Our principal models how to build relationships with students' families.
45. Our principal fosters a school culture that is focused on instructional improvement.
10. Our principal's decisions on school-wide issues and practices are influenced by faculty input.
18. Our principal is committed to providing teachers with opportunities to improve instruction (e.g. observations, feedback, collaborating with colleagues).
60. Our administrators engage teachers in conversations about instruction and student learning.
1. Our principal believes teacher learning is essential for achieving our school goals.
43. Our school leaders encourage sharing responsibility to achieve school goals.
49. School goals determine how resources are allocated.

Appendix C

IMPACT Site Visit Protocol Form

IMPACT Site Visit Protocol http://it.ncwiseowl.org/UserFiles/Servers/Server_4500932/File/IMPACT/IMPACTrev1.31.08.pdf	
School:	**Date:**
Principal:	**Consultant:**
	LEA Technology Director:
IMPACT Action Plan:	
Teaching and Learning	
Project Funds:	
Professional Development Status: **Needs:**	**List Current PD Activities:**
Digital-Age Literacy	**Hardware Installation / Infrastructure Status:**
IMPACT Staff/Personnel Status:	**Current status of Partnerships and Outreach Initiatives:**
Media Collection Status:	**Formative Evaluation Status:**
Supporting Documentation(Y/N): (Data collection tools, benchmarks)	
Collaborative Planning:	
MTAC Activities:	
Flexible Schedule Progress:	**1:1 Initiative:**
Milestones, Key benefits, or Major activities this month: _____ Notes:	

Appendix D

IMPACT District/School Rubric

MEDIA AND TECHNOLOGY PROGRAM EVALUATION RUBRICS

NOTE: **"Most"** represents more than half and **"some"** represents less than half.
Terms designated with an asterisk* are defined at the end of the document.

TEACHING AND LEARNING

	OUTSTANDING	DEVELOPING	MINIMUM	BELOW MINIMUM
INSTRUCTIONAL DELIVERY – Meaningful instruction in the full range of concepts and skills that students need to interact effectively with all information resources.				
INTEGRATION	Information and Computer/Technology skills are integrated with all curriculum areas and grade levels.	Information and Computer/Technology skills are integrated across most curriculum areas and grade levels.	Information and Computer/Technology skills are integrated across **core curriculum areas*** and some grade levels.	Information and Computer/Technology skills are taught in isolation from curriculum areas.
DIFFERENTIATED INSTRUCTION	**Differentiated instruction*** is addressed through instructional strategies designed for all students.	**Differentiated instruction*** is addressed through instructional strategies designed for most students.	**Differentiated instruction*** is addressed through instructional strategies designed for some students.	**Differentiated instruction*** is not provided.
LEARNING STYLES	The **learning styles*** of all students are addressed through a variety of instructional resources and strategies.	The **learning styles*** of most students are addressed through a variety of instructional resources and strategies.	The **learning styles*** of some students are addressed through a variety of instructional resources and strategies.	**Learning styles*** are not addressed in instructional resources and strategies.
LITERACIES FOR THE DIGITAL AGE	All learning experiences promote **literacies for the digital age*.**	Most learning experiences promote **literacies for the digital age*.**	Some learning experiences promote **literacies for the digital age*.**	Learning experiences do not promote **literacies for the digital age*.**
RESOURCES IN LEARNING EXPERIENCES	All learning experiences are examined for application of appropriate resources.	Most learning experiences are examined for application of appropriate resources.	Some learning experiences are examined for application of appropriate resources.	Learning experiences do not include the application of appropriate resources.
RESEARCH PROCESS	A **systematic research process*** is consistently implemented school-wide.	A **systematic research process*** is implemented at some grade levels or departments.	A **systematic research process*** is implemented in some classrooms.	No **systematic research process*** is implemented.
FLEXIBLE ACCESS FOR INSTRUCTION	Media and technology flexible access for instruction is implemented at all grade levels.	A fixed/flex media and technology schedule for instruction is implemented for no more than a year, and a plan for the implementation of flexible access in the following year is in place.	A fixed/flex media and technology schedule for instruction is implemented.	Fixed scheduling for media and technology instruction is implemented at all grade levels.

TEACHING AND LEARNING

	OUTSTANDING	DEVELOPING	MINIMUM	BELOW MINIMUM
COLLABORATION – Partnership between media and technology professionals and teachers to design instructional activities that promote student achievement *(See Collaborative Planning Session Rubric for additional information)*				
COLLABORATION BETWEEN SLMC & TF	Collaboration occurs between media and technology personnel all the time.	Collaboration occurs between media and technology personnel most of the time.	Collaboration occurs between media and technology personnel on some occasions.	Collaboration does not occur between media and technology personnel.
COLLABORATIVE ENVIRONMENT	An environment based on shared instructional goals, a shared vision, and a climate of trust and respect is established that fosters collaboration between media and technology personnel and all teachers.	An environment based on shared instructional goals, a shared vision, and a climate of trust and respect is established that fosters collaboration between media and technology personnel and most teachers.	An environment based on shared instructional goals, a shared vision, and a climate of trust and respect is established that fosters collaboration between media and technology personnel and some teachers.	An environment that fosters collaboration between media and technology personnel has not been established.
COLLABORATION FOR DATA-DRIVEN INSTRUCTION	Media and technology personnel consistently collaborate with teachers in using assessment data to design instructional activities.	Media and technology personnel frequently collaborate with teachers in using assessment data to design instructional activities.	Media and technology personnel occasionally collaborate with teachers in using assessment data to design instructional activities.	Media and technology personnel do not collaborate with teachers.
BEST PRACTICES	The media and technology program implements **best practices*** for instruction at all grade levels.	The media and technology program implements **best practices*** for instruction at most grade levels.	The media and technology program implements **best practices*** for instruction in some classrooms or at some grade levels.	The media and technology program does not implement **best practices*** for instruction.
INSTRUCTIONAL FEEDBACK	**Instructional feedback*** is provided to students all of the time to ensure that learning goals are being met.	**Instructional feedback*** is provided to students most of the time to ensure that learning goals are being met.	**Instructional feedback*** is provided to students some of the time to ensure that learning goals are being met.	**Instructional feedback*** is not provided to students to ensure that learning goals are being met.
CO-TEACHING	An environment is established that fosters **co-teaching*** between media and technology personnel and all teachers.	An environment is established that fosters **co-teaching*** between media and technology personnel and most teachers.	An environment is established that fosters **co-teaching*** between media and technology personnel and some teachers.	An environment for **co-teaching*** between media and technology personnel and teachers has not been established.

TEACHING AND LEARNING				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
PROFESSIONAL DEVELOPMENT – Appropriate professional development provided for individual growth.				
PROFESSIONAL DEVELOPMENT	Professional development for teachers related to the media and technology program is included in the school-wide professional development plan and addresses school improvement plan goals.	Professional development for teachers related to the media and technology program is included in the school-wide professional development plan.	Professional development for teachers related to the media and technology program is provided in isolation from the school-wide professional development plan.	Professional development for teachers related to the media and technology program is not provided.
MEDIA AND TECHNOLOGY PROFESSIONAL DEVELOPMENT	Media and technology personnel are provided professional development opportunities through local, state, and national conference/ workshop attendance that are a part of the school-wide professional development plan.	Media and technology personnel are provided professional development opportunities through local or state conference/ workshop attendance that are a part of the school-wide professional development plan.	Media and technology personnel are provided professional development opportunities through local or state conference/ workshop attendance.	Media and technology personnel are not provided professional development opportunities.

INFORMATION ACCESS AND DELIVERY				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
ACCESS TO RESOURCES – Access to resources regardless of ability or physical challenges				
FLEXIBLE ACCESS (NOTE: does not apply to career technology education labs)	Computer lab and media center facilities and resources are available through flexible access.	Computer lab and media center facilities and resources are available on a fixed/flex schedule for no more than a year, and a plan for implementing flexible access in the following year is in place.	Fixed/flexible access to computer lab and media center facilities and resources is provided.	Computer lab and media center facilities are available only on a fixed schedule.
ACCESS TO ELECTRONIC RESOURCES	The school's electronic resources are available throughout the school before, during, and after school, as well as through remote access.	The school's electronic resources are available throughout the school before, during, and after the school day.	The school's electronic resources are available during the school day within the school library media center and computer labs.	The school's electronic resources are available part of the school day from the school library media center and/or computer labs.
EQUITABLE ACCESS TO RESOURCES	The school's media and technology resources are available school wide before, during, and after school.	The school's media and technology resources are available school wide throughout the entire school day.	The school's media and technology resources are available during the school day within the school library media center and computer labs.	The school's media and technology resources are not available throughout the school day from the school library media center and/or computer labs.
EQUITY OF ACCESS (assistive/adaptive)	Equitable access to resources and facilities that exceed requirements of federal ADA and special education laws is provided for identified students and others with special needs.	Equitable access to resources and facilities that meet minimum requirements of federal ADA and special education laws is provided for identified students and others with special needs.	Equitable access to resources that meet minimum requirements of federal ADA and special education laws is provided for identified students.	Equitable access to resources and facilities is not provided for all students.
ORGANIZATION OF RESOURCES	All media and technology resources, including classroom sets, are cataloged and circulated using standard library conventions or a comparable tracking system.	All media and technology resources are cataloged and circulated using standard library conventions or a comparable tracking system.	Most media and technology resources are cataloged and circulated using standard library conventions or a comparable tracking system.	Resources are not cataloged and circulated using standard library conventions or a comparable tracking system.

INFORMATION ACCESS AND DELIVERY				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
DESIGNING FACILITIES FOR TEACHING AND LEARNING – Adequate facilities to meet the instructional needs of teachers and the learning needs of students				
AESTHETICALLY PLEASING ENVIRONMENT	Media and technology facilities provide an aesthetically pleasing and stimulating environment with numerous attractive decorations, current information displays, and student work/art.	Media and technology facilities provide an aesthetically pleasing environment with a variety of attractive decorations and displays and student work/art.	Media and technology facilities provide an aesthetically pleasing environment with some decorations and displays.	Media and technology facilities do not provide an aesthetically pleasing environment.
ADEQUATE FACILITY SPACE	Media and technology facility spaces meet 90% or more of the square footage recommendations in the *IMPACT Guidelines*.	Media and technology facility spaces meet 75% -89% of the square footage recommendations in the *IMPACT Guidelines*.	Media and technology facility spaces meet 50% - 74% of the square footage recommendations in the *IMPACT Guidelines*.	Media and technology facility spaces meet less than 50% of the square footage recommendations in the *IMPACT Guidelines*.
APPROPRIATE FURNISHINGS AND EQUIPMENT	90% or more of the media and technology furnishings and equipment meet *IMPACT Guidelines*.	75% -89% of the media and technology furnishings and equipment meet the *IMPACT Guidelines*.	50% - 74% of the media and technology furnishings and equipment meet the *IMPACT Guidelines*.	Less than 50% of the media and technology furnishings and equipment meet the *IMPACT Guidelines*.
PLANNING FOR NEW AND RENOVATED FACILITIES	Opportunities are provided for media and technology staff to play an ongoing and active role throughout the planning and construction of new, renovated, or repurposed facilities.	Opportunities are provided for media and technology staff to offer advice on a regular basis for the planning of new, renovated, or repurposed facilities.	Opportunities are provided for media and technology staff to make initial suggestions during the planning of new, renovated, or repurposed facilities.	Opportunities are not provided for media and technology staff to participate in the planning of new, renovated, or epurposed facilities.
TECHNOLOGY INFRASTRUCTURE/ EQUIPMENT	Technology infrastructure and equipment exceeds state technology plan standards and *IMPACT Guidelines*.	Technology infrastructure and equipment meets state technology plan standards and *IMPACT Guidelines*.	Technology infrastructure and equipment does not meet state technology plan standards but a plan has been developed to meet standards and *IMPACT Guidelines*.	Technology infrastructure and equipment does not meet state technology plan standards and a plan has not been developed to meet standards and *IMPACT Guidelines*.

PROGRAM ADMINISTRATION				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
PLANNING THE PROGRAM – Planning to support program development				
MEDIA AND TECHNOLOGY PLANNING	Short- and long-range plans are in place and continuously assessed and updated to ensure balance among all aspects of the media and technology program.	Short- and long-range plans are in place and assessed and updated at least once a year to ensure balance among all aspects of the media and technology program.	Short-range plans for the media and technology program are in place and assessed occasionally.	Only short-range plans for the media and technology program are in place and are not assessed.
MEDIA AND TECHNOLOGY ADVISORY COMMITTEE (MTAC) – Representative committee that guides media and technology program development				
MEMBERSHIP	The MTAC meets and exceeds the membership recommendations outlined in the *IMPACT Guidelines* (e.g., community member, paraprofessional representative).	The MTAC meets most of the membership recommendations outlined in the *IMPACT Guidelines.*	The MTAC meets some of the membership recommendations outlined in the *IMPACT Guidelines.*	The MTAC does not meet the membership recommendations outlined in the *IMPACT Guidelines.*
MEETING FREQUENCY	The MTAC meets at least monthly to provide support for the planning and implementation of the media and technology program.	The MTAC meets at least quarterly to provide support for the planning and implementation of the media and technology program.	The MTAC meets occasionally to provide support for the planning and mplementation of the media and technology program.	The MTAC meets only as needed to react to a specific situation or problem.
MTAC RESPONSIBILITIES FOR PLANNING	MTAC participates in developing long- and short-term plans for the media and technology program at least quarterly.	MTAC participates in developing long- and short-term plans for the media and technology program at least twice a year.	MTAC participates in developing long- and short-term plans for the media and technology program at least once a year.	MTAC does not participate in developing long- and short-term plans for the media and technology program.
MTAC RESPONSIBILITIES FOR FORMAL ADVOCACY *(See Advocacy and MTAC sections)*	MTAC participates in developing, implementing, and continuously updating a comprehensive, research-based advocacy plan for the media and technology program.	MTAC has developed and is in the beginning phase of implementing a comprehensive, research-based advocacy plan for the media and technology program.	MTAC is in the process of developing a comprehensive, research-based advocacy plan for the media and technology program.	MTAC does not participate in developing an advocacy plan for the media and technology program.

PROGRAM ADMINISTRATION				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
MEDIA AND TECHNOLOGY ADVISORY COMMITTEE (MTAC) – continued				
MTAC RESPONSIBILITIES FOR INFORMAL ADVOCACY	The MTAC informally communicates the role of the media and technology program in supporting instruction and promoting student achievement on a continuous basis.	The MTAC informally communicates the role of the media and technology program in supporting instruction and promoting student achievement at scheduled meetings and events.	The MTAC informally communicates the role of the media and technology program in supporting instruction and promoting student achievement in response to challenges that would compromise the program, e.g., budget cuts, reversion to fixed scheduling, cutting staff, etc.	The MTAC does not communicate the role of the media and technology program.
MTAC RESPONSIBILITIES FOR COLLECTION DEVELOPMENT	The MTAC provides input for an up-to-date and well-balanced media and technology collection on a continuous basis.	The MTAC provides input for an up-to-date and well-balanced media and technology collection through regularly scheduled MTAC meetings.	The MTAC provides input for an up-to-date and well-balanced media and technology collection once a year.	The MTAC does not provide input for an up-to-date and well-balanced media and technology collection.
MTAC RESPONSIBILITIES FOR BUDGET	The MTAC is actively involved in developing and advocating for a budget plan for the media and technology program that is prioritized, justified, and includes school-based and additional funding sources.	The MTAC is actively involved in developing a budget plan for the media and technology program that is prioritized, justified, and includes school-based and additional funding sources.	The MTAC is actively involved in developing a budget plan, representing school-based and additional funding sources, for the media and technology program.	The MTAC is not involved in developing a budget plan for the media and technology program.
MTAC RESPONSIBILITIES FOR DE-SELECTION (WEEDING) OF THE COLLECTION	The MTAC is involved in making recommendations for removing items from the entire collection that are outdated and no longer support the curriculum.	The MTAC is involved in making recommendations for removing items from most areas of the collection that are outdated and no longer support the curriculum.	The MTAC is involved in making recommendations for removing items from some areas of the collection that are outdated and no longer support the curriculum.	The MTAC is not involved in making recommendations for removing items from the collection.

PROGRAM ADMINISTRATION				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
POLICIES AND PROCEDURES – Framework for program Implementation				
POLICIES AND PROCEDURES	System-level and school-level media and technology policies and procedures based on the *IMPACT Guidelines* are followed.	System-level policies and procedures based on the *IMPACT Guidelines* are followed and school-level policies and are being developed.	System-level media and technology policies and procedures are followed.	System-level policies and procedures are not followed.
REVIEW/REVISION OF POLICIES AND PROCEDURES	All policies/procedures related to the media and technology program are reviewed and revised on a regularly scheduled basis.	Most policies/ procedures related to the media and technology program are reviewed and revised on a regularly scheduled basis.	Some policies/ procedures related to the media and technology program are reviewed and revised on a regularly scheduled basis.	Policies/procedures related to the media and technology program are not reviewed and revised on a regularly scheduled basis.
COMMUNICATION OF POLICIES AND PROCEDURES - STAFF	Media and technology policies are communicated to the entire staff through meetings, documentation, and professional development.	Media and technology policies are communicated to the entire staff through meetings and documentation.	Media and technology policies are communicated to the entire school staff through documentation.	Media and technology policies are not communicated to the school staff.
COMMUNICATION OF POLICIES – EDUCATION COMMUNITY	Media and technology policies are communicated to the education community through meetings and documentation on an ongoing basis.	Media and technology policies are communicated to the education community through meetings and documentation annually.	Media and technology policies are communicated to the education community through documentation annually.	Media and technology policies are not communicated to the education community.

PROGRAM ADMINISTRATION				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
HIGH QUALITY COLLECTION OF RESOURCES – Appropriate range of resources in a variety of formats to meet the needs of teachers and students				
BUDGET	An operational budget is provided for maintaining all resources that includes Total Cost of Ownership (TCO) and that meets the needs of anticipated growth.	An operational budget is provided for maintaining all resources that includes Total Cost of Ownership (TCO) and a budget plan for anticipated growth is in development.	An operational budget is provided for maintaining all resources that includes Total Cost of Ownership (TCO).	An operational budget is not provided for maintaining resources.
HIGH QUALITY COLLECTION	A high quality and well-balanced collection of current resources is provided that aligns to the curriculum and that supports teaching and learning.	Most areas of the collection represent high quality, current resources that align to the curriculum and support teaching and learning.	Some areas of the collection represent current resources that align to the curriculum and support teaching and learning.	The collection of resources does not provide high and does not support the curriculum.
DIVERSE COLLECTION	A collection of resources is provided that meets the needs of learners with diverse learning styles, cultural backgrounds, and physical challenges.	A collection of resources is provided.that meets the needs of most learners with diverse learning styles, cultural backgrounds, and physical challenges.	A collection of resources is provided.that meets the needs of some learners with diverse learning styles, cultural backgrounds, and physical challenges.	A collection of resources is not provided.that meets the needs of learners with diverse learning styles, cultural backgrounds, and physical challenges.
COLLECTION DEVELOPMENT PLAN	The MTAC provides input for the long-range (3-5 year) collection development plan for an up-to-date and well-balanced media and technology collection that is revised annually.	A long-range (3-5 year) collection development plan for an up-to-date and well-balanced media and technology collection is in place and revised annually.	A long-range (3-5 year) collection development plan for an up-to-date and well-balanced media and technology collection is in place.	A long-range (3-5 year) collection development plan for an up-to-date and well-balanced media and technology collection is not in place.
INVENTORY	Annual inventories of media and technology resources are conducted and shared with the MTAC to determine needs for additional resources.	Annual inventories of media and technology resources are conducted and used to determine needs for additional resources.	Annual inventories of media and technology resources are conducted.	Annual inventories of media and technology resources are not conducted.

PROGRAM ADMINISTRATION				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
EVALUATION – Documentation demonstrating the effectiveness of the media and technology program				
PROGRAM EVALUATION	Working with the MTAC, qualitative and quantitative measures are used to document and evaluate how media and technology resources and program initiatives meet the needs of students and staff.	Qualitative and quantitative measures are used to document and evaluate how media and technology resources and program initiatives meet the needs of students and staff.	Quantitative measures are used to document and evaluate how media and technology resources and program initiatives meet the needs of students and staff.	Data is not used to evaluate how media and technology resources and program initiatives meet the needs of students and staff.
STAFFING – Personnel resources needed to support the media and technology program				
ADEQUATE STAFFING *(See Personnel Chart below**)*	Media and technology programs are fully staffed as recommended.**	Media and technology programs are in the process of fully staffing media and technology programs as recommended.**	Plans are in place with an implementation timeline to fully staff media and technology programs as recommended.**	Media and technology programs are not fully staffed as recommended.**

PROGRAM ADMINISTRATION PERSONNEL CHART**		
ADM	Recommended minimum staffing for each school based on average daily membership (ADM)	
1-500	• 1 full-time library media coordinator • 1 full-time technology facilitator	• 1/2 media assistant • 1/2 technology assistant
501-1000	• 1 full-time library media coordinator • 1 full-time technology facilitator	• 1 full-time media assistant • 1 full-time technology assistant.
1001-1500	• 2 full-time library media coordinators • 2 full-time technology facilitators	• 1 1/2 media assistants • 1 1/2 full-time technology assistants
1501-2000	• 2 full-time library media coordinators. • 2 full-time technology facilitators	• 2 full-time media assistants • 2 full-time technology assistants

SYSTEM-LEVEL LEADERSHIP AND SUPPORT EVALUATION RUBRICS

NOTE: **"Most"** represents more than half and **"some"** represents less than half.
Terms designated with an asterisk* are defined at the end of the document.

TEACHING AND LEARNING (SYSTEM-LEVEL)

	OUTSTANDING	DEVELOPING	MINIMUM	BELOW MINIMUM
CURRICULUM INVOLVEMENT – Ensuring the integration of information and computer/technology skills				
PROMOTING BEST PRACTICE	Leadership continuously promotes a collaborative environment that incorporates **best practices*** for instruction, provides up-to-date resources, and shares information with others outside of the school system.	Leadership continuously promotes a collaborative environment that incorporates **best practices*** for instruction and provides up-to-date resources.	Leadership promotes a collaborative environment that incorporates **best practices*** for instruction.	Leadership does not promote a collaborative environment that incorporates **best practices*** for instruction.
INTEGRATION OF MEDIA AND TECHNOLOGY	Leadership supports curriculum integration of information and computer/technology skills across all curriculum areas and grade levels.	Leadership supports curriculum integration of information and computer/technology skills across most curriculum areas and grade levels.	Leadership supports curriculum integration of information and computer/technology skills across **core curriculum areas*** and some grade levels.	Leadership does not support curriculum integration of information and computer/technology skills across subject areas and grade levels.
COLLABORATION – Strengthening media and technology programs by working with a variety of individuals and organizations				
COLLABORATION BETWEEN LEVELS	Leadership continuously promotes communication and collaboration between system-level curriculum/program directors and school-based administrators.	Leadership frequently promotes communication and collaboration between system-level curriculum/program directors and school-based administrators.	Leadership occasionally promotes communication between system-level curriculum/program directors and school-based administrators.	Leadership does not promote communication between system-level curriculum/program directors and school-based administrators.
COLLABORATION WITH COMMUNITY RESOURCES	Partnerships are continuously developed with business, civic, and community groups to provide resources for instruction and to implement collaborative initiatives in schools (e.g., volunteer speakers and tutors; field trip opportunities).	Partnerships are developed occasionally with business, civic, and community groups to provide resources for instruction (e.g., volunteer speakers and tutors; field trip opportunities).	A plan is being developed to work with business, civic, and community groups to give these organizations opportunities to provide resources for instruction.	No efforts are made to work with business, civic, and community groups.

TEACHING AND LEARNING (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
PROFESSIONAL DEVELOPMENT – Appropriate professional development provided for individual growth				
PROFESSIONAL DEVELOPMENT	All professional development for teachers related to the media and technology program is included in the system-wide professional development plan.	Most professional development for teachers related to the media and technology program is included in the system-wide professional development plan.	Some professional development for teachers related to the media and technology program is included in the system-wide professional development plan.	Professional development for teachers related to the media and technology program is not included in the system-wide professional development plan.

INFORMATION ACCESS AND DELIVERY (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
INFRASTRUCTURE AND CONNECTIVITY – Ensuring equity of access to resources				
STANDARDIZATION OF TECHNOLOGY RESOURCES	System-wide guidelines for the standardization of all technology resources are in place	System-wide guidelines for the standardization of most technology resources are in place.	System-wide guidelines for the standardization of some technology resources are in place.	System-wide guidelines for the standardization of technology resources are not in place.
TECHNOLOGY INFRASTRUCTURE, EQUIPMENT, AND CONNECTIVITY	System-wide technology infrastructure, equipment, and connectivity exceeds state technology plan standards and *IMPACT Guidelines.*	System-wide technology infrastructure, equipment, and connectivity meets state technology plan standards and *IMPACT Guidelines.*	A plan has been developed for system-wide technology infrastructure, equipment, and connectivity that meets state technology plan standards and *IMPACT Guidelines.*	A plan has not been developed for system-wide technology infrastructure, equipment, and connectivity that meets state technology plan standards and *IMPACT Guidelines.*
EQUITY OF ACCESS (assistive/adaptive)	Equitable access to resources and facilities that meet requirements of federal ADA and special education laws is provided for all schools with identified students and others with special needs.	Equitable access to resources and facilities that meet minimum requirements of federal ADA and special education laws is provided for some schools with identified students and others with special needs.	Equitable access to resources that meet minimum requirements of federal ADA and special education laws is provided only for schools with identified students.	Equitable access to resources and facilities is not provided for all students.

INFORMATION ACCESS AND DELIVERY (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
NEW AND RENOVATED FACILITIES – Ensuring adequate facilities for system-wide media and technology programs				
PLANNING AND CONSTRUCTION OF NEW AND RENOVATED FACILITIES	System-level media and technology personnel play an active and ongoing role throughout the planning and construction of new, renovated, or repurposed facilities, in collaboration with building-level personnel.	System-level media and technology personnel offer advice on a regular basis for the planning of new, renovated, or repurposed facilities.	System-level media and technology personnel make initial suggestions during the planning of new, renovated, or repurposed facilities.	System-level media and technology personnel do not participate in the planning of new, renovated, or repurposed facilities.

PROGRAM ADMINISTRATION (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
ADVOCACY – Leadership promotes system-wide media and technology programs				
FORMAL ADVOCACY	A comprehensive, research-based advocacy plan for the role of media and technology programs in supporting instruction and promoting student achievement is implemented and updated.	A comprehensive, research-based advocacy plan for the role of media and technology programs in supporting instruction and promoting student achievement has been developed and is in the beginning phase of implementation.	A comprehensive, research-based advocacy plan for the role of media and technology programs in supporting instruction and promoting student achievement is in the process of being developed.	A comprehensive, research-based advocacy plan for the role of media and technology programs in supporting instruction and promoting student achievement has not been developed.
INFORMAL ADVOCACY	The role of media and technology programs in supporting instruction and promoting student achievement is communicated continuously throughout the community.	The role of media and technology programs in supporting instruction and promoting student achievement is communicated at scheduled meetings and events.	The role of media and technology programs in supporting instruction and promoting student achievement is communicated in response to challenges that would compromise the program.	The role of media and technology programs in supporting instruction and promoting student achievement is not communicated.

PROGRAM ADMINISTRATION (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
POLICIES AND PROCEDURES – Leadership provides framework for system-wide media and technology program implementation				
DEVELOPMENT OF POLICIES AND PROCEDURES	All system-level policies/procedures related to the media and technology program are based on the *IMPACT Guidelines* and all are aligned with state and federal laws and regulations.	Most system-level policies/procedures related to the media and technology program are based on the *IMPACT Guidelines* and all are aligned with state and federal laws and regulations.	Some system-level policies/procedures related to the media and technology program are based on the *IMPACT Guidelines* and all are aligned with state and federal laws and regulations.	Policies/procedures related to the media and technology program are not aligned with state and federal laws and regulations or *IMPACT Guidelines*.
REVIEW/REVISION OF POLICIES AND PROCEDURES	Review and revision of all policies/procedures related to the media and technology program are conducted on a regularly scheduled basis.	Review and revision of most policies/ procedures related to the media and technology program are conducted on a regularly scheduled basis.	Review and revision of some policies/ procedures related to the media and technology program are conducted on a regularly scheduled basis.	Review and revision of policies/procedures related to the media and technology program are not conducted.
COMMUNICATION OF POLICIES AND PROCEDURES	All media and technology policies and procedures are communicated consistently throughout the school system annually.	Most media and technology policies and procedures are communicated throughout the school system annually.	Some media and technology policies and procedures are communicated throughout the school system annually.	Media and technology policies and procedures are not communicated throughout the school system annually.

PROGRAM ADMINISTRATION (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
PLANNING - Planning to support program development				
TECHNOLOGY PLAN	A system-level technology plan is in place and assessed as required by state legislation and *IMPACT Guidelines* and monitored at scheduled intervals to assure forward progress.	A system-level technology plan is in place and assessed as required by state legislation and *IMPACT Guidelines* and monitored occasionally to assure forward progress.	A system-level technology plan is in place and assessed as required by state legislation and *IMPACT Guidelines*.	A system-level technology plan is not in place.
PLANNING FOR TECHNOLOGY	The system-level technology plan is developed with input from representatives of all stakeholder groups: administrators, teachers, technology facilitators, media coordinators, parents/ community members, and students.	The system-level technology plan is developed with input from representatives of most stakeholder groups: administrators, teachers, technology facilitators, media coordinators, parents/ community members, and students.	The system-level technology plan is developed with input from representatives of some stakeholder groups: administrators, teachers, technology facilitators, media coordinators, parents/ community members, and students.	The system-level technology plan is developed without input from stakeholders.
COLLECTION DEVELOPMENT	Building-level collection development plans (created with input from the MTAC) for up-to-date and well-balanced media and technology collections are in place for all schools and revised annually.	Building-level collection development plans for up-to-date and well-balanced media and technology collections are in place for all schools and revised annually.	Building-level collection development plans for up-to-date and well-balanced media and technology collections are in place for all schools.	Building-level collection development plans for up-to-date and well-balanced media and technology collections are not in place for all schools.

PROGRAM ADMINISTRATION (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
BUDGET – Leadership for the provision of adequate funding to support system-wide media and technology programs				
BUDGET	Every school has an operational budget for maintaining all media and technology resources that includes Total Cost of Ownership (TCO), and a budget plan for anticipated growth.	Every school has an operational budget for maintaining all media and technology resources that includes Total Cost of Ownership (TCO), and a budget plan for anticipated growth that is in development.	Every school has an operational budget for maintaining all media and technology resources that includes Total Cost of Ownership (TCO).	Schools do not have an operational budget for maintaining all media and technology resources.
ADDITIONAL FUNDING SOURCES	Every school is continuously made aware of additional media and technology funding sources, and support is offered and provided throughout the application process.	Every school is frequently made aware of additional media and technology funding sources and has the support needed to apply for these funds when requested.	Every school is made aware of additional media and technology funding.	Schools are not made aware of additional media and technology funding sources.
PROGRAM EVALUATION – Leadership and vision for evaluating the effectiveness of system-wide media and technology programs				
DATA COLLECTION	System-wide data from quantitative and qualitative measures related to media and technology programs is aggregated, analyzed, and disseminated to system-level administrators, curriculum staff, school board, and community members when appropriate.	System-wide data from quantitative and qualitative measures related to media and technology programs is aggregated and analyzed.	System-wide data from quantitative and qualitative measures related to media and technology programs is aggregated.	System-wide quantitative data related to media and technology programs is aggregated.
USING DATA FOR RECOMMEN-DATIONS	System-level staff and building-level media and technology representatives team with teachers to use analyzed quantitative and qualitative data to make recommendations for media and technology programs system-wide.	System-level staff and building-level media and technology representatives use analyzed quantitative and qualitative data to make recommendations for media and technology programs system-wide.	System-level staff use analyzed quantitative and qualitative evaluation data when making recommendations for media and technology programs system-wide.	Data is not used when making recommendations for media and technology programs system-wide.

PROGRAM ADMINISTRATION (SYSTEM-LEVEL)				
	OUTSTANDING	**DEVELOPING**	**MINIMUM**	**BELOW MINIMUM**
STAFFING – Personnel resources needed to support system-wide media and technology programs				
ADEQUATE STAFFING *(See System-Level Personnel Chart below**)*	All system-level media and technology personnel are in place as recommended in the System-Level Personnel Chart.**	Most of the system-level personnel r ecommended in the System-Level Personnel Chart** are in place, and a timeline exists for full staffing.	Plans are in place for providing system-level media and technology personnel as recommended in the System-Level Personnel Chart.**	System-level media and technology staff are not in place staffed as recommended the System-Level Personnel Chart.**

SYSTEM-LEVEL PERSONNEL CHART**

# SCHOOLS IN SYSTEM	RECOMMENDED STAFFING:
1-5	• 1 Director/Coordinator for both media and technology, with other system-level duties.
6-15	• 1 Director/Coordinator for both media and technology, with "lead teachers" for each school level that have only part-time teaching responsibilities.
16-50	• 1 Director/Coordinator for school library media programs. • 1 Director/Coordinator for technology programs.
50+	• 1 Director/Coordinator for media/technology at the Associate Superintendent's level. • 1 School Library Media Programs Supervisor • 1 Instructional Technology Supervisor

Vita

Melanie Duckworth Honeycutt is the Digital Teaching and Learning Consultant with the North Carolina Department of Public Instruction. She has been in this position for nine years and works with the school districts in the northwestern part of North Carolina. In 1984 Mrs. Honeycutt received her Bachelor of Science degree from Western Carolina University in Cullowhee, NC. In 1995 she entered the Master of Library Science degree program at Appalachian State University in Boone, NC.

Mrs. Honeycutt is a professional member of the International Society for Technology in Education, the North Carolina Technology in Education Society, the North Carolina School Librarians Association, Consortium of School Networking and State Educational Technology Directors Association.

Mrs. Honeycutt resides in Morganton, North Carolina with her husband Troy and son Wes.