Framing Innovation: Does an Instructional Vision Help Superintendents Gain Acceptance for a Large-Scale Technology Initiative?

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FRAMING INNOVATION: DOES AN INSTRUCTIONAL VISION HELP SUPERINTENDENTS GAIN ACCEPTANCE FOR A LARGE-SCALE TECHNOLOGY INITIATIVE?

Dissertation in Practice
by

GINA E. FLANAGAN

with Erik P. Arnold, Peter D. Cohen,
Anna P. Nolin and Henry J. Turner

submitted in partial fulfillment
of the requirements for the degree of
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by

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Dr. Vincent Cho and Dr. Diana C. Pullin, dissertation co-chairs

Abstract

There is limited research that outlines how a superintendent's instructional vision can help to gain acceptance of a large-scale technology initiative. This study explored how superintendents gain acceptance for a large-scale technology initiative (specifically a 1:1 device program) through various leadership actions. The role of the instructional vision in helping superintendents gain acceptance for a technology initiative was the focus of this research. Five school districts where a large-scale, 1:1 technology initiative was being implemented were the location for this study. These superintendents as well as district administrators with key roles in the technology initiative were interviewed to explore their knowledge and perceptions regarding the district's instructional vision and how it was being utilized to gain acceptance for the technology initiative.

The study found that the superintendents utilized various strategic processes to create resonance with stakeholders between the instructional vision and the technology initiative. The superintendents utilized instructional visions that contained many elements of constructivist and 21st century learning skills. However, the definition and communication of the superintendent's specific instructional vision was not always clear and consistent throughout the district. The mission statements, technology plans and district administrators often communicated an instructional vision for the district that was

unrelated to the instructional vision communicated by the superintendent. Additionally, while the implementation of the instructional vision was described as a collaborative effort in all of the districts, the development of the instructional vision was primarily limited to the superintendent and his leadership team (principals and central office academic administrators). Study results showed that while there was an understanding amongst district administrators of how technology can support teaching and learning, there was inconsistency in the understanding of the superintendent's instructional vision for the district and how technology should be utilized to help accomplish these goals. Often, it would appear that the technology initiative was driving the instructional vision for the districts and not the other way around.

Since there is limited research that outlines how a superintendent's instructional vision can help to gain acceptance of a large-scale technology initiative, this study hopes to highlight the use of the instructional vision in gaining acceptance of a large-scale technology initiative and the practical methods of achieving this.

Executive Summary

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Dissertation in Practice

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Gina Flanagan, Anna Nolin &
Henry Turner

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Research conducted and report produced in partial fulfillment of the requirements for the degree of Doctor of Education.

Dissertation Committee

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Context and Background

In recent years, school districts across the country have begun to identify the academic promise and possibilities that technology may have on teaching and learning. Despite inconclusive research on the impact of technology use on teaching and learning, school districts have moved ahead with securing the funding and acceptance from stakeholders to support 1:1 laptop/tablet, Bring Your Own Device (BYOD) or Blended Learning Environments initiatives (Nagel, 2010).

A 1:1 initiative ensures that every student has access to either a district owned or family leased/purchased device and the wireless infrastructure at school to support these devices. A BYOD initiative accommodates family owned technology devices of all kinds. A Blended Learning Environment supports a combination of a 1:1 and BYOD environment. The focus towards these learning environments has caused school districts to look for creative ways to secure funding to purchase technology devices and improve their wireless infrastructure (Salerno & Vonhof, 2011). It is estimated that in 2009 alone, U.S. school districts spent over $7 billion on technology purchases (Dexter, 2011).

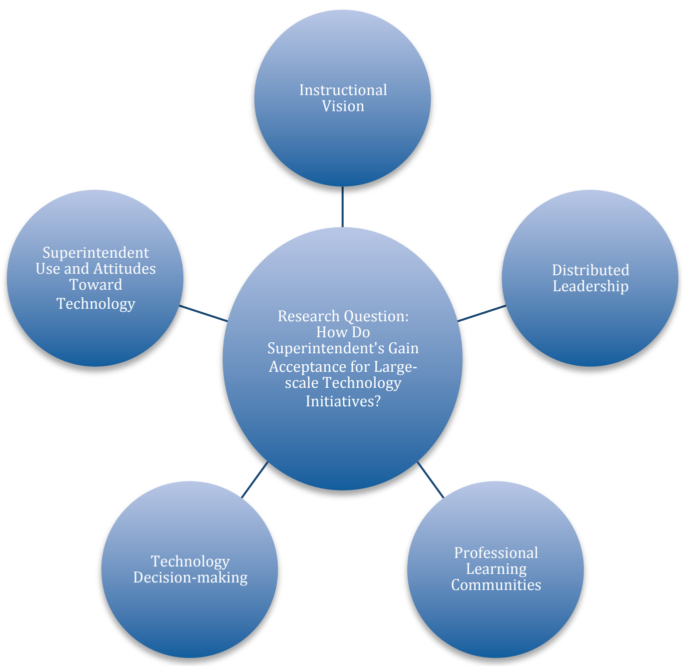
A 2010 National School Boards Association survey showed that 37% of school districts have some type of 1:1 computer initiative in place and this number continues to grow (Nagel, 2010). It is our assumption that superintendents are no longer asking whether it makes sense to move towards a large-scale technology initiative, but rather *when* and, most urgently, *how*. For many school leaders, efforts to effectively and seamlessly integrate technology to meet the goals of increased student achievement and productivity require "buy-in" from district stakeholders at all levels—central office staff, teachers, students, parents and the community-at-large.

Purpose of This Study

While superintendents often seek informal guidance on technology integration decision making from other districts that have already implemented such an initiative, these methods often provide a fragmented and broad road map that often focuses on the logistics of a technology initiative and not necessarily on the leadership moves that a superintendent should employ in order to gain acceptance.

There does not appear to be a comprehensive, individualized, research-based guide to technology integrations that takes into account the unique political, cultural and socioeconomic characteristics of various school districts that are considering this movement. There is also no research-based study available to superintendents to help them understand and consider the leadership moves that may help them gain acceptance for a large-scale technology movement.

Guided by research related to *frame theory*, the superintendent's instructional vision, distributed leadership, professional learning communities, technology infrastructure decision-making and the superintendent's use and attitudes toward technology use, this research team worked toward gaining an understanding of the leadership moves that superintendents utilize to gain acceptance of a large-scale technology initiative. These five interconnected studies are aligned to the overarching study.



Methodology

This study is categorized as a multi-case study of school districts within one state where a 1:1 large-scale technology initiative was implemented. Both the overarching (how superintendents gain acceptance of a large-scale technology initiative) and the individual studies focused on specific leadership moves (instructional vision, distributed leadership, professional learning communities, technology infrastructure and the superintendent's technology use and attitudes). All individual studies employed the same methodologies and protocols of interviews from five superintendents and individuals that they identified as being key players in their large-scale technology initiative. Interview questions were designed to address the components of both the overarching and individual studies. This is outlined in the chart below.

Individual Study and Corresponding Research Questions

Individual Spoke/Author	Research Questions
Instructional Vision (Flanagan, 2014)	• What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment? • How does the superintendent connect his or her instructional vision with the implementation of technology within the district to all stakeholders? • How do district administrators make sense of the superintendent's instructional vision for technology?
Distributed Leadership (Turner, 2014)	• Who does a superintendent work with to gain acceptance of large-scale technology initiatives? • How do members of leadership teams interact with each other around large-scale technology initiatives? • How do members of a leadership team interact with each other around large-scale technology initiatives?
Decision-Making Regarding Infrastructure (Arnold, 2014)	• What factors are considered by superintendents in making decisions about technology infrastructure? • What factors are considered by superintendents in making decisions about funding the large-scale technology initiative? • How did the technology infrastructure or funding decisions have an impact on the perceived acceptance of the initiative?
Communication & Modeling (Cohen, 2014)	• How do superintendents and other district leaders use technology? • What are their attitudes about technology? • How do these attitudes influence their framing?
Professional Learning Communities (Nolin, 2014)	• What are the superintendent's expectations around collaboration? • What is the relationship between district expectations for professional collaboration and acceptance of large-scale technology initiatives in school districts?

Additionally a within-case and cross-case analysis of the data collected from interviews was conducted. A description of school districts that participated in this study is reflected below. The titles of district administrators that participated in this study included superintendent, principal, assistant principal, director of technology, technology integration specialist, network manager, director of academics and district grant writer.

Description of Participating School Districts

System	System size in number of students	Type of Technology Implementation	Grade Level of Technology implementation	Number of Interview Participants
Adams	3600	District Provided iPads	Grades 1, 4-12	4
Jefferson	2900	District Provided iPads	Grades 9-12	3
Madison	1000	Blended Design of DPD carts, Lease-to-Own and Bring Your Own Device	All grades, parent purchase dependent, carts at all schools & levels	5
Monroe	2700	District Provided Mac Laptops	Grades 6-12	3
Washington	4400	Bring Your Own Device	Grades 6-12, parent purchase dependent, carts at all schools	8

Findings

As previously stated, this study included an overarching research question concerning the leadership moves superintendents employ when implementing a large-scale technology initiative as well as five individual studies on areas related to that process. The findings for the entire study are delineated below to reflect each aspect of this study.

Overarching Study:
How Do Superintendents Gain Acceptance of a Large-scale Technology Initiative?

1. Superintendents achieved resonance through leadership actions consistent with prognostic and motivational framing.
2. Superintendents considered constraints the initiative might face in conjunction with prognostic and motivation framing in order to gain acceptance of the initiative.
3. Superintendents developed strategic processes to gain acceptance of the initiative.

Achieving Resonance Through Prognostic and Motivational Framing

Frame theory identifies the development of resonance amongst stakeholders in any social movement as a key method of gaining acceptance (Benford & Snow, 2000). With any large-scale initiative, such as a technology initiative, the superintendent works to help his or her constituencies understand and accept the rationale for any movement through *resonance* (Park, Daly & Guerra, 2012). In this study, the use of prognostic and motivational framing was consistent with each superintendent. Prognostic framing works to create a solution to a problem through goals and a structured plan (Coburn, 2006). All superintendents in this study had goals for what they hoped the technology initiative would accomplish. This ranged from access to devices to various teaching and learning goals. Motivational framing refers to how the rationale or a "call to action" is articulated (Park, et.al., 2014, p. 4). Throughout this study, the superintendents demonstrated that effective communication to all constituencies was important in gaining acceptance for the technology initiative. Superintendents demonstrated this through the use of informational meetings, district websites, social media and blogs.

Identification of Constraints with the Technology Initiative

Each of the superintendents that participated in this study identified and assessed constraints related to the technology initiative to their constituencies. These constraints were an element of the prognostic framing in which superintendents developed solutions to goals via structured plans for improvement (Benford and Snow, 2000). These constraints were often financial or political in nature, but also included competing interests and issues with technology support staffing. Identified financial constraints were most prominent in all the districts that participated in this study. This factor often played a role in the decision regarding what devices or implementation model would be adopted. Political constraints often centered on the lack of support from various stakeholders, whether perceived or actual. Competing interests became a constraint when local or state initiatives were in place at the same time as the technology initiative and effected time and money allocations. Nearly all superintendents identified constraints in the capacity of their existing technology staff to support the initiative.

Superintendents Developed Strategic Processes

Strategic processes are also components of frame theory that identify specific actions of the superintendent to gain acceptance within the district. In our study, we identified several strategic processes that superintendents utilized to create buy-in for the technology initiative. This included: conducting research about the technology implementation, equipment selection, identifying key players, piloting devices, conducting professional development, communicating the expectations for use, maximizing public relations and assessing the capacity of the technology staff.

Discussion

The overarching study produced contributions to both theory and practice. Theoretical contributions in the area of frame theory highlighted that the use of prognostic and motivational framing were highly utilized professional practices in developing resonance for technology initiatives (see figure below). This included the identification of specific leadership actions that could be utilized to gain resonance/acceptance of the technology.

In terms of the elements of prognostic and motivational framing, this study indicates that this is not a linear process in districts that are working to gain acceptance of a large-scale technology initiative. Districts in this study did not start by first identifying a problem. All started by the goal of integrating technology into their district. This study makes the important contribution to frame theory by highlighting the mix of leadership actions and effective communication that can help a superintendent gain acceptance for a large-scale technology initiative.

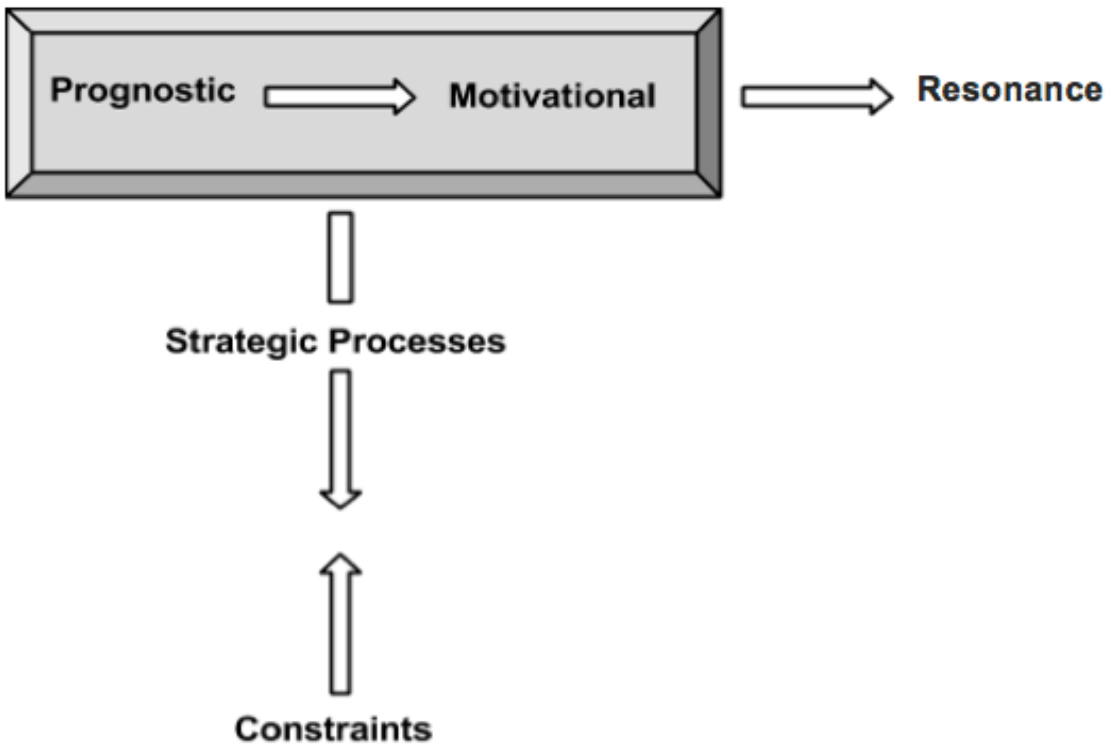
Limitations.

Because this study only examined five school districts, the data were limiting in terms of identifying themes and conclusions. By expanding the number of districts, there could be more generalizability of the findings. Another limitation included the lack of urban districts in this study. It is unclear on how this demographic component would affect the findings. As interviews were conducted through the recommendation of the superintendent, this might have skewed interviews to support the superintendent. This study did not interview teachers, students or parents. This perspective might have created different findings particularly to the areas of instructional vision and communication. This study did not look at student achievement in these five districts nor did it quantify the use of technology in classrooms. It also did not look at districts where a large-scale technology initiative was attempted, but did not gain acceptance.

Considerations for Future Study.

This study found that the diagnostic frame of frame theory, in which leaders identify a problem through the processing of blame and then define goals to resolve issues, was only present in one district. Since this study focuses on how leaders frame issues in a large-scale technology initiative, this would seem to have some relevance. Additionally, as this study examined only districts where acceptance was gained for the technology initiative, it would be interesting to examine what has contributed to districts that have failed to gain acceptance of a large-scale technology initiative. Lastly, another interesting future study would be to include teachers into the mix of participants. Our study did not measure the degree of resonance in the classrooms that was achieved in each district. This perspective would be a great counter to this study's focus on leadership actions.

The Use of Prognostic and Motivation Framing in a Large-Scale Technology Initiative



Recommendations

Districts that have not already implemented a large-scale technology initiative may benefit from this study by applying their own individualized lens of their district to the actions listed in this study that can be replicated regardless of demographics. These general recommendations are listed below and described in detail in the full study:

1. Prepare for the initiative with self-assessments, research and a strategic plan.
2. Carefully plan communication and public relations efforts to garner buy-in.
3. Ensure effective staff is in place to lead the initiative.
4. Anticipate obstacles so that you can plan solutions.

Individual Studies: Findings and Recommendations

Individual Study: Gina E. Flanagan

Does an Instructional Vision Help Superintendents Gain Acceptance for a Large-scale Technology Initiative?

1. ***What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment?***

The instructional vision of superintendents who have participated in a large-scale technology initiative is often connected to constructivist/21st century learning components such as: communication, collaboration, creativity, student engagement, real world applications and technology use. This is consistent with early studies that suggest that constructivist/21st century learning skills are supported in technology integration efforts of schools and can assist with helping to create buy-in for these initiatives (Howland, Jonassen, Marra & Moore, 2003; Jonassen, Peck & Wilson, 1999; Dede, 2010; Boschee, Jensen &

Whitehead, 2003; Haertel, Means, Penuel, Roschelle & Sabelli, 2003). However, in most of the districts who participated in this study, the superintendent's instructional vision was not consistently re-iterated or emphasized in the district's mission statement, technology plan or by district administrators.

2. *How does the superintendent connect his or her instructional vision with the implementation of technology within the district to all stakeholders?*

The development of the instructional vision in a district where a large-scale technology initiative has been implemented did not involve all the district administrators who were identified as key players with the technology initiative. Instead, the vision development involved primarily the superintendent and his leadership team (building principals, central office academic staff). As such, the articulation of the instructional vision in connection with the technology initiative by district administrators was inconsistent in each district. The implementation and communication of the instructional vision in these districts, specifically as it pertained to the technology initiative, was often described as much more collaborative, involving all stakeholders including teachers, parents and students. The focus was primarily on the technology initiative and how it helped students learn in general, not necessarily how technology addresses the specific teaching and learning goals of the district. Despite this factor, there was some evidence in this study that the use of prognostic framing by the superintendents helped some stakeholders see how the technology initiative could help improve teaching and learning in these districts. Motivational framing of the instructional vision and the technology initiative also helped gain acceptance by (a) emphasizing the importance of the technology initiative to teaching and learning and (b) consistently sending the message to all stakeholders that they had a part in achieving the teaching and learning goals of the district. Both prognostic and motivational framing were primarily evidenced in the utilization of strategic actions related to professional development, the allocation of resources and the communication of the instructional vision and the technology initiative. By creating resonance between the instructional vision and the technology initiative, stakeholders could understand the value of technology in their schools (Coburn, 2006).

3. *How do district administrators make sense of the superintendent's instructional vision for technology?*

District administrators felt that the superintendent's leadership in defining and supporting the instructional vision for the initiative was very helpful in gaining acceptance. However, in this study, although most district administrators were inconsistent in their communication and understanding of the superintendent's articulated instructional vision, they seemed to understand and accept technology's place in the classroom. Most district administrators often defined the instructional vision as the technology initiative. While almost all district administrators gave examples of how they support the technology initiative, they did not all give examples of how they support the superintendent's instructional vision. Many district administrators gave their own beliefs regarding teaching and learning when describing the instructional vision for their district that was not necessarily articulated by their superintendent

Recommendations

1. Superintendents should develop, utilize and consistently communicate a meaningful and sustainable instructional vision in the implementation of a large-scale technology initiative.   These instructional visions should include elements of constructivist/21st century learning skills to help create resonance with stakeholders.

2. Superintendents should involve stakeholders in the development and implementation of the instructional vision- particularly with the implementation of a large-scale technology initiative.

3. Superintendents should support the development and implementation of the instructional vision in a large-scale technology initiative.

Individual Study: Henry J. Turner

The Role of Distributed Leadership in Gaining Acceptance of Large-scale Technology Initiatives

1. Who does a superintendent work with to gain acceptance of large-scale technology initiatives?

All five districts had a primary leader and at least two secondary leaders working to gain acceptance of the large-scale technology initiative.

Primary Leaders

With the exception of the superintendent of Washington, Brody, the superintendents relied on one person more regularly than the other members of the technology team to help gain acceptance of the initiative. This leader is referred to as the primary leader. These primary leaders did not take the sole power for the initiative, nor were they independent from the authority of the superintendent. Furthermore, in most of the districts these individuals typically described the collaborative work that they were involved in rather than their sole influence. However, in all of the districts a primary leader was identified as the key framer in gaining acceptance of the initiative. In Washington, Brody was the primary leader.

Secondary Leaders

Within each district, the superintendent identified similar positions to lead the initiative. These positions included principals, technology directors and instructional technology directors. However, despite their formal titles, each secondary member played various roles with the technology initiative. Additionally, the work that these individuals produced was different among the districts as well. The number of secondary leaders differed as well among the districts. The size of the secondary leadership that the superintendents identified ranged from 3 people to 7 people.

2. How do superintendents interact with the members of their leadership team around large-scale technology initiatives?

Superintendents used mainly institutional practices to interact with other leaders and the superintendents mainly took on job tasks that fell clearly within their job description.

Institutionalized Practices. Meetings were the more common form of interaction between the superintendent and the people that worked to gain acceptance of the technology initiative in his district. In all of the districts, meetings were an institutionalized practice of interaction between the superintendent and other members of the district. These meetings mostly occurred formally during regularly scheduled meetings.

Intuitive working relations. Intuitive working relations were demonstrated in three ways: (a) the technology leaders reached out to the superintendent based upon his skills, (b) the superintendent included non-administrators in an administrative meeting, and (c) the primary leader and the superintendent began working together on this initiative based upon a shared history when the superintendent was in a previous position.

Coordinated Tasks of Superintendent. During the interactions between the superintendent and members of the technology leadership team, tasks were coordinated. The superintendents' tasks were implicit, meaning the tasks fell within their job responsibilities. Generally, the superintendents took responsibility for funding the initiative and communicating the initiative. Around these topics, the superintendent interacted with critical stakeholders around this initiative, which included school leadership, municipal leadership and consultants. Many of these groups made important financial decisions for the initiative. These groups included the school committee in all districts, which approved the budgets in all of the districts that purchased devices for students. In nearly all of the districts, the school committee approved budgets for the devices in the schools as well as approved budgets that included backend infrastructure in the district.

3. How do members of a leadership team interact with each other around large-scale technology initiatives?

Members of the leadership team interacted with each other through various interaction structures and took on both implicit and explicit job tasks.

The primary leaders and secondary leaders regularly interacted through institutionalized practices, collaboration and intuitive working relations. During these meetings they coordinated tasks that fell within and outside of their job descriptions.

Institutionalized Practices. Respondents described regular practices of interaction an institutionalized practice in the school district. These patterns of interactions typically occurred as part of regular meetings or planning and implementing professional development.

Collaboration. Primary and secondary leaders identified informal meetings to discuss and plan the initiative. Some of these less formal meetings were spontaneous meetings in which the group collaborated to address a problem.

Intuitive working relations. Members described working with other leaders individually based upon their history of working with the leader or based upon leaders skillset. Many of these meetings were used to troubleshoot issues with the initiative. For example, many people described working with the technology director or network administrator to troubleshoot infrastructure challenges or issues for the initiative.

Coordinated Tasks. During the meetings primary and secondary leaders coordinated working tasks on the initiative. Some of these tasks were completed jointly, while other tasks were completed individually. Additionally, some of these tasks were implicit and fell clearly within the job description of these leaders, such as supporting teachers in the classroom. However, some tasks were explicit and fell outside of the job description of the leaders, such as meeting with community groups.

Recommendations

1. Superintendents should empower leaders with an interest and knowledge in technology leadership.

2. Superintendents should interact and coordinate jobs with technology leaders and encourage technology leaders to interact with each other.

3. District leaders should create structures that allow leaders to take on responsibilities that fall within and outside of their job responsibilities.

Individual Study: Anna P. Nolin

Do Professional Learning Communities (PLCs) Influence Acceptance of Large-scale Technology Initiatives?

Framing Innovation: Technology Implementation and Existence of PLCs in Districts

The findings of this study indicate that the combination of framing and PLC constructs constitute the creation of an important learning medium—a technology learning ecology--with which to nurture educator learning about technology and increase acceptance of large-scale technology implementations in districts.

Superintendents created their own technology learning ecologies that functioned as PLCs for technology implementation teams, but did not necessarily "scale up" PLCs for district-wide technology learning. Key framers (primary leaders) of the technology initiative were identified in each district. Four superintendents (Jefferson, Madison, Monroe and Washington) created technology leadership ecologies with their technology leadership teams and one superintendent (Adams) did this through connections with his key framer/primary leader (leader of initiative) and through the use of social media and virtual learning networks. These PLC learning ecologies helped the superintendent to understand and implement the initiative.

In districts where more PLC constructs were described in relation to the technology initiative, participants identified more moments of resonance within the initiative and identified fewer constraints around the initiative. A possible synergy between PLCs and motivating educators to accept the initiative is sketched, as is the possibility that PLCs serve as a potential buffer to minimize worry over political or financial barriers to gaining acceptance for the initiative.

1. What are the superintendent's expectations around collaboration?

All superintendents identified shared collaborative time as a formal part of their technology initiative and provided district resources to support it. Collaboration time existed in formal and informal ways. The term "PLCs" or PLC constructs were not directly used as a part of any superintendent's deliberate strategy to support technology implementation or gain acceptance, even if the system claimed to formally implement PLCs. However, all five superintendents and their leadership teams described PLC construct expectations for *shared time, collaborative teams*, an *action orientation* and expectations for *continuous improvement* in their descriptions of educator work involving the large-scale technology implementation in their districts.

2. What is the relationship between district expectations for professional collaboration and acceptance of large-scale technology initiatives in school districts?

Professional learning communities as a formal part of the district's overall instructional vision existed only in Washington and Monroe. However, across all five districts, superintendents described *research tasks, formal professional development* and *informal professional development* opportunities and provided collaboration around the technology initiatives.

Research: In all districts, superintendents actively connected professional collaboration and the technology initiative by creating technology PLCs *for their own learning* and planning through the use of their technology leadership or vanguard teams and by modeling technology use . Collaboration occurred through strategic planning meetings (virtual and in person), research visits to implementing districts, use of technology to model technology collaboration, and social media and online collaborative platforms.

Formal Professional Development: Formal professional development was described by all superintendents using PLC constructs. These experiences were described as a key forms of collaboration around the technology implementation. This professional development collaboration around technology was described as district-coordinated full and half day professional days and graduate workshops. Graduate workshops, due to their formal arrangement, staff's autonomy in choosing the courses and the fact that many courses were taught by the district's initiative's key framer/primary leader emerged prominently as connected to PLCs and collaborative learning.

Informal Professional Development: Informal professional development was described by superintendents as connected to the technology initiative, but were not consistently described using PLC constructs. These professional development experiences were described as job-embedded shared collaboration time, workshops provided in various forms by technology integration specialists, after-school drop in technology help sessions, use of video conference distance learning to collaborate and use of memos or social media to read about new technology practices.

Like the learning medium described in Zhao & Frank (2003), PLCs help to create a "learning ecology" that nourishes development of the work in the system. While PLCs may not be necessary to gain initial acceptance for large-scale technology initiatives, they may be critical to sustaining acceptance or maximizing the initiative in the systems. This study indicates that PLCs do have a relationship to motivating staff and leaders within the district and for minimizing the effect of district constraints that threaten to hamper or slow the diffusion of technology implementation through the school system.

Recommendations

1. *Grow PLC culture* by combining PLCs with research, choice and formal professional development for all educators impacted by the technology initiative. The act of doing so strengthens the collaborative culture and deepens organizational learning around new initiatives, policies and practices (Talbert, 2009; Honig, 2006).

2. *Create small innovation/implementation teams across the school system to aid in collaborative learning.* Such teams create a sense-making learning ecology between all levels of the school organization (Spillane, Reiser & Reinter, 2002) enable innovation, sustain adult intention and autonomy while allowing for change, creativity, chaos and variety in adult learning and growing (Eisenhardt & Zbaracki, 1992; Nonanka, Umembto & Sasaki, 1998). Such regular team learning and mutal engagement sustains connections across the new implementation (Coburn & Stein, 2006).

Individual Study: Erik P. Arnold

The Impact of the Superintendent's Technology Infrastructure Decisions on the Acceptance of Large-scale Technology Initiatives

1. What factors are considered by superintendents in making decisions about technology infrastructure?

Superintendents valued the capabilities and reliability of a device and were willing to pay more (within budget) for a device that had these qualities. The capabilities of the device could include things such as: battery life, audio/video recording, full size keyboard, variety of apps or software, portability, and ease of use. A reliable device would be one that is still likely to operate correctly even when it is constantly being transported from class to class and from school to home over a several year period. All superintendents considered a device to be reliable if they got three to four years of serviceable life from each device.

2. What factors are considered by superintendents in making decisions about funding the large-scale technology initiative?

Superintendents funded 1:1 initiatives by seizing one-time budget opportunities and through creative financial moves. Superintendents considered the financial sustainability of the large-scale technology initiative before committing to it. In addition to the reliability and cost of the device, superintendents chose devices that they believed had the features and capabilities that their students and teachers needed in the classroom. No superintendent purchased the least expensive device available (netbook, Chromebook, iPod). Instead, given the budget they had available, they purchased the device they thought offered the best reliability and capabilities for their students and teachers. Four of the five districts in this study had a portion of their large-scale technology initiative paid for by the state as part of a new building or renovation project. Some superintendents used political maneuvers to get a fixed sum in the budget that was dedicated for technology purchases. The superintendent typically worked with members of the Town Finance Committee (FINCOM) to secure these funds. Another important finding was that superintendents of this study considered the financial sustainability of the large-scale technology initiative before committing to it.

3. How did the technology infrastructure or funding decisions have an impact on the perceived acceptance of the initiative?

Robust and reliable Wi-Fi networks were recognized as being critical to gaining acceptance by teachers for 1:1 initiatives. A reliable network is one that is, rarely, if ever, not functioning properly (operational 99.9% of the time). All districts indicated they put the necessary planning and funds into their wireless networks in order to support their large-scale technology initiative.

Recommendations

1. District leaders need to make the necessary investments in their wireless networks to ensure they are robust and reliable.

2. School districts who do not believe they have the funds necessary to sustain a 1:1 initiative should consider a lease-to-own model. This should be done with the consultation of legal counsel.

3. Superintendents should have a plan to sustain the initiative when new equipment needs to be replaced.

Individual Study: Peter D. Cohen

The Impact of the Superintendent's Attitude and Use of Technology on the Acceptance of Large-scale Technology Initiatives

1. How do superintendents and other district leaders use technology?

All of the superintendents and district leaders in this study use technology in their everyday practice. The specific devices used include a range of laptops, tablets, and smart phones with the common thread to each of these tools being mobility and access to Wi-Fi. Regardless of the specific brand of device, having the capability to access email and the web from anywhere at anytime was vital to work of these leaders. The data suggests that the leaders in this study use technology almost daily and for two main purposes in their professional practice: communication and collaboration.

2. What are superintendents' and district leaders' attitudes about technology?

While the use of technology by superintendents and other district leaders is somewhat variable, the data suggests that the 5 superintendents studied are aligned their overall attitudes about technology. For example, the superintendents and other district leaders indicated that technology was an important tool for improved instruction. Secondly, leaders in each district discussed the positive influence of technology to ensure that students are college and career ready. Thirdly, there was also an indication that superintendents aspired for their districts to be on the cutting edge as innovative school districts. These leaders did not wish to be behind the technology curve, but instead worked to proactively insert the tools students need to be successful now and in the future.

3. How do these attitudes influence their framing of large-scale technology initiatives?

The superintendent in each of the five districts studied reported a positive attitude about the direction of the district in regards to technology. This attitude appears to have more of an impact on the overall acceptance of the technology initiative than the superintendent's personal use of technology. In other words, while there is no direct correlation between the *use* of technology by superintendents, the superintendent's *attitude* about technology is a vital factor in gaining acceptance for the large-scale technology initiative. The findings of this study indicate that a primary leader is essential to frame the initiative. That leader does not need to be the superintendent, but the superintendent needs to also frame the initiative to gain acceptance. Our findings indicate that without the support of the superintendent, the technology initiative will not gain acceptance. Ultimately it is the superintendent who needs to make the case for the funding and sustainability of the initiative.

Recommendations

1. **Ensure technology leaders are in place.** The superintendent will be prepared to successfully lead a district into a large-scale technology initiative when proper leadership and staff are in place at all levels of the school district.

2. **Demonstrate conviction and belief in the initiative.** Without a superintendent who fully supports the integration of technology in the schools and moving toward a 1:1 learning environment, large-scale technology initiatives will not be successfully implemented, funded, or sustained.

3. **Promote innovation and sustainability.** Because of the ever-changing landscape of technology, thorough research and planning are needed in order to ensure both technology innovation and sustainability. If a superintendent is going to give support for a large-scale technology initiative, they must insist on decisions being made only after exhaustive research and thoughtful strategic planning has been completed. A successful initiative will require a comprehensive plan where ideas have been vetted, training needs considered, infrastructure requirements delineated, and long term funding solutions created. Innovation requires leaders continuously stay current with the technology. Large-scale technology initiatives require large-scale planning and strong leadership to be forward thinking in order to maintain the direction of the initiative and plan for the future.

Overall Conclusions

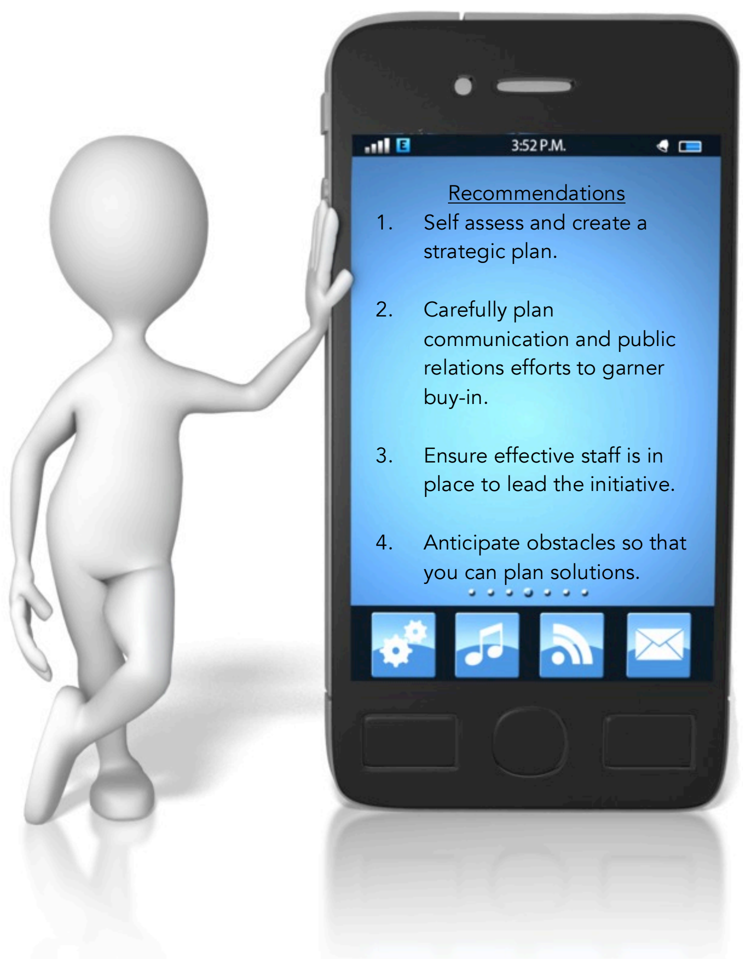
As previously stated, this study looked to first understand how superintendents gain acceptance of a large-scale technology initiative. The overarching study led researchers to examine more specific aspects of superintendent leadership that could be useful in implementing a large-scale technology initiative. This included a focus on the superintendent's instructional vision, role of distributed leadership, creation and development of professional learning around technology, technology decision-making and the superintendent's use and attitudes regarding technology. While all five research areas presented some very unique findings relative to the area of study that are found in each individual chapter, they also uncovered some common themes across these five spokes.

Superintendents interaction with others. Whether implementing an instructional vision, developing professional learning communities or making decisions regarding the technology infrastructure, all superintendents in this study relied on interactions with district administrators and communication with all stakeholders to help gain acceptance of their large-scale technology initiative. As the study on distributed leadership concluded, superintendents relied on primary leaders/key framers of their district administrative team to develop and implement their technology initiative in all areas of the five individual studies.

The development of strategic processes. As outlined in this study, superintendents utilized a variety of strategic processes in connection with prognostic and motivational framing to generate acceptance of their large-scale technology initiative. Across all spokes of this study, superintendents identified district-wide issues related to the individual focus areas and charted out strategic plans to help address these issues. In preparing for the initiative, the instructional vision, professional learning opportunities, leadership teams, technology infrastructure and communication avenues were all considered as elements necessary to build buy-in for the initiative. These focus areas were continued throughout the implementation phase of the initiative.

Additionally, the strategic process of developing professional learning opportunities related to the initiative was also interwoven within the five spokes. Professional development focused on moving forward the instructional vision of the district, involved the assistance of primary leaders/key framers, took into account the technology tools and infrastructure of the district and was communicated by the superintendent through various avenues including social media, blogs, newsletter and the district website to name a few.

The overall study, in conjunction with the five related studies, all focus on the leadership actions that superintendents employ when working to gain acceptance of a large-scale technology initiative. This study has shown that the superintendent's framing of the technology initiative and the strategic actions that he or she utilizes throughout the initiative related to each of the five spokes of this study are vital to developing resonance, and ultimately acceptance by stakeholders.



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Dedication

I dedicate my study to my family, friends and colleagues who supported my pursuit of this degree. I hope that my three years of work on this project will serve as a positive example to my two daughters, Caitlin and Meagan that anything is possible if you have the desire and commitment to follow through.

Acknowledgements

I am grateful to the support and guidance from the Boston College Professional School Administrators Program (PSAP). I am very proud to be associated with a university that cultivates such high levels of academic excellence mixed with a commitment to social justice. I am particularly grateful to Dr. Vincent Cho and Dr. Diana Pullin who spent many hours coaching us through the process and served as excellent examples of academic leadership. I also wish to thank Dr. Daniel Gutekanst who appreciated the practical application and relevance of our work in the most calming, supportive manner. Thank you to Dr. Damien Bebell for his time, support and expertise in the area of technology integration research.

Lastly, I extend much gratitude to my research team that includes: Erik Arnold, Peter Cohen, Anna Nolin and Henry Turner. Through the sharing of ideas and the challenging of opinions, these four individuals have made me a stronger educational leader. Their support and work throughout this process has produced a deep and lasting bond of collegiality and friendship.

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Chapter One

Introduction[1]

In recent years, technology companies have developed mobile devices such as tablets and laptops that allow students to transport the devices from the classroom to the home with ease. Many school systems have begun to identify the academic promise and possibilities that these devices may have on teaching and learning. Therefore, every year more school districts have secured the funding to purchase devices for students, or opened their wireless network for students to bring their personal devices with them to school (Nagel, 2010). Within each district the programs might be referred to as 1:1 tablet or laptop and *Bring Your Own Device* (BYOD) initiatives.

For the purposes of this study, we define *large-scale technology initiatives* as those technology adoptions in public school districts that seek to provide a one-to-one (1:1) computing or tablet device for every student in a section or level of the school system, for example, one tablet or laptop for all students in grades 8-12. *One-to-one (1:1)* is defined as one computing device per child in the classroom setting combined with ubiquitous access to the Internet and all the power of a wired Internet connection for instruction. These 1:1 initiatives can employ a *District Provided Device* (DPD), *Bring Your Own Device* (BYOD), District Sponsored *Lease-to-Own* (LTO), or a *Blended* design (Salerno & Vonhof, 2011). District provided devices are selected, paid for, and maintained by the school system. BYOD initiatives ask that, in some manner, families of students bear the financial burden of purchasing the device for student use in the classroom. BYOD initiatives can range from districts allowing any and all devices for

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[1] This chapter was jointly written by the authors listed and reflects the team approach of this project: Gina E. Flanagan, Anna P. Nolin, & Henry J. Turner with Erik P. Arnold, Peter D. Cohen

classroom use to strictly limiting the choice of devices. A lease-to-own model pushes the cost of the device to families, but it allows for it to be paid for in installments, often over a three or four year period. A blended technology school district would utilize a combination of DPD, BYOD, or LTO.

As support to the work of school districts, researchers have begun to identify potential ways in which these devices can support or even transform the learning environment (Bebell & Kay, 2010; Bebell & O'Dwyer, 2010; Dunleavy, Dexter & Heinecke, 2007; Weston & Bain, 2010; Zucker & Light, 2009). There are researchers who have found that technology integration in schools can have a positive impact on student learning (Bebell, 2010; Darling-Hammond, Meyerson, LaPointe, & Orr, 2010; Roschelle, Pea, Hoadley, Gordin, & Means, 2000; Sánchez & Salazar, 2012). This research remains relatively new and faces the challenge of refuting well-established technology integration critics. These critics found technology reforms to be ineffective, inconsistently implemented or to have no aggregate effect on education and therefore remain skeptical of such reforms (Cuban, et al., 2001; Ertmer, 2005; Tyack & Cuban, 1995; Wallace, 2004; Zhao & Frank, 2003).

Despite the debate within the research, many district leaders have moved ahead and secured funding and acceptance from their various constituencies: school board, taxpayers, building administrators, and/or teachers. It is estimated that in 2009, U.S. school districts spent over $7 billion on technology purchases and that the market is expected to continue to grow with the increasing number of schools introducing 1:1 computing initiatives (Compass Intelligence, 2010, Zucker & Light, 2000). A 2010 National School Boards Association survey showed that 37% of school districts had some type of 1:1 computer initiative already in place and if the trend continues that percentage will continue to grow (Nagel, 2010). This commitment to developing technology has occurred in schools with no guarantee of success, or at best, differing views of success.

There can be a heavy price tag for school districts to consider when implementing a 1:1 technology initiative. Even though tablets and laptops are becoming more affordable, purchasing a device for each student is still cost prohibitive for most districts, as is building up a district's infrastructure to implement 1:1 initiatives of any sort. Many school districts are challenged to find ways to fund and sustain the initial expenses of a large-scale technology initiative as well as the many other initiatives that are being supported in their district at the same time. Additionally, efforts to seamlessly integrate technology with the goal of increasing student achievement and productivity may be met with mixed results in terms of teacher "buy-in" and learning outcomes. Bebell, Russell and O'Dwyer (2003) noted that these mixed results have been due to problems with decision-making and implementation rather than the actual technology.

While superintendents might seek informal guidance on technology decision-making from districts that have implemented technology, as well as utilizing frameworks from educational organizations that focus on technology integration such as *Project Red* and the *Partnership for 21st Century Skills* (Partnership for 21st Century Skills, 2009; Project Red 2010), these methods provide a fragmented and broad road map to technology integration, often focusing on the structural components of the integration and not necessarily the leadership moves that a superintendent should employ in order to help gain acceptance.

By themselves, these methods do not provide a comprehensive, individualized guide to technology integration that takes into account the unique political, cultural and social-economical characteristics of various districts that are considering this movement. There does not appear to be a research-based study available to superintendents to help them understand and consider the leadership moves that may help them gain acceptance for a large-scale technology movement.

Despite the many issues to consider when developing a large-scale technology initiative, it is our assumption that superintendents are no longer asking *whether* it makes sense to move towards large-scale technology initiatives, but rather *when* and, most urgently, *how*. As more districts move toward technology integration in classrooms, the pressure increases on all superintendents to decide for their own districts how they might implement these large-scale technology initiatives. Therefore, our aim was to study what superintendents do to gain acceptance for large-scale technology initiatives in their school systems. The overarching study will focus on the following research question: How do superintendents gain acceptance for a large-scale technology initiative? Specifically, this includes the examination of leadership moves of superintendents that contribute to this acceptance. This aspect of the study will be presented through five individual studies related to superintendent leadership in a large-scale technology initiative.

Preview of the Dissertation in Practice

In order to understand the context of the overarching and individual studies related to this dissertation, we provide a preview of the theoretical rationale, research design, methodology, and the organization of chapters below.

Theoretical Rationale

The study of *frame theory* provides an examination of how various social movements, such as a large-scale technology initiative, gain acceptance through various strategic actions. By examining various aspects of *frame theory* including motivational and prognostic framing, the development and use of resonance and the strategic actions that accompany this, we look to uncover if *frame theory* is an effective lens that superintendents apply when seeking acceptance of a large- scale technology initiative.

Research Design

As the overarching study seeks to identify actions of superintendents that are used to gain acceptance of a large-scale technology initiative through the lens of *frame theory*, it also includes five interconnected studies that emerge from the overarching study. The results and discussion of *frame theory* and technology innovation can be found in Chapters 4 and 6. The individual studies focus on various areas of leadership that superintendents might engage in during this type of initiative. This includes how superintendents utilize distributed leadership (Turner, 2014), instructional vision (Flanagan, 2014), professional learning communities (Nolin, 2014), technology decision-making (Arnold, 2014) and the superintendent's use and attitudes regarding technology (Cohen, 2014). These relationships to the overarching study are represented in Figure 1 below:

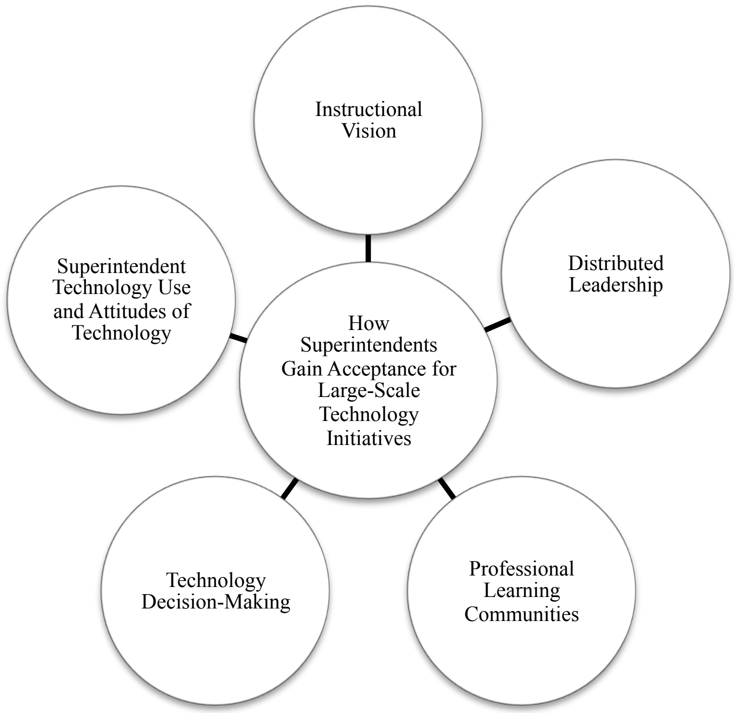

Figure 1. An overview of the complete study. The overarching study is in the middle with the five individual studies surrounding it. Each individual study (or spoke) provides data to answer the central research question of our overarching study.

As the overarching study utilizes the lens of *frame theory* to the study of leadership actions, the five individual studies do so as well.

Methodology

This is a multi-case study of districts within one state that were each independently implementing a large-scale, 1:1 technology initiative. Both the overarching and individual studies employ the same methodologies and interview protocols for five superintendents and the individuals that they have identified as being key players in their technology initiative. Additionally, all studies include a within-case and cross-case analysis of the data collected from the interviews. Throughout all sections of the study, coding was used to identify the presence of leadership actions, framing activity, and acceptance of the technology initiative. In the related individual spokes of this research, codes represented individual research interests and the application of framing actions by the superintendent. This process helped to establish the analysis of frame theory across the five individual studies.

Overview of Chapters

In Chapter 2, a review of the literature related to the study of district instructional leadership, technology leadership, technology integration and frame theory provide support to the current inquiry into a superintendent's leadership actions in a large-scale technology initiative. Chapter 3 describes the methodology employed to collect and analyze data. Chapter 4 presents the findings of the overarching study based on the synthesis of all data collected from the overall study. Chapter 5 presents each of the individual studies related to the actions of superintendents undergoing a large-scale technology initiative. Each of the individual studies identify a problem, provide a literature review of relevant topics related to the study and outline methodologies, findings, contributions to theory and practices and recommendations for superintendents implementing a technology initiative. Chapter 6 addresses the contributions of the overarching study and the individual studies to theory and practice. Chapter 6 also addresses some limitations of this study, the implications for future research and outlines recommended actions for superintendent and district leaders who are undergoing a large-scale technology initiative.

Chapter Two

Literature Review[2]

This study describes what superintendents do to gain acceptance of large-scale technology initiatives. There is no known research on the role of the superintendent as a technology leader. The focus of this research, however, limits large-scale technology initiatives to instructional technology. Relevant research already exists on instructional leadership. Therefore, instructional leadership research was used to help frame this study as well.

This study draws from a broad range of literature from social scientists, business, organizational and education scholars to help us place this question into context. We begin this literature review with a definition of what we mean by "large-scale technology initiatives" in education and discuss our focus on instructional technology. Then this section reviews literature focused on four themes: (a) the conflicting research about large-scale technology initiatives in schools, (b) the relationship between instructional leadership and technology leadership, (c) the role of the superintendent and central office in instructional leadership, and (d) frame theory, our theoretical framework, which guided our data collection, analysis and conclusions for this study.

With this body of literature we will describe the leadership challenges of implementing large-scale initiatives within an organization such as a school district's technology initiative. Additionally, this literature review demonstrates gaps in research, which further raises the need to study what superintendents do to gain acceptance for these programs.

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[2] This chapter was jointly written by the authors listed and reflects the team approach of this project: Henry J. Turner and Gina E. Flanagan with Erik P. Arnold, Peter D. Cohen, Anna P. Nolin

Large-scale Technology Initiatives in Schools

School districts are purchasing expensive technology with the hope to improve several functions of schooling. Schools have always purchased technology to improve the productivity or job-related functioning of adults in the industry, such as accounting programs and copy machines. Additionally, school districts are now purchasing technology devices directly for instructional purposes to influence student learning as well (Means, Roschelle, Penuel, Sabelli, & Haertel, 2003; Dunleavy, Dexter, & Heinecke, 2007; Bebell & Kay, 2010). Instructional technology devices will be the focus for this study. This section defines instructional technology and its role in schools.

Instructional Technology Devices

For the purpose of this study, instructional technology devices are defined as technology tools that have the potential to improve the capacity for substantial and worthwhile learning through the relations of teachers, students and the technology tool (Ball & Cohen, 1999; Means et al, 2003). These devices could include tablets, smartphones or laptop computers.

Many school districts across the nation are amassing devices such as laptop computers and tablets for students and teachers. Furthermore, some school districts are purchasing an instructional device for every student or allowing students to bring devices to school. Often referred to as one-to-one (1:1) computing in schools, within these initiatives one instructional technology device is assigned to each student for use in a wireless, Internet-connected classroom setting. Therefore, in addition to purchasing devices, many districts are building a wireless infrastructure throughout schools to support and maximize the use of the devices in classrooms. These initiatives are expensive and typically include taxpayer dollars as a funding stream.

Despite the high costs, many schools have already taken on full-scale 1:1 computing programs. Some of these programs have occurred through statewide initiatives, such as in Maine, Michigan, and North Carolina (Corn, Osborne, Halstead, Oliver, Tigen & Stanhope, 2009; Silvernail & Lane, 2004; Silvernail & Grutter, 2005). More commonly local districts have implemented programs in Virginia, Florida, California, Massachusetts, Iowa, Vermont, Texas and elsewhere (Bebell & Kay, 2010; Cavanaugh, Dawson, White & Valdes, Ritzhaupt & Payne, 2006; Penuel, 2006; Shapely, Sheehan, Sturges, Carnanikas-Walker, Huntsberger & Maloney, 2009; Zucker & Light, 2009). This type and definition of large-scale technology implementation maintains a broad umbrella of instructional technology devices. Furthermore, the definition only incorporates technology used by teachers and students. A description of how these instructional technology programs are used in classrooms follows.

Use of Instructional Technology in the Classroom

Emerging research demonstrates several examples of technology uses in the classroom. Means et al. (2003) found that technology influences instruction by providing curriculum resources and creating alternative instructional activities and processes. Additionally, some are teachers using a variety of teaching strategies using the technology devices in their classrooms, which have increased project based learning, student engagement, collaboration, and research skills in the studied classrooms (Dunleavy et al., 2007; Bebell & Kay, 2010). With these strategies, researchers found that technology could more adeptly meet individual learning styles for students (Collins

& Halverson, 2009; Dede, 2011; Selwyn, 2011). Therefore, researchers have demonstrated the potential of technology in the classroom for instructional purposes.

Despite growing research of its effectiveness, instructional technology is a challenging implementation initiative in many schools. In many classrooms instructional technology remains underused and ineffective (Cuban, 1993; Cuban, 2003; Cuban, 2006; Gray, Thomas & Lewis, 2010; Tyack & Cuban, 1995). Furthermore, scholars have identified teacher resistance to be one of the greatest impediments to technology acceptance into the classroom (Zhao & Frank, 2003; Weston & Bain, 2010). Therefore, while some studies showcase the successful use and potential of technology in the classroom, they also highlight the important role that teachers play in determining the success of the integration of instructional technology devices. If instructional technology devices continue to become a larger presence in the classrooms, leaders may need to think about building teacher capacity to accept devices in the classroom.

School and district leaders may be an important group to help teachers accept technology and learn to integrate it into their classrooms. Furthermore, as schools continue to purchase expensive technology, school and district leaders may have to make more decisions about the potential benefits that technology can provide their school system. They may need to provide professional development for staff on how to use technology in the classroom. Finally, leaders may feel constrained by teachers and community members due to the initiative's high cost and newness to the classroom.

This expectation for large-scale technology to improve an organization has been an important area of focus in business research (Brynjolfsson & Hitt, 2000; Brown, 2001; Acemoglu, Aghion, Lelarge, Van Reenen, & Zilibotti, 2007). However, no known research exists about the increased expectations for school and district leaders to adopt these initiatives. Leaders, therefore, may need to develop and utilize leadership strategies to ensure acceptance of these initiatives.

In order to achieve this goal, leaders might use both instructional and technology leadership to implement a large-scale technology initiative. If district leaders resolve technology integration problems, the potential for instructional technology to improve education may become more apparent. The relationship between instructional leadership and technology leadership is therefore important to define in today's educational context.

The Role of Instructional Leadership and Technology Leadership

Regardless of any evidence of technology's benefits in the classroom, technology integration into the classroom has been met with mixed results. Leadership may be one way to improve instructional technology integration in the classroom. Emerging research on both instructional leadership and technology leadership exists and is summarized for use in this study. While this study focused on district level leadership, most of the research in this field has focused on building-level leadership.

Description of Technology Leadership

Very few studies have investigated the role of leadership with respect to technology and even these few studies are focused on building-level leadership. Some studies have identified that technology leadership is unique to other forms of school leadership (Anderson & Dexter, 2005; Flanagan & Jacobsen, 2003; Gerard et al., 2010). McLeod and Richardson (2011) demonstrated the need for further study on technology leadership. Although technology leadership remains an emerging research field, early studies suggest that strong technology leadership is an important component to successful school technology integration (Anderson & Dexter, 2005; Gerard et al., 2010; Dexter, 2011a). Again, all of these studies focus on building-level leadership, such as principals, which raises the question of the role of the central office within this leadership lens. This section will describe the research on technology leadership.

Studies on technology leadership have mostly studied the technical skill of principals, which have found that many school leaders have minimal technical knowledge (Flanagan & Jacobsen, 2003, Gerard et al., 2010). Furthermore, they found that increased technology use existed within the school, including the classroom, when principals had technical skill and knowledge (Flanagan & Jacobsen, 2003; Anderson & Dexter, 2005). These studies defined technical skill as the leader's ability to use technology within his/her professional life, such as email. Anderson and Dexter's (2005) comprehensive quantitative study of leadership in a digital environment confirms and correlates the role of technology leadership with increased educational technology usage and integration in schools. The study names basic indicators of administrator leadership to promote technology integration, but the indicators here, again, fall short of defining a student-achievement driven set of technology leadership actions that inspires teachers to integrate technology.

Existing research has yet to study the characteristics of technology leadership focused on student learning. Some research literature has laid the groundwork to study technology and learning; however, they vary in their manner of defining technology integration—conflating teacher personal and administrative use of technology for productivity reasons, such as student information systems, with technology used for instruction, such as instructional technology devices (An & Reigeluth, 2011; Galizio, Ledesma, Schrum, 2011; Hughes & Zachariah, 2001; Kincaid, 2002; Leonard & Leonard, 2006; McLeod & Richardson, 2011). Therefore, more research is needed that directly links technology leadership effectiveness with student learning. Our study hopes to initiate this scholarly discussion.

Some studies examine school and district characteristics that result in increased use of technology by teachers for their own professional preparation, for delivery of instruction, and in directing students to use technology for production of academic projects (Bebell & Kay, 2010; Bebell & O'Dwyer, 2010; O'Dwyer, Russell & Bebell, 2004; O'Dwyer, Russell & Bebell, 2005). While leadership skills or actions can be inferred through examination of school and district characteristics in a school system, these studies do not directly identify leadership competencies or actions most important for elevating student achievement through technology use.

Technology leadership is an important area for further study because of the complexity of technology and its unique challenge of gaining acceptance within a school setting. Furthermore, the resistance and lack of technical knowledge that people have of technology suggests technology leadership demands leadership actions that may not be necessary for other aspects of leadership (Cuban, 2006; Gerard et al., 2010). These technology initiatives are focused on students using these devices in the classroom. Therefore technology leadership may also relate closely to instructional leadership. Additionally, an analysis of instructional leadership assists in understanding technology leadership and potential links between the two.

Instructional Leadership

Researchers have been able to connect building based instructional leadership as a factor in increasing student learning within the classroom (Leithwood, Harris & Hopkins, 2008; Robinson, Lloyd, & Rowe, 2008; Louis, Dretzke, & Wahlstrom, 2010). However, there is only one known study that connects technology leadership with instructional leadership in a school (Dexter, 2011b). Based on this gap in research, examination of the overlapping findings as well as gaps in the research between instructional leadership and technology leadership is required. Additionally, the question of whether technology leadership requires skills and knowledge beyond that required of good instructional leadership must also be contemplated.

Researchers have found that effective instructional leadership exists when teachers and the principal participate in the decision-making (Hallinger & Heck, 1995; Hallinger, 2005). These researchers found that when teachers and principals collaborate they: (a) provide clear goals around student learning, (b) utilize a range of stakeholders, (c) create a climate of high expectations, (d) develop and monitor student learning outcomes, and (e) oversee staff development. Dexter (2011b) found these factors within instructional technology decision-making as well.

Effective instructional leadership and effective technology integration have other common themes as well, such as the need for a clear vision and choosing the correct tools/methods (Ball & Cohen, 1999; Hallinger & Heck, 1996; Anderson & Dexter, 2005). However, technology leadership poses unique challenges, such as technical decision-making (Gerrard, Bowyer & Linn 2008; Gerrard, Bowyer & Linn, 2010). Therefore, these technical decisions may require the use of several leaders, including some who have technical knowledge, such as technology directors (Dexter, 2011b).

Technology initiatives in school systems often are implemented in more than one school; therefore leadership may be needed to implement larger-scale technology initiatives across a district, requiring a study of technology leadership to include examination of the power and skill of district leadership. Increasingly, researchers are studying the role of the superintendent and central office as instructional leaders outside of a technology context. For this study, the role of the superintendent and the central office around instructional leadership must therefore be studied, which will raise the question as to how technology leadership might be described or have impact at the district level.

Superintendent and the Leadership Team

The previous section discussed the relationship between instructional leadership and technology leadership. The research described, however, focused mostly on the leadership of principals. While this study interviewed principals, superintendents remain the focus for this study due to the district-wide and large-scale, community-wide ramifications of 1:1 computing initiatives in a school system. Emerging instructional leadership research demonstrates the important roles of district level leaders in order to implement instructional reforms in schools (Corcoran, Fuhrman, & Belcher, 2001; Hightower, 2002; Elmore, 2004). Therefore, the purpose of this section is to discuss the role of superintendents and their central office staff with instructional leadership. The role of the superintendent must be examined as well as the work of central offices. We will begin with an overview of the role of the superintendent. Next we will discuss the work of the central office. Finally, we will discuss the work of the superintendent and his/her leadership team in gaining acceptance of instructional initiatives. It should be noted that some district leadership teams include principals. For this study, every participating school district included principals as part of the district leadership team. Thus discussion of the superintendent and central office's leadership roles will provide a stepping-stone to this research on superintendents as technology leaders.

The Superintendent

The superintendent's job has become increasingly complex. Often superintendents deal with structural and organizational issues such as facilities and human resource issues within an ever-increasing political dynamic (Petersen & Barnett, 2005; Childress, Elmore, Grossman & Johnson, 2006). Furthermore, superintendents are facing increased pressure from state and federal policy, taxpayers, school councils and other municipality groups (Elmore, 2004). Researchers report that superintendents must contend with an increasingly complex system with less financial flexibility (Orr, 2006). Nevertheless, within this complexity there is a need for superintendents to remain instructional leaders in their district.

Superintendents provide the glue that connects many important district stakeholders including: school boards, parents, building administrators and district administrators. Their direct connection with these stakeholders provides a trickle-down effect of instructional leadership within each school. In working with these groups, the work of the superintendent is to provide a collective instructional vision, ensure collaboration between different departments of the district, and secure appropriate funding for instructional programs and professional development (Petersen & Barnett, 2005). Researchers have begun to study how superintendents carry out these actions within the new dynamics of the position (Childress, et. al, 2006).

Despite the increased complexity of the job, researchers found that many superintendents' instructional responsibilities have remained consistent with the traditional instructional responsibilities superintendents held for a long time regardless of district size. These areas of instructional responsibility include: (a) working with stakeholders such as central office administrators, principals, and school boards, (b) securing and allocating resources, (c) establishing a vision and goals, and (d) evaluating and reviewing instruction using data (Petersen & Barnett, 2005; Childress, et. al, 2006).

While these actions may not directly impact student learning, they have a district-wide impact and effect through district and building administrators, which ultimately impacts teaching and learning at the classroom level. With these strategies, superintendents are able to provide oversight and ensure consistency throughout the district during a time in which their job has become more complex. Due to the complexity of the job, however, superintendents must work with their district leadership teams in order to execute the total responsibilities of the position. This central office teamwork is important to the district's instructional success and the district leadership team must be examined as a component of the superintendent's instructional leadership.

District Leadership

Depending on the size and structure of the school district, superintendents may work with other building and central office administrators to carry out the functions of their job. Therefore, district leaders other than the superintendent can play an important role in carrying out instructional leadership.

Central office leaders possess some of the strongest understanding of education theoretical content as well as instructional best practice within their district, which can be structurally siloed within a department (Hightower, 2002; Honig, 2003). Hightower (2002) identified the isolating nature in a large school district. This structure prevented central office administrators from working collaboratively with other leaders within the organizational structure. Researchers have found that some of the most important leaders in implementing an instructional policy are the non-instructional central office leaders of: the human resource office, facilities office, and business office, etc. as well as building based leaders such as principals (Hightower, 2002; Honig, 2003; Wayman & Cho, 2008; Coburn, Tourre & Yamashita, 2009). When communication between each office occurs, districts are able to think about the total impact of large-scale programs and, by extension, act more cohesively.

Researchers have demonstrated that central office administrators can have an impact on instructional leadership. Much of this impact can be found in supporting the responsibilities of the superintendent through: (a) interpreting data, (b) building district knowledge and skills, (c) aligning curriculum and instruction and (d) targeting interventions on low performing students and/or schools (Massell, 2000). With effective central office leadership, school districts may be able to develop more district consistency and richer professional development. Still, due to the organizational complexity and politics of the district, gaining acceptance of programs within these areas can be challenging. Therefore, district leaders must frame these initiatives through effective communication and strategic thinking.

One of the critical positions that district leaders must gain acceptance from in large-scale district-wide reform work is with building principals. As previously stated, researchers have demonstrated the link of principal instructional leadership to student learning as well as a principals technical skill with increased technology use throughout the school. Therefore, combining the leadership power of the principal, and curricular knowledge of the central office administrators could create an effective relationship with which to provide schools collaborative and evidence based instructional leadership (Hightower, 2002; Honig & Coburn, 2008; Coburn et al, 2009). Therefore, district leaders must utilize strategic thinking and effective communication to gain acceptance of initiatives from principals. While this process is simple and logical, superintendents must gain this acceptance from their teams while balancing all of the other organizational challenges inherent in district leadership. The work of the superintendent is to balance organizational challenges and cultivate the work of their leadership teams.

Work of the superintendent and the leadership team. As previously detailed, district-wide technology initiatives present leadership challenges for school and district leaders. As previously defined, the central office may include instructional or organizational leaders. Furthermore, some school districts may include principals as members of the district leadership team. Despite the complexity for district leaders implementing a technology initiative, no known research addresses the role of such leadership in implementing technology initiatives. However, a variety of research has examined the role of the superintendent and central office in implementing other instructional initiatives and is summarized below. This section describes three categories of work for superintendents and their leadership teams in gaining acceptance of instructional initiatives: (a) collect evidence of an initiative through data and research; (b) make sense of the evidence for stakeholders, such as parents, school committee and faculty; and (c) build capacity throughout the district to accept the initiative. The rest of this section will explain these three areas of work.

Collect evidence through data and research. Through state and local assessments districts are inundated with data (Wayman & Cho, 2008; Honig & Coburn, 2008). Furthermore, state and federal laws mandate central office administrators to utilize and interpret data. Data specialists have become a new and important role in some districts. In turn, central office staff members have begun to focus their decision-making on the evidence collected and analyzed (Honig & Coburn, 2008). Therefore, the challenge for district leaders is not finding and interpreting data that can develop a message, but finding the data that will make an impactful and meaningful message.

One of the challenges for district leaders is the lack of data coherence and knowledge outside of the central office. Honig and Venkateswaran (2012) found that school administrators relied on district administrators to help them incorporate evidence use within their school as well as provide professional development. Another study found that school leaders who were reluctant to utilize data could: (a) focus on using data to address small scale workable problems and (b) select technology that will reduce work or improve work efficiency for school leaders (Wayman & Cho, 2008). As stated before, the relationship between the district leaders and school leaders is critical in order to create meaningful instructional leadership. Therefore, district leaders must choose data that is impactful to leaders and will energize them to use the data. In order to accomplish this successfully, leaders must make sense of the data through a political lens.

Make sense of evidence. Researchers have identified sensemaking as an inert task in the central office. Coburn, Tourre and Yamashita (2009) defined sensemaking in the central office as leaders understanding evidence and enacting its use within a school district. This step allows district leaders to make their interpretations of the data and think about how it impacts their district. Additionally, districts must utilize this step in making sense of policies developed by state and federal law as well as research and recommendations from outside consultants.

While districts utilize data to inform their practice, one potential challenge is the political influence for district leaders. Researchers found that district leaders and superintendents understand evidence-based strategies to improve learning, however, their decisions are largely made for political reasons (Spillane, 2005a; Coburn, et al., 2009). Therefore, there is a need to understand how leaders can work within this political structure to improve learning.

Researchers have found that success of these policies and initiatives is founded around the district's ability to make sense of these ideas as they pertain to the needs and culture of the district (Spillane, 1996; Spillane, 2005a; Spillane, 2005b; Coburn et al., 2009). Spillane (2005a) found that school districts interpreted even the most rigid federal mandates from NCLB from their own perspective, which in many ways went against the intent of the law to mandate uniformity.

Capacity building. In addition to sensemaking, another related role of the central office is to provide professional development within the district. As discussed earlier, central office leaders may possess the most instructional and pedagogical knowledge within the district. If they are the most knowledgeable, then their role may be to educate other educators within the district, including teachers and building-based leaders. Researchers, refer to this level of adult education as capacity building (Spillane & Thompson, 1997; Mulford, 2007).

In order to get stakeholders on board with an instructional reform, the district must possess the capacity to accept this reform. Spillane and Thompson (1997) define capacity for instructional reform as "a complex and interactive configuration". Additionally, capacity is based upon the willingness of the leadership to support and teach about the initiative and the teachers to have the willingness to adopt the initiative.

Spillane and Thompson (1997) also found that capacity building requires investing in two critical forms of capital: *human capital* and *social capital*. Human capital is based upon the knowledge base of the people within the organizations and that the leadership has the knowledge, not only of the initiative, but also to teach people about the initiative. Social capital comes in the form of the trust and collaboration among educators within the district and the ability of the district to gain support from consultants outside of the district. If districts have the robust investment in human and social capital, the stakeholders are more apt to accept the initiative (Mulford, 2007; Spillane & Thompson, 1997).

Stakeholders are also more apt to adopt a new instructional program if the district has a culture as a learning organization. Cohen and Barnes (1993) identified that policymakers often fail to see themselves as teachers of the policies they create. Additionally, they point that policymaking is an opportunity for learning that often goes unnoticed. For example, they note that when the speed limit was reduced to 55, drivers needed to learn to drive slower. Even more than speed limits, some policies require teaching for people to learn how to adapt to the policy. This is true for programs established by school districts. When creating a program, superintendents and district leaders should recognize the need to teach stakeholders the importance and impact of the program.

However, scholars have highlighted that districts fail to create structures that teach stakeholders about new instructional programs. Often, teachers complain that a new initiative is similar to a previous one that failed. The school districts that establish learning structures for teachers create great opportunities to teach stakeholders the rationale and purpose of the initiative (Ball & Cohen, 1999; Blumenfeld, Fishman, Krajcik, Marx & Soloway, 2000; Elmore & McLaughlin, 1988; Grossman & Thompson, 2004).

Professional development is the most common way in which teachers learn about new district programs. However, professional development "has been the most frequently overlooked component of technology integration since schools began using technology" (Greaves et al., 2010, p. 41). Jacobsen (2001) referenced a survey of educators, conducted by the Alberta Teachers Association Computer Council in 2000, where they were asked to identify the main reasons that were preventing them from integrating technology in their classrooms. According to the survey, over 54% of teachers chose a lack of time to develop lessons that incorporated technology as one roadblock and another 38.6% chose insufficient professional development and/or funding for professional development as a second roadblock. A thorough professional development program would provide time and support for teachers to develop lessons to integrate the technology. The literature is clear that professional development for integrating technology should be ongoing throughout the year and not just a one-shot three-hour session (Banister, 2011; Jacobsen 2001, 2002; Vaughn, 2010; Waters, 2009).

This section discussed the different roles played by superintendents along with the central office relative to gaining acceptance of initiatives. Researchers identified three areas where district leadership can be impactful around instructional initiatives: (a) collect evidence of an initiative through data and research; (b) make sense of the evidence for stakeholders, such as parents, school committee and faculty; and (c) build capacity throughout the district to accept the initiative. These three actions fall in line with the components of frame theory, which is the theoretical framework for this study.

Theoretical Framework

The studies reviewed in this chapter identified the relevant literature to help understand the superintendent's potential role in gaining acceptance of large-scale technology programs. Literature reviewed included discussion of: (a) the challenges of implementing instructional technology, (b) the need for technology and instructional leadership, and (c) the work of the superintendent and central office in gaining acceptance of instructional initiatives. In the final section, we found three areas in which the superintendent and central office can make an impact in instruction: (a) collecting evidence of an initiative through data and research; (b) making sense of the evidence for stakeholders, such as parents, school committee and faculty; and (c) building capacity throughout the district to accept the initiative. These three actions overlap with several ideas within frame theory. This final section explains frame theory's role as a theoretical framework for this study.

Through the lens of frame theory, what superintendents do to gain acceptance of large-scale technology programs can be examined. Frame theory discusses the ways in which political or social movements are constructed. A district's move toward technology acceptance at this time in educational history can be compared to these types of social movements. Furthermore, the day-to-day reform work of the superintendent appears to fall in line with two components of frame theory. For this study, *frame theory* is used as it was initially conceived in Goffman (1974), and promulgated further in analyses in different social contexts by Benford and Snow (2000), Coburn (2006), and Snow, Rochford, Worden and Benford (1986).

Frame Theory

Frame theory lends itself as a framework for how leaders are able to gain acceptance of large-scale initiatives such as those involving technology implementation in districts. Because of its focus on movements, this theory lends itself to study the leadership actions that are required when district leaders move towards educational innovations such as large-scale technology initiative proposals. Frame theory allows for analysis of such large-scale proposals and reform movements from different angles, such as frame analysis is able to show how competing interpretations and perspectives may lead to dramatically different policy designs and degrees of "resonance," relative to the proposed new initiative implementation (Benford & Snow, 2000). Frame theory also helps leaders understand how to shape a policy in order for constituencies to make sense of the policy. Frame theory lends itself to the practical work of superintendents who lead large-scale technology initiatives.

Research based on this approach has mainly been used to study political communication and media discourse; more particularly, scholars have studied how people are mobilized with a social movement (Snow & Benford, 1988; 1992; Snow et al, 1986; Benford, 1993).

Frame analysis and technology plan development. There are many leadership actions employed by superintendents when implementing reform or policy changes in a district including: collaborating with a leadership team, modeling of skills, decision-making, communication with stakeholders and strategic planning. Therefore, we will employ frame theory to help us understand these leadership moves required to maximize "resonance" or the mobilizing potency of superintendent actions conducted to gain acceptance of a district's technology initiative (Benford & Snow, 2000). There are three key components of frame theory that include frame "development, generation, and elaboration" (Benford & Snow, 2000). Embedded in these components are the three core parts to frame development: *diagnostic framing*, *prognostic framing, and motivational framing.* Each of these core parts can play a unique role in building a consensus and/or moving people toward action around proposed technology implementations in a district.

Through diagnostic framing, leaders identify a problem that they wish to change. Within social movements these problems were typically identified as an injustice (Benford & Snow, 2000). In education, it can be argued that the creation of NCLB utilized the diagnostic frame to identify an achievement gap in minority and special needs students that was caused by years of inattentive focus by educational systems toward these groups. Diagnostic framing could also be applied to the push toward a 1:1 technology initiative in that there are equity and socio-economic issues with students who have, and do not have, access to technology in the classroom or at home. It could be argued that this imbalance puts one group at an academic advantage over the other.

Prognostic framing also identifies a problem, but instead of focusing on the aspect of blame, prognostic framing works to carve out solutions via goals and a structured plan to achieving these goals (Coburn, 2006). In the world of education, issues involving student achievement and skill development, for example, are addressed through professional learning communities, district strategic plans and technology plans.

Motivational framing can be viewed as the mechanism used to bring forth collective action particularly through the use of language/communication structures (Benford & Snow, 2000). In relation to technology implementation, the terms, *college and career readiness*, *21st century learning* and *global competitiveness*, amongst others, have created an urgency to put digital tools into the hands of students and are often the motivational tools of language used to frame technology initiatives.

Superintendent leadership was examined from these various framing perspectives as well as considering various framing characteristics, processes and dynamics that are essential components in the framing implementation; specifically, including the framing concepts of *resonance, strategic processes and constraints*.

Resonance. Theoretical frames help bring meaning to a movement, and thereby, mobilize acceptance of an initiative. A concept similar to acceptance, resonance is an essential characteristic of framing development and implementation (Benford & Snow 2000). Park, Daly, and Guerra (2012) expand Benford and Snow's conception of resonance and describe it as occurring when "frames motivate action or cause [a] shift [in] beliefs" (p. 4).

The concept of credibility plays an important role in developing resonance as it establishes consistency and expertise related to the movement, as well eliminates any contradictions. The use of "empirical credibility" with frame theory helps to create resonance in that it makes a connection between the movement itself and what may be happening within the organization or its surroundings. Equally important is the perceived credibility of the individual(s) who are communicating the frame itself—the frame articulators. Here, resonance is often created through the frame articulator's experience with the movement or the manner in which they create "narrative fidelity." Narrative fidelity utilizes the concept of "cultural resonance" whereby, the frame articulator connects the movement to specific elements of the organization's ideology (Benford & Snow, 2000).

Through this analysis, it is the hope that school leaders can learn effective ways in which superintendents have created resonance and, therefore, acceptance in the school district of a large-scale technology initiative. With this, frame analysis becomes a lens through which to view how district leaders establish meaning within a large-scale technology initiative with their constituencies. In turn, if superintendents contemplating a future technology initiative understand the meaning-making process that garners acceptance of technology initiatives, they can more effectively envision, design, and lead such initiatives in their own school systems.

Strategic processes. The development and diffusion of frame theory relies on specific tasks that propel the frame into motion. Strategic processes are often constructed by the frame articulator methods to mobilize individuals toward the movement. These processes are deliberately tied to the identified goals. Some strategic processes include enlisting supporters and resources for the movement (Benford & Snow, 2000). Identifying strategic processes utilized by superintendents and educational leaders involved in large-scale technology initiatives may help create a more effective understanding of the use of frame theory to gain acceptance.

Constraints. Frame theory consists of many variables that may accelerate or impede its mobilization. As it is an ongoing process, it is often affected by various elements of an organization. Constraints are identified as political, social, cultural and even financial roadblocks that slow down the movement. An analysis of how superintendents and educational leaders maneuver around or through constraints will hopefully broaden the understanding of how superintendents gain acceptance of a large-scale technology initiative.

Frame diffusion analysis. The aforementioned aspects of frame theory allow for examination of the design, creation and meaning-making aspects of technology implementation. Frame diffusion analysis allows for examination of the widespread acceptance of the initiative in a district. Likening the implementation of large-scale technology initiatives to a social movement, these initiatives can be analyzed by using frame theory to conduct a *frame diffusion* analysis (Benford & Snow, 2000). Analysis of frame diffusion relative to technology implementation allows for discussion of how constituencies make sense of a technology initiative and how the movement of ideas, collective action frames, and practices spread throughout the school system. Frame diffusion analysis also allows for examination of how the initiative affects the diffusion of beliefs, objects, and practices in the system by way of strategic selection or adaptation, or the strategic fitting or accommodation of these practices in light of the technology initiative and its impact. A clear connection between frame theory and technology leadership actions is evident in the prognostic and collective action aspects of frame theory and this study will focus on those two aspects of frame theory and their relationship to diffusion of the initiative across a school district.

Finally, analysis of frame diffusion will allow us to discuss *frame alignment* employed during the implementation, that is, the actions taken by those who produce and invoke frames in an attempt to connect these frames with interests, values, beliefs and those they seek to mobilize toward acceptance of the technology initiative (Snow et al., 1986; Williams & Kubal, 1999).

The aggregate of this analysis allows for detection of potential trends or patterns of acceptance gaining that potentially allow for greater resonance between constituencies and the initiative, thereby tracing levels of acceptance to the leadership actions that brought them forward (Benford & Snow, 2000). Further, analyzing such leadership action will allow for identification of which leadership actions and framing moved the technology initiative to acceptance in the schools and at all levels of the community surrounding the school district. For this analysis we will use the perspectives of the district leadership and those they name as critical to implementation of the technology initiative.

Ultimately, we hope to inform practice by creating thick, rich descriptions of superintendent leadership actions intended to bring about acceptance of large-scale technology initiatives and illuminate themes and patterns across case studies about the actions of superintendents who have gained acceptance for large-scale technology initiatives in their school systems. The next chapter will describe the methods that we used for this study.

Chapter Three

Methodology[3]

The aim of this overarching study is to describe what superintendents do to gain acceptance of large-scale technology initiatives. As described in Chapter 2, *Acceptance* means that a district has technology devices in the hands of students in a 1:1 fashion for some regular and reliable portion of their instructional program. To address this aim, a multiple-case study analysis of five central office-led large-scale technology implementations was conducted. This chapter describes the methods for this study.

Spokes of Related Study

Our research team conducted a group study of the work of the superintendent in gaining acceptance of large-scale technology initiatives. In addition to the overarching study, five individual studies based on the work of superintendents in gaining acceptance of large-scale technology initiatives were also conducted. These individual studies are referred to as "individual spokes" of study. For the overarching study and the individual spokes, the majority of the research conducted was simultaneous and collaborative. The research methods that were unique to individual spokes of study are addressed in Chapter 5.

The topics for the five individual spokes stemming from our overarching study of what superintendents do to gain acceptance of large-scale technology initiatives are:

1. The impact of the superintendent's instructional vision on acceptance of large-scale technology initiatives.

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[3] This chapter was jointly written by the authors listed and reflects the team approach of this project: Anna P. Nolin & Henry J. Turner with Erik P. Arnold, Peter D. Cohen, Gina E. Flanagan

2. The impact of distributed leadership practices on acceptance of large-scale technology initiatives.
3. The impact of the superintendent's technology infrastructure decisions on the acceptance of large-scale technology initiatives.
4. The impact of the superintendent's use of technology on acceptance of large-scale technology initiatives.
5. The impact of a school district's collaboration practices and professional learning structures on acceptance of large-scale technology initiatives.

Table 1 (on the next page) illustrates individual areas of study and research questions.

Design of Study

To address our team's overarching research questions, a case study methodology was employed. A case study is an empirical inquiry that "investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident" (Yin, 2009, p. 326). Case study methods are best for uncovering the "how" or "why" of events and are appropriate for this study because several of the research questions for our individual spokes of related study are "how" questions (Yin, 2009). Case studies allow us to explore and describe the complexity of contemporary situations without the ability to control behavioral events (Yin, 2009; Creswell, 2012). Specifically, a multiple-case study design was employed. While employing multiple-cases, across multiple interviewees, we were able to describe and compare the cases to enhance our understanding of the issue being studied (Creswell, 2012).

Table 1

Individual studies and research questions detailed in Chapter 5

Individual Study/Author	Research Questions
Framing Innovation: Does An Instructional Vision Help Superintendents Gain Acceptance for a Large-Scale Technology Initiative? (Flanagan, 2014)	• What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment? • How does the superintendent connect his or her instructional vision with the implementation of technology within the district to all stakeholders? • How do district administrators make sense of the superintendent's instructional vision for technology?
Framing Innovation: The Role of Distributed Leadership in Gaining Acceptance of Large-Scale Technology Initiatives (Turner, 2014)	• Who does a superintendent work with to gain acceptance of large-scale technology initiatives? • How do members of leadership teams interact with each other around large-scale technology initiatives? • How do members of a leadership team interact with each other around large-scale technology initiatives?
Framing Innovation: The Impact of the Superintendent's Technology Infrastructure Decisions on the Acceptance of Large-Scale Technology Initiatives (Arnold, 2014)	• What factors are considered by superintendents in making decisions about technology infrastructure? • What factors are considered by superintendents in making decisions about funding the large-scale technology initiative? • How did the technology infrastructure or funding decisions have an impact on the perceived acceptance of the initiative?
Framing Innovation: The Impact of the Superintendent's Attitude and Use of Technology on the Acceptance of Large-Scale Technology Initiatives (Cohen, 2014)	• How do superintendents and other district leaders use technology? • What are their attitudes about technology? • How do these attitudes influence their framing?
Framing Innovation: Do Professional Learning Communities Influence Acceptance of Large-Scale Technology Initiatives? (Nolin, 2014)	• What are the superintendent's expectations around collaboration? • What is the relationship between district expectations for professional collaboration and acceptance of large-scale technology initiatives in school districts?

A multiple-case study approach uses qualitative measures to build theory by linking "rich qualitative evidence to mainstream deductive research" (Eisenhardt & Graebner, 2007, p. 25). The rich evidence gathered are "individual cases [that] share a common characteristic or condition...[and] the more cases included in a study, and the greater variation across the cases, the more compelling an interpretation is likely to be"

(Merriam, 2009, p. 49). Thus, we were able to engage in *cross-case analysis*, drawing conclusions and generalizations based on how patterns held up or failed to hold up (Yin, 2009). For this reason, a multiple-case study on the workings of superintendents was necessary because little research exists describing how such leaders implement technology initiatives in their districts. Our study analyzed this unique time in implementation history—a period of potential interest to others engaged in or considering large-scale technology implementations.

Having detailed rationale for using the multiple-case study approach, the remainder of the chapter discusses the data collected, how the data was analyzed, and how we ensured the validity of the research. In what follows, we provide descriptive information about each of the study districts.

Study Districts

One individual state was chosen to provide a research site for two reasons: the state mandates a coordinated set of curriculum frameworks but large-scale technology initiatives remain locally controlled. Further, in the town structure of school governance, policies are made at the local level so that superintendents may champion large-scale technology initiatives, making district level leadership ideal for examination.

Districts were targeted in a manner that was purposive and criterion-based while seeking maximal variation within our district sampling. Researchers employed a criterion-based sampling approach (Creswell, 2011). Through this sampling method, participants were chosen using a predetermined list of potential characteristics. This selection process supported the building of theoretical insight using interview data (Eisenhardt & Graebner, 2007) and allowed analysis using the specific theoretical lens of frame theory (Benford & Snow, 2000; Snow et al, 1986). Specifically, we sought to gather insights about superintendents and leadership teams who implement 1:1 device programs through the theoretical lens of frame theory. M*aximal variation sampling* was used as described by Creswell (2007), to the extent possible, within this theoretical sample, resulting in varied types of technology implementations at varying grade levels within the systems.

Five small and mid-sized Level 1 or Level 2 school districts implementing large-scale technology initiatives were selected for our study[4]. In the state, 6% of public schools carry no accountability level, 2% are Level 4 schools, 15% are Level 3 schools, 54% are Level 2 schools and 23% are Level 1 schools. Level 3, 4 or 5 status schools, according to the Department of Elementary and Secondary Education, require intensive, mandatory state oversight, intervention, and restructuring (Department of Elementary and Secondary Education, 2012) and, therefore, were not prioritized for this study as such sites may have introduced undue complications to the study of the technology initiative. However, three months after we concluded our interviews in the district, the Madison School District dropped from Level 2 to a Level 3 system; because one of its elementary schools became Level 3, the state designates the entire district as such. This status change did not impact our study because notice of this status and its pending state interventions occurred after the conclusion of our research in the district.

Small and medium-sized districts were prioritized because of the desire to capture a more comprehensive examination of the role of central office leaders at the local level.

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[4] The state's Department of Elementary and Secondary Education (DESE) ranks all public schools on a performance rating of 1-5. Level 1 schools demonstrate the highest achievement and level 5 districts are the lowest performing. Level 4 and 5 districts receive state-mandated and controlled involvement.

While many studies of central office leadership exist, the majority of studies describe large and urban systems (Hightower, 2002; Honig, 2003; Coburn, Bae, & Turner, 2008; Coburn, Toure & Yamashita, 2009; Coburn & Stein 2010; Honig & Venkateswaran, 2012); no studies, to our knowledge, examine the roles of central office staff in smaller districts. It is theorized that smaller districts employ central office staff who may be required to play more or varied leadership roles in systems; indeed, in these smaller districts, central office staff demonstrated more discretion and power to implement technology leadership decisions, thus making this study that much more descriptive of leadership actions.

At the time of this study, 30 school districts in the state contained large-scale technology initiatives, constituting 13.6% of the state's total school districts. These districts were identified through an informal email survey of member districts in the state's secondary administrator's association, a large, powerful, and comprehensive professional association in the state. From those 30 school districts, 12 met size and accountability designation criteria. From that sample, sites were chosen based on the following criteria:

- Superintendent must have been a leader in a targeted school system implementing a large-scale technology initiative for the past two years.
- Superintendent must have been a leader in the system at the inception of district's large-scale initiative implementation (on the ground in schools).
- Superintendent was willing to participate in the larger study.

Superintendents were contacted by phone; all superintendents contacted agreed to participate in the study.

The districts chosen and relevant criteria for inclusion in the study are detailed in Table 2. This table recounts district size, accountability level, the grade levels into which the large-scale technology initiative was implemented, the type of technology implementation, the size of the technology leadership team identified as responsible for implementing the technology initiative, and the approximate number of students involved in the initiative. The type of technology implementation included: district-provided device 1:1 models of technology deployment (DPD), district-sponsored lease-to-own 1:1 models (LTO), a bring-your-own-device model (BYOD) and a blended model combining LTO and BYOD.

Table 2.

Description of Study School Systems

System	Accountability designation	System size in number of students	Type of technology implementation	Grade level of technology implementation	Size of technology leadership team	Approx. # of students involved
Adams	Level 2	3600	District Provided iPads	Grades 1, 4-12	4	2700
Jefferson	Level 2	2900	District Provided iPads	Grades 9-12	3	770
Madison	Level 3	1000	Blended Design of DPD carts, Lease-to-Own and Bring Your Own Device	All grades (parent purchase dependent, carts at all schools)	5	990
Monroe	Level 2	2700	District Provided Mac Laptops	Grades 6-12	3	1500
Washington	Level 1	4400	Bring Your Own Device	Grades 6-12 (parent purchase dependent, carts at all schools)	8	1200-2000

Washington School District

Washington School District is in a suburban community outside of a major United States metropolitan city. Based upon the state's school district accountability system Washington is considered a Level 1 school district. In the fall of 2011, the superintendent, Brody, and members of his technology leadership team began to plan for an initiative to allow students in the 6-12th grades to bring their own electronic devices to school. The members of the technology leadership team included principals, a network administrator, and school technology integration specialists. Pseudonyms for the participants of the technology leadership team are described in Table 3. In January 2012, Washington began their large-scale technology initiative. This program, sometimes referred to as Bring Your Own Device (BYOD), allowed students to use their personally owned devices in their classrooms and utilize the district wireless Internet connection. Students and teachers in the two middle schools and one high school participate in the initiative. The principal and building technology integration specialist work with teachers to integrate technology within the classroom. According to the district's network administrator, in this district with 4400 total students, approximately 53% of them participate in the technology initiative—connecting their personal wireless devices to the district's wireless network.

Adams School District

The Adams School District is in a suburban community outside a major metropolitan area and, based upon the state's school district accountability system, is considered a Level 2 school district. In the spring of 2011, the superintendent, Norman, and members of his technology leadership team used money allocated from the district budget to purchase tablets for all students at the district's single high school. The members of the technology leadership team included the high school principal, the technology director, and instructional technology director. Pseudonyms for the participants on the technology leadership team are described in Table 3. Since the initial implementation in 2011, Adams School District has purchased more devices at the elementary and middle school levels with the goal that all students and teachers will have access to technology devices. Additionally, Paul, the high school principal, has moved into a central office position. Working with the high school principal, the technology director and instructional technology director have incorporated several strategies to provide professional development as well as communicate with the larger community, including a large focus on use of social media.

Jefferson School District

The Jefferson School District is in an exurban community between a major metropolitan city and a large city and, based upon the state's school district accountability system, is considered a Level 2 school district. In the summer of 2012, new superintendent, David, and members of his technology leadership team, purchased iPads for high school students through money allocated through the high school new building project. Discretionary funds that accompanied the building project were allocated for device purchase. The members of the technology leadership team included the high school principal and the assistant high school principal. Since that time a technology director has been hired and contributes to the leadership of this initiative. Pseudonyms for participants on the technology leadership team are described in Table 3. During the final phase of the building project and technology purchase, the assistant principal created what she referred to as “a vanguard technology team” of teachers to plan for the implementation of the initiative within the classrooms.

The Madison School District

The Madison School District is in a rural community comprised of four small towns. Based upon the state’s school district accountability system, it was considered a Level 2 school district during the time of the interviews. Since that time the district was identified as a Level 3 district. Around 2003, Bob, the superintendent, and Brett, the technology director, started an initiative to provide students technology throughout the district. This initiative has included the district using grant money to purchase technology; using money from a new building project, which consolidated four elementary schools; and creating a non-profit organization, which created a lease-to-own device program for parents. The members of the technology leadership team included principals, the technology director, the director for academics as well as the district’s grant writer/public relations director. Since the project’s inception, the district has experienced personnel changes including a change of technology director and the director of academics, who previously served as principal. Additionally, since the beginning of the initiative, Madison has purchased more devices at the elementary and middle school levels with the goal that all students and teachers will have access to technology devices. Pseudonyms for participants on the technology leadership team are described in Table 3.

The Monroe School District

The Monroe School District is in a suburban community outside a major metropolitan area and, based upon the state’s school district accountability system, is considered a Level 2 school district. In summer of 2011, Jackson started as superintendent in Monroe and some planning for the technology initiative had already begun. Jackson's predecessor, the district technology director, high school principal, and instructional technology specialist worked to conceptualize a program to provide all high school students and teachers with laptops. During Jackson's first year as superintendent, the team continued to work on the program and the school committee approved funding for the devices; Jackson worked creatively to fund the initiative through operating funds and build understanding within the town around the initiative. In the fall of 2012, the high school began the laptop initiative. Two years later, members of the technology leadership team continue to work with teachers to provide professional development and integrate technology into classroom instruction. Pseudonyms for the participants on the technology leadership team are described in Table 3.

Table 3

Pseudonyms for Interviewed Members of the Technology Leadership Team

Pseudonym	Position	Descriptor
	Washington School District	
Brody	Superintendent	Primary Leader/Key Framer
Ethan	Former Middle School Principal	Secondary Leader
Grady	Middle School Principal	Secondary Leader
John	Network Manager	Secondary Leader
Rylan	Technology Integration Specialist	Secondary Leader
Ava	Technology Integration Specialist	Secondary Leader
Caitlin	Technology Integration Specialist	Secondary Leader
Grace	Technology Integration Specialist	Secondary Leader
	Adams School District	
Pseudonym	Position	Descriptor
Norman	Superintendent	
Paul	Former High School Principal	Primary Leader/Key Framer
Howard	Director of Technology	Secondary Leader
Jim	Technology Integration Specialist	Secondary Leader
	Jefferson School District	
Pseudonym	Position	Descriptor
David	Superintendent	
Charles	High School Principal	Secondary Leader
Grace	High School Assistant Principal	Primary Leader/Key Framer
	Madison School District	
Pseudonym	Position	Descriptor
Bob	Superintendent	
Teagan	Director of Academics	Secondary Leader
Theresa	Grant Writer	Secondary Leader
Rose	Elementary Principal	Secondary Leader
Brett	Former Technology Director	Primary Leader/Key Framer
	Monroe School District	
Pseudonym	Position	Descriptor
Jackson	Superintendent	
Meagan	Director of Technology	Primary Leader/Key Framer
Tim	Former High School Principal	Secondary Leader

Table 3 describes the members that were interviewed for this study, which was the largest method of data collection. As described in the limitations section, some district members of the technology leadership teams were not interviewed. The next section discusses how our study data was collected.

Data Collection

Interviews and document review were the data sources for our study. The identified superintendents (i.e., one per district) from the selected systems were interviewed first. Those individuals named by the superintendent as members of the district's technology leadership team involved in gaining acceptance of the district's technology initiative were next interviewed, employing a snowball sampling method. While interviews were the primary source of data, a document review was also conducted. If superintendents or team members mentioned documents that were key to the technology initiative or to gaining acceptance for the initiative, they were aggregated, coded and analyzed using the same system as interview data. This section further explains the data collection process.

Interview Sample

In each of the selected school systems, using a snowball sampling procedure, all individuals named by the superintendent as holding leadership roles within each district's technology initiative were interviewed. This type of *snowball sampling* is defined as "a form of purposeful sampling that typically proceeds after a study begins and occurs when the researcher asks participants to recommend other individuals to study" (Creswell, 2011, p. 217). Additionally, this sampling method allowed researchers to describe and understand the leadership team and its implementation dynamic. Table 3 details who was interviewed for this study.

In most cases, these interviews resulted in the team members naming each other as key to the initiative—corroborating the individuals suggested by the superintendent. In all districts, additional people were mentioned in the interviews, but were not interviewed. In four districts (Washington, Adams, Jefferson and Monroe) these individuals were not mentioned by the superintendent, but were identified as important to the initiative by other leadership team members. We inquired about the importance of the person to the implementation to the superintendent who, in each case, verified that the person was not important to the initiative. Since the purpose of our study was to understand the role of superintendents and technology initiatives, the superintendent's assessment and vision of the team and initiative dictated that these individuals were not important to the study. In Madison, the superintendent mentioned one technology team member (new Director of Technology) as he described the 2014 state of the technology initiative; however, the individual came into her position several years after the initiative was in place within the district and was not a part of the initial framing and roll-out of the initiative in any way.

Interview Procedures

The five researchers collaboratively conducted interviews in the following manner. Between June and November of 2013, the research team, working in pairs, conducted one-hour, in-depth interviews as described by Yin (2009), with the five superintendents and those identified by the superintendent as key to implementation of the technology initiative. The interviewing procedure was piloted with three superintendents who work in school districts with 1:1 initiatives in their districts, but were not included in the formal study.

After the pilot work, our team conducted 23 interviews. An interview guide was used for all interviews (see Appendix E for interview guide and questions), which included notes to the interviewer, including: (a) a protocol for superintendents, (b) a separate protocol for non-superintendents, (c) follow-up prompts and probes for both types of interviews, and (d) a format for field notes. To further ensure consistency in interviewing, two interviewers attended and took notes during each interview, relying on Seidman (2006) for guidance in interviewing technique. Interviewers were encouraged to ask follow-up questions when confused or lacking understanding of what was said and were asked to explore and ask for more information about areas brought up by the participant in keeping with interview probes related to the larger study and individual spokes of study.

Interviewers maintained the semi-structured interview protocol predetermined by the group and linked to our theoretical framework and spoke areas. The interview guide itself was arranged and guided by the larger study and the individual spokes. Components of frame theory also guided the organization of the interview questions (See Appendix E for interview protocol and guide), seeking to determine if a relationship existed between the topics of individual spokes and the superintendent's leadership actions relative to the framing of the initiative to gain acceptance in the community.

Documents

Document review of district strategic plans occurred as a way to validate information obtained in the interviews, but were not used to create generalizable theory on their own (Yin, 2009). The document review included district web posts/sites, district goals and/or school plans as well as technology planning documents, technology deployment and funding documents. These documents were chosen based on how and whether the superintendent and leadership team discussed the documents as part of their work to design, prepare, implement and communicate the aims of the technology implementation. District memos, websites, curriculum documents, presentations, and other email or written communication including budget documents were also reviewed to determine leadership actions of the superintendent that may have contributed to acceptance of the technology initiative in the system. A total of twenty documents were mentioned by study participants during interviews and were therefore analyzed. Table 4 describes the documents analyzed for this study.

Table 4

Documents Reviewed by District

Adams	Jefferson	Madison	Monroe	Washington
Central office leaders' blogs (3) School district goals School website Twitter feeds of leadership team members (2)	School iPad program implementation documents School district goals School website	School district goals School district website Non-profit technology purchase and lease organization details	School district goals School district website	School district goals School district website Syllabi for superintendent's technology course Internal newsletters to staff (3)

Data Analysis

Detailed in this section are the specific methods used to analyze the data obtained for this study including how interview data was tracked and organized, and how transcripts were coded. Our thinking was tracked in a variety of methods as we went through a three-step analysis cycle. Miles and Huberman (1994) describe three steps in analyzing data for a multiple-case study approach that were used for this study: (a) early steps in analysis, (b) within-case analysis, and (c) cross-case analysis. Each phase of analysis required the team to code and analyze cases in pairs and then come together for group analysis. Informal research journals, individual analytic memos, and group interim summaries assisted in this process and are all defined in this section as are code definitions and coding procedures. The three phases of analysis served as a starting point for researcher work, beginning during data collection and unifying the researchers through the coding and analysis phase of working with the data.

Tracking and Organizing Researcher Thinking

We used unified methods to track and organize thinking and note taking throughout the study. As noted in the interview guide (Appendix E), we took notes during the interview process as they related to the interview experience itself or to help clarify ideas stemming from the interviews. These notes served as a companion to the oral interviews, focused on further revealing the central phenomena being studied, or illuminated information relative to the individual spokes of inquiry as they arose in the interviews. These notes were the foundation for the manner of tracking and organizing our thinking. This section describes how thinking and note taking was tracked and organized in order to be useful to the analysis process.

Informal research journals. As described by Emerson, Fretz & Shaw (1995), researchers should strive to capture their "daily ruminations" from each aspect of their research in the field. To capture these ruminations or jottings and put them into a meaningful context, researchers wrote musings, insights, descriptions and brief summarizing paragraphs in informal research journals as a means to track thinking and aid in interpretation of data. The use of such journals allowed us to remember impressions and insights when case studies were later analyzed and composed.

Analytic memos. Each team participant kept a record of any memos, reflections or thoughts that emerged at any time during the entire research, data analysis and interpretation process. These memos followed the guidance used in Saldana (2009), which suggests that researchers write about the following: (a) How the researcher personally relates to the participant's phenomenon; (b) the study's research question; (c) code choices and operational definitions; (d) possible networks, links, connections, overlaps, flows among patterns, categories, themes and concepts; (e) emergent theory; and (f) problems within the unfolding study and future directions for the study.

Saldana also advises that the notes themselves can be useful in later coding and theming processes as they can be coded and categorized for further review. Analytic memos "reveal the researcher's thinking process about the codes and categories developed thus far," (Saldana, 2009, p. 157). Additionally, memos, intended for use here, are "somewhat comparable to researcher journal entries or blogs—a place to 'dump your brain' about the participants, phenomenon, or process under investigation by thinking and thus writing and thus thinking even more about them" (Saldana, 2009, p. 32). Analytic memos were used to mesh our work and thinking and to inform the writing of interim summaries intended to move analysis toward agreed upon findings.

Interim summaries. The creation of interim summaries described by Miles & Huberman (1994) took place one-third of the way through analysis. The summaries were shared among our team as well as with our dissertation advisor (see Appendix F for interim summary format). The process of summary writing and sharing was designed to demonstrate missing pieces in the research and to begin to address and identify emerging patterns. Interim summaries were an opportunity for sensemaking within the data throughout the data collection process. Themes from the data were documented in the summaries and both connect and utilize the writings found in the analytic memos written immediately after time in the field. Deeper coding and theming (Saldana, 2009) of the data occurred at this stage and was taken on again in the cross-case analysis. Themes emerged relative to the aims of the larger study and its sub-questions in relation to the researchers' individual spokes of inquiry.

Coding

We employed a collaborative coding process throughout the study (Saldana, 2009). The team practiced the coding and analysis procedure detailed in the next sections using the pilot interview transcript data and then used the exact same process to code the actual interview transcripts. This section demonstrates how study analysis and coding worked together to deepen and sharpen our understanding and serve as an overview of the component parts of coding employed for analysis.

A "code" in a qualitative inquiry is a word or short phrase that "symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldana, 2009, p. 3). In this study, codes were markers for the presence of leadership actions, framing activity, and acceptance of the technology initiative. In the related individual spokes of this research, codes represented our individual research interests and how they related to framing actions by the superintendent, allowing the studies to work together to provide a frame theory analysis of leadership through five lenses. This section details coding procedures for the larger study; individual studies detail tailored coding and analysis procedures (see Methods sections of Chapter 5 submitted by each researcher).

A "start list," or provisional set of codes, is a list of letter codes used to symbolize ideas around which the research team wants to unearth further thinking. The codes used in this study were tested with the pilot interviews and were then revised and refined as the study progressed and ideas and concepts evolved for the research team (Miles & Huberman, 1994). Frame theory components guided the provisional “start list” procedures and served to anchor the study by revealing descriptions of certain leadership actions and ways in which superintendents framed large-scale technology initiatives. Sub codes were added after initial coding had been conducted and analysis of the data had begun. Table 5 (on the next page) indicates how the prognostic, diagnostic and collective action frames were coded relative to leadership actions in a system; sub codes were added one-third through the coding of superintendent transcripts based on discernible patterns from initial coding and were further refined with sub or “child” codes.

We employed a collaborative coding and analysis process using the shared interview transcripts. This coding process required each researcher to take a copy of a single interview transcript and apply agreed-upon provisional codes (Table 5). In a second reading of the transcripts, the researchers then collaboratively developed new codes based on his/her individual transcript with the aims of the larger study in mind. Then, with newly generated codes, we created agreed-upon code definitions in a code dictionary. This process allowed for greater alignment and unity in coding across our research team.

Table 5

Initial Set of Provisional Codes and Revised Sub Codes

	Description	Broad Code	Sub Codes
Core framing tasks	Frame theory constructs describing how movements are initially framed for implementation and communication.	Framing Orientation (FO)	D - Diagnostic Framing P - Prognostic Framing M - Motivational Framing
Resonance	Key component of frame elaboration—reason that a particular initiative or movement begins to resonate with constituencies involved in a social movement.	Resonance (RE)	CL - Connection to Learning IC - Individual Credibility EI - Empirical Credibility NF - Narrative Fidelity
Strategic processes	Key aspect of frame theory describing how movements are elaborated and diffuse through a community/constituency.	Strategic Processes (SP)	PDF - Professional Development (formal) PDI - Professional Development (informal) PM - Political Maneuvering PILOT - Piloting LOG – Logistics Planning PR - Public Relations ES - Equipment Selection RES - Research KP- Key Players USE - Expectations for technology use Staff - Staffing
Constraints		Constraints (CO)	P - Political Constraints S - Staffing F - Financial Constraints C - Cultural Constraints T - Time and/or Competing Interests L - Leadership

Interview data was then collaboratively re-coded with newly refined and agreed upon codes; this process was practiced until a satisfactory degree of "inter-coder agreement or interpretive convergence" was achieved (Saldana, 2009, p. 27). Our team sought 85% convergence as an informal measure of skill and unity before solidifying codes and procedures. After that process, the group created a coding manual with the agreed upon definitions and example quotes for our use in coding all subsequent data. The dictionary was updated, as necessary, throughout the study and analysis process. See individual spoke methodologies for where individual researcher practice picks up from the coding and analysis of the data sets described here.

In the *early steps in analysis* phase we examined the interview data while the interview occurred, and, thereafter, applied our provisional start-list codes (Table 5). After the first reading/analysis, new codes (initial coding) pertaining to the framing actions of the superintendent with his leadership team emerged and required integration, reorganization and creation of sub or "child" codes within our starting codes (also detailed in Table 5).

Throughout the analysis phase, the processes of both coding and analysis were fluid, iterative, and recursive. Therefore, analysis occurred simultaneously with coding procedures and informed next steps in processing the study's collected data. Researchers revisited the data to write, rewrite and rethink findings as the data and codes allowed for new insights. Specific procedures to guide this process for both coding and analysis are defined below.

As noted in previous descriptions of frame theory, it was theorized that frame theory would assist in analysis in this study of superintendents and how they gain acceptance for large-scale technology initiatives. Frame theory served as a lens to view and describe the manner in which superintendents and their leadership teams worked to identify problems in a system, propose and develop solutions to those problems, and move others to collective action to solve them. In the case of this study, it also included use of different leadership actions to frame how technology was used in the district to both solve problems and mobilize communities to support learning in new ways.

The new codes, once applied, allowed our team to detect patterns within and across cases. Identifying patterns emergent from the codes was used to: (a) search for explanations and causes in the data, (b) examine social networks and patterns of human relationships, (c) form theoretical constructs and processes, and (d) unearth development of major themes from the collected data (Miles & Huberman, 1994, p. 69). Determining the code patterns helped to organize the larger body of data. The pattern of codes then became a "stimulus to develop a statement that describes a major theme, a pattern of actions, a network of interrelationships, or a theoretical construct from the data" (Saldana, 2009, p. 154). Categories emerged for analysis and probing/connecting to other ideas. Once larger study patterns were identified, the group conducted a data meeting and crafted a second interim summary, again, theming the data based on new ideas and patterns. Thereafter, our team worked individually to code for constructs for individual spokes of research using codes specific to researcher interest areas (see Chapter 5 for how individual research extends the larger study). Each researcher then conducted within- and cross- case analysis relative to his/her individual research spokes.

Developing and Analyzing Cases

This study employs early analysis, within-case analysis, and cross-case analysis of collaboratively and individually coded data. From the collaboratively coded data, themes emerged that allowed for the description of leadership that helped to gain acceptance for large-scale technology implementation in school districts. Theming of the data first occurred for the study as a whole and also included researchers moving to individualized areas of research. As detailed earlier, themes were developed and refined throughout the coding process**.** Provisional codes were reviewed and reworked as patterns emerged from the transcripts. Researchers identified broad emerging categories of ideas from the early coding and created more detailed and descriptive codes. The team then developed phrases that captured the leadership actions of the superintendent and his team. Saldana calls this "process coding" and indicates that this type of coding demands a sifting of the data and codes to date to create phrases (Saldana, 2009, p. 77). This process allowed researchers to describe the central phenomena and answer the research questions relative to the theoretical framework (Saldana). Examples of such phrases included "engaging in strategic processes," and "contended with constraints." These phrases eventually emerged as shortened descriptors of key findings from the study.

As code patterns within and across cases began to emerge from the transcripts, researchers recognized the need to create more detailed and descriptive codes to describe these broad pattern areas. For example, the area of "strategic processes" was repeatedly coded and it became clear that the strategic processes code area could be broken down into many sub code areas such as "professional development," "equipment selection," "key players," and "piloting."

It was theorized that within all phases of coding, a potential link between superintendent actions and frame theory might exist. In seeking to match superintendent actions with core frames, we identified what frame theorists call *degree of resonance* (Snow et al., 1986; Benford & Snow, 2000) within the technology initiative. Several common actions taken by superintendents to frame the initiative emerged from this study; these actions are described as findings in Chapter 4. However, some actions created more resonance within the initiative. During within-case analysis, coding was examined, even in the earliest stages, to reveal that the frequency of codes indicated which superintendent leadership areas/activities were most frequently employed or were identified as important by interviewees. Certain codes were identified that matched more frequently to prognostic and/or collective action framing that also brought the greatest amount of "resonance" to interviewees' understanding of the technology initiative. For example, Norman, the Adams superintendent, crafted a prognostic frame that likened 1:1 technology implementation to use of electricity or other utilities in the district. All interviewees in his district described Norman's way of framing the initiative as a moment where the technology initiative gained momentum or where they gained understanding of the importance, logic, and power of the movement. Resonance moments like this one and others were coded for (a) the superintendent's action, i.e. "strategic process"; (b) how the superintendent framed them, i.e. "technology is the next utility"; and (c) whether and how participants described the action and framing as "resonating" or building understanding and movement around the initiative. We examined all places of overlap between framing and resonance. The team was able to identify that the more frequent the overlapping coding, the more present the leadership action relative to solving problems or moving to collective action.

These areas of intensity provided greater resonance and yielded insight into the key actions that allow superintendents to gain acceptance for large-scale technology initiatives. Examining patterns of coding and frequency of coding allowed for the development of case analyses. Individual research procedures for analysis are detailed in Chapter 5; the workflow of coding and analysis for both the larger study and individual studies is detailed in Figure 2. This section further explains within-case and cross-case analysis procedures.

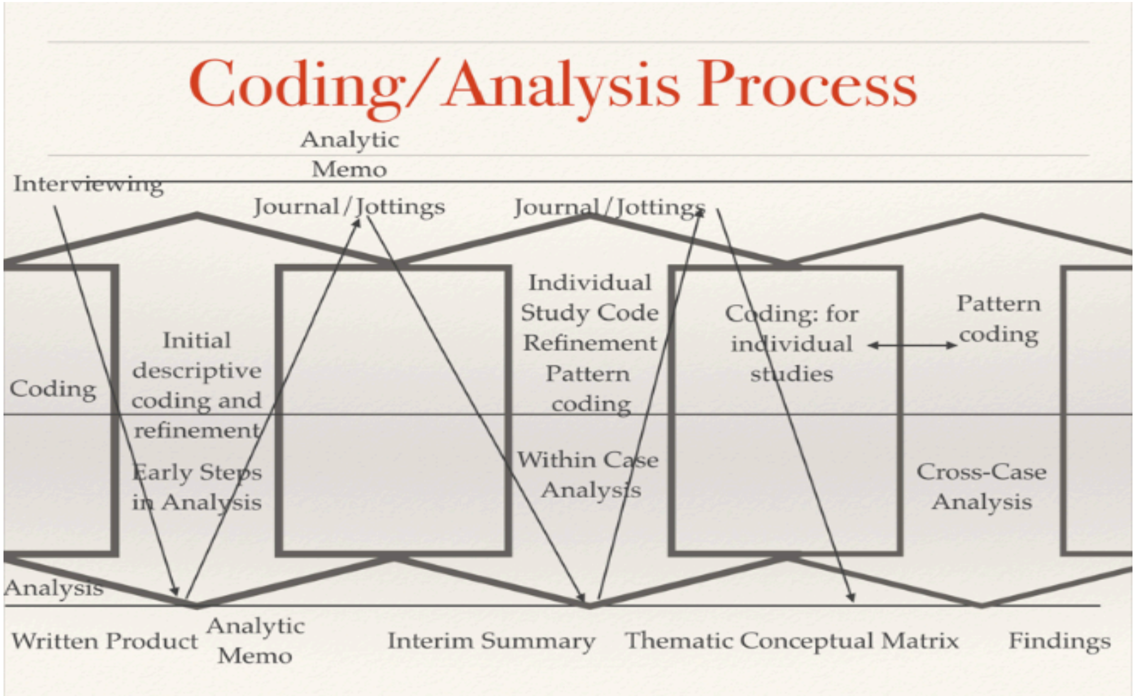

Figure 2. Researcher Team Coding and Analysis Process. Adapted from "Qualitative Data Analysis: An Expanded Sourcebook," by M. B. Miles and A. M. Huberman, 1994, Sage Publications, Inc.

Within-Case Analysis

The next step of this process was *within-case analysis*. The purpose of this level of analysis was to allow us to explore, explain and predict areas of interest within each case. By analyzing each case and its coding structure individually, we studied the unique aspects of interaction between superintendents, their leadership team and their districts. With this analysis we were able to make connections between their patterns of interaction and the framing of the district's technology program as evidenced by the emergent coding patterns in the transcripts and documentation. For example, in the Washington system, all interviewees mentioned the teaching with technology graduate course taught by Superintendent Brody as key to advancing the initiative in the system. This pattern of discussion created a topic around which coding was then more closely examined. Evidence of how acceptance was achieved relative to the superintendent's framing actions, could, therefore, be described within each case as a result of tracking these descriptions across participant transcripts within each district.

Cross-Case Analysis

Cross-case analysis allowed the researcher team to explore and describe connections across the cases and coding patterns linking all of the transcripts/school sites. Through this analysis, we were able to make generalizations across five cases about how the interactions between superintendents and their leadership teams influenced the acceptance of large-scale technology initiatives in a manner that was more generalizable for practitioners. For example, as noted in the prior example about the Washington district and the superintendent teaching a course identified as key to moving the initiative forward, this same professional development trend was noted in three other study districts. The possible resonance of this superintendent action was noted after the strong impact this action had within the Washington district, but then was further identified in other districts—picking up the pattern first revealed in Washington. Informal research journals, interim summaries, and the researchers' analytic memos generated throughout the early and within-case analysis/coding process, proved helpful in conducting and tracking this kind of analysis, especially when using five researchers in the process. From this analysis, theory emerged from the larger study and areas for further exploration in the individual spokes of study were identified.

Thematic Conceptual Matrix and Graphic Illustration of Findings

A thematic conceptual matrix described by Eisenhardt (1989) and Miles & Huberman (1994) is a visual display used in a research study to help link together items that logically go together and is recommended when a series of research questions are attached to a study. Given the varied spokes of inquiry linking to the overarching research study question related to acceptance, we sought to create a thematic conceptual matrix to map findings and give them "conceptual coherence," both within-case and across cases (Miles & Huberman, p. 126-132). Within our multiple-case study, conceptual ideas emerged and researchers had to learn how those ideas connected and would constitute a useful addition to this area of research and practice. The core framing tasks of prognostic, diagnostic and motivational framing were contrasted and mapped relative to strategic processes and constraints that emerged within districts. These ideas were mapped and organized several times throughout the coding and analysis process relative to the leadership actions taken by superintendents during the technology initiative; therein, trends within each case were described and organized. This matrix also allowed for analysis and organization under the areas of frame theory within individual spokes of inquiry across the five cases in a similar fashion. The matrix was then used to create a graphic representation of the research findings to aid in conceptual understanding of research findings (Figure 3). The thematic matrices acted in concert with the memos, journals, and interim summaries to build coherent theory and ensure a core unity of understanding among the researchers.

Limitations/Delimitations and Validity/Reliability of Research

This chapter discussed the methods that were conducted for the larger study as well as for the individual spokes. Limitations, validity and reliability of the methods were considered throughout the process. This final section of methods discussion relies on the advice of Miles & Huberman (1994) relative to the validity and reliability of methods that advises researchers to check for representativeness of the data relative to the phenomena by “checking for researcher effects…triangulating across data sources, and deciding which kinds of data are most trustable” (p. 263). This section describes procedures employed to increase validity and reliability of the study and will discuss the limitation and delimitations.

Limitations and Delimitations

This study was limited to Level 1 and 2 school systems, as described by the state’s system of leveling of school district performance. This study delimited the inclusion of urban/large systems or Level 3 or 4 status systems, due to potential complicating factors that these systems bring (and possible restructuring/turnaround mandates imposed on them). However, Level 1 and 2 school systems comprise 77% of all of the state’s school systems and the descriptions recorded here should remain applicable to a wide variety of school systems within the state and country. The primary data set was obtained through interviews and is therefore limited; all information was self-reported and reliant upon participants’ memories of the initiative’s start years earlier. Nonetheless, participants relayed common narratives of the implementation and leadership actions of the superintendent.

The study sample may be limited as we purposefully chose only to study successful implementations of large-scale technology initiatives, limiting the generalizability of our results. Finally, the snowball sampling procedure was potentially biased and limited in that some of the key players named as central to the implementation were not always corroborated by other members of the leadership team or the superintendent. Allowing the superintendent to name additional interviewees per the snowball sample methodology meant that those involved may have been more loyal and supportive of the initiative and superintendent, and therefore, resonance and acceptance may have been overly heightened or described in ways that do not reflect reality across districts. The sample may be, therefore, skewed toward certain circles of individuals in the district. Such a sampling procedure may have limited the data collection's breadth and failed to identify variability or voices of criticism and dissention that may exist within the initiative and district; however, these limitations did not hamper the descriptions of how superintendent actions and work with identified leadership teams occurred.

Validity

This section explains how we worked to ensure internal and external validity in this study. To address potential threats to internal validity, we resisted making premature or incomplete inferences related to naming findings during analysis. For example, throughout the research process, we resisted a tendency to seek to name findings for the larger study that confirmed the hypotheses of our individual studies. Collaborative analysis of data and constant questioning of assumptions in team meetings allowed us to resist the urge to simply identify spoke-related findings; instead, we had to be open to a wider range of findings relative to framing that may or may not have linked to our individual studies. To test the explanations of the findings in the study, we adhered to strategies such as "ruling out spurious relations, checking out rival explanations and replicating findings" (Miles & Huberman, 1994, p. 263). Case analysis meetings among the research team also allowed us to craft both interim summaries and a thematic conceptual map. In conducting such meetings and creating these products, we (a) tested the strength of ideas, (b) reduced the likelihood of jumping too quickly to create causal relationships and (c) reduced the likelihood of jumping to illogical or weak connections within and across the data by seeking rival explanations for seemingly causal relationships. Additionally, using the multiple-case study data, we found patterns in cross-case display and tracked those patterns carefully through all of the cases to see if the patterns were repeated, thus increasing validity through data corroboration (p. 273). In each of the study interviews, patterns that emerged in earlier interviews were verified through new interview, coding and analysis procedures, tracked in analytic memos, and discussed and examined by our research group.

The interviews, as well as coding and analysis practices conducted in pairs, helped to address the above noted internal validity threats or biases inherent in one researcher's ideas or another's interpretive slant. After each interview, we created individual analytic memos; we wrote these memos as we left the field, later comparing them with the memos of our research teammates, which allowed for the drafting of collaborative interim summaries (Miles & Huberman, 1994). Partner perspectives on interview data and their meaning helped to avoid common research pitfalls such as generalizing from non-representative events and drawing inferences from non-representative processes (p. 264). Further, this strategy, as well as working to avoid generalizing by using outlier cases and seeking contrasting cases within the study sample, (districts with variance in technology initiative or in district features within our selection parameters) worked to strengthen the trustworthiness of the study. Multiple-case study analysis was used to address threats to the external validity of this study (Merriam, 2009) using the strength of five cases instead of telling the story of only one technology implementation.

Due to the study's relatively small sample size, we are limited by how much we can generalize from this study. Nevertheless, within this limitation, specific actions were taken to ensure external validity. According to Merriam (2009) external validity relates to how the findings of a study can transfer to other situations. In other words, external validity equates to a study's potential for generalizability. One way to achieve external validity through case study research is through *rich, thick description*, which is a strategy that uses "description of the setting and participants of the study, as well as a detailed description of the findings with adequate evidence presented in the form of quotes from participant interviews, field notes, and documents" (Merriam, p. 227). This study's description of districts and use of quotes and evidence in the findings section served to strengthen validity. A final strategy used to achieve generalizability was the use of *Maximum Variation,* which was used to carefully select districts to ensure a range between the studies. To ensure maximum variation we studied five districts with distinct characteristics in terms of: (a) device use (tablet, laptop, and mix); (b) initiative (BYOD, 1:1 and hybrid); and (c) demographics (rural, suburban and exurban).

This format of research strengthens the validity and applicability of our findings across varied settings to be more widely useful to educational leaders of all types and all school system demographics. Additionally, among the multiple-cases being studied, outlier, surprise, and negative case evidence was carefully scrutinized for effects on pattern and logic making within the findings, further strengthening the validity of the data.

Reliability

Reliability is achieved when the steps of a study are clearly delineated and can be repeated with the same results and when the data emergent from the study "can be buttressed from several independent sources" (Miles & Huberman, 1994, p. 273). To create such buttressing of the data, five researchers executed this study—gathering data and conducting analysis in collaborative pairs and groups. We employed one unified set of overarching research methods to conduct the study; methods and steps of the research process varied only in the coding and analysis phase of our individual spokes of research in the final phases of analysis. Nonetheless, the steps for executing the larger study and the steps for our individual studies were clear, specific, and followed the same format of execution. A strong evidence and analysis chain of development was kept in the form of our researcher memos, team and individual interim summaries, and the conceptual matrix in order to document study processes as detailed in the within and cross-cases analyses sections of this chapter.

As also noted in Yin (2009), "the most important advantage presented by using multiple sources of evidence is the development of *converging lines of inquiry*, a process of triangulation and corroboration " (p. 115). Yin goes on to discuss the following four types of triangulation in doing evaluations, as noted in the work of Patton (2002): "(1) of data sources (*data triangulation*), (2) among different evaluators (*investigator triangulation*), (3) of perspectives to the same data set (*theory triangulation*), and (4) of methods (*methodological triangulation*)" (Yin, 2009, p. 116).

As a five-person research/evaluation team, we used collaborative interviewing and coding to strengthen examination of interview transcripts and documentation from the school district to employ data triangulation. These collaborative actions combined with study design sought to address recommendations by Yin (2009). Collaborative interviewing, coding and analysis sought to provide investigator triangulation. Finally, unified methodology for the overarching study combined with coordinated individual research coding and analysis actions sought to meet expectations for methodological triangulation.

Researcher Bias and Assumptions

Bias and assumptions may exist within this research study in the following ways. We made assumptions that participants were honest and forthright, and the events of technology implementation are as they describe them. Our doctoral student research team is comprised of central office and building-level administrators with professional experience in implementing technology initiatives. A place of potential researcher bias relates to our professional roles as instructional and technology leaders in our own school systems. In some way or another, each of us has led, participated in, or extensively researched the implementation of technology in his/her own respective school systems, and, as such, has had to justify its value in an advocacy stance. Thus, inherent and strong biases based on our roles and experiences relative to technology integration were minimized through collaboration among the research group and interaction with our dissertation committee.

As researchers who work within the fields of educational leadership and technology implementation, the team recognizes that these biases must be minimized in order for the study to be meaningful to educational leaders. As a group of researchers, even with attempts to unify this work and thinking through the use of interview protocols, scripts, provisional coding, collaborative coding and analysis, as well as the iterative process of shared analytic memo and interim-summary writing, this work will never be free from flaws. In addition, Merriam (2009) indicates that it is often thought that a case study is inherently more biased than other types of research because cases are selected based on researchers' prior notions. We acknowledge that such bias may exist in case selections, although the overall study design seeks to reduce the impact. In employing this process, we uphold the second and third recommendations for triangulation as described by Yin (2009).

Additionally, we could be biased in two additional areas in this research: (a) by way of an over reliance on frame theory as a theoretical lens and (b) by not entertaining the potential that superintendents do not play a significant role in implementation of technology initiatives in the district. To address these potential biases, data was coded in a manner that allowed for the potential that frame theory might not be an accurate lens through which to analyze the actions of some school systems. Additionally, the multiple-case study approach was employed to limit these biases and allow for multiple leadership dynamics to exist within the study rather than just focusing on one superintendent and leadership team/technology implementation.

Chapter 4

Findings[5]

The overarching study sought to answer the question, "What do superintendents do to gain acceptance for large-scale technology initiatives." In order to do so, 23 central office and school administrators in five school districts were interviewed for this study. Although superintendents were the main source of data, they also identified technology leadership team members involved in the initiative who were interviewed as well. A review of pertinent documents was also conducted. The technology leadership team members identified by the superintendents held positions such as: principal, assistant principal, technology director, network director, technology integration specialist, and director of academics. As indicated in Table 2 of Chapter 3, the districts had the following types of technology initiatives: (a) BYOD in the Washington School District, (b) district-provided 1:1 iPads in the Adams School District, (c) district-provided 1:1 iPads in the Jefferson School District, (d) blended design in the Madison School District that included a district sponsored lease-to-own, and (e) district-provided 1:1 laptops in the Monroe School District.

In addition to the five thematic studies addressed by the research team, frame theory was applied to the interview data as an aid in exploring how superintendents gain acceptance for these technology initiatives. It was found that a number of the superintendents' actions were consistent with aspects of frame theory and led to three central findings: (a) superintendents achieved resonance through leadership actions that

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[5] This chapter was jointly written by the authors listed and reflects the team approach of this project: Erik P. Arnold & Anna P. Nolin with Peter D. Cohen, Gina E. Flanagan, Henry J. Turner

were consistent with prognostic and motivational framing, (b) superintendents considered constraints the initiative might face, and (c) superintendents developed strategic processes to gain acceptance for the initiative. The next section discusses the three findings in detail and the findings are presented in keeping with Bem (2003) in terms of most general to most specific in nature.

Achieving Resonance

We found that superintendents achieved resonance through leadership actions that were consistent with prognostic and motivational framing, but not diagnostic framing. Frame theory identifies resonance as a component of framing acceptance relative to social movements (Benford & Snow, 2000). Superintendents hope that everyone understands that initiatives they promote are important for the district. The degree to which superintendents are able to motivate action or change opinions to support the initiative is what frame theorists refer to as resonance (Park, Daly, & Guerra, 2012). The methodology we used to identify points of resonance is described in Chapter 3. As discussed in Chapter 2, Benford and Snow (2000) have identified three core framing tasks in frame theory: diagnostic, prognostic, and motivational framing. Achieving resonance would indicate that the diagnostic, prognostic and motivational framing actions by the superintendents were effective (Benford & Snow, 2000). Analysis of transcript and document data revealed that the superintendents in this study created resonance through their prognostic and motivational framing of the large-scale technology initiative, but only the actions of one superintendent were consistent with diagnostic framing. Each of these framing processes are described below.

Prognostic Framing

Prognostic framing, described in more detail in Chapter 2, works to create a solution to a problem through goals and a structured plan (Coburn, 2006). Accordingly, we analyzed data to uncover the goals of superintendents around large-scale technology initiatives such as: 1:1, BYOD, and Blended initiatives.

Consistent with prognostic framing, we found that all superintendents had goals for what they hoped the technology initiative would achieve.[6] One goal that was common to each district was to provide greater access to mobile technologies. Examples from the Adams and Washington school districts are representative of this goal. In addition to data from interviews, documentation from Adams states, "Students will have a mobile device to use throughout the school day and at home, [and this will] allow for the extension of learning beyond the classroom walls." The Washington superintendent, Brody, saw the BYOD initiative as providing students and teachers that "just-in-time access to devices," so teachers no longer had to worry if the computer lab was available or not.

All superintendents believed that if this ubiquitous access to technology was achieved, teaching and learning would improve in the district. Bob, the superintendent from Jefferson, indicated, "a big focus...was on student engagement and higher-order thinking skills, and making that switch from teacher-directed instruction to more student-directed learning**"** He argued that "going 1:1 was really about getting ahead of the curve" and he wanted to make sure that "every student has access consistently to very rich

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[6] For this study, the following terms will be defined as: (a) *all* – the characteristic was present in each district, (b) *nearly all* – the characteristic was present in at least three of the five districts, (c) *do not consider* or *not present* – the characteristic was identified in no more than one district.

dynamic materials and curriculum." Greater access to learning, regardless of whether the students were in school, at home, or anywhere else that had free Wi-Fi access, was a common goal of the large-scale technology initiatives; this is frequently referred to as "learning without walls". While the actions of superintendents surrounding the technology initiative to develop goals, and a plan for achieving those goals was consistent with prognostic framing, motivational framing was employed by superintendents in order to communicate support for the goals and plans of the large-scale technology initiative.

Motivational Framing

Motivational framing is how "the rationale for action is articulated" (Park, et al., 2012, p. 4). We found that communication from the superintendent to his leadership team, the faculty, parents, students, elected officials, and the public was important in building support for the initiative.

In general, superintendents and technology leadership team members built support for the initiative by communicating their goals at parent informational meetings, school committee meetings, town finance committee meetings, faculty meetings, and by meeting with the students. School district websites and blogs were also used to share the plan and their goals, such as making technology ubiquitous in order to increase student engagement and personalizing the learning experience.

This kind of motivational framing was evidenced in several ways. For example, when Brody communicated with stakeholders, he indicated that he wanted "the students to have the ownership of the learning, so that it's more meaningful to them." Jackson, the Monroe superintendent, communicated that he did not want computers to simply substitute for pencil and paper. When he viewed the classroom use of technology he wanted to know: "Is this really engaging kids more? Is this really pushing them so they're doing more higher order thinking around it?" The cost of the large-scale technology initiatives brought more scrutiny from stakeholders in the community. Superintendents and technology leadership team members worked to reframe the argument. A good example of this was when Norman, the superintendent from Adams, wanted to get stakeholders to stop thinking of technology for education as a luxury, but rather as an expense that is as necessary as textbooks or electricity:

> We basically turned the conversation around and said "technology infrastructure is our fourth utility." I went through the whole spiel about textbooks and electricity. We pay $1 million a year in electricity and no one bats an eye. Not the cost of it, no one at a town meeting cares, it's just expected that we'll have electricity in our buildings.

Norman also made the case that having 1:1 iPads was not a new idea: "We had 1:1 for fifty years…our 1:1 was previously textbooks." The ability to make an effective argument for the large-scale technology initiative was important for the superintendent's motivational framing activity. Brett from Madison discussed how he used a similar analogy when discussing the initiative with stakeholders:

> [If I said] "take me to your pencil lab." "Pencil lab? What's a pencil lab? It's ridiculous." Well, we look at technology the same way. You don't always need the pencil and you don't always need the laptop, but when it's there situationally, you need it.

Communicating goals and arguments such as these, in the multiple forums that were used by superintendents and their team, were leadership actions that were consistent with motivational framing (See Figure 3).

Diagnostic Framing

As described in Chapter 2, diagnostic framing focuses on the identification of a problem and assigning blame connected to some injustice (Benford & Snow, 2000). Therefore, we analyzed the data to discover any superintendent actions that were consistent with diagnostic framing.

We found that Bob, the Madison superintendent, was the only superintendent that considered diagnostic framing in his attempt to gain acceptance for the large-scale technology initiative. Bob described the lower socioeconomic status of families in his district as a motivator for their large-scale technology initiative. Bob’s students lacked internet-connected computers and he saw their initiative as being able to close this digital divide. The other four superintendents did not connect their large-scale technology initiatives to any injustice or see the need to assign any blame to justify the initiative.

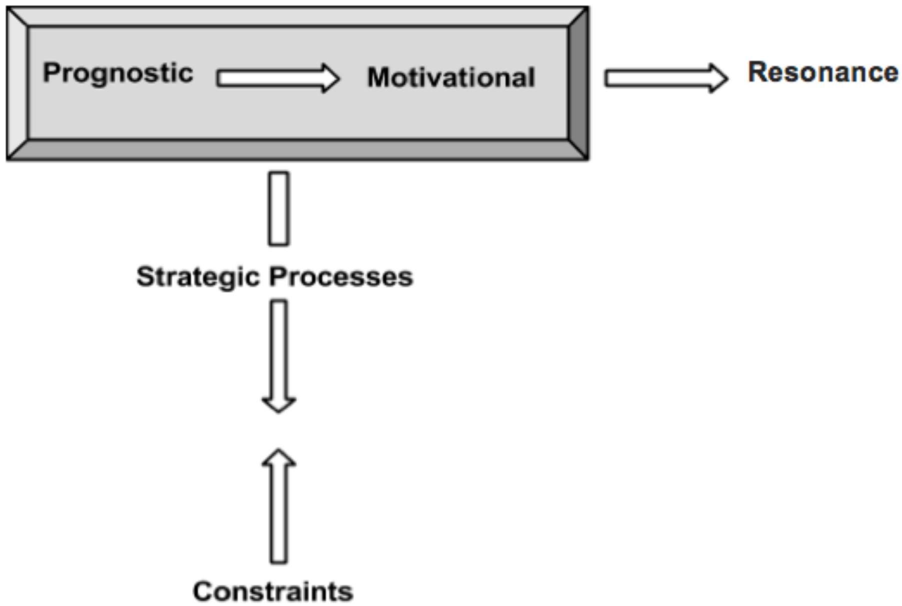

Figure 3. Strategic processes are a function of prognostic and motivational framing and they work to counter constraints. If successful, this leads to resonance. Adapted from, "Framing Processes and Social Movements: An Overview and Assessment," by R. D. Benford and D. A. Snow, 2000, *Annual Review of Sociology*, 611-639.

Superintendents Considered Constraints

When the superintendents planned for implementation of the large-scale technology initiative, nearly all assessed their educational community and considered constraints that might hinder acceptance of the initiative. Consistent with prognostic framing, all superintendents developed solutions to problems via goals and a structured plan for achieving those goals (Bedford & Snow, 2000). The problems were not static, however, and the superintendent's structured plan was constantly contested and influenced by various constraints. These constraints were often of a financial or political nature. An important early action taken by superintendents was the manner in which they responded to constraints surrounding the large-scale technology initiative. We found that superintendents considered the following constraints: (a) financial, (b) political, (c) competing interests, and (d) technology support staffing.

Financial Constraint

Financial constraints were considered most often (by all superintendents and nearly all technology leadership team members) in planning their initiatives. When districts are proposing large-scale technology initiatives there is usually a correspondingly large price tag that goes with it. A financial constraint may mean that the best decisions regarding the technology initiative might not be possible. If the cost of a 1:1 initiative is determined to be too large, districts will look for other options, such as BYOD. Accordingly, we analyzed data to see what financial constraints superintendents faced and how those constraints may have influenced their decision-making regarding the initiative.

As an example, the Washington School District looked at what a district-provided 1:1 initiative would cost and decided to pursue a BYOD initiative because of their financial constraint. As Brody noted, “We made the conscious choice that there was no way we could do a 1:1 from a financial standpoint, it wasn’t a sustainable solution.” Other technology leadership team members echoed the sentiments of the superintendent. Georgia, a technology integration specialist, stated, “We made it perfectly clear why we’re doing this, number one being financial.” Even though implementing a BYOD program is less costly than a district-provided 1:1 initiative, there are still costs associated with building a robust wireless network that can handle all of the devices. John, the network manager, described the financial constraints they faced building the network: “Because the wireless was so expensive, we literally took four to five years to get that to where we wanted it at all the schools." Districts that decide to provide devices to all students face expenses far beyond the cost of building a wireless network.

How much a particular technology device costs is a decision that affects a district's 1:1 budget. The two districts that decided to purchase iPads for their students did so partially due to financial constraints. David, the superintendent of Jefferson indicated: "We looked at laptops…that was very tempting, but financially we couldn't afford that so we never really got beyond that point to be honest." Jim from Adams described their thinking this way:

> Would we have done a different device if we could have spent a lot more money? It's possible. We always talked about a MacBook-type laptop for all students, but that would have been a lot more expensive. Could we have said, "Maybe we'll do that?" Maybe, if we had more money, but ultimately, we wanted the iPad device.

These districts were referring to the cost of Apple laptop computers, which began at $999 (all prices in 2013 dollars), because there were PC based laptops that were comparable to the cost of an iPad ($499). Chromebooks were a more recent laptop product that were even less than the cost of an iPad, but for reasons that will be discussed later these districts had decided they were going to purchase an Apple product. The superintendent from Madison, Bob, described their ability to keep adding new technology and the decision to go with Apple products this way:

> You can buy two iPads for the price of a MacBook Pro. We have [also] looked at the total cost of ownership, because you can buy a Dell [laptop] for around $400 compared to $1200 or $1000 for a MacBook Pro, but by the time we add the

software, the infrastructure, the support, and the rest, I think they're not that far off.

As Bob stated, other costs were considered in addition to the cost of the device. The costs varied by district but included the following: mobile device management software, protective cases, software and apps, extended warranties, and insurance. Some of these costs were passed on to the students. For example, Adams, Jefferson, and Monroe school districts provided devices to students, but informed them that if they wanted to insure the device it would be at their own expense.

Jackson, the Monroe superintendent, had a large financial constraint removed when the town financial committee decided to increase the school operating budget in order to pay for technology purchases. The Monroe district was able to purchase Apple MacBook Air computers for all high school students. Previously, the school district would make capital spending requests of the financial committee for technology infrastructure. Jackson stated that when this change was made,

> There was this influx of funds, that we could all at once put towards a lease, which in a different year might have gone towards actually paying for [network] infrastructure. [This] is mostly what the capital money was for, but we were in good shape in that regard. We didn't need to do that…we were able to apply [the money] to this lease. Once it's in your operating budget it's there, where you don't have to ask for it every year. So that stabilized us enough to have [the funds] to pay for the lease of the computers.

Making cuts to other areas of the school budget was another way to overcome financial constraints. In the Adams School District the community placed great value on not having fees that parents would have to pay related to school. Jim indicated the importance of this financial constraint:

> The biggest thing that was considered is that we're a district that doesn't have fees. So we knew right away that we were not going to fund our technology initiative with a technology fee. That was kind of off the table from the very beginning, which made it more of a challenge for us right from the very beginning --we knew that we had to fund this thing entirely.

In order to partially fund their iPad initiative, the Adams School District reallocated money that was budgeted for new textbooks, decided not to fund a new foreign language lab, cut the positions of one teacher aide and a permanent sub, and reallocated funds that were earmarked for printing costs. Paul, the former high school principal, justified the cutting of the foreign language lab by claiming that due to the 1:1 iPad initiative, "we're going to have a language lab in every classroom." When a district faces financial constraints that no amount of cutting or reallocating of funds would allow for a district-provided device 1:1 model to take place, one option is to have the parents pay for the device.

The Madison School District came to this conclusion and developed a blended model to get their students access to more technology. Madison decided to overcome their financial constraints by creating a non-profit company that was managed by the superintendent and some of his staff. They developed a lease-to-own model where the non-profit purchased MacBooks and iPads from Apple and then leased them to parents who make monthly payments on the device until it is paid off. Bob estimated that roughly 30-40% of students in grades 7-12 were participating in the lease program.

Students that received free or reduced lunch were able to pay a reduced cost for the lease. Madison supplied carts of iPads and MacBooks in the schools for students that did not participate in the lease program. The district also permitted students to bring their own device in and use the school network. This blended model was not a true 1:1, but as Brett described it:

> We were very entrepreneurial. I would say that differentiated us from a lot of the other programs that I still see today. We did not have much money and so we always had to be entrepreneurial, especially when you have parents investing in your program, you have to be providing value.

Every superintendent faced financial constraints of varying degrees and they made decisions based on those constraints. In addition to financial constraints, nearly all districts faced political constraints that the superintendent had to consider.

Political Constraint

When implementing large-scale technology initiatives support may need to be gained from multiple stakeholders. These stakeholders could include school committee, town financial committee, parents, teachers, and the community. For this study, the lack of support (perceived or actual) from any stakeholder was defined as a political constraint. Nearly all school districts in this study described political constraints surrounding their large-scale technology initiative.

The Jefferson district was in the midst of building a new high school. The town had already approved a tax increase to finance the new building project and technology leadership team members did not feel they could ask the community to pay any additional money for the 1:1 iPad initiative they were considering. Grace, the former high school assistant principal, described the perceived political constraint this way:

> The biggest thing was whether or not we could pull it off within the building funds, because politically there was no way we could've done it otherwise. If we had to go to parent funding, that would have never flied in this town with all the money people were putting towards a new building.

David, the superintendent, agreed with this sentiment when he was asked if he ever considered asking parents to contribute money to help pay for the iPads:

> It was definitely talked about…[but] Jefferson has historically prided itself on not having fees. We do not have an activity or athletic fee. The only fee we have is a bus fee and a parking fee, that's it, and even those don't go over too well. Politically, that would have been a tough one. I couldn't have done it.

The concern over the high cost associated with large-scale technology initiatives was pervasive among the five districts, but districts also faced other types of political constraints.

The Monroe School District faced a greater challenge convincing parents and the community of the merit of the 1:1 laptop initiative than it did funding it. Tim, the former high school principal, described the political constraint the initiative initially faced from teachers:

> We needed teacher buy-in first and foremost, and that was successfully achieved by it being a teacher-lead initiative; by going to other schools [to check out their 1:1 programs], getting a feel and talking to other teachers about what impact it has

> on their instruction, but there were some who thought, "I'm teaching Math, I don't really need this..." [so] there was that element there.

The Madison School District also faced a political constraint from some of their teachers. As Brett recounted: "We tried to start with the high school teachers. We pitched the idea to them and they said, 'No way. Ain't going to happen'." Due to this opposition from the high school teachers, Madison decided to implement their technology initiative in grades five and six, where the teachers were more open to the initiative.

Overcoming a political constraint from the community was another challenge in the Monroe School District. According to Tim,

> With the lease program, it's something like $230k per year. The community had to be convinced this was a good thing for our school and a good thing for the community as a whole. That was tough in some ways, and not so tough in others. There are people who would say: "This is a 'well to do' community. The median cost of a home is around $600 thousand…why are we using school funds to buy computers for kids when people can buy them on their own?" There were other families who frankly had been shielding their kids from technology. "My kid doesn't have a phone, we have one computer in the house and it's in the kitchen so we can monitor it. You're going to give them this tool and now my parenting is going to be a lot harder." They needed to be convinced. [At the same time] it was easier because there were a lot of technology folks in town, so at these community meetings those parents would pipe up and say "This is the direction of the future, we need to get our kids ready, this is what college- and career-ready is." There was a nice balance, but the community needed to be convinced.

The Adams School District faced a similar political constraint from their community and school committee. Howard stated:

> "We had numerous fights from town meeting members and so forth, thinking it was a waste of money. The more and more education that we provided to them, the more and more buy-in we got. The first year was a little bit rough to get that approval. After that we've done numerous presentations with students and teachers, for school committee, for Ways and Mean Committee, town meeting members. We've invited all of those committees and regular town residents to visit our schools…and let them do walk-throughs of our buildings to actually see the devices in action.

In addition to financial and political constraints, superintendents that implemented large-scale technology initiatives also considered time and competing interest constraints.

Competing Interests Constraint

At the same time that the districts were trying to implement their large-scale technology initiative, the attention of teachers and administrators needed to be spent on other initiatives. These competing interests were locally, as well as state, driven. Nearly all superintendents considered time and competing interest constraints and technology leadership team members in all of the districts identified them as well. As Tim, the former principal from Monroe High School, indicated, competing interests can impact the implementation of a large-scale technology initiative:

> If I were to give advice to any other school around initiating a 1:1 project, I would make sure that's the only thing you're doing that year. Not only did we start 1:1, we also started an advisory program. This was the intersection of things we were

> talking about and planning for a long time and they just happened to come together in the same year. Then we had the introduction of the new evaluation system that we had to train on last year. So you had three really big things happening. Then we [also] had looming a [regional accrediting association] visit. So there was a lot going on and I think that had a little bit of an impact on the 1:1, or a lot [of an impact].

Jackson, the superintendent of the Monroe School District, expressed his concern over the "deluge of initiatives, most of which are fairly good, but collectively are overwhelming." Some of these competing interests that Monroe and the other school districts identified were: the state's new educator evaluation process, the state requirement to identify assessments that will be used to measure the impact teachers have on student learning, the state English language learner requirements, state program reviews, and updating curriculum frameworks, partially due to the adoption of the Common Core State Standards (CCSS).[7] Ethan, a former middle school principal from Washington, expressed a sentiment heard in nearly all districts: "It's definitely had a huge impact on staff. Many of them realize it will lead to a positive place…but it's still a lot on their plates." In most cases, the appreciation for the strain that these competing initiatives placed on teachers resulted in little more than a sympathetic attitude from technology leadership team members.

When Jackson considered this competing interest constraint and the demands it placed on his educators, he saw his role as "helping teachers and principals to focus their time, energy and resources." Norman, the superintendent of Adams, decided to limit the

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[7] CCSS= Common Core State Standards, a new national curriculum implementation as part of Race to the Top.

amount of time he had teachers working on the competing interests because, “First, we'd bore the hell out of people, and second, it's not necessarily what we value.” Norman decided to prioritize professional development time around transforming the classroom through technology integration and improving student engagement, and use only what time was necessary to train the faculty on state initiatives such as the new teacher evaluation system. Charles, the high school principal from the Jefferson School District, recognized the pressure the teachers were under and wanted to make sure that teachers were not presented with any more new initiatives in the second year of the 1:1 iPad initiative: “Curriculum, [regional accrediting association], 1:1, co-teaching, level changes, brand new building – you name it, there was a lot going on. That wears on people and on the faculty, and I fully get it.” All superintendents recognized the strain that competing interests placed on the implementation of the technology initiative, but most superintendents did not have a remedy for this constraint. The last constraint that superintendents considered was with regards to their technology staff.

Staffing Constraint

Nearly all superintendents identified the capacity of their existing technology staff to support the large-scale technology initiative as a constraint. Superintendents recognized that the addition of large numbers of mobile devices accessing the school network in their buildings would place demands on their technology staff. Even in a BYOD environment such as in the Washington School District, the superintendent had concerns about the capacity of his technology staff. Brody noted that there would be greater demands on his technology staff, “at the start of the year when students bring in devices, but also to make sure the network is maintained. We had to be sure we had the staffing, so we put in the budget to have additional staffing." To try and avoid adding additional staff (technology staff were eventually hired), Norman, the Adams superintendent, was attracted to the iPad because the students could individually manage the devices.

Another way nearly all superintendents addressed the staffing constraint was by utilizing the technology skills of their students. Student help desks were created in the Adams, Jefferson, Madison, and Monroe school districts. As Grace from Jefferson stated, "We used our own kids to expand our tech capacity because we didn't have it." Brett from Madison recounted a student help desk story he witnessed:

> I'll never forget the day I walked in and there was a seventh grader on the phone with Apple Care saying: "Listen guy, I ran triage on it, I replaced the battery, it can't be fixed here, send me a box, it's coming back." It was a seventh grader. It was just brilliant. It was just absolutely brilliant.

Grady from Washington made it clear that there were really two types of technology staff that districts needed to consider. He indicated that Washington had technology staff that worked on the network and infrastructure side and then they had technology integration specialists that worked closely with teachers to help them understand how to use the technology and how they could develop lessons around the technology. While recognizing the important work that both types of technology staff were responsible for, Grady said, "Do we have enough? The answer is no…on both sides we could use support." Our third finding related to the actions superintendents took to gain acceptance for the large-scale technology initiative and is discussed in the next section.

Superintendents Developed Strategic Processes

As stated in Chapter 2, strategic processes are components of frame theory. Strategic processes are specific actions regarding the initiative to gain acceptance within the district. Our second finding was that there were several strategic processes that superintendents developed to gain acceptance for large-scale technology initiatives. These processes were developed in two ways. First, they helped to prepare for implementation. Second, they helped to create buy-in.

Preparing for Implementation

All or nearly all superintendents utilized the strategic processes listed below to prepare for the implementation of the large-scale technology initiative. These were large initiatives that commanded significant financial resources; the number of actions taken by superintendents indicated their understanding of the complexity of the initiative. The order of the strategic processes described below was chosen for reasons of style and it is not our intent to imply a particular order was used by the superintendents.

Conduct research and select equipment. The term “research” is used to describe the investigative practice of learning from other 1:1 or BYOD school districts, reading relevant articles, and learning from product specialists or sales representatives from technology infrastructure companies. Conducting research and selecting equipment were very much tied together. District leadership conducted investigations into what type of equipment should be selected. All of the superintendents described researching other school districts with 1:1 initiatives in varying degrees of implementation. Varying by district, superintendents and technology leadership team members visited 1:1 schools in Iowa, Maine, and Massachusetts to learn from their experiences. Jackson, the Monroe superintendent, decided to forego a BYOD model based partially on what he saw at a 1:1 school in Maine:

> I really saw when I went up to Maine how seamless the whole thing is, when everybody has the same [device]…the teacher didn't have to waste any time at all in terms of spending precious minutes [orienting the] kids in the beginning of the class for instance.

Brody from Washington stated they "did a lot of research in what successful BYOD programs were, what were the challenges and obstacles, so that we could try to eliminate as many of those as possible." Grady from Washington concurred with the superintendent:

> There was a significant amount of time, effort, and research put into what could be a good fit for our community. District leaders went to presentations on 1:1, to other schools, and talked to administrators and other people in our roles to ask, "How did you do it? What were your challenges? What worked well for you?" We tried to match our challenges to theirs.

After conducting research, David, the superintendent of the Jefferson School District, decided that he was going to make it a priority to build a robust wireless network: "That was one thing that I heard loud and clear from superintendents. Do not skimp on the infrastructure…don't build it for 3,000 devices, build it for 20,000 devices."

Some of the research conducted by Tim from Monroe shaped his opinion on what type of device to purchase: "For me, it was wanting a quality machine – we've heard disaster stories when people have bought certain other things, netbooks – we [also] wanted to make sure it was PARCC-ready."[8] Meagan, the director of technology from Monroe, recalled that they "chose the MacBook Air because of the solid-state drive, we thought that would be more durable, less moving parts." Charles from Jefferson indicated that from "conversations and visiting other places, we felt the iPad was more user-friendly. The flexibility and the apps you could use." Norman, the superintendent of the Adams School District, had concerns about the workload his existing technology staff could handle and felt that managing iPads would create less demands on their time than other devices would. "I wanted them [the devices] individually managed. Long battery life because we have an older school without a lot of outlets. We thought with a laptop we'd get three to four hours out of them and then have problems." The Adams Technology Plan further stated why they selected the iPad as their 1:1 device:

> After extensive research, discussion, and community input, Adams High School believes that the iPad currently provides students and teachers with the best option for creating a 1:1 school. The iPads will be a source of student engagement and instruction with the use of applications, web-based software, and eBooks.

In addition to conducting research and selecting equipment, identifying key players that would help lead the large-scale technology initiative and help gain acceptance for it, was another strategic process that all superintendents carried out.

Identify key players. Each superintendent identified district technology leadership team members that played important roles in the planning and implementation of the large-scale technology initiative. These individuals would be considered key

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[8] PARCC = Partnership for Assessment of Readiness for College and Careers – includes online assessments to measure student progress with regards to the Common Core State Standards; not a required assessment at the time of this study.

players, but nearly all superintendents identified certain teachers, students, and parents that were also key players in the implementation of the initiative. The superintendent of Washington, Brody, acknowledged the importance of the key players in his district: "Getting the principals on board was critical, [but] the tech integration specialists were the ones that were going to help support these teachers…they would go into these pilot classrooms, and work with the teachers." Additionally, Tim, the former high school principal from Monroe, described the important role some of the teachers played:

> It was always framed as a teacher initiative. There were enough teachers on campus who were interested in and committed to increasing the amount of technology for themselves and students that I didn't really have to push all that hard. It was a matter of getting the group together and having them be the mouthpiece for the direction the school was headed.

Key players were asked to promote the initiative to the community, school board, or the town finance committee. Jackson, the Monroe superintendent, used some of his key players in this way. Tim indicated the importance of the teachers, student and parents:

> There were a handful of teachers who were just phenomenal. We had faculty meetings, and with something this big, my voice better not have been the loudest…[it was important to have] a representative body [of teachers] saying "this is going to work for us". We had students who were also involved and presented at the community meeting, so their voices were a part of it. We had parents as well. When we went to [another 1:1 school] to visit, there were parents that came, and at least one of them wasn't on board [with the 1:1 laptop initiative].

> It was good [to have the parent that did not support the initiative come, because] at least [the parent could now make a more] informed decision.

The Washington School District had a group of "lead teachers" that would meet monthly with the technology integration specialists to help move the BYOD initiative forward. According to Ava: "we would all share apps we were using, things that were successes, things that weren't going so well, ways to improve, ways to expand, how to get more teachers and students on board, etc." The Adams School District created a 1:1 parent committee that had a similar goal. Jim, the technology integration specialist, described how the committee would talk about matters such as what types of protective cases were best and iPad insurance options. Jim also indicated that they "involved the parents and community members in the conversation from the very beginning." Key players were often involved in piloting new technology as well.

Pilot devices. Piloting is defined as schools conducting classroom trials of mobile devices. Piloting was typically conducted for the following reasons: testing devices to see if they should purchase more of them, identify potential technical problems, give teachers experience creating and conducting lessons that integrate the technology, and to create momentum for the initiative among students and teachers. Each superintendent piloted mobile devices as a strategic process in their effort to gain acceptance for the large-scale technology initiative. Rylan, a technology integration specialist from Washington, described how they used their key players for piloting:

> The idea is if you put technology in the hands of the right people, it's just going to spread and grow. They targeted willing people, a few teachers, years ago. They were given room to play. There was no breathing down their backs; they could

> take it at their own pace to incorporate it into their curriculum and classroom. I've seen that spread throughout teams, spread through the same grade level, and then different grade levels. It's almost like a virus that's gone around.

All districts piloted various devices to test them before making a final purchase for the 1:1 initiative. The Adams district initially bought a couple of mobile iPad carts that teachers could sign-out for classroom use. The iPads were used constantly and the success of the pilot helped them decide on the iPad for their 1:1 initiative. Before the Monroe School District chose MacBook Airs as their device they piloted PC laptop carts and netbooks. Chromebooks were one of the options investigated because of their lower cost. Rose from Madison described their experience piloting Chromebooks:

> We piloted the Chromebooks in one room specifically just to monitor how often they need to be fixed, how often there are issues, and that teacher has been like, "Please... just take them away..." Even though they're cheaper and we could've put more of them in place rather than an Apple product, we had way more issues with them than with Macs.

In contrast, while the Adams School District was 1:1 with the iPad they were still piloting new technologies such as the Chromebook and had a more positive experience than Madison indicated. The superintendent, Norman, stated that each school in the district had at least one classroom set and they were seeing their use "grow in popularity." When districts were introducing new technology, whether it was through piloting or a full-scale implementation, all superintendents recognized the importance of professional development for the teachers that were expected to use the technology in the classroom.

Conduct professional development. The superintendents in each of the five study districts supported professional development in the use of classroom technology. The professional development occurred before the large-scale technology initiative began and has continued after implementation. The value that the districts placed on professional development was evident in the interviews we conducted as well as in the documents we reviewed. The technology plan for the Adams School District states:

> All Adams Public Schools teachers will receive extensive training and ongoing support to help them learn about technology and prepare students for life in a digital world. Technology professional development is administered throughout the school year and is led by both Instructional Technology staff and academic area teachers. Adams Public Schools is very proud of the staff in Adams and its commitment to technology in our schools. We are also very excited by the growing number of teachers leading professional development sessions for their peers.

Other districts had similar statements in their technology plans. All districts had limits on the amount of contractual time that was available for professional development. To overcome these contractual limitations, as well as the reality that time must be saved for professional development around competing interests, each district offered their educators optional or voluntary technology professional development that was held outside of contractual time. The most striking example of this was in the Washington School District where the superintendent taught a course on improving teaching and learning. Encouraging teachers to integrate technology into their lessons was a major focus of the course. Teachers signed up for the class and could earn six graduate credits that were available through a local university. Teachers who successfully completed the course were provided with classroom technologies such as iPads or laptops as an incentive. Brett from the Madison School District did something similar. Brett became an adjunct professor for a local university; teachers could take his course in educational technology for credit. At Adams the technology staff made themselves available several times a month for technology professional development sessions that were titled, “How do I do that?” or, “Open Support”. Howard indicated that they would have “anywhere from three teachers to fifty teachers” in attendance at these voluntary sessions. The Jefferson School District offered “Technology Thursdays” and “Wednesday Walkthroughs” as optional professional development for their teachers. The Thursday sessions had an open agenda, and the Wednesday sessions were for teachers to observe how their colleagues were integrating technology into the classroom.

All superintendents offered professional development related to their large-scale technology initiative during contractual times as well. Professional development began in Jefferson six months before the students were given devices and two years before in Monroe. Grace from Jefferson described the initial training they offered their teachers:

> We had a couple days' training by Apple, and we broke it up so you had advanced users, intermediate, and beginners. Everyone got the self-selected level of training they needed. Those in the advanced group, many were vanguard teachers [key players], and many took the lead in offering trainings to other teachers.

As reported above, in addition to hiring outside trainers, nearly all districts used their own staff to train their colleagues. The largest example of this is the Adams School District three-day *edcamp* that is held before classes begin each September. According to the superintendent, Norman, “There will be sessions certain individuals have to go to, but there’s always choice.” Over the three-day span approximately one hundred sessions are offered and nearly seventy percent are related to technology. Whether the technology professional development is during contractual time or optional, the superintendent action of making professional development opportunities available to teachers is a strategic process geared towards gaining acceptance for the large-scale technology initiative.

Assess the capacity of the technology staff. An additional strategic process that superintendents took to prepare for the implementation of the initiative was to assess the capacity of the technology staff. The capacity of the technology staff was defined as the ability of the technology staff to fulfill any additional responsibilities that would come if a large-scale technology initiative were implemented. This was considered a strategic process when the superintendent used the results of the assessment to add technology staff if needed to ensure that teachers and students would be properly supported for the large-scale technology initiative. As a result of this assessment, the Washington, Jefferson, and Monroe districts added at least one person to assist with the technology initiative; Adams and Madison added technology staff in their second year of the initiative. Norman, the Adams superintendent, tried to avoid hiring additional technology staff because of the cost:

> In the old world, you added about 10% on for every person you [hired] for health and benefits, but we're up to about 40% now. I get less grief adding iPads than I did adding like, a custodian, because they know that's a sustained cost over time and [they] know that health care is going to kill us.

Despite this desire, Norman hired an additional technology staff person to support the initiative in the second year. Jim described the staffing issue:

> Well, there were only two members of the IT staff at the time we first started; now there are three. We were concerned. We talked a lot about the fact of putting 1100 new devices in one school; how would we ever be able to support that? Realistically, two people -- it wasn't going to be enough.

As part of this assessment of the capacity of their technology staff, four of the five districts added a student help desk, also known as a Genius Bar, in order to utilize the knowledge and skills of their students to help with technical support issues for students and teachers. According to Tim from Monroe, they created their student-run Genius Bar "to cover the issues kids might encounter, like not being able to print, or creating presentations. The kids were trained and in the process of becoming Apple certified." The Jefferson School District created a student help desk, but as Charles described, they also added an additional technology support person:

> The big piece was we wanted to make sure we had enough staff to help out – and we're still looking to add more staff, especially as we become a bigger building. They definitely had a role in it. The staffing is a big piece. You can have all the technology you want, but you need those people. We learned that from [another 1:1 school we visited]. Their tech people were there all the time and they communicated very well.

In addition to strategic processes to prepare for implementation of the initiative, superintendents made efforts to create buy-in for the initiative from the various stakeholders.

Create Buy-In

Not surprisingly, superintendents would like to see any new initiative they support to be successful. Creating buy-in amongst the stakeholders is one way to help achieve that success. The superintendents in our study identified that the main stakeholders they wanted to create buy-in with were the teachers, principals, school committee, parents, community, and the students. Of these multiple stakeholders, teachers were the main focus of the effort to create buy-in. The two strategic processes that superintendents took to create buy-in were communicating expectations for use (for teachers and students) and public relations efforts.

Expectations for use. All superintendents communicated their expectations for how the technology would be integrated in the classroom. This was communicated through speech and documents at school committee meetings, public forums, to teachers, to students, and through modeling. The expectations for use that was communicated varied somewhat between the school districts. Nearly all superintendents indicated they saw technology's role in the classroom as a tool, like many others available to teachers, on an "as needed" basis and not a mandatory one. These comments from Norman were representative of the group:

> We have some teachers here who think technology is the bane of existence and they had kids in inkwells and calligraphy is a lost art – but they're still here and we've got to work with them. We say it all the time – a [bad] lesson with an iPad is a [bad] lesson. Again, [we] focus on engaging high-quality instruction, [it] has nothing to do with the device. You can lecture - as long as it's engaging, that's

great. We look for engagement and we prioritize engagement. Technology is one vehicle towards that, but may not be all the time.

Nearly all superintendents' and technology leadership team members' communication to teachers contained a message of patience. Teachers did not need to be experts in the technology right away, but hopefully that would not restrain them from attempts at incorporating the new technology in their lesson plans. Risk-taking by teachers was encouraged. Grace from Jefferson described how she communicated her expectations for use: "I went over the SAMR Model [with the faculty]...I said it's okay to be at any one of these levels when you start, but the goal is to take risks, because we want you to move up the model."[9] The superintendent from Monroe, Jackson, had a very similar message: "we're not fully there, [but my expectation is for teachers to use the technology in] transformative [ways], as opposed to just substituting [for] paper or the textbook…If that's all there was, I don't know we'd want to put this huge investment into it." The message of taking risks was repeated by Jim from Adams: "No one says you have to use technology all day long, but there's a very consistent message from the leadership that you should be trying to integrate something new, so that is a message that they hear quite often." The Washington School District had the most relaxed expectation for use. Washington is a BYOD model and as Ava described it: "Teachers are still given the option if they want these devices in their classrooms. Some embrace them, some are really nervous about them."

While the overall message from superintendents was partly one of patience, nearly all superintendents modeled the use of technology to encourage use among their

[9] SAMR = Substitution, Augmentation, Modification, Redefinition. Indicates the level of technology integration from low to high (Puentedura, 2013).

staff. The Washington superintendent taught the college course on integrating technology, the Adams superintendent blogged regularly, and the Madison superintendent was a frequent user of Google Apps. Bob stated his belief in leadership by example and said, "I often model what I want to see the principals or administrators model [for their staff]. Oftentimes I have assignments for them that require them to actually go online or use technology to get things done." The message from superintendents of setting reasonable expectations for use, encouraging risk-taking, and personally modeling the use of technology was a strategic process used by superintendents to help achieve buy-in. In addition to communication expectations for use, public relations efforts by the superintendent were another strategic process used by superintendents to achieve buy-in.

Public relations. We defined public relations efforts as the actions the superintendent took (or supported) for the purpose of creating buy-in with people, often stakeholders outside of the school system and with those that have authority over the superintendent. These actions were designed to persuade people to support the large-scale technology initiative and to coordinate the message that was communicated to the public with regards to the initiative.

All superintendents engaged in public relations efforts. The most common action in all districts was to hold public informational meetings about the initiative. Howard, the director of technology from Adams, described how the district achieved some buy-in after holding multiple meetings:

> The more and more education that we provided to them, the more and more buy-in we got. The first year was a little bit rough to get that approval. After that

> we've done numerous presentations with students and teachers, for school committee, for Ways and Means, [and for] town meeting members. We've invited all of those committees and regular town residents to visit our schools. Not at any time of course, but as groups, and let them do walk-throughs of our buildings to actually see the devices in action.

Superintendents and technology leadership team members gave presentations on the initiative to one or more of the following groups: school committee, parent teacher organization, and town finance committee. Data was not collected to show if any group was more targeted than others. According to Grady from Washington, their meetings helped put parents at ease: "The community needed reassurance to know that within this particular BYOD initiative that if a child didn't have one of the many supported devices, we could provide [one for them]." Norman, the superintendent of Adams, tailored his sales pitch for the initiative based on his audience:

> I said it's actually going to be more cost-effective if we do this a bit over time, and sustain a modern infrastructure so I don't come to you every ten years and say "I need another $10 million". If they're bean counters, you make a bean counter argument. If they're inspirational leaders, you make the inspirational argument. But if you go in and try to make an inspirational instructional argument to people who are seventy and on fixed pensions, you're barking up the wrong tree.

Superintendents worked to get their message out to the public in other ways as well.

Superintendents promoted their websites as sources of information about their large-scale technology initiative. Jackson from the Monroe School District indicated that they have a website dedicated to the initiative: "It's got the research. It's got the goals.

It’s got easy access for the public.” All superintendents also indicated they used one or more of the following mediums to get their message about the initiative out to the public: email blasts, Twitter, Facebook, blogs, and electronic newsletters. Norman from Adams indicated that the press doesn’t cover public meetings as much as they use to, but that people were still looking for local news. He saw that blogging was critical to filling this void and it helped to get an accurate and consistent message out to the public. Norman stated, “A lot of newspapers now are pulling stories directly off my blog, [the assistant superintendent’s] blog, [and] our principal's blog; I think that's part of the job responsibility that didn't exist before.” The Monroe School District took a different approach to educate their school committee about the initiative and to try and create buy-in. They created a course on 1:1 initiatives and had the school committee members complete the course on the district’s learning management system. Superintendents took a variety of actions to create buy-in for the large-scale technology initiative.

Conclusion

The overall study resulted in three central findings as to what superintendents do to gain acceptance for large-scale technology initiatives: (a) superintendents achieved resonance through leadership actions that were consistent with prognostic and motivational framing, (b) superintendents considered constraints the initiative might face, and (c) superintendents developed strategic processes to gain acceptance for the initiative. These three findings, as well as the findings from the five individual studies (see Table 1), will be discussed in Chapter 6. The individual studies will be submitted for each author as Chapter 5.

Chapter Five

Framing Innovation: Does an Instructional Vision Help Superintendents Gain Acceptance for a Large-Scale Technology Initiative?[10]

Problem

The implementation of any type of large-scale educational initiative, such as one that involves technology integration, suggests that school superintendents carefully frame their ideas and actions in various ways in order for it to make sense to stakeholders and ultimately gain their acceptance. The development of an instructional vision can be a leadership move used by superintendents to help stakeholders accept and make sense of the superintendent's decision-making process and goals for the district. The application of the theoretical lens of *frame theory*, which looks at various leadership actions that move an initiative, may be helpful in clarifying if and how a superintendent's instructional vision is utilized to gain acceptance of a large-scale technology initiative (Benford & Snow, 2000; Coburn, 2006). The aim of this study is to understand how the superintendent's instructional vision is used to gain acceptance of stakeholders in districts undergoing a large-scale technology initiative.

As with most large-scale school initiatives, the superintendent's leadership seems to play an integral part in the success or failure of any systemic changes (Bjork, 1993). In districts were technology use has been limited, a large-scale technology initiative may potentially represent an instructional paradigm shift. Additionally, technology initiatives may include a heavy price tag. For these reasons, these initiatives might be viewed as challenging to implement.

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[10] Author: Gina E. Flanagan

As the demand for technology in classrooms across our country grows, many school superintendents are racing to develop technology plans that will put these costly tools into the hands of educators and students as quickly as possible (Collins & Halverson, 2009; Gulbahar, 2007; Weston & Bain, 2010). These plans generally address the logistics and the implementation of the technology such as hardware and software decisions, professional development for staff on technology use, accessibility of users, infrastructure components and user requirements. At the same time, they are often absent of an instructional vision that outlines educational standards and methodologies associated with effective teaching and learning (Conlon, 2000; Flanagan, 2003).

Without an instructional vision in place supporting the educational use of technology, it is possible that districts may be saturating classrooms with technology devices but have a fragmented and unfocused implementation. This could possibly have little impact on student learning and create a scenario where there is little acceptance of the technology by all stakeholders (Conlon, 2000). The instructional vision of a superintendent may take many shapes. Essentially, it is the roadmap that outlines the superintendent's norms, beliefs, and activities toward a desired goal related to student needs (Sergiovanni, 1990; Rallis, Tedder, Lachman & Elmore, 2006). While most superintendents focus on improving academic achievement in developing their instructional vision, there are many who also incorporate the social, emotional and physical well being of students as well.

For the purpose of this study, it is important to make the distinction between a superintendent's instructional *vision* and instructional *focus* as they are often used interchangeably. However, there is no universally accepted definition of either instructional vision or instructional focus in academic research. For the purpose of this study, the superintendent's instructional *vision* will be defined as a model that provides a broad perspective of what instructional and organizational practices, theories, philosophies and beliefs that lay the foundation to maximize student academic, social and emotional goals. A superintendent's instructional *focus* may highlight a more specific *practice* that is necessary to achieve the overall vision. For example, a superintendent may have the vision that all students are provided maximum critical thinking opportunities to allow for real world problem solving. The instructional focus may be embedding *21st century learning skills* into all aspects of the district curriculum and developing professional learning communities to help facilitate the instructional practice.

Frame theory outlines that strategic actions are essential considerations when trying to gain acceptance of a movement (Bedford & Snow, 1986; Coburn, 2006). In order for a superintendent to successfully implement his or her vision, it is helpful that they frame their vision to all stakeholders in a way that helps stakeholders understand the reasoning and meaning of why the vision is important and will enhance student achievement. The effective framing of the vision may lead to a strong collaboration of all stakeholders toward actions needed to accomplish these goals.

While research linking instructional vision to the principal is abundant, research linking the instructional vision to the superintendent is extremely limited (consisting of only a handful of studies) and outdated (Bredeson & Kose, , 2007; Peterson & Barnett, 2005; Sergiovanni,1996). While the existence and articulation of a strong instructional vision helps develop the actions and support necessary to achieve district goals (Peterson & Barnett, 2005; Bredeson & Kose, 2007), superintendents report that the nature of their position sometimes hinders them from spending the majority of their time on curriculum and learning goals. One study identified that the majority of superintendents spend their time on issues related to budget, finance, communications and personnel (Peterson & Barnett, 2005).

The role of the superintendent has historically focused on the political and financial aspects of managing a school district. However, in the age of academic accountability and a global focus on 21st century learning skills, there is a greater need for superintendents to serve in the capacity of instructional leaders who improve student learning and achievement through curriculum and best practices in teaching and assessment (Rallis, Tedder, Lachman & Elmore, 2006).

Complicating matters is the fact that instructional technology is still considered a fairly new concept in terms of empirical research on best practices and overall student outcomes (Cuban, 2001; Cuban & Tyack, 1995; Greenfield, 2009). As a result, some districts risk making decisions and expenditures regarding technology without fully developing the vision of teaching and learning that the technology will be supporting. In many school district technology plans, the *technology* seems to be the focus, while the *instructional vision* is sometimes not included or not clearly stated (Brooks, 2011). This unstructured, fragmented approach might have an impact on the perception of the value of technology in the classroom for improving of student learning. It could also limit the overall impact of technology in developing authentic, higher level learning in the classroom (Bennett & Everhart, 2003; Ertmer, Glazewski, Newby & Ottenbreit-Leftwich, 2010).

The instructional vision of school leaders is increasingly moving toward how to best prepare students to be productive workers and innovative and analytical thinkers- all components of 21st century learning (Dede, 2010). With so much to consider in terms of literacy, critical thinking, collaboration, problem solving and communication, a superintendent must work to develop and articulate an instructional vision for all stakeholders that is clear, sustainable and effective. The use of technology in the classroom has succinctly and successfully played a role in developing some of these areas, however there is little research in connecting the instructional vision with the acceptance needed for a large-scale technology initiative.

Therefore, the aim of this study is to determine if a superintendent utilizes an instructional vision to gain acceptance for a large-scale technology initiative. The following research questions will answered in this study:

4. What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment?
5. How does the superintendent connect his or her instructional vision with the implementation of technology within the district to all stakeholders?
6. How do district administrators make sense of the superintendent's instructional vision for technology?

Literature Review

In order to develop an understanding of how an instructional vision could possibly influence in the acceptance of a large-scale technology initiative, the following topics will be reviewed: (a) how public policy influences a superintendent's instructional vision related to technology; (b) the impact of the superintendent's instructional vision; (c) how an instructional vision is developed and framed; (d) how a superintendent's instructional vision is integrated into technology implementation; and (d) how the superintendent's instructional vision supports the district technology plan and (e) how frame theory can help emphasize the need for an instructional vision in connection with technology initiative.

Technology and Public Policy

The proliferation of technology in the classroom has added an additional layer to the instructional lens that superintendents must view. Education public policies and professional standards for school leaders are outlining that not only should technology be present and used in schools but also used to achieve effective 21st century learning goals. These learning goals should play a significant role in the development of the instructional vision of a superintendent. Professional standards for administrators across the country are starting to include language related to the effective implementation of instructional technology (Massachusetts Department of Elementary and Secondary Education [DESE], 2003). The instructional use of technology in classrooms has become a mandate in public schools as well.

The issue of accessibility and learning with technology was a key component of the NCLB act that all public schools were expected to meet (No Child Left Behind [NCLB], 2001). Title II, Part D of the NCLB act emphasizes that schools should be using technology to improve student achievement. While the "how," is left wide open, it would suggest that superintendents and school leaders should be developing instructional visions and plans to integrate technology in support of effective learning goals. In addition to the NCLB Act creating pressure for school districts to embrace technology, the adoption of the Common Core Standards by forty-five states has also emphasized the use of technology to support constructivist and 21st century learning skills (Common Core State Standards Initiative, 2010).

Now more than ever, superintendents are being pushed through federal and state mandates to develop an instructional vision and implementation plan related to the use of technology in schools. The No Child Left Behind Act was enacted to ensure that all children had a fair and equal opportunity to obtain a high quality education by reaching a status of proficiency on state academic standards (No Child Left Behind [NCLB], 2001). As a result, the U.S. Department of Education has supported the International Society for Technology in Education (ISTE), which assisted in creating the 2007 National Educational Technology standards (NETS). These standards have helped to set international standards of excellence and best practices related to the teaching and learning using technology. Additionally, in some states, the professional standards for administrative leadership, which are used to evaluate the effectiveness of school leaders, is also including indicators for the successful use of technology. For example, the *Massachusetts Professional Standards and Indicators for Administrators* states that school leaders should "expect and support the effective use of technology to support instruction" (Massachusetts Department of Elementary and Secondary Education [DESE], 2003).

Additionally, the need to connect best practices in instructional theories and strategies with technology is further documented in the United States Department of Education's 2010 National Education Technology Plan. This document highlights the goals of technology in the areas of learning, assessment, teaching, infrastructure and productivity.

The Superintendent and Instructional Vision

According to a 2005 superintendent survey conducted by *Education Week*, 90% of superintendents say that district-level leaders *should* play a “large” role in providing direction on curriculum and instruction for the schools in their district (Belden, Russonello, & Stewart, 2005).

Although the role and the skill set of a superintendent who is embarking on a large-scale technology initiative is still emerging (Reitz, 2000; TSSA Collaborative, 2001), there is some indication that the presence of a clear and focused vision when integrating technology with instruction is useful in creating buy-in (Shuldman, 2004). The presence of a strong instructional vision, with or without technology, may be an essential component of any superintendent’s strategic plan (Petersen, 1999). As technology is a tool for instruction, not something that defines it, it may benefit a superintendent to work in the role of instructional leader for this type of initiative. There is some research that suggests that if technology is to be viewed as an effective instructional tool, it should be embedded with the same instructional leadership as any other type of curriculum or instructional initiative (Shuldman, 2004).

All this being said, it should be noted that in terms of empirical research, literature linking instructional vision to the role of the superintendent is limited (Peterson & Barnett, 2005; Bredeson & Kose, 2007). There is even less data on the superintendent’s instructional vision related to technology integration (Flanagan & Jacobsen, 2003). It has also been suggested that the lack of close involvement and instructional leadership with a district technology initiative from the superintendent could result in decision making by individuals who have no true understanding of curriculum and instruction. Additionally, the lack of instructional leadership from the superintendent level could also result in individuals who do not have the broad vision to put together a cohesive plan that will maximize the link between technology and effective instructional practices for all students (Shuldman, 2004). So how does a superintendent work in the role of an instructional leader within his or her district?

In a 1996 study that identified how superintendents engaged in the leadership of curriculum and instruction, four major focus points consistently surfaced: (1) instructional visionary (2) instructional collaborator (3) instructional supporter (4) instructional delegator (Bredeson, 1996). Similarly, a 1999 study of superintendents highlighted five leadership moves that superintendent utilized in developing curriculum and instructional: (1) instructional vision (2) creation of an organization structure that supports instructional vision (3) assessment and evaluation of personnel and instructional programs and (4) organizational adaptation (Petersen, 1999). This research seems to indicate that superintendents need to work as instructional leaders in their district.

The limited studies do indicate that the presence of a superintendent's instructional vision can play an important role in meeting the mission and goals of the district (Morgan & Petersen, 2002). However, no studies were identified on how an effective instructional vision is developed.

What Makes Up an Instructional Vision and How is it Implemented?

As the aim of this study is to examine the role of a superintendent's instructional vision in gaining acceptance for a large-scale technology initiative, it would seem relevant to have some understanding of some of the components that might make up a superintendent's instructional vision particularly as it pertain to the focus of this study-technology. As stated earlier, the instructional vision of a superintendent outlines a variety of beliefs about learning and the instructional practices that should be employed to maximize student achievement (Sergiovanni, 1990; Rallis, Tedder, Lachman & Elmore, 2006). Research has shown that effective district leadership often employs the feedback of all relevant stakeholders including central office staff, building administrators, board members, staff, students and parents (Waters & Marzano, 2006). Most important, the development of a superintendent's instructional vision is one that is often cultivated by instructional research, best practices, public policy and demands of post-secondary education, the workforce and the global economy.

For example, when the Soviet Union threatened U.S. national security in 1957 with its release of the Sputnik satellite, a re-focus on science in schools across the country became a national priority (Cuban, 2001). Similarly, as today's employers are reporting a significant deficit in the skills of creativity, collaboration, critical thinking and problem solving (elements of constructivist and 21st century learning) in new employees, there has been a re-emphasis and priority of these skills with school districts across America (Casner-Lotto & Barrington, 2006).

Constructivist learning emphasizes that in order for a student to gain a true understanding of a desired learning objective, content must be presented in way that allows the student to make a personal connection through active participation in real world applications (Jonassen, Peck & Wilson, 1999). 21st century learning emphasizes this focus on authentic learning experiences through the application of skills that develop creativity, innovation, critical thinking, collaboration, communication, global awareness, business literacy, information/technology literacy and other life/career skills (Bellanca & Brandt, 2010).

It is not to be assumed that the participants of this study will incorporate constructivist/21st century learning into their instructional vision, if they even have one at all. However, whether there is a focus on literacy, social development, life long learning, etc., many instructional focuses may be connected to constructivist/21st century learning areas. This may help to categorize and identify the instructional vision for research purposes.

Constructivist learning can be viewed as synonymous with 21st century learning due to the fact that it employs the same focus on critical thinking, collaboration, communication, creativity, problem solving and real world experiences that are the tenets of 21st century learning. Therefore, for this study, the term *constructivist learning and 21st century learning* will be referred to as one in the same. Constructivist / 21st century learning provides students authentic instructional strategies and experiences that allow students to construct their own meaning of knowledge in a wide variety of ways and involves various higher level thinking skills (Howland, Jonassen, Marra & Moore, 2003; Jonassen, Peck & Wilson, 1999; Dede, 2010). In the constructivist / 21st century learning classroom, the teacher acts as a facilitator of learning rather than a source of knowledge (Driscoll, 2004).

Constructivist / 21st century learning skills may support the integration of technology in a multitude of different ways (Howland, Jonassen, Marra & Moore, 2003; Reiser, 2001). These tools bring efficiency and easy access to a wealth of information so that students can test, experiment, discuss, question, apply, and integrate content knowledge with the support of their peers, teachers and even those in the global society. In a constructivist / 21st century learning classroom, the student is not given the technology and told to produce. Rather, the student seeks the appropriate technology to help in their endeavors toward inquiry and knowledge. Students are best served when they encounter something they do not know and are given the opportunity to find the solution on their own. This contradicts the traditional, teacher-centered approach to learning where the teacher is the main disseminator of information.

While the impact of technology in and of itself on student achievement continues to be difficult to measure, there is research that supports the effective use of technology built on a foundations of effective instructional practices such as constructivist and 21st century learning skills to improve learner attitude and confidence, provide more varied, hands on learning experiences, increase student collaboration, increase the mastery of vocational skills, provide a greater emphasis on problem solving, improve writing skills, provide instant feedback to guide instruction, and provide more experiences of differentiated learning. A superintendent who is working to develop an effective and sustainable instructional vision to complement a large-scale technology initiative could find that embedding constructivist / 21st century learning skills into his or her vision might help in creating an effective frame for buy- in (Boschee, Jensen & Whitehead, 2003; Haertel, Means, Penuel, Roschelle & Sabelli, 2003).

Once the instructional vision and focus have been established, the superintendent often carefully plans how the instructional vision and focus will be implemented and articulated systemically throughout the district. George Petersen (1999) was able to develop a model for how the instructional vision of a superintendent is transferred throughout the organization. In a study of the perceived and actual leadership characteristics of five California superintendents through the lens of curriculum and instruction, he linked the instructional vision to three key areas: assessment and evaluation, organizational structure and organizational adaptation.

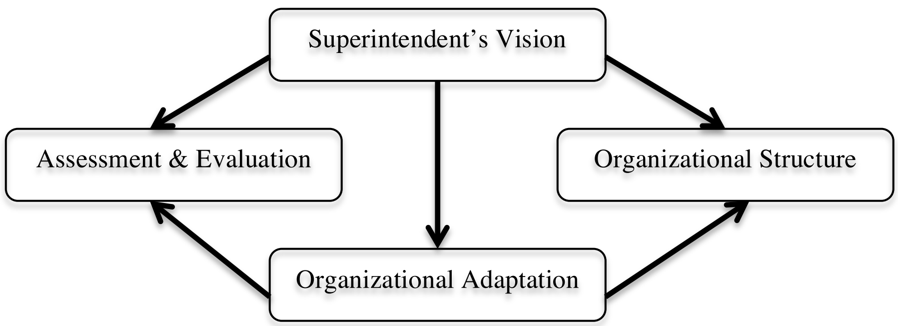

Figure 4. Petersen's model of superintendent behavior in the implementation of instructional vision. *From "Demonstrated actions of instructional leaders: An examination of five California superintendents," by Petersen, G. J., 1999. Education Policy Analysis Archives, 7(18), p. 12.*

In terms of this portion of the larger study that focuses on the instructional vision, having this lens to identify how the instructional vision is implemented and how it could be articulated throughout the district may prove to be very useful in terms of understanding how it may be used to gain acceptance for the initiative.

Technology leadership. Research has shown that while teacher professional development in technology helps to sustain the use of technology, it is the leadership of the district or school administrator that has the greatest impact on the success of the implementation (Andersen & Dexter 2005; Schrum, 2010; Galizio, Ledesma & Schrum, 2011). Leading a large-scale technology initiative involves many key players who focus on a variety of specific aspects that are essential to a successful integration (infrastructure, budget, implementation, etc.). A superintendent's instructional focus would seem to help provide direction for all these individuals in the decisions they have to make to support student learning through the use of technology. The superintendent would also need to consider how to navigate innovations of technology in the classroom, which is often seen as a "disruptive" to the traditional learning environment, into a sustaining innovation so that it fits with the existing instructional focus and other structures of the organization (Christenson et al., 2008).

District Technology Plans

As stated earlier, there is limited research available related to the development of an effective and sustainable instructional focus in support of a large-scale technology initiative.

In a four-year study of a district in Texas involving forty-two schools, grades 6-8, two student groups were compared (classrooms with laptops versus classrooms without laptops) (Shapely, Sheehan, Maloney and Caranikas-Walker, 2009). In this study, there was no defined instructional vision on the district level. It appeared to mainly be an exercise in saturating classrooms with technology. The results were too inconsistent to show a positive impact on student scores with the use of technology. Additionally, while the study did show an increase in collaboration between teachers and students and an increase in technology proficiency, only 25% of the "technology immersion classrooms" (that is, classrooms with high volume of technology)" used the technology at a "high level" to support critical thinking and problem solving. (Shapely, Sheehan, Maloney, and Caranikas-Walker, 2009). In terms of student engagement, some studies show that the use of technology tied to instructional goals and effective practice can produce a positive result in this area (Lemke & Fadel, 2006). In one study, only 33% of U.S. school districts where a full 1:1 laptop computing environment was present believed that the laptop initiative itself was responsible for key gains in learning goals (Greaves & Hayes, 2008).

These studies may indicate that the mere presence of technology in classrooms without a clear instructional vision and strategic plan for learning does not achieve increased learning. If that is the case, a challenge for a superintendent and his leadership team might be to incorporate an instructional focus into an effective district technology plan that makes sense to all stakeholders in terms of supporting student learning outcomes, hardware and software decision making, and sustainability in order to maximize acceptance of technology. In recent times, districts have been developing technology plans as the model for outlining the strategic blueprint for all aspects of a large-scale technology initiative. While these documents mainly focus on the logistical and mechanical aspects of a large-scale technology initiative, there is research suggesting a need to also provide a rationale between teaching and learning and the use of technology in the school setting (Dede & Richards, 2012).

For centuries, classroom instruction has focused on assessing the memorization of facts, rather than the application of factual content to real world scenarios. Transference of knowledge from one situation to another is the essence of learning for understanding as opposed to the memorization of facts (Dede & Richards 2012; Mestre, 2002). The practice of this type of pedagogy appears to one of the strongest, consistent variables for success in the use of technology in preparing students to be lifelong learners and productive workers in the global economy (Kay, 2010; Dede & Richards, 2012; Duffy & Jonassen, 1992). This type of instructional focus in a school district might prove to be useful for a superintendent looking to gain acceptance of a large-scale technology initiative.

Frame Theory, Instructional Vision and Technology Initiatives

For many educational leaders, particularly superintendents, implementing initiatives that involve a paradigm shift and involve large-scale funding, can be viewed as challenging. The implementation of a large- scale technology initiative certainly fits the above description.

One theoretical frame that may help to move forward such an initiative is *frame theory*. Research has shown that the thoughtful and strategic manner in which leaders "frame" issues or problems can make or break initiatives or policies (Benford & Snow, 1986; Coburn, 2006).

Most important, the process of effective framing helps to provide a rational and legitimate plan of action while weeding out irrelevant topics or actions. In essence, effective framing of an issue helps all stakeholders "make sense" of the rationale, actions and results, related to a particular policy or initiative, and helps them determine a clear path to getting there (Coburn, 2006). .

The instructional vision of a superintendent could be applied to the implementation of the diagnostic, prognostic and motivational frame in which the superintendent works to create buy- in for a large-scale technology initiative. The development and implementation of an instructional vision by the superintendent could also be utilized as a strategic process in which a superintendent creates resonance between the technology initiative, the goals of the district and stakeholders. For example, if a district is trying to meet the requirements outlined by NCLB by responding to low student achievement data in the areas of literacy and math or working to embed higher level thinking skills into classrooms, then an instructional vision of the superintendent may be to promote critical thinking, collaboration, creativity, and problem solving for all students. In this case, the distribution of technology to all students for learning purposes could be viewed as an equalizer of resources. Thus, the use of technology as a tool to help maximize this focus may become relevant and possibly effective in the eyes of stakeholders. The next section will outline the methods that were used to develop the study of a superintendent's instructional vision to gain acceptance in a large-scale technology initiative.

Methodology

As outlined in Chapters 1-3, the focus of the overarching study was to explore the leadership of actions of superintendents who are seeking acceptance of a large-scale technology initiative. The application of frame theory provided an effective lens for which to connect specific leadership actions to acceptance of a large-scale technology initiative as it focused on prognostic and motivational constructs as well as strategic actions that helped to gain resonance for the initiative. To that end, five Boston College doctoral students selected five different aspects of superintendent leadership to research in conjunction with a large-scale technology initiative. My study examines the role of a superintendents' instructional vision on the acceptance for a large-scale technology initiative. As stated above, the following research questions guided this portion of study:

1. What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment?

2. How does the superintendent connect his or her instructional vision with the implementation of technology within the district?
3. How do district administrators make sense of the superintendent's instructional vision for technology?

The methods utilized for this study were designed to identify the successes and challenges that the superintendent faced during the large- scale technology initiative to clearly communicate and connect the instructional vision to the technology initiative and gain acceptance from stakeholders. Additionally, methods were designed to help gauge the consistency of the instructional vision throughout the district as well as the strategic actions associated with *Frame Theory* that developed resonance with stakeholders.

The Study Context

Details of the full methodology utilized for this study are outlined in Chapter 3. The data for this study included a variation sampling in five school districts (Creswell, 2007) to allow for the development of themes across the various school district settings.

Data collection. A multiple case study was conducted of five superintendents and district leaders who were identified as having a key role in the implementation of the large-scale technology initiative. In order to examine the role of the superintendent's instructional vision in the implementation of a large-scale technology initiative, qualitative interviews with five superintendents and various leadership team members who have a role in the large-scale technology initiative took place. Data was collected in the form of interviews and document reviews.

Interviews. Research questions for the study of instructional vision were designed to specifically address the development, implementation and perceptions of the instructional vision in the role of the superintendent and other district administrative positions that were key players in a large-scale technology initiative. The interview guide that includes the questions, notes to the interviewer, suggested follow-up questions and probes have been developed for this process and are included in Appendix E.

Analysis. The analysis of data took place simultaneously to data collection, beginning with the use of research journals and analytic memos. It also included the use of a web-based data collection tool to help organize the data for coding purposes.

Research journals and analytic memos. With each interview, research journals and analytic memos were used to collect thoughts, identify and reflect on emerging themes both from a with-in case and cross-case analysis. Related to the study of instructional vision, these memos helped to quickly and clearly identify the instructional focus of the interview subjects and therefore assist in the establishment of codes. Additionally, perceptions of the interview were recorded and highlighted as well as any other pertinent information that may have needed follow up or clarification. Formal analysis of how such data helped create a list of codes is outlined in the "coding" section below. Document reviews of technology plans as well as district websites were conducted as well. In terms of the study of the instructional vision, this often served as a cross reference of what was being said in interviews and what was actually practiced and communicated outside of the interviews.

With a focus on the superintendent's instructional vision, the data extracted and analyzed from these interviews, research journals, analytic memos and documents helped to provide an understanding of how the instructional vision is developed, communicated and implemented to stakeholders and processed with members of the superintendent's leadership team. In this study, codes served as markers for the presence of the places where leadership actions meet instructional vision in the context of a large-scale technology initiative. These were analyzed to determine the presence of patterns and themes related to the study of the instructional vision. Additionally, these codes were helpful in identifying connections to the prognostic, motivational, strategic processes and resonance elements related to the study of fr*ame theory* that is a focus of this overall study.

A hypothesis that superintendents would employ a wide variety of instructional vision focus areas was identified early in the coding process. In terms of identifying the instructional vision of the district, participants were asked to articulate the instructional vision of the district. Codes were assigned to identify the *direct* articulation of the instructional vision through the interview question, "What is your instructional vision?" Codes were also assigned to identify the *indirect* references to the instructional vision that gathered in the narratives given when superintendents were asked to describe how the instructional vision is taking shape in the district and how the instructional vision relates to the technology initiative. Codes were also established to assist in calculating the frequency of certain identified codes throughout the study in order to determine which instructional vision focus areas were most prominent in this study. For example, a matrix was utilized to identify the instructional vision articulated by the participants as well to show connections between the responses to the others participants. This process was also used for document reviews. The codes were also developed to connect to the individual research questions and the individuals who provided the data. This process helped to focus on the research questions and distinguish the perceptions of each group of participants- superintendents and district administrators. A complete list of the codes used for the study of the instructional vision in districts implementing a large-scale technology initiative can be found in Appendix J.

Within and cross-case analysis. Once the coding was underway, the within-case analysis helped to identify unique interactions patterns, strengths and challenges related to the instructional vision of each specific school district involved in a large-scale technology initiative. The within-case analysis also helped to identify the elements of frame theory that were present in each of the five school districts.

Lastly, a *cross-case analysis* was utilized to allow the researcher to explore and describe connections and consistency in responses across the cases. Various matrices were developed to help collect and sort data to allow for meaningful and accurate analysis. For example, various fields and descriptor codes were established to help organize and analyze references to the instructional vision that were identified in the transcripts. This helped to identify what common instructional focus areas were connected with the vision of a superintendent who is undergoing a large-scale technology initiative and how that instructional vision was communicated and interpreted by various stakeholders throughout the district. Collectively, it identified common strategic actions implemented by superintendents in terms of utilizing an instructional vision to gain acceptance of the technology initiative.

Results

This section will outline the findings related to each of the three research questions that are connected to the instructional vision in a large-scale technology initiative. This will include first identifying the instructional vision utilized by the participants, a look at how the instructional vision was developed and implemented throughout the district, district administrator's perceptions of the role of the superintendent's instructional vision in a leading a technology initiative, the communication and implementation of the instructional vision amongst district administrators and the role of motivational and prognostic framing in connection with the instructional vision in a large-scale technology initiative.

Instructional Vision and Large-Scale Technology Initiatives

The first research question for this study focused on identifying the instructional vision of superintendents that gained acceptance for a large-scale technology initiative.

Elements of the instructional vision. Each of the five superintendents who were interviewed for this study articulated an instructional vision that they utilized in creating a focus for their district. All of the superintendents articulated an instructional vision that included some element of constructivist /21st century skills (e.g. communication, collaboration, creativity, student engagement, problem solving, real world applications, use of technology). Through the interview questions, the superintendents of Washington and Jefferson articulated more emphasis on these skills than other superintendents. The superintendent of Jefferson School District best summarized the thoughts of most superintendents involved in this study:

> I'm trying to make sure that every student has access consistently to very rich dynamic materials and curriculum. Those materials and curriculum are focused on the long-term development of creativity, communication, critical thinking and collaboration.

Through the interview questions, the superintendents of Monroe, Jefferson and Washington very clearly articulated that the use of technology was an important part of their instructional vision for their district while others eluded to technology use in their narratives connected to other interview questions. When speaking about his instructional vision that included the use of technology Jackson, the Monroe School District superintendent stressed that technology had to be used to transform instruction in the classroom: “Now that we have [these tools] in their hands and people are knowledgeable about them, how do we free them up to really figure out how to use this in a way that’s more transformative?”

The superintendents of Adams, Jefferson and Washington discussed that increasing student engagement was a major component of their instructional vision. This is evidenced by this statement from David, the Jefferson superintendent: “I need that teacher to be fostering high level of student engagement and active learning, of course, with a focus on continued growth.”

The superintendent’s communication of the instructional vision. The manner in which superintendents articulated their instructional vision through the interview questions varied. For example, Brody, the superintendent of Washington articulated a very direct, clear and consistent instructional vision that identified what he wanted students to experience in their classrooms. He stated:

> The vision I have, which is actually a vision we've been discussing and talking about for several years now, is you want the students to be the owners of the learning; that they are the generators of the knowledge, and that as teachers and

> educators, we're the facilitators of that. In giving them the tools necessary to access the curriculum, and to be able to be engaged to do the learning.

The superintendents of Adams, Jefferson, Madison, Monroe spoke in more general terms and vacillated between various thoughts throughout the interview. These superintendents articulated an instructional vision attached to specific models or philosophies. For example, Norman, the superintendent of Adams stated that his instructional vision was all about supporting the *Whole Child* model, that is, working to address the social, physical, emotional and academic needs of every student: "I guess my vision in any district would be that kids get what they need, when they need it."

The superintendent of Jefferson and Monroe described objectives or programs they supported in describing their instructional vision. For example, Jackson, the superintendent of Monroe stated: "My five goals are about health and wellness, the evaluation system, the achievement gap, RTI and technology."

Additionally, all the superintendents repeatedly talked about a certain vision for the district in their interviews, but did not explicitly name a program, model or concept. For example, Norman, the Adams superintendent made numerous references of how he wanted to empower people "to take an idea and run with it if it made sense for kids." He also stated it was an expectation that district personnel constantly motivated themselves to do new things that were innovative. While he didn't explicitly state that his vision for the district was to create opportunities for innovation and creativity, he certainly provided numerous examples of what he wanted to see in his district. Table 6 reflects the instructional vision focus areas of the five superintendents who were interviewed for this study.

Table 6

Instructional Vision of Five Superintendents Implementing Large-Scale Technology Initiative

Superintendent	21st Century Skills	Collaboration Skills	College & Career Ready	Creativity Development	Literacy Focus	Student Engagement	Technology Use	Whole Child	Differentiated Instruction
Norman from Adams					X	X		X	
Brody from Washington	X		X			X	X		
David from Jefferson	X	X				X	X		
Bob from Madison		X						X	X
Jackson from Monroe				X			X		X

The alignment of the instructional vision. The alignment of the superintendent's articulated instructional vision with the district's mission statement and vision statement connected to their technology plan was also examined (Table 7). The purpose of this study was to determine if there was consistency throughout the district in the instructional vision that was being communicated to stakeholders. This was done by comparing the superintendent's articulated instructional vision through the interview question with the instructional message conveyed through both the district's mission statement and technology plan's instructional vision statement. As the table below reflects, none of the districts in this study had complete alignment in what the superintendent communicated as their instructional vision and what was stated in their district's mission statement and technology plan. Three districts (Adams, Washington & Madison) had the superintendent's instructional vision matched to either their mission statement or the technology vision statement, but not both. Two out of the five districts (Jefferson and Monroe) had no alignment with what the superintendent articulated as the instructional vision and what was stated in the mission statement and technology plan in the form of a vision statement. Table 7 identifies (a) the superintendent (b) each superintendent's instructional vision (c) the part of the superintendent's instructional vision that is mentioned in the district mission statement and (d) the part of the superintendent's instructional vision mentioned in the district's technology plan. The bolded phrases indicate the specific connection to the superintendent's instructional vision.

Table 7

Alignment of the Superintendent's Instructional Vision to District Mission Statement and Technology Plan Vision Statement

District	Superintendent's Instructional Vision	Mission Statement Alignment to Supt. Instructional Vision	Tech. Plan Alignment to Supt. Instructional Vision
Norman from Adams	Whole Child, **Student Engagement**, Literacy	none	CCR, **Student Engagement**
David from Jefferson	Collaboration, Student Engagement, Tech. Use, 21st Century Learning	none	Enhance Communication
Brody from Washington	Student Engagement, Tech. Use, **21st Century**, **CCR**	**CCR**, Whole Child	**21st Century Learning**, Authentic Learning
Jackson from Monroe	Creativity, Tech. Use	Whole Child, Student Engagement, CCR	CCR, 21st Century Learning
Bob from Madison	Collaboration, Differentiated Instruction, **Whole Child**	**Whole Child**, CCR	**Differentiated Learning**

Note: *CCR* refers to the term *College and Career Readiness*. CCR refers to the content knowledge and skills high school graduates should possess to successfully prepare them for post high school endeavors.

The lack of consistent and well defined alignment of the instructional vision with district mission statements and technology plans would seem to suggest that some districts do not have a focused instructional vision that is applied to all the aspects of the district. For the purpose of this study, it seems important to emphasize that the superintendent's instructional vision, more often than not, is not clearly articulated in the district technology plan's vision statement. This disconnect seems to suggest inconsistency between what the superintendent and district technology plan outlines in terms of the instructional vision for the district. However, at least in the general sense, the instructional vision of these superintendents is all connected to constructivist/21st century learning skills, which many of these documents reference directly and indirectly. For example, the superintendent of Monroe articulated an instructional vision connected to creativity and technology use in his district. While both the mission statement and district technology plan did not *specifically* state this, they did make reference to the development of college and career readiness, developing the whole child and 21st century learning.

The Development of the Instructional Vision and Large-Scale Technology Initiatives

With research question two, the focus was to identify ways in which the superintendent connected his or her instructional vision for the implementation of technology to all stakeholders. This section will identify the key players in the development of the instructional vision and how the instructional vision was communicated and internalized.

Key players in instructional vision development. Identifying who was a part of the development of the instructional vision was one component of this portion of the study. District administrators (building principals, central office academic administrators and technology staff) were asked to identified as key players in the technology initiative. They were asked to identify who was involved in the instructional vision development of their district. All district administrators (with the exception of those within the Monroe School District) stated the superintendent and members of the district leadership team, which usually consists of central office academic administrators and building principals, developed the instructional vision. Tim, a principal of Monroe Public Schools, was not sure how the instructional vision in his district was developed.

> I don't know. I arrived mid-stream. I assume that came out of the regional accreditation process [regional accreditation process], perhaps during self-study, but when I arrive that bus was already moving.

While the district administrators of the Monroe School District did not list the superintendent as someone who developed the instructional vision, it is important to note that Jackson, the Monroe superintendent came to the school district as the technology initiative was just about to be implemented. These district administrators seemed to be defining the instructional vision of the district as the technology initiative. Consequently, they identified the superintendent's limited involvement with the early days of the technology initiative with him not having a role in an instructional vision.

This blur between the instructional vision and the technology initiative in the district was common in a few districts and is described in detail below. Out of all the district administrators (i.e. building administrators, central office staff and technology staff) that were interviewed for this study, only 44% of these individuals stated that they *specifically* had a part in the instructional vision development process. The majority of district administrators who took part in this study identified individuals other than themselves, who were a part of the development of the instructional vision. The district administrators who identified themselves as having a part in the instructional vision process were four principals from Washington, Jefferson and Madison school districts as well as three Directors of Technology from Madison, Adams and Monroe and the Director of Academics from Madison. The district administrators who did not specifically identify themselves as participating in the development of their district's instructional vision were the six IT specialists from the Washington School District, the high school principal from the Adams School District, the assistant principal from the Jefferson School District, the district grant writer from Madison School District and the former high school principal from Monroe School District. This indicates that many of the key players of these technology initiatives were not key players in developing the instructional vision for their district, but had a role in implementing it.

The instructional vision and technology initiative are often blurred. Another important finding is that the articulation and understanding of the instructional vision varied amongst the participants. This could impact the achievement of overall district teaching and learning goals. All three Directors of Technology blurred the instructional vision (which broadly defines the beliefs and goals of teaching and learning within the district) with the logistics of the technology initiative. In doing so, it was not always clear if the technology initiative was meeting the teaching and learning goals established by the district.

For example, in the case of Madison School District, when Brett, the director of technology at Madison was asked how the instructional vision was developed, he primarily focused on the technology integration, not the overall focus on teaching and learning. He mentioned that he; along with the superintendent and a professor at a local university (who helped him teach a technology course to teachers in their district), were the key players in developing the instructional vision. In doing so, he did not speak of district goals for students, but rather, who was involved in the process of supporting the technology initiative:

> I always think of it, the Superintendent, you know, I was a director, report to the Superintendent and so it was always wide technology in the first place. Because it's easy to bring technology and because it is sexy and even back then, a program might not have been sexy but the technology is always sexy and it's very enamoring. [Bill Smith] and I – [Bill] is a professor at [Sturbridge State]…we actually [taught] a full Master course on our campus so we we're certifying teachers in getting their Master's degree in Educational Technology. So it is myself, Bill Smith, the superintendents, the principals, but probably not at that time…the principals are all really very buried in their schools … [The Superintendent] and I were kind of thinking about what is this initiative about? Why are we doing this in the first place?

When asked how the instructional vision was developed in her district, Meagan, the director of technology for the Monroe School District also referred specifically to the technology initiative and not specifically how the vision connected to the district learning goals. Her description of how the instructional vision was developed seemed to indicate that the main instructional vision was technology use.

> This is a vision that's [already] out there. When you look at people who are driving educational goals... the onset of OER (Open Source Educational Resources[11]), the ability for students to go out there and learn through e-learning type environments and grow their knowledge; it's prevalent that leaders see where we're headed. We have that vision of where we need to go.

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[11] OER (Open Source Educational Resources) refers to internet materials that are freely accessible, for the purposes of learning and research

Howard, the director of technology in the Adams School District, also focused on the technology integration when asked how the instructional vision was developed:

> And there has always been a push for us to upgrade the technology with [Norman] (superintendent) coming on board. He was more supportive of spending money on technology than our previous superintendent. So I would say that it's been a vision for long before Norman, it really just came into play because Norman got here.

It is important to emphasize that there is a difference between the instructional vision and the vision for technology integration. Based on the responses above related to the inquiry on the development of the instructional vision, there seems to be some support that for technology administrators in these districts, the development of the instructional vision *begins and centers* around the use of technology. These technology administrators did not identify the goals for students in their district as articulated through the superintendent's instructional vision *absent of technology*.

It should be noted that the directors of technology in both Madison and Monroe were conversant in how technology should be integrated to support elements of teaching and learning. Throughout their interviews, they often discussed many relevant and frequently referenced elements of learning, such as differentiated instruction and authentic learning, however they did not make a connection to how these elements *specifically* related to the instructional vision of their district. This gave the perception that they had created and developed their own *technology vision*, but was not defining their superintendent's or districts *instructional* vision. While these technology visions connected in some way to the instructional vision of their districts, this seemed to be more of a coincidence rather than a deliberate effort. For example, Bob, superintendent of the Madison district described his instructional vision having a focus on meeting the needs of the whole child and elements of differentiated instruction. When asked about the instructional vision for his district, Brett, the Madison technology director stated:

> I looked at learning in sort of three buckets…acquisition, where I'm collecting information, meaning making- where I'm trying to understand, evaluate, and analyze information and then transfer- where I'm actually able to put students into real world type of environments.

In some ways, Brett was communicating elements of differentiated instruction and meeting the academic needs of student which touches on Bob's instructional vision, however, Brett did not explicitly state this nor did he elaborate on other elements of the Whole Child model which focuses on the social, physical and emotional well being of students.

Building principals articulated the development of the instructional vision with less emphasis on the technology initiative than the Directors of Technology. Some of their perspectives on instructional vision development focused around the connection to teaching and learning goals of the students identified by the district or other initiatives being implemented in the district.

Rose, a principal in the Madison School District, expressed the development of the instructional vision for her district in this manner:

> I'd say we've developed it based on identifying our needs and what areas we need to improve on…we, being teachers and administrators. We have a bit of a

> collaborative leadership, and we're trying to work more towards it so that there's more buy-in of the work.

In terms of the superintendent's perspective of the development of the instructional vision for the district, all of the superintendents who participated in this study identified themselves and their district leadership team as having a part in the this process. Like most of the principals, none of the superintendents discussed the technology initiative when describing how the instructional vision was developed. Bob, superintendent of Madison School District explained:

> As we worked as a leadership team and we [met] weekly and looked at the various concerns that people had across the district. And a lot of those concerns focused on how we meet the students' needs; in particular educational needs, behavioral needs and social needs.

David, the superintendent of Jefferson who demonstrated a collaborative effort in developing his district's instructional vision stated:

> When I entered, I used a well developed entry plan that involved well over 100 interviews with people from the board of selectman to committees, to teachers, to aids, to students; it was more complex than this but in a general sense [I was asking] what was working, what wasn't working, what you think we should do about it; presented it to school, community; had forms in every schools. So, it wasn't just my vision that I wanted to hear where we were, obviously my vision was part of that, but I think it had to be to some degree, research-based.

Based on the research on the development of the instructional vision in districts where a large-scale technology initiative has occurred, there does seem to be some disconnect with the involvement of this process between superintendents and their district leadership teams and the district technology staff, particularly in the districts of Washington, Madison and Monroe.

In the Washington School District four out of the seven individuals that the superintendent identified as key players in the technology initiative stated that they had no role in the development of the instructional vision. These were all technology integration specialists. In regards to identifying the instructional vision and development, one of these individuals, John, the Network Manager stated, “I'm not really part of those discussions. They decide, I implement.”

Additionally, when asked to describe how the instructional vision was developed, these same four individuals shared that they reviewed the interview questions in advance and formulated some answers together. As such, their responses to this inquiry were identical. They all stated that in terms of the development of the instructional vision, it was a community effort involving the public, teachers, administrators and students. Ava, one of the Washington IT specialists stated:

> We went over these questions with some others you're interviewing as well, and we felt the community had input through different meetings as well, and they still do, whether through a PTO meeting or if a topic is changing in the district, they have school committee meetings where they're invited to attend. Other special-interest meetings they invite the parents to if the curriculum is changing. Teachers work in teams at our middle school, and they collaborate whenever there's any different curriculum changes, and the district administration... I think all in all, everyone is included. Parents, teachers, students, and administrators.

When speaking about the development of the instructional vision in the Washington School District, Brody, the superintendent, did not *specifically* mention how others were a part of this process. In his interview, he gave the perception that the instructional vision was a continuation of a previous superintendent that he pushed forward. He stated:

> I would say this started – I'm trying to think of how long it's been since I came on as superintendent... 8 or 9 years ago. The superintendent who was here at the time, he was new to the position, and he was really pushing to move towards preparing our students for 21st century skills. He pretty much charged me and others to move forward with that vision. I think that was at the time when all the different research was coming out, *Rising Above the Gathering Storm* and Friedman's first book, *The World Is Flat*. It was really starting to hit home that we need to change what we're doing in the classroom, that we're not effectively preparing our students for jobs that don't exist yet. That's where the vision first germinated, at that time. He basically gave me carte blanche and said go for it. For every single project that we were working on, that was the goal and the idea in mind that we were heading towards.

In the Madison and Monroe school districts, the technology staff portrayed their involvement with the development of the instructional vision very differently than the technology staff in the Washington School District. The technology staff in the Madison and Monroe school districts that were also identified as key players of the initiative were directors of technology and not technology integration specialists. It is presumed that by the title and responsibilities of their position, they had more leverage in district decision-making. The technology directors of these districts identified themselves as having a key role in developing the instructional vision of their districts and explained this in detail. However, as discussed above, there does seem to be some confusion with these two individuals with the difference between developing the instructional vision and the implementation of the technology initiative.

While all districts described the development of the instructional vision to be mainly the work of superintendent and district level administrators, it is to be noted that some of the instructional vision statements that were articulated by the superintendents were in direct relation with issues they perceived to be of concern in their district. For example, both in the Adams and Madison School District, both superintendents discussed emotional and behavioral issues with students in their district and how it related to their focus on the Whole Child and personalized assistance. Norman, the Adams superintendent, repeatedly shared the importance of "giving kids what they need when they need it":

> I think I came into a district that had a really high referral rate in terms of parents and staff seeking specialized instruction…I think that's an educator or parent's way of asking for help…we're giving kids what they need when they need it. We're not waiting for the disparity in their achievement to get so large that all of a sudden you can slap a label on a kid that doesn't really belong. That occurs at all levels, from 3 year olds to high school….if there's an emotional crisis coming, we usually have a clue….we're pretty good predictors…if you have good, high quality programming and kids have positive relationships with adults and they

feel like they're loved and someone cares about them, I would argue that's an investment in student safety.

Bob, the superintendent in Madison, also stressed the importance of looking at individual student needs in developing the instructional vision and provided this example:

In terms of looking at individual student needs… I look at [how we] started the behavioral program…that program was really developed for these students who didn't necessarily have an educational reason of why they couldn't learn it was behaviors things. [We wanted] to provide resources in a setting that helps students in the class but also gave them a place where they can time out and get them assistance.

These statements support that while a small group constructs the development of the instructional vision, it is grounded in the needs of the students in specific school district.

Table 8

Stakeholders Involved in the Instructional Vision Development Process According to District Administrators

District	Superintendent	District Administrators	Teachers	Parents	Students	Community Members
Adams	X	X				
Washington	X	X	X	X	X	X
Jefferson	X	X				
Madison	X	X	X			
Monroe		X				

Note: This data reflects *collective* responses from the participants in this study. It does not reflect *agreement* by all participants that each of these groups was involved in the development of the district's instructional vision.

Implementation of the Instructional Vision in a Large-scale Technology Initiative

While the *development* of the instructional vision often took place between superintendents and their district administrators, the *implementation* of the instructional vision in these districts had a much more collaborative approach. This is detailed in Table 9.

Collaborative approach. The collaboration of the instruction vision was often articulated to take shape in the form of professional development, allocation of resources and communicating the instructional vision.

The participants from the Monroe School District described the creation of a "technology task force" that helped to shape and implement the instructional vision specifically as it was related to the technology initiative. Meagan, the Monroe technology director explained:

> The year before I came into the district, they developed a "technology task force" and it's been in place 6 years. It was a team of teachers, administrators, people in the community, and a student. They worked together to develop a vision and a goal for [our district] around what technology should look like. A lot of those players had corporate or educational backgrounds or K-12 experience. They were not only defining what we need as far as infrastructure, but they were also defining some educational goals because they were out working in the industry a step ahead of K-12. That group has been working together to craft this vision in the community, and helped bring us to where we are.

In the Washington School District, where Brody, the superintendent took the unusual approach of teaching a class on how he envisioned technology integration in the classroom, his staff noted the benefit of this helping to reinforce his instructional vision. In a discussion regarding how the instructional vision was taking shape within the

Washington School District, Caitlin, a technology specialist, stated that teachers who took the superintendent's class were definitely utilizing technology more than others.

The Washington superintendent was consistently identified as *the* driving force in implementing the technology instructional vision in his district. This approach was different and unusual from all other districts. Most districts portrayed the implementation of the instructional technology vision as a more distributed process that had more of a balance in key players who were pushing the initiative forward. At first glance, this finding might appear to contradict the results in Table Six, which shows how key players in each district's technology initiative responded to who was involved in the *development* of the instructional vision. However, this is not the same as who was involved in the *implementation* of the instructional vision. It is also important to note that in the Washington District, the superintendent named the former superintendent as the person who primarily developed the instructional vision while all technology integration specialists in this district collectively stated that the development involved all stakeholders in the school community (superintendent, district administrators, teachers, parents and community members).

Staff and community involved with instructional vision. Nearly all districts that participated in this study shared that the implementation of the instructional vision, specifically as it relates to the technology initiative, extended itself beyond the superintendent and the district leadership team. Teagan, the Director of Academics in the Madison School District, shared an example of how this collaboration of implementing the vision was fostered in their district:

> We [the district leadership team] set district goals and then each school, of course has their school improvement plan… we constantly refer back to that [district goals and school improvement plans]…what do we need for tools? how do we embed technology? how do we reach all the learners for differentiated instruction? Staff, teachers, and all players have a big role in that.

Nearly all of the district participants of this study expressed the importance of ensuring that the teachers, parents and the general community were a part of the vision implementation process, but again, this was mostly related to the technology initiative. This included educating individuals on various aspects of the technology initiative. For example, Adams School District offered free professional development on utilizing laptops. Paul, a principal in the Adams School District shared how they approached this process:

> We run a lot of sessions where we bring them [parents] in and teach them how to use the stuff, reach out to them and say "even though you don't have kids in this school, we're still a resource for you, it's a community.

Ava, a technology specialist in the Washington School District, also conveyed that the support of all stakeholders was solicited to help them understand the technology vision: "We went over these questions with many people. We felt the community had input through different meetings as well, and they still do. I think all in all, everyone is included. Parents, teachers, student and administrators."

In the Jefferson School District, Grace, an assistant principal, educated teachers on how technology could help transform learning and their instructional vision, thereby creating resonance for the staff:

> That was part of our planning leading up. You have the mix of teachers that are really gung-ho about technology and those that are afraid, so how do you push them all with your vision? What I did was in the opening faculty meeting – and I feel this helped – I went over the SAMR[12] model of what you're doing with technology. I said it's okay to be at any one of these levels when you start, but the goal is to take risks, because we want you to move up the model.

In the districts of Jefferson, Monroe and Washington, the district administrators provided evidence that the superintendent, district administrators, teachers, parents, students and community members had some part in the implementation of the instructional vision. Evidence of how these superintendents and district administrators helped in the implementation of the instructional vision is detailed in upcoming sections. Teachers were often identified as helping to implement the instructional vision through their participation in district aligned professional development and their work toward implementing district initiatives. Ethan, a principal in the Washington School District explained: "There are informal positions where [teachers] are facilitating the work being done in aligning curriculum, developing common assessments, talking about vertical alignment, and the overall direction of the district."

Students were primarily identified as helping to implement the instructional vision by their demonstrations of technology use at community presentations. Parents and the community were often identified as helping to implement the instructional vision through their participation in PTOs, various committees that supported the district

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[12] SAMR = Substitution, Augmentation, Modification, Redefinition. Indicates the level of technology integration from low to high (Puentedura, 2013).

instructional vision and through attendance at various district-sponsored events. Tim, the former principal of the Monroe School District stated that: “We had students who were also involved in [the technology initiative] present at the community meeting, so their voices were a part of it. We had parents there as well.”

Howard, the director of technology of the Adams School District explained how students and parents supported the instructional vision, which once again, translated to the technology initiative, through this example:

> When we did the iPad carts, we formally -- not formally, we put together an iPad 1:1 committee and that was parents and students. It was all volunteer of course. It all took place after hours. There were a few people on our IT team and then a few administrators as well. We would meet together; we would talk about some of the things that were already happening in our pilot programs and also some of the things that were available.

As illustrated by the quotes above, it is important to note that as discussed in the previous section, all districts provided more evidence of how stakeholders where implementing the instructional vision through *the use of technology* rather than the *defined instructional vision* of the district.

Table 9

Stakeholders Involved in the Implementation of Each District's Instructional Vision

District	Superintendent	District Administrators	Teachers	Parents	Students	Community Members
Adams	X	X	X	X		
Washington	X	X	X	X	X	X
Jefferson	X	X	X	X	X	X
Madison	X	X	X			
Monroe	X	X	X	X	X	X

Note: This data reflects *collective* responses from participants in this study. It does not reflect *agreement* by all participants that each of these groups was involved in the implementation of the district's instructional vision.

Another curious finding is that not all of the district administrators who participated in this study provided examples as to how they were specifically involved in the implementation of the instructional vision in their district.

Effect of the Superintendent's Instructional Vision with a Technology Initiative

In these districts where a large-scale technology initiative was present, district administrators felt that the superintendent's leadership in defining and supporting the instructional vision for the initiative helped gain acceptance.

Superintendents lay the groundwork. Research question three sought to identify how district administrators made sense of the superintendent's vision and the technology initiative. District administrators discussed the ways in which the superintendent communicated and supported the instructional vision to help them understand the instructional vision and its connection to the technology initiative.

All district administrators gave evidence that the superintendent was helpful in implementing the instructional vision of the district. Yet once again, at least one district administrator in each district blurred the line between the instructional vision and the technology initiative, often making the two synonymous in some districts. When asked to describe how the superintendent was supporting the instructional vision of the district, at least one administrator in each district described the support for the technology initiative and not other instructional goals.

Different leadership styles. In the Adams School District, where there was the least amount of alignment identified between the articulated instructional vision of the superintendent and the district administrators, the district administrators gave the most examples of how the superintendent supports the implementation of the instructional vision- primarily through the technology initiative. Tim, a technology integration specialist from Adams summarized this support by stating:

> Having [Norman] as a superintendent, there's -- I can't imagine this program [technology initiative] working without having somebody like him that is so willing to kind of go to the right people and not just make decisions without the proper knowledge. That's one of his best qualities; he'll joke about it, he'll say he knows nothing about [technology] when he really does know a lot about it, but if he doesn't understand something he goes to somebody who he thinks he knows more of the expert and looks for their support. I don't think anybody in this district feels that they don't have the support of the leader in this initiative, and that makes more people more willing to try to use it. I don't think people feel like he is not a part of what's happening in the program, whether it's technology or any instructional practice, he's involved. And I think people feel very appreciated and they feel very supported and that's why I think so many people are willing to try out new things, because he's always there.

Norman, the superintendent from Adams, cultivated a learning environment where the key players of the technology initiative felt they had the autonomy to try new things and felt that the superintendent was in support of their work. Norman summarized this in the following manner:

> Every kid has to get what they need when they need it. If it's an iPad today, a Chromebook tomorrow, who the hell cares? If brilliant instructional people came to me, and said "I want to be able to do this", I want to say as long as kids aren't getting hurt, great! Because that's how you're going to stay jazzed up in your job and do what you want to do. If you get told no 150 times, you get frustrated. The challenge for me was to create an environment where that happened.

Based on interviews conducted with the superintendent and district administrators, Jefferson School District had the highest level of alignment identified between the instructional vision of the superintendent and the district administrators, yet provided the least amount of examples of how the superintendent supported the instructional vision. In the Jefferson School district, it appeared that the building administrators were the driving force behind the initiative and the superintendent played more of a background role of support. Charles, a Jefferson principal, supported this with the following statement: "[David, the superintendent,] said to do your research because we were going to have to live with it. He was there, but we had to get our ducks in a row."

Because the technology initiative at the Jefferson School District was primarily funded through a new high school building project, Charles, the high school principal, played a large role in many aspects of decision making when it came to the technology initiative. He explained:

> [There was a group of people involved], many people, but everything still had to go through [Grace, the assistant principal] and myself, and as the process went on longer, we separated a little more, where I handled more of the building instruction and furniture and equipment, and [Grace] took on the role of working the meetings, making sure everybody was on board on the technology side. It was a partnership that way. When you go through a building project, you know there's so many pieces to it.

Similar to Norman, the Adams superintendent, David, the Jefferson superintendent, was also cultivating the implementation of the instructional vision through technology. In both scenarios, the superintendent played a role in implementing the instructional vision, just utilizing a different style. These various elements of support, whether intangible (above) or tangible (professional development and resources), were seen in all districts.

While all superintendents provided support in the implementation of the instructional vision, the perception of this involvement was higher in some districts than in others. The district administrators in the Adams and Washington school districts gave the most examples of how the superintendent helped to implement the instructional vision of their districts while district administrators in Jefferson and Monroe school districts gave the least.

District Administrators, the Instructional Vision and the Technology Initiative

This section will outline the findings related to how district administrators made sense of the superintendent's instructional vision in a large-scale technology initiative. This will include a look at the alignment and clarity of the instructional vision between the superintendent and district administrators and evidence of the instructional vision taking shape throughout the district.

Alignment of instructional vision with superintendent and district administrators. District administrators in large-scale technology initiatives are not always consistent with the superintendent in their communication and understanding of the instructional vision of their district. This is illustrated in detail in Appendix Q that outlines the instructional vision that was identified by interviewees. As the examples presented below will show, many district administrators see the technology initiative as the instructional vision for the district and align their work to this initiative. All district administrators either do not display evidence of a clear alignment with the superintendent's instructional vision and/or take liberties in describing the instructional vision for the district. They express a vague understanding of the superintendent's instructional vision and expand their idea of the instructional vision based on their own beliefs about teaching and learning.

In order to determine the alignment between the superintendent's articulated instructional vision and its connection with technology use in the district, both superintendents and district administrators were asked to share (1) the instructional vision of the district and (2) how the vision was being supported through the use of technology in the district. In the Washington School District, Brody, the superintendent, shared that his instructional vision was focused on 21st century learning skills, student engagement and technology use. At least one of the seven district administrators mentioned at least one of these components when asked about the instructional vision; however, none of the district administrators mentioned all of them and some did not mention any of these elements. In the case of the Washington School District, it seemed the technology staff had the most difficulty in articulating the instructional vision on their own. Ava, the Washington technology specialist, did not articulate any instructional vision. Caitlin, another technology specialist from the district, stated: "I would refer to the district mission statement, which I don't have at the moment but is on our district home page."

In the Washington School District, the element of student engagement had the most alignment between the superintendent and district administrators. Two out of the seven district administrators interviewed for this study (28%) shared the importance of this component in relation to the instructional vision of the district. This included both Ethan and Grady, who were middle school principals in the district.

Norman, the superintendent in the Adams School District, focused his instructional vision primarily on meeting the needs of the whole child. Throughout various parts of his interview, he also highlighted the importance of literacy and student engagement.

> I guess my vision in any district would be that kids get what they need, when they need it. I think the district's role in that is – the work of schools is done in the classroom, so the work of a central office is really to provide the space for that to happen and stay out of the way as much as we can. It's not much of a vision, I wish I could say "world peace," but I just think you need to get kids what they

> need, value all kids, all learners, and recognize that the work of schools isn't done in my office.

Two out of the three district administrators (67%) from his district stated that student engagement was an element of the instructional vision, while none of the three administrators talked about literacy and a focus on the whole child.

David, the superintendent of Jefferson, mentioned the following elements when asked about the instructional vision of his district: 21^{st} century learning skills, collaboration, student engagement and technology use. There were only two district administrators from Jefferson who were interviewed for this study. They included the high school principal and assistant principal who were both involved in the large-scale technology initiative via a new building project. Both Charles, the high school principal and Grace, the high school assistant principal, shared David's instructional vision related to student engagement but did not discuss collaboration or reference technology use in their descriptions of the instructional vision. Charles, the high school principal, also talked about meeting the needs of the whole child and Grace, the assistant principal, elaborated on the importance of developing critical thinking skills. In reference to student engagement, David, the superintendent of Jefferson highlighted the following:

> I'm trying to make sure that every student has access consistently to very rich dynamic materials and curriculum. Those materials and curriculum are focused on the long-term development of creativity, communication, critical thinking and collaboration. We want student to be highly engaged, actively learning.

Charles, a principal in the Jefferson School District discussed the focus on student engagement and then elaborated to include:

> The only thing that comes to mind is reaching all learners in a wide variety of ways. I think it's the engagement piece- how do we engage kids, some who excel in the high end and some who don't. Meeting the needs of all those kids. Then from there, for them to show some success at whatever level they're at, and to achieve some confidence in themselves. The vision is to see teachers take risks, students take risks, us to take risks. That we see an environment where teachers and students can excel by using a wide variety of things, and be able to take chances and go in different directions. That's the job of a leader, not to hinder people.

As illustrated from the two quotes above on student engagement, there was alignment on the importance of student engagement, but consistent with many district administrators in this study, Charles elaborated to share his own beliefs about the instructional vision.

Bob, the superintendent of Madison School District, spoke at great length about meeting the needs of the whole child, differentiated instruction and the importance of collaboration between administrators and teachers to help meet the needs of students:

> I think overall, what we're really looking for in a district or what I'm looking for in a district is to…and I think it's pretty clear in the vision stated which is to challenge every student in a setting appropriate for their needs. So that means a lot of differentiating instruction, that means meeting students where they are at… I think we worked as a leadership team and we meet weekly and looked at the various concerns that people had across the district. A lot of those concerns focused on how we meet the students' needs, in particular educational needs,

> behavioral needs and social needs. [We tried to find out] what would it take to empower teachers to help meet those needs in terms of professional involvement, in terms of time, in terms of a collaborative effort.

Three out of the four district administrators (75%) interviewed from Bob's district reiterated the importance of differentiated instruction. One out of the four district administrators referenced the development of the whole child, but no district administrators referenced collaboration as a big component of the instructional vision. Rose, a principal in the Madison Public Schools stated:

> Our district is huge on the whole child. I would say using data and our [state assessment scores] is important, but not our sole driving force here. Technology is a huge initiative, and has been a huge focus of our superintendent to make sure that all our teachers are using technology in their lessons, and designing engaging lessons for students. Given how students learn these days, engaging them is also a big part of implementing technology into the classroom.

Clarity and the instructional vision. Rose's statement above seems to support a re-occurring misconception throughout the study of the instructional vision; that is, the integration of technology is often confused as the instructional vision rather than a tool to support it. It also highlights some of the common liberties taken with the articulation of the instructional vision between superintendents and district administrators.

Jackson, the superintendent of Monroe Public Schools highlighted the development of creativity and technology use when discussing his instructional vision. Only two district administrators were identified by Jackson to be interviewed for this study. Meagan, the director of technology, did not discuss creativity in her description of the instructional vision. As referenced in a previous section, Meagan, talked about Open Source Resources and student acquisition of their own knowledge, which is closely related to technology use. When asked about his district's instructional vision, Tim, the former high school principal stated:

> [In Monroe], I don't know if there is anything written or codified that officially explains that. There's a mission statement at the high school that came out of the accreditation process that happened well before I got there. When I arrived, it seemed clear there was a focus on 21st-century skills, and therein, the anchor piece was around the Four Cs: Communication, Collaboration, Critical Thinking, and Creativity. It was around those focuses that instructional practices came together.

Tim's reference to creativity seems to be underscored in the connection to 21^{st} century learning skills, while Superintendent Jackson clearly highlighted this as a major component of his instructional vision. Also it's important to note that an individual school's mission statement is not the same as the district's instructional vision.

As stated above, while most district administrators provided examples that were closely related to the superintendent's instructional vision, a large majority articulated elements of an instructional vision that were not communicated by their superintendent.

For example, in the Adams School District, the district administrators collectively articulated a connection to the superintendent's instructional vision focused on student engagement, however, they also placed a heavy emphasis on providing students with authentic learning experiences, college and career readiness skills, collaboration skills, communication skills and fostering creativity. These were all areas that were not articulated by the Norman, the superintendent. Jim, a technology specialist in the Adams School District stated:

> The biggest thing that we were looking for is that we felt that our kids were not coming into a school environment every day, which was like the world they were living in. They were going to go to college, they were going to get access there, they were going to workplaces and have access to devices there – we just felt that we needed to create an environment that was more like the world which they were going into. And that was our goal in this.

As stated in the previous section on the instructional vision of a superintendent implementing a large-scale technology initiative, all superintendents articulated the instructional vision in very different ways. In all districts, the instructional vision was explained in very general terms ("give kids what they need, when they need it" or "make students owners of their own learning"). The communicated instructional vision of these superintendents often required much parsing together of terms and examples and left much room for interpretation. As a result, when district administrators were asked to state the instructional vision of their district, they either described terms or scenarios that were closely related to what the superintendent articulated as the instructional vision or made statements that were not communicated by the superintendent at all.

All of the above seems to indicate that while the superintendents in a large-scale technology initiative articulate some type of instructional vision, their district administrators who are key players in implementing the technology initiative do not clearly communicate it or communicated it in the way that made sense to them. Additionally, the data examined above also seem to indicate that district administrators create an instructional vision related to their own perspective of what teaching and learning should look like and this is not always in sync to what the superintendent is emphasizing for the instructional vision of the district.

Role of technology in teaching and learning. In trying to understand how superintendents connect their instructional vision with the implementation of technology in their district and how district administrators made sense of this, superintendents and district administrators were asked to describe the role that they believed technology should play in teaching and learning.

Brody, the superintendent of the Washington School District, Norman, the superintendent of the Adams School District and David the superintendent of the Jefferson School District all emphasized that the use of technology in their district was a means of getting to the instructional vision of the district.

In the case of Brody, the superintendent of Washington, he stressed that technology was a tool to help move the vision forward:

> It's not driving the vision; it's a tool to help us get to the vision. I think the important piece about the access to having a mobile device is that there are going to be days when the device is not used at all in the classroom. I see it as a tool, and nothing more than a tool. It shouldn't be driving what we're doing.

Norman, the superintendent of the Adams School District emphasized this point as well:

> We say it all the time – a [bad] lesson with an iPad is a [bad] lesson. Focusing on high-quality, engaging instruction has nothing to do with the device. We look for and prioritize engagements. Technology is one vehicle towards that, but may not

> be all the time. That's our focus. One of the nice things about putting the technology in place is that it's put a lot more pathways for kids to get to the outcomes we're trying to get them to.

District administrators were also asked what role technology should have on teaching and learning. Consistent with the superintendents, nearly all district administrators described technology as a tool in meeting the needs of students. No district administrator connected the specific instructional vision of their district to technology use in their district. Instead, they spoke of technology as a tool in accomplishing very general goals related to learning. Paul, the principal of the Adams School District focused on the use of technology in classrooms as a "must have" to accomplishing very general learning outcomes:

> I think it's like "what role should electricity play in education?" You just have it. You don't think about it any more…we feel like our kids will be better off if they get to where they're going, and this is just part of what they do. That's what we're striving for.

A few district administrators outlined more specific connections between the instructional vision of their district and the use of technology. Tim, former principal of Monroe School District stated:

> I think technology is integral, but it's a tool. It's not the actual teacher. When you think about the four Cs, collaboration and creativity, this is a mechanism with which students can achieve those ends. I think it makes instruction a lot simpler.

Although many district administrators emphasized the role of technology as "just a tool for learning," they also used it to define their district's instructional vision.

Nearly all district administrators gave examples of how technology is used to support some aspect of the superintendent's instructional vision; however, they also elaborated on other learning objectives that technology use achieved throughout the district. For example, as referenced earlier, Bob, the superintendent of the Madison School District stated that part of his instructional vision supported a focus on differentiated instruction.

The concept of differentiated instruction as a focus of the instructional vision and technology use for the district was reiterated by the high school principal, however, he elaborated on the vision as well:

> We're doing a lot of small group differentiated instruction, and the teachers are looking at individual needs and what they need to do to address each individual child….I would also say this year, our big focus in student engagement…in walkthroughs, that's what we've been looking for.

Evidence of the instructional vision taking shape in the district. All participants of this study to provide evidence of the instructional vision taking shape throughout the district. In each of the twenty-three interview transcripts, specific examples of how technology was being used throughout the district was extracted and coded by the instructional vision focus areas that were identified by the superintendents. These focus areas included: whole child, student engagement, college and career readiness, collaboration, communication, creativity, literacy, 21st century learning and differentiated instruction. The purpose for this area of the research was to see if the district administrators could provide examples of how technology was specifically supporting the instructional vision of the superintendent. For example, Bob, the superintendent emphasized that his instructional vision included providing students differentiated instruction. Theresa, the district grant writer, gave an example of how technology was supporting this instructional vision component:

> [We started] using on the laptop to help reluctant readers read and make progress with their reading. And so, one of the things that was hard for them was if they came across a vocabulary word that they couldn't sound out or they couldn't deem to understand the definition. From this, it let them highlight it and somebody would, you know, a digital voice would pronounce it and explain it and so they, they weren't held up by having to look it up in a dictionary and be uncertain about whether or not they will pronounce it.

Table 10 illustrates the alignment between the superintendent's instructional vision and examples from district administrators of how technology supports this vision throughout the district. The superintendent's instructional vision is listed in the second column. A check mark next to their instructional vision focus area indicates that a district administrator(s) provided an example of technology use within the district that supports this particular focus area. With the exception of the Jefferson and Monroe School Districts, all district administrators identified an example of technology use within the district that supported at least one aspect of the superintendent's instructional vision. The sections labeled, "other" indicates that district administrators provided other examples of how technology supports various focus areas related to an instructional vision outside the scope of what their superintendent articulated.

Table 10
Alignment of the Superintendent's Instructional Vision and District Technology Use

Superintendent and District	District Administrators examples of how the superintendent's instructional vision is being supported by technology use throughout the district.	Superintendent instructional vision areas where no examples of technology use was provided
Superintendent Norman from Adams	✓Whole Child ✓Student Engagement OTHER: Collaboration, CCR (College and Career Readiness	Literacy
Superintendent Brody from Washington	✓Collaboration ✓Whole Child OTHER: Communication	College and Career Readiness Student Engagement
Superintendent David from Jefferson	No connection	21st learning Collaboration Student engagement
Superintendent Bob from Madison	✓Differentiated Instruction OTHER: Student Engagement, Creativity, 21st Century Learning, CCR, Literacy	Whole Child
Superintendent Jackson from Monroe	OTHER: Differentiated Instruction	Creativity

Note: Check marks indicate an alignment between the superintendent's instructional vision and examples of district technology use provided by district administrators. The term "other" identifies an additional learning goal that district administrators provided examples in terms of technology use in their district.

Utilization of the Instructional Vision with Motivational and Prognostic Framing

Superintendents often utilized an instructional vision with elements of motivational and prognostic framing to create resonance with the technology initiative to stakeholders. This involved superintendents outlining specific issues or problems related to teaching and learning in their district, articulating their goals and showcasing how technology could play an important role in rectifying these issues or problems. The district administrators who were identified as key players in the technology initiative used this practice as well.

As referenced in Chapter 2, *prognostic framing* identifies certain problems within the organization and then outlines goal through a plan of action. *Motivational framing* brings forth collective action toward the goals via language and communication of the frame articulator. For example, Brody, the Washington School District's superintendent teaching a class to his staff related to how technology should be integrated in classrooms best represented the motivational frame in action. As an incentive and reward for taking this class, staff members were given technology to utilize in their classrooms.

Table 11 provides other examples of how the superintendents utilized motivational and prognostic framing in conjunction with the instructional vision to create resonance for the initiative. The first column identifies the superintendent or district administrator and their district. The second column provides evidence of either motivational or prognostic framing in connection to the instructional vision through interview quotes.

All superintendents utilized prognostic framing in connection with the instructional vision. All superintendents with the exception of Jackson from Monroe and David from Jefferson utilized motivational framing in connection with the instructional vision to help gain acceptance with the large-scale technology initiative. The comments below from both superintendent and district administrators illustrate that all districts utilized motivational and prognostic framing in connection to an instructional vision and moving the technology initiative forward.

Table 11

Examples of the Instructional Vision used with Prognostic and Motivational Framing

District Position	Quotes related to the instructional vision and motivational and prognostic framing
Jackson, Monroe Superintendent	PROGNOSTIC FRAMING: "One of the things I wanted to do was make sure the system wide goals resonated- we developed a uniformed format for school improvement plans and so as a bottom line, all schools had to have at least one goal related to each of the system wide goals."
Bob, Madison Superintendent	PROGNOSTIC FRAMING: "In getting it out to the public, one has to connect the broader goals about what you're trying to accomplish with regard to academic content and skill building with what you're trying to achieve with the investment." MOTIVATIONAL FRAMING: "In my mind, technology is like oxygen in the room. You never see it, it's never in your way but without it, you can't function. You can't do the types of tasks you really want to do. I'm not a believer in acquisitional learning. I heard someone say once, "No one is ever going to pay your students for information that looked upon on Google."
Norman, Adams Superintendent	PROGNOSTIC FRAMING: "Lots of different initiatives have come and gone because it really hasn't been exactly what we wanted to see in the classroom. That isn't the case with this initiative." MOTIVATIONAL FRAMING: "My strategic plan, if there was one, was to just simplify this. Don't put together a five year study of how we're going to get into the 21st century. People don't want to hear that…just figure it out and do it." PROGNOSTIC FRAMING: Our kids are pretty good kids and they are fairly tolerant of poor instruction so and I am not knocking teachers. What I am saying is that teachers can get up and not have a very dynamic curriculum or not have a very engaging curriculum and the vast majority of our students will generally be compliant. MOTIVATIONAL FRAMING: I was hoping that by going 1:1 we could create a new medium where teachers would have to rethink their curriculum and almost rethink what they were teaching and create it again. I was hoping that people would rethink their classrooms, start to rethink the way school looks in regard to the restrictions of time and place, and really develop an engaging learning environment.. You know and engaging quality for us would be personal response. Can we individualize the experience enough for students to really get them to be excited by it and engage in it and give them some control over their learning?
Brody, Washington Superintendent	PROGNOSTIC FRAMING: "It was really starting to hit home that we need to change what we're doing in the classroom, that we're not effectively preparing our students for jobs that don't exist yet. That's where the vision first germinated, at that time." MOTIVATIONAL FRAMING: "I started meeting more with my instructional technology staff and telling them, "I want to do this in a year."
David, Jefferson Superintendent	PROGNOSTIC FRAMING: "In the most simplistic way, [technology] is a tool to help us get to our fine ends. A big piece of that I see as clearly preparing students for a world having these devices, having this level of connectivity can be powerful and forceful….I like the fact that we're starting to move in a direction where not only does it look differently …but it's augmenting and improving our level of instruction in our goals for learning."
Charles, Jefferson District Administrator	PROGNOSTIC FRAMING: "A big focus of teaching and learning was to focus on student engagement and higher-order thinking skills, and making that switch from teacher-directed instruction to more student-directed learning.
Theresa, Madison Grant Writer	MOTIVATIONAL FRAMING: "You want a kind of leader that envisions things like school technology…You want visionaries…they think outside the box, can see the future for kids and the district overall. This is what has motivated others
John, Washington Network Manager	MOTIVATIONAL FRAMING: "In this district, we are always trying to provide value of the things we are doing." PROGNOSTIC FRAMING: "The vision is to have all students have access to learning, regardless of pace, ability, skillsets, so they can all reach their potential."
Jim, Adams Technology Integration Specialist	MOTIVATIONAL FRAMING: "The reason why things, I believe, have been very successful here at tech. integration is because the administration, the superintendent and the team are very connected and very much on the same path. That's why I think it works so well."

Professional development, supporting resources and communication make a difference. The use of motivational and prognostic framing to help gain acceptance of a large-scale technology initiative involved strategic actions related to the areas of professional development, communication of the instructional vision, the allocation of resources, programs and the use of data and classroom observations. This is described in detail in the following sections.

Professional development and the instructional vision. When superintendents and district administrators were asked how the instructional vision was taking shape within the district, the majority of them gave evidence in the form of various professional development activities that supported technology use in the classroom by teachers and students. However, they did not always explain how the professional development specifically moved forward their instructional vision, which was not always synonymous with the technology initiative.

For example, Norman, the superintendent of Adams stated that his instructional vision was focused on the whole child, literacy and student engagement. However when asked to provide evidence of that taking shape in the district, in terms of professional development, Norman cited their development of *Educamps*, which are professional development sessions in which educators set the agenda based on their interests and share thoughts around the topics. He found the value of this professional development structure being that teachers "got to do different things that they wanted to do and share what was important to them" but did not identify how they were connected to the instructional vision of the district. He also stated that teachers were also given choices of courses to take during these days but nothing specific to the whole child, literacy or student engagement. This is not to say that the topics teachers selected to take part in during the *Educamps* where not related to whole child, literacy and student engagement topics. Norman just did not explicitly spell out how professional development activities that were offered to staff either connected to or helped move his instructional vision forward.

This is in contrast to Jackson, the superintendent of Monroe, who in addition to technology use, cited a focus on the *whole child* as his instructional vision. He discussed *Response to Intervention* professional development quite extensively and gave examples of how technology was supporting this effort. *Response to Intervention (RTI)* is an educational model that utilizes learning and behavioral data in various forms to make decisions and action plans to help a student with both learning and behavioral goals (Elliot, 2008). Jackson believed that the RTI model could help address the needs of the whole child and technology had a role in its effective implementation. Jackson felt that technology could support the implementation of RTI through specific software and web-based programs that provides students educational opportunities to improve their skills in various areas. He also felt that software and web-based programs that helped to collect, chart and analyze student progress data could also increase the goals of RTI. Jackson explained the connection in this manner:

> I mentioned for instance, Symphony Math and Lexia, those are two tools that are sort of natural assessments that teachers can get the information about how kids in their class are doing with regard to particular skills and where they are progressing with regard to their overall skills, which is another way the technology helps around assessment.

The main focus of professional development in these five districts was related to furthering the use of technology in the classroom by the teacher and by the student, however, it is important to note that very little was communicated as to how these activities explicitly pushed forward the non-technology elements of their overall instructional vision.

With the exception of the Jefferson School District, all districts that participated in this study communicated that they utilized district staff to facilitate technology professional development. Brody, the superintendent of the Washington School District even taught a class to district teachers regarding the use of technology in the classroom which one district administrator voiced as a valuable strategic move: "The superintendent's technology class that he taught really helped teachers move forward with things."

Tim, a high school principal of the Monroe School District shared how professional development around the instructional vision was implemented in his district:

> One thing we did last year, we did "technology share days" where teachers would sign up to go see different presentations, like a best practice experience, but outside your content area. A History teacher might be doing something a Math teacher could integrate into their classroom.

Additionally, the districts of Adams, Madison and Washington utilized outside personnel to conduct technology professional development for district staff. Brett, the director of technology in the Madison School District shared their experience:

> We actually contracted with [a local university] to offer courses here for our teachers where they would structure technology lessons using the Understanding

> by Design model. We'd evaluate these lessons in our evaluations and hosted these lesson plans on our website. It was a great resource and an overall successful process.

Communication of the instructional vision. Other examples of evidence of the instructional vision being supported throughout the districts included the communication of the instructional vision and the technology initiative to various groups of stakeholders.

Tim, a high school principal in the Monroe School District shared how this strategy was a collaborative process in their district as it pertained to the technology initiative:

> It was a matter of getting the group together and having them be the mouthpiece for the direction the school was headed. There were a couple community meetings and presentations at school committee, always as a teacher initiative, never as an administration-lead initiative.

Nearly all the districts reported that the superintendent played a large role in getting the message out to the community- at-large of the direction the district was moving in and that this communication created buy-in in terms of the technology initiative.

All district superintendents utilized a strategic process of saturating the community with the district's instructional vision as a method of gaining acceptance of the technology initiative. The instructional vision for technology was often communicated through newsletters, meetings, reports and the use of social media venues. Jim, the technology integration specialist from Adams shared how his district accomplished this:

> The other thing that we do that I think we do well is we kind of control the news a little bit, so we have lots of blogs. Twitter obviously -- social media is a big part of what we do. We're highlighting as much as possible what's happening in the classroom, so you could easily go on a principal's blog, or a tech specialist, or a library blog, and see four or five examples of lessons happening with technology engagement, a lot of talk about what they're doing with students in the classroom, how things are going, visiting Google or doing something else that's outside the classroom.

Frequently communicating the instructional vision throughout the district helped to familiarize all stakeholders with the teaching and learning goals and allowed them to see the connection between the instructional vision and the technology initiative.

Jefferson and Washington School District shared the importance of showcasing how the instructional vision was taking shape in their district through the use of technology as a method of gaining buy-in for the initiative. Brett, the director of technology for the Madison School District explained:

> I don't want to call it a science fair, but they had like a little technology fair where they were demonstrating what they had produced on the devices whether it be writing documents or web pages or movies or whatever it happened to be -- so they were showing parents the projects that they had done and so people really got into it.

Nearly all superintendents shared that they clearly communicated their vision to their staff. Jim, the technology integration specialist from Adams explained:

> Now for the staff, there's no question that there is some expectation and there's an understanding that you have to integrate some technology. No one says you have to use technology all day long, but there's a very consistent message from the leadership and the administration that you should be trying to integrate something new.

Resources, programs, data and observations and the instructional vision. The superintendents and district administrators that were interviewed for this study also cited various resources, programs, data and classroom observations as evidence that the instructional vision (focused mainly on technology use) was present in their districts. All technology directors and specialists shared examples of how their department supported the vision. Jim, the technology integration specialist for the Adams School District, shared that the resources his department provided the teachers had to be seamlessly integrated into classrooms:

> Technology is just a tool that helps you with what you need to do with your curriculum. I don't think technology for us or for anybody should be the total focus – it's just part of what you have as a resource. So we say a lot that, you know, you have a curriculum, you have content, you have materials, you have standards that you need to reach -- how can we help you bring technology into those standards? What can we do to integrate maybe a lesson that you've always done on a poster board, but now let's do it with an app that can explain everything, or do it while you're creating something that's more interactive, that's more visual.

Nearly all the superintendents that participated in this study expressed that providing meaningful programs and resources to teachers was a strategic action that helped them move forward their vision and the technology initiative.

The role of programs, data and observations in gaining acceptance. Less frequently discussed methods of support utilized by the superintendent to implement the instructional vision, were the use of programs, data, and classroom observations, however, they were identified nonetheless. Regarding the use of data to support the instructional vision, Jackson, the superintendent of the Monroe District stated: "So we're using technology to kind of supply information to teachers around assessment and even on basic level of just putting the results in spreadsheets that they can look at and compare how kids are doing."

Classroom observations were also described as a strategic action in implementing the instructional vision. David, the superintendent of the Jefferson School District explained: "In terms of [evidence of the instructional vision in our schools], so far the evidence is qualitative in terms of what I see every day, of what I'm hearing back, in terms of [my discussions with] teachers."

Whether it was professional development, programs, resources, data, time, classroom observations or communication, all superintendents and district administrators expressed that these elements that supported the instructional vision were key components in gaining acceptance for the technology initiative.

Maximizing the instructional vision in a large-scale technology initiative. While the section above discusses various ways in which superintendents utilized their instructional vision to create resonance and acceptance of the technology initiative through various strategic actions, superintendents in this study did not always articulate how technology could maximize their instructional vision. For example, each superintendent who participated in this study was asked how they had hoped the technology initiative would help address various issues or problems within their district. Only Norman from the Adams School District and Jackson from the Monroe School District stated that the technology implementation directly correlated with their instructional vision. Norman, superintendent of the Adams School District referenced student engagement as part of his instructional vision. When asked how he hoped technology would help address issues in this district, he stated:

> I guess I was hoping to improve the level of student engagement. Our kids are pretty good kids and they are fairly tolerant of poor instruction… and I am not knocking teachers. What I am saying is that teachers can get up and not have a very dynamic curriculum or not have a very engaging curriculum and the vast majority of our students will generally be compliant. I was hoping that by going 1:1 we could create a new medium where teachers would have to re-think their curriculum and almost re-think what they were teaching and create it again…and really develop an engaging learning environment. Can we individualize the experience enough for students to really get them to be excited by it and engage in it and give them some control over their learning?

The other three superintendents expressed little to no relation to their instruction vision and the hopes they had for the technology initiative.

For example, Bob, the superintendent of Madison stated that his instructional vision focused on collaboration and differentiated instruction, however, when asked how he hoped the technology initiative would help address educational issues in his district he stated:

> We were working to make technology more ubiquitous for our students and the way in which we went about that also helped us reach out to provide some potential Internet service to those students who at the time we started the program did not have any Internet service at home. In addition to that we hoped that over time it would allow us to save money in the district by eventually moving to electronic materials for the classroom and to engage students and teachers more fully in an interactive process of education.

There was no mention by Bob, the superintendent of Madison, of how technology would help support his instructional vision of collaboration or differentiated instruction in his district. This seems to suggest that for some superintendents, there was little relationship between the instructional vision and the reasons for going forward with the technology initiative. For most of the superintendents, the technology initiative seemed to be viewed as an element of pushing forward the technology simply because it represents "getting a head of the curve" or provided some other value within the district that was unrelated to the instructional vision.

Table 12 summarizes a list of the instructional vision of all five superintendents and the educational goal they identified the technology initiative would help their district with accomplishing. The connection between the superintendent's instructional vision and the issue the technology initiative were identified as helping is bolded. For example, David the superintendent of the Jefferson School District described his instructional vision to include elements of student engagement, collaboration and 21st century learning (see column two of table 12). However, when asked what issues in his district that he was looking for the technology initiative to help with, he described that it was more about "getting ahead of the curve (see column three of table 12)." David explained:

> It was less to solve a current problem. It was more about the future- giving us a fighting chance to be ahead of the curve for once. Our 1:1 came about – the opportunity in terms of funding came about due to the fact that we had a brand new high school. I wanted to grasp that funding and that opportunity for change to avoid a problem down the road.

Table 12

The Superintendent's Instructional Vision in Relation to the Issues or Problems that they had Hoped the Technology Initiative Would Help With

District	Supt. Instructional Vision	What were you hoping the tech. initiative would help with?
Adams	Whole Child **Student Engagement** Literacy	**Increase Student Engagement**
Washington	**Student Engagement** 21st Century Learning	Equity with Tech. Access **Increase Student Engagement**
Jefferson	Student Engagement Collaboration 21st Century Learning	Get Ahead of the Curve
Madison	Whole Child Collaboration Diff. Instruction	Equity with Tech. Access Increase Student Engagement Financial benefits
Monroe	Creativity	Equity with Tech. Access

Additionally, each superintendent was asked to cite examples of how technology was utilized within their district to push forth their instructional vision. Nearly all clearly articulated specific examples of how technology was supporting their instructional vision (see table 13 below). This suggests that superintendents connect their instructional vision to how technology is being used in their districts.

Table 13

Did the Superintendent Provide Evidence of how Technology was Specifically Supporting their Instructional Vision?

District	Supt. Instructional Vision	Tech. Use Evidence Provided?
Adams	Whole Child	YES
	Student Engagement	YES
	Literacy	NO
Washington	Student Engagement	YES
	21^{st} Century Learning	NO
Jefferson	Student Engagement	NO
	Collaboration	YES
	21^{st} Century Learning	NO
Madison	Whole Child	YES
	Collaboration	YES
	Diff. Instruction	YES
Monroe	Creativity	NO

Discussion

This study focused on how superintendents utilized their instructional vision to gain acceptance of a large-scale technology initiative. In terms of the initial research questions several conclusions were determined. The superintendents who participated in this study all had an instructional vision that had element of constructivist/21^{st} century learning components. However, their instructional visions were not consistently communicated through the district through the mission statement, technology plan. Additionally, the instructional vision was not clearly understood by district administrators. In many of these districts, the instructional vision was often communicated as a description of the technology initiative and not the specific teaching and learning goals of the district. The development of the instructional vision was primarily the work of the superintendent and his leadership team. However, the implementation of the instructional vision for these districts was mostly described as a collaborative process with a focus on professional development, allocation of resources and communicating the instructional vision. The implementation of these strategic processes indicated that prognostic and motivational framing were utilized to gain acceptance of the technology initiative.

The following sections will describe the limitations of the research, outline possibilities for future studies, discuss theoretical and practical contributions of the research and provide recommendations for superintendents.

Limitations of the Research

As discussed in Chapter 3, one limitation of this study was that the process of interviewing relies heavily on the recollection and perspective of the interviewee. This can skew the narratives in terms of accuracy and bias. Also adding to skewed results was that in at least one of the districts that participated in this study, the interview questions were collaboratively reviewed in advance so the participants could formulate their responses together.

Another limitation was the large number of technology specialists that participated in this study. Several of these technology specialists (excluding the directors of technology) seemed to have limited understanding of educational jargon and the latest pedagogy that often surrounds the instructional vision. Therefore, they sometimes interpreted the instructional vision to be synonymous with the technology integration. In some districts, this was accurate, however, in other districts, the instructional vision was separate and apart of the technology initiative.

This study focused on the instructional vision of the superintendent could have been more developed if teachers were asked to be a part of the interview process. Teachers could have validated the focus and implementation of the instruction vision from the perspective that is closest to the classroom.

As stated earlier, we asked superintendents to identify key individuals who were essential in helping to gain acceptance for the large-scale technology initiative and not who were key players in developing the instructional vision. By containing the interviews to just those individuals who superintendents identified as having a key role in the technology initiative, thoughts regarding the relevance and importance of the instructional vision in each district may be limiting.

Since this study focuses solely on how the instructional vision helps in gaining acceptance of a large-scale technology initiative, there is no examination whatsoever that gauges the impact an instructional vision and a technology initiative may have on teaching and learning goals of these districts.

Lastly, the majority of district administrators that participated in this study identified individuals other than themselves, who were a part of the development of the instructional vision of their district. This could be because they were not solicited for this input or because they were not in the district at the time the instructional vision was being developed. An additional limitation of this study was the absence of an interview question that asked each district administrator the length of time they had been employed in the district and when the instructional vision was created. Questions that may project from this limitation are: (a) does the amount of turnover in a district effect the understanding and implementation of the instructional vision in connection with a large-scale technology initiative? and (b) does having the input of all key players in developing the instructional vision of the district, (including district technology staff) effect the communication and implementation of the instructional vision in a large-scale technology initiative?

Possible Future Studies

As mentioned earlier, this study did not examine the knowledge or perceptions of the instructional vision in a large-scale technology initiative with anyone else but the superintendent and key administrative staff that were identified as having a key role with the initiative. A future study could extend the examination of the instructional vision to students, teachers, parents and community members to determine its impact on acceptance and learning in a large-scale technology initiative.

Another study that might have practical applications for school districts contemplating a large-scale technology initiative is to examine if the presence of a well-aligned instructional vision in a large-scale technology initiative has any impact on student learning goals. As schools look to justify these large-scale technology initiatives, an examination on the "return on investment" might provide strong rationale as they work with stakeholders to gain acceptance of these initiatives.

Theoretical Contributions

This section identifies the theoretical contributions of this study in relation to the instructional vision and a large-scale technology initiative. Each section is closely aligned to the research questions of this study that relate to identifying the instructional vision, understanding how the superintendent utilizes the instructional vision in a large-scale technology initiative and how district administrators understand, communicate and implement the instructional vision.

The instructional vision. The instructional vision of superintendents who have participated in a large-scale technology initiative is often connected to constructivist/21st century learning components such as: communication, collaboration, creativity, student engagement, real world applications and technology use. This is consistent with early studies that suggest that constructivist/21st century learning skills are supported in technology integration efforts of schools and can assist with helping to create buy-in for these initiatives (Howland, Jonassen, Marra & Moore, 2003; Janassen, Peck & Wilson, 1999; Dede, 2010; Boschee, Jensen & Whitehead, 2003; Haertel, Means, Penuel, Roschelle & Sabelli, 2003). However, in most of the districts who participated in this study, the superintendent's instructional vision was not consistently re-iterated or emphasized in the district's mission statement, technology plan or by district administrators. This lack of consistency in defining and communicating the district's teaching and learning goals, particularly as it relates to the district's technology plan, may contribute to an unfocused implementation of technology use in classrooms that may or may not address the instructional vision of the district (Dede & Richards, 2010).

Connecting to the instructional vision. The development of the instructional vision in a large-scale technology district did not involve all the district administrators that were identified as key players of the large-scale technology initiative (primarily technology support staff). Instead, the development of the instructional vision primarily involved the superintendent and his leadership team (building principals, central office academic staff). As such, the articulation of the instructional vision in connection with the technology initiative by district administrators was inconsistent in each district. This could have occurred for multiple reasons. It could be that some of the individuals who were key players in the technology initiatives were not employed in the district at the time the instructional vision was developed. With the exception of the superintendents, not all participants were asked how long they had been in the district.

Another possibility may be related to the position some of the individuals who were identified as key players to the technology initiatives have in their district. In many school districts, the superintendent and members of his or her leadership team typically construct the development of the instructional vision. This is not to say that others do not have influence on the instructional vision, but it is often the district leadership team that clearly defines it and has the primary responsibility of implementing it.

District leadership teams usually include building principals and central office administrators who are closely connected to teaching and learning. This could include assistant superintendents, directors of curriculum and instruction, and directors of special education. While the majority (56%) of the individuals who participated in this study have roles that are typically found on district leadership teams (5 superintendents, 6 principals and 1 director of academics), 44% of the participants held different roles that would not typically place them on a district leadership team. These individuals included: one assistant principal, one grant writer, five technology integration specialists and four directors of technology. Two out of the six principals who participated in this study (Monroe and Adams) did not name themselves specifically as being a part of the instructional vision development process for their district. This is particularly interesting in the case of the Adams School District where the principal there is often identified as being the primary leader and key framer of the technology initiative (Nolin, 2014).

Another possibility for this occurrence could also be that some of these individuals were underplaying their role in the development of the instructional vision for their district. In many districts, the instructional vision was often defined *as the technology initiative*. The implementation and communication of the instructional vision in these districts, specifically as it pertained to the technology initiative, was often described as much more collaborative, involving all stakeholders including teachers, parents and students. Yet again, the focus was primarily on the technology initiative and how it helped students learn in general, not necessarily, how technology addresses the specific teaching and learning goals of the district.

Regardless, this strategic action of involving stakeholders in the implementation and awareness of the instructional vision and technology initiative as much as possible proved to be an effective district leadership move in gaining acceptance (Waters & Marzano, 2006). Lastly, in terms of *how* the superintendent connected his instructional vision with the technology initiative to all stakeholders, the superintendents utilized motivational and prognostic framing which helped to create acceptance for the technology initiative.

As discussed in Chapter 2 and evidenced in this chapter, superintendents who identify issues within their district that need attention and then outline a plan to help rectify these issues, can more easily create resonance for their teaching and learning goals or initiatives. For this particular study, the use of prognostic framing helped all stakeholders see how the technology initiative could help improve teaching and learning in these districts. Motivational framing of the instructional vision and the technology initiative also helped gain acceptance by (a) emphasizing the importance of the technology initiative to teaching and learning and (b) consistently sending the message to all stakeholders that they had a part in achieving the teaching and learning goals of the district. Both prognostic and motivational framing were primarily evidenced in the utilization of strategic actions related to professional development, the allocation of resources and the communication of the instructional vision and the technology initiative. By creating resonance between the instructional vision and the technology initiative, stakeholders could understand the value of technology in their schools (Coburn, 2006).

District administrators and the instructional vision. In terms of how district administrators made sense of the superintendent's instructional vision for technology, district administrators felt that the superintendent's leadership in defining and supporting the instructional vision for the initiative was very helpful in gaining acceptance. This supports earlier research that highlights the importance of the superintendent's ability to convey how innovations, such as technology, can fit into the existing instructional focus of the district (Christenson et al., 2008).

However, in this study, although most district administrators were inconsistent in their communication and understanding of the superintendent's articulated instructional vision, they seemed to understand and accept technology's place in the classroom. As stated above, most district administrators (particularly district technology staff) defined the instructional vision as the technology initiative. While almost all district administrators gave examples of how they support the technology initiative, they did not all give examples of how they support the superintendent's instructional vision. Many district administrators gave their own beliefs regarding teaching and learning when describing the instructional vision for their district that was not necessarily articulated by their superintendent.

Prognostic and motivational framing. The elements of *frame theory* which focus on how leaders push forward various social movements was visible and prevalent in this study of the instructional vision; specifically, motivational and prognostic framing and the utilization of strategic actions to build resonance (Benford & Snow, 2000). The application of frame theory relies heavily on how district leaders communicate to all stakeholders the relevance and importance of issues related to a certain initiative or policy *and* how they de-emphasize or ignore others (Coburn, 2006). In this study, the *motivational* and *prognostic* frames related to this theoretical lens were utilized most frequently in conjunction with the instructional vision to help stakeholders see the educational value of technology and therefore help accept the technology initiative more readily.

All superintendents in this study strategically utilized their instructional vision in some capacity as a vehicle to identify and address key instructional needs and goals that resonated with stakeholders and could be easily connected to the technology initiative. They created this resonance and acceptance for this initiative by strategically tying the instructional vision to various district functions including professional development, allocation of resources, communication to stakeholders, data collection, and observations of classrooms. As they emphasized the components of an instructional vision that engaged students with constructivist/21st century learning skills, they also created a created a sense of urgency to put digital tools into the hands of students. (Driscoll, 2004).

Practical Contributions

As stated earlier, there is much more literature and research related to the utilization of an instructional vision in the role of a principal than a superintendent. Historically, the role of a superintendent has focused a great deal on the fiscal management and political maneuvering of a school district than the development and instructional vision of the district. This study provides additional research into how a *superintendent's* instructional vision can be utilized with large-scale technology initiatives.

The *Common Core Standards* movement as well as federal regulations including *No Child Left Behind* and now *Race to the Top,* have put more pressure on superintendents to create an instructional vision as well as integrate technology in classrooms to help create productive and competitive college students and workers (Common Core State Standards Initiative, 2010); No Child Left Behind Act [NCLB] 2001; Race to the Top Executive Summary, 2009). This study provides superintendents assistance on how to connect their instructional vision to relevant learning goals to move forward a large-scale technology initiative. The recommendations leading toward this work is listed in the section below.

Recommendations

Superintendents should develop, utilize and consistently communicate a meaningful and sustainable instructional vision in the implementation of a large-scale technology initiative. As a large-scale technology is costly and there is no conclusive data yet on the impact of technology use in classrooms on student achievement and other learning goals, superintendents should be prepared to articulate ways in which technology could support the teaching and learning goals of the district. This instructional vision must be consistently and clearly communicated throughout the district so that all stakeholders are clear of the district's teaching and learning goals and can work effectively and efficiently in accomplishing these goals- particularly with the use of technology.

This study showed that while there was an understanding of how technology can support teaching and learning, there was inconsistency of exactly what were the instructional goals for the district and how technology helped accomplish these goals. None of what was communicated in terms of an instructional vision by either superintendents or district administrators was irrelevant to general goals of teaching and learning, but the lack of a consistently communicated instructional goal often made it appear that the technology initiative was driving the instructional vision for the districts and not the other way around. An instructional vision is a strategic process that could easily work in tandem with a large-scale technology initiative and would certainly help constituencies more clearly understand and accept the investment (Petersen, 1999). Making that instructional vision as clear and consistent as possible and then communicating the instructional vision in all aspects of the school district would seem to help provide even more leverage for various initiatives, programs and models used throughout the district.

Additionally, as this study has shown, an instructional vision, that is connected to constructivist learning components such as 21st century learning skills and college and career readiness skills makes sense to school stakeholders and adds value in a competitive economy (Boschee, Jensen & Whitehead, 2003; Haertel, Means, Penuel, Roschelle & Sabelli, 2003). However, a superintendent should also balance taking a personalized approached to developing an instructional vision that addresses the specific needs of students in his or her district as this will also resonate with local constituencies.

A superintendent who rarely and inconsistently communicates their instructional vision risks a fragmented approach to teaching and learning in their district. The frequent and consistent communication of the instructional vision however, helps stakeholders understand the rational for professional development activities, the allocation of various resources, programs and numerous other district decisions (Morgan & Petersen, 2002). This alignment helps "makes sense" of the instructional vision and will help develop sustainability in terms of support. Highlighting how the instructional vision is taking shape within the district also creates a sense of pride within the district.

Lastly, the use of motivational and prognostic framing of the instructional vision in connection with a technology initiative should be a strategy considered by superintendents undergoing a large-scale technology initiative. Defining the teaching and learning issues of the district (an element of the instructional vision) and then outlining clear goals to address these issues (for example, a technology initiative) helps constituencies see the relevance and importance of all district decisions. Motivating stakeholders to support and work toward these goals by consistently and frequently communicating the actions needed to accomplish these goals also helps in the acceptance of district initiatives such as a large-scale technology initiative.

Superintendents should involve stakeholders in the development and implementation of the instructional vision- particularly with the implementation of a large-scale technology initiative. A superintendent is best served by involving a wide variety of stakeholders when developing and implementing the instructional vision (Waters & Marzano, 2006). As referenced above, this strategic process creates a sense of responsibility, meaning and pride with district administrators to work together to provide students with the technology tools and skills needed to accomplish the district's instructional vision.

As this study has shown, there are often pockets of misalignment to the instructional vision throughout a district. Ensuring that all stakeholders are well educated and understand the necessity of the district's instructional vision could also help to garner more support for decision making in the district- such as a large scale technology initiative. Specifically, it can help to develop an effective and efficient fiscal model for many aspects of a school district's budget including, but not limited to professional development, resources, and staffing- all considerations in with a large-scale technology initiative.

Lastly, enlisting the assistance from multiple stakeholders in the development and implementation of the instructional vision ensures the support and commitment to the learning goals established by the district.

Superintendents should support the development and implementation of the instructional vision in a large-scale technology initiative. All participating superintendents utilized strategic processes and actions that focused on teaching and learning that resonated with their constituencies. In all districts, the superintendent gained the most momentum in pushing forward their instructional vision with the acceptance of technology use with staff, by giving them the time and freedom to explore technology use in a meaningful way related to the needs of their students. This was mostly seen in the format of professional development and the allocation of resources that supported the instructional vision or initiative.

Additionally, all superintendents who participated in this study frequently communicated their support of the individuals in their district who were working toward moving the instructional vision forward. In most cases, this provided district administrators the motivation to work toward the teaching and learning goals of the district and the technology initiatives that were being implemented.

Conclusion

As previous stated, the work of school superintendents is increasingly focused on effective instructional leadership (Belden, Russonello, & Stewart, 2005). With this focus, the presence of a well-developed and consistently communicated instructional vision is an essential element of a superintendent's strategic plan for teaching and learning in his or her school district (Petersen, 1999). Now more than ever, schools are being asked to cultivate constructivist/21st century learning skills such as critical thinking, problem solving, collaboration, communication through the application of real world experiences and scenarios (Casner-Lotto & Barrington, 2006).

The application of technology tools in schools has certainly been viewed as one way to develop college and career ready students. As such, school leaders have been moving at a rapid pace to get technology into the hands of teachers and students. As the overall study has shown, the development of an effective, large-scale technology plan involves a careful examination of several key components to ensure that the school community accepts and utilizes technology. As this portion of the study has outlined, a focus and communication of teaching and learning goals can play a role with any district initiative, but particularly a large-scale technology initiative where the connection to effective and efficient teaching and learning blends well together.

Chapter Six

Discussion[13]

Introduction

This chapter will summarize the key findings of this study and discuss the potential contributions of this study for practice and theory. The discussion will outline limitations of the study and the implications for future research. Finally, the research team will make recommendations from the results for superintendents pursuing large-scale technology initiatives in their districts.

Summary of Key Findings

The findings of this multiple-case study describe the many actions superintendents took to gain acceptance for technology initiatives in their districts. In addressing this research, the team assumed that superintendents are no longer asking *whether* it makes sense to move toward a 1:1 learning environment, but rather *when* and, most urgently, *how*. The study results provide assistance to district leaders as they work toward framing the implementation of a technology initiative. Additionally, this study begins to fill the current gap in the literature on superintendents as technology leaders by detailing how the five districts in the study gained acceptance for the technology initiatives in their districts.

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[13] This chapter was jointly written by the authors listed and reflects the team approach of this project: Peter D. Cohen with Erik P. Arnold, Gina E. Flanagan, Anna P. Nolin, Henry J. Turner

Three central findings resulted from this study. The first finding was that superintendents achieved resonance through leadership actions that were consistent with prognostic and motivational framing. Achieving resonance is a sign of the effectiveness of the framing actions of the superintendents and all superintendents were able to gain acceptance for their initiatives.

The second finding was that superintendents considered constraints the initiative might face. These constraints were (a) financial, (b) political, (c) competing interests, and (d) technology support staffing. Understanding these constraints allowed superintendents to develop a structured plan for the technology initiative that took these constraints into account.

The third finding was that superintendents developed strategic processes to gain acceptance for the initiative. These processes were undertaken to either prepare for implementation or to create buy-in. The strategic processes that superintendents took to prepare for implementation were: conduct research, select equipment, identify key players, pilot devices, conduct professional development, and assess the capacity of the technology staff. The strategic processes that superintendents took to create buy-in were: communicate expectations for use and public relations efforts. Taken together, effective action by the superintendent in these areas helped to gain acceptance for the initiative.

Summary of Thematic Studies

The research team also conducted five thematic studies that address how superintendents utilized distributed leadership (Turner, 2014), instructional vision (Flanagan, 2014), professional learning communities (Nolin, 2014), technology decision-making (Arnold, 2014), and the superintendent's use and attitudes regarding technology (Cohen, 2014). This section summarizes the findings of each of these studies.

Distributed leadership. Turner (2014) studied distributed leadership and its role in the acceptance of technology initiatives. While there were different methods of interaction in all districts, leadership was distributed in each district and required more than one person to gain acceptance of the initiative. With the exception of the superintendent of Washington, Brody, the superintendents relied on one person more regularly than the other members of the technology team to help gain acceptance of the initiative. This leader is referred to as the primary leader. While the superintendents identified one individual as the primary leader, there were additional individuals who played direct leadership roles in gaining acceptance of the initiative. Often the secondary leaders worked alongside the primary leader to gain acceptance of the initiative. Study results found that superintendents worked with a primary leader as well as secondary leaders to gain acceptance.

Superintendents worked with these leaders to discuss logistics and ensure effective communication with the stakeholders, be they parents, school committee members, or faculty. Superintendents typically interacted with primary and secondary leaders through institutional practices, such as meetings where they worked through explicit tasks.

Instructional vision. Flanagan (2014) studied the development of an instructional vision and how that process can help superintendents gain acceptance for a technology initiative. Our results indicated that the instructional vision of superintendents who have participated in a large-scale technology initiative is often connected to constructivist/21st century learning components such as: communication, collaboration, creativity, student engagement, real world applications, and technology use.

In most of the districts who participated in this study, the superintendent's instructional vision was not consistently re-iterated or emphasized in the district's mission statement, technology plan or by district administrators. The development of the instructional vision in a large-scale technology district, did not involve all the district administrators who were identified as key players of the technology initiative (primarily technology support staff). In terms of *how* the superintendent connected his instructional vision with the technology initiative to all stakeholders, the superintendents utilized motivational and prognostic framing which helped to create acceptance for the technology initiative.

The articulation of the instructional vision in connection with the technology initiative by district administrators was inconsistent in each district. In many districts, the instructional vision was often defined *as the technology initiative*. The implementation and communication of the instructional vision in these districts, specifically as it pertained to the technology initiative, was often described as much more collaborative, involving all stakeholders. In terms of how district administrators made sense of the superintendent's instructional vision for technology, district administrators felt that the superintendent's leadership in defining and supporting the instructional vision for the initiative was very helpful in gaining acceptance. However, in this study, although most district administrators were inconsistent in their communication and understanding of the superintendent's articulated instructional vision, they seemed to understand and accept technology's place in the classroom.

Professional learning communities. Nolin (2014) studied professional learning communities and their role in the acceptance of large-scale technology initiatives. The findings confirm that PLCs, their constructs and collaborative structures in districts do serve to assist in the implementation of large-scale technology implementations in school systems, but largely at the central office strategic planning level. Superintendents created their own technology learning ecologies that functioned as PLCs for technology implementation teams, but did not necessarily "scale up" PLCs for district-wide technology learning.

Superintendents clearly expect collaboration and shared time to occur across the school systems with regards to implementing the technology initiatives, but varied in the degree to which they connected PLC constructs to support the technology initiative.

The term PLCs was not used as a part of the superintendent's deliberate strategy to support technology implementation or gain acceptance. However, all five superintendents described expectations for *shared time, collaborative teams*, an *action orientation* and expectations for *continuous improvement* in their descriptions of educator work involving the technology implementation in their districts.

Infrastructure. Arnold (2014) studied the factors considered by superintendents in making decisions about technology infrastructure. The study results found that superintendents valued the capabilities and reliability of a device and were willing to pay more (within budget) for a device that had these qualities. A device (laptop or tablet) was considered reliable if it worked well for three to four years. Superintendents knew these devices would be transported to and from school daily and they wanted some assurance that the device could withstand this type of handling. Ease of use, long battery life, multi-media recording, and compatibility with existing district technology were the device capabilities most frequently mentioned by superintendents and technology leadership team members. The other factor that was considered by superintendents was the price of the device. This did not mean, however, that they chose the least expensive device; in fact, no superintendent did this. Instead, superintendents discussed the value they thought they were getting by purchasing a device that may have cost more, but offered the capabilities and reliability that they were looking for.

The next two findings concern the factors that superintendents consider when they are making decisions about how to fund a technology initiative. One finding is that superintendents funded 1:1 initiatives by seizing one-time budget opportunities and through creative financial moves. Technology funds that were available due to a state-subsidized school building or renovation project helped fund four of the five technology initiatives. The one exception to this was the Adams School District. They were able to fund their 1:1 iPad initiative through a combination of creative financial moves that included: transferring annual network infrastructure costs from the school budget to the town budget, staff reductions, and cost savings in other areas of the high school budget. The third finding is that superintendents considered the financial sustainability of the technology initiative before committing to it. Each superintendent chose a large-scale technology initiative that they felt was financially sustainable. For example, Washington chose a BYOD program, Madison went with a Blended model, and Monroe chose a 1:1 laptop program. Each of these initiatives had very different costs associated with them, but each superintendent indicated they were sustainable given their respective school district budgets.

In seeking to find if the infrastructure decisions had an impact on acceptance of the initiative, we found that in order to gain acceptance by teachers for 1:1 initiatives, robust and reliable Wi-Fi networks were identified as being critical. Technology leadership team members in each district indicated that if teachers considered the network unreliable, they would be less likely to integrate the technology into their lessons.

Superintendent's use and attitudes regarding technology. Cohen (2014) described how superintendents and other district leaders use technology in their practice as well as exploring the leaders' attitudes about technology. All of the superintendents in this study and all other district leaders involved in the technology initiatives used technology in their everyday practice. The leaders in this study describe using technology for two main purposes in their professional practice: communication and collaboration. While the data indicates that nearly all superintendents and district leaders are using technology for communication, the data are inconclusive about any connection between the superintendent's use of technology and gaining acceptance for a technology initiative.

While the *use* of technology by superintendents and other district leaders is variable, the overall attitudes about technology amongst the five superintendents indicated commonalities. First, the superintendents and other district leaders indicated that technology was an important tool for instruction. Second, leaders in each district discussed the helpfulness of technology in preparing students for college and careers. Third, there was also an indication that superintendents wanted their districts to be on the cutting edge as innovative school districts, not behind the curve, but proactively inserting the tools students will need in the future.

Every superintendent we interviewed was pleased that his district had moved toward deeper involvement with technology in the classroom. This attitude appears to have more of an impact on the acceptance of the technology initiative than the superintendent's use of technology. In other words, while there is no direct correlation between the *uses* of technology by superintendents, the superintendent's *attitude* about technology is a strong factor in gaining acceptance for the technology initiative. Ultimately it is the superintendent who needs to make the case for the funding and sustainability of the initiative.

Discussion of Findings

This section will highlight the contributions this study makes to theory and practice as well as the relevance of this study to the literature.

Theoretical Contributions

Frame theory identifies three core steps to framing that include diagnostic framing which identifies a problem; prognostic framing, which identifies a solution to the problem; and motivational framing, which creates a call to action through communication to solve the problem (Benford & Snow, 2000). The study results add to the complex dynamic of framing social movements. The framing process is not linear when applied to gaining acceptance for technology initiatives in schools. The study results indicate that it is not even necessary to gain acceptance for a technology initiative by first identifying a problem. In the district of Adams, for example, Paul, who was the high school principal as well as the primary leader of the technology initiative, made the case to Norman, the superintendent, that every student in the high school needed a mobile device. Paul did not first identify a problem rather he made the case for the goal of integrating more technology into his school.

Elements of frame theory were present in each of the five districts researched for this study. More specifically, motivational and prognostic framing and the utilization of strategic actions to build resonance (Benford & Snow, 2000) were in place as superintendents worked to gain acceptance for the technology initiatives. The study results highlight the importance of effective communication when seeking to gain acceptance. Superintendents in this study needed to convince all key stakeholders – teachers, parents, and community – in order to create resonance by making the case for the importance of the technology initiative.

This study makes an important contribution to frame theory by highlighting the mix of leadership actions and effective communication that can help a superintendent gain acceptance for a technology initiative. Additionally, the data of this study indicate that motivational framing can help leaders successfully create resonance for an initiative and overcome constraints.

Lack of Diagnostic Frame. Only Bob, the Superintendent from the Madison School District looked at that district's technology initiative through the lens of diagnostic framing. He saw the majority of his rural student population without computers at home and without Internet access. Of note is that numerous studies have actually shown robust home computer and Internet access amongst low-income students in this rural area of the state. Bob's personal view for the students in his district was that access was a problem. According to Bob, getting the students in Madison a computer was not enough: "the reality of how you're going to get high speed internet to, you know, roughly less than ten thousand people over two hundred and five square miles is pretty difficult." The Madison superintendent identified a problem and put a plan in place to solve that problem. The superintendents in Adams, Jefferson, and Monroe did not identify a problem that they saw technology as the solution, rather, as the Jefferson superintendent indicated, "It was less about solving a current problem, it was more about the future and giving us a fighting chance to be ahead of the curve for once." This leads us to consider if it is even necessary for there to be an educational problem for which a technology initiative is seen as the solution. Could it be that increasing student access to technology through a 1:1 initiative is seen as an educational innovation that does not require diagnostic framing? In hindsight, however, the superintendents in Washington, Adams, Jefferson, and Monroe identified the lack of 1:1 technology in the hands of students as a problem. The problem was access to technology either because students did not have technology at home, as in Madison, or because demand for using technology in school outpaced supply of computer labs and carts of laptops. While nearly all of the districts skipped over the step of assigning blame as identified as part of diagnostic framing, they did seek to remedy the issue of access to technology.

Resonance. Frame theory tells us that the goal of resonance is reached when the framing actions of a leader sway the beliefs of others thus creating movement for an initiative. In this study, resonance meant that the superintendent evoked a connection or shared feeling that the technology initiative was important for the district. Our findings indicate that the superintendents in this study sought resonance through their leadership actions. However, in some cases, it took the primary leader of the initiative to first achieve resonance with the superintendent before the initiative could move forward. Resonance is essential to gain acceptance. Figure 5 indicates that the effective countering of constraints by strategic processes leads to resonance. The leadership actions of superintendents and other district leaders were a function of their efforts to solve a problem – prognostic framing, and initiate a call to action – motivational framing. These actions work to overcome any constraints that an initiative may face and eventually lead to resonance. The study results indicate that resonance then builds acceptance.

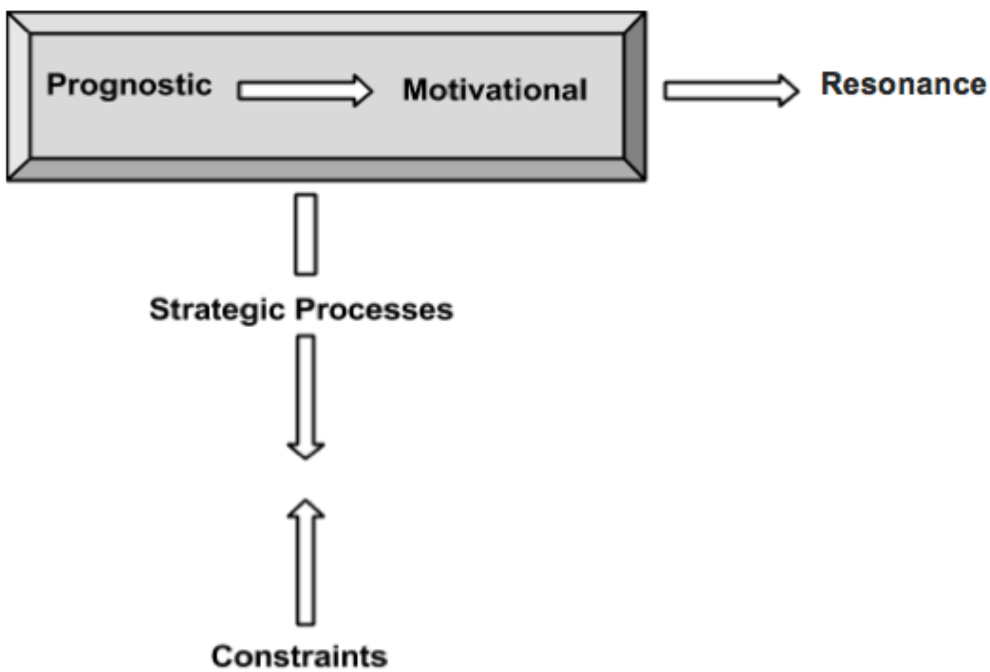

Figure 5. Strategic processes are a function of prognostic and motivational framing and they work to counter constraints. If successful, this leads to resonance. Adapted from, "Framing Processes and Social Movements: An Overview and Assessment," by R. D. Benford and D. A. Snow, 2000, *Annual Review of Sociology*, 611-639.

Our study reinforces this idea and indicates that it may be that resonance is achieved in small ways and ripples out to others. Having the superintendent frame the initiative seems to be an essential step in achieving resonance. Benford & Snow (2000) teach us that the more resonance moments that occur in a movement, the more likely it is for a movement to gain momentum. Resonance leads to a higher rate of buy-in amongst key stakeholders. In our study the district leaders were able to take the necessary steps in their specific situations to connect the technology initiative to student learning and create positive support for technology in the hands of students.

At the commencement of this study, we were unaware of any published research on the role of the superintendent as technology leader, although the literature indicated that school districts purchase technology devices for the purpose of student learning. There are ongoing studies examining the impact of 1:1 learning environments on student achievement. However, none of these studies specifically looked at the leadership actions taken to gain acceptance for these technology initiatives. With the lack of existing studies on superintendents as technology leaders, it is challenging to determine strong connections to the literature. However, this study does add to the existing literature on instructional leadership and the few studies on technology leadership that have been conducted.

Honig (2006) describes the role of district leaders as boundary spanners. Her research indicates that district level leaders serve as boundary spanners in schools as they search out strategies for reform in other arenas and bring them back to the district. Honig also argues that it is the superintendent who can support boundary spanners in their districts in order to increase their potential as levers of change. This is a shift from the traditional leadership model of top-down leadership to a relationship where the superintendent supports the schools in making key decisions about how to improve student learning. This idea was confirmed by our study, as we found the superintendent supported the primary leader of the technology plan, which led to acceptance for the technology initiative.

At the commencement of this study there were no known research studies with a focus on the role of the central office in implementing *technology* initiatives. The only existing research focused on the role of the superintendent and central office in implementing *instructional* initiatives. When considering the existing literature on implementing instructional initiatives in schools, our findings indicate that similarities do exist between how superintendents successfully implement instructional initiatives and technology initiatives. With or without a technology component, similar patterns exist of collecting evidence, making sense of the evidence for stakeholders, and building capacity throughout the district to accept the large-scale technology initiative.

Each of the districts in this study went through a process of gathering evidence from other arenas and other districts to be able to make the best decisions for their individual circumstances. The difference in the case of technology initiatives is that there is not the assessment data that districts may rely on for instructional initiatives.

Coburn, Tourre & Yamashita (2009) defined sensemaking in the central office as leaders understanding evidence and enacting its use within a school district. This step allows district leaders to make their interpretations of the data and think about how it impacts their district. Brody, the superintendent in Washington was the primary leader of the technology initiative. The findings of this study indicate that the superintendents in Adams, Jefferson, Madison, and Monroe were persuaded by the primary leader of the technology initiative and in turn able to make the case for key stakeholders in order to gain acceptance. Once the primary leader was able to gain acceptance from the superintendent in these districts, the superintendents then became integral to framing the initiative for all key stakeholders. Superintendents also needed to ensure that professional development opportunities were available to staff. Furthermore, superintendents had to address public relations issues to gain the support of the community and the school committee. This reinforces the research on capacity building as indicated in our review of the literature.

As noted, Spillane and Thompson (1997) found that capacity building requires investing in two critical forms of capital: *human capital* and *social capital*. Human capital is based upon the knowledge base of the people within the organizations and that the leadership has the knowledge, not only of the initiative, but also to teach people about the initiative. Social capital comes in the form of the trust and collaboration among educators within the district and the ability of the district to gain support from consultants outside of the district. If districts have the robust investment in human and social capital, the stakeholders are more apt to accept the initiative (Mulford, 2007; Spillane & Thompson, 1997). Frame theory and in particular, motivational framing as described in this study supports this investment in human and social capital. Without this investment, the superintendents in this study would not have been able to achieve resonance for the technology initiative. This study confirms that capacity building needs to be in place for technology initiatives in the same way it is necessary for instructional initiatives not involving technology. Superintendents in this study either took on the role of teaching stakeholders about the importance of the technology initiative or designated another district leader to perform this task.

Recommendations for Practitioners

The study results describe leadership actions that lead to gaining acceptance for large-scale technology initiatives. Districts that have not already implemented a large-scale technology initiative will benefit from this study by customizing our findings to their idiosyncratic situation and needs. These actions include the strategic processes that leaders took as outlined in the findings described in Chapter 4. Urban districts, districts that have more significant achievement gaps, or districts that face additional obstacles than described in the five districts of this study will need to adapt the recommendations to their own situation. For example, technology may be framed as the solution to differentiate instruction and close achievement gaps. Key to gaining acceptance is to identify key stakeholders and effectively communicate the importance of the technology initiative. These actions are intended to create resonance and support for the technology initiative, in turn leading to acceptance.

Prepare stakeholders for the initiative. All districts planned carefully for the implementation of their technology initiative. Districts that are currently in the planning process for a technology initiative can conduct a self-assessment or technology audit of their current level of technology by making comparisons to the districts in this study and others that have gained acceptance. Securing funding, identifying key players, and selecting which implementation model to pursue are all necessary steps in the process. Superintendents will need to both lead the public relations efforts and frame the initiative in order to get buy-in, or entrust this to a key leader in the district.

Communicate to key stakeholders. A highlight of our study was the necessity for effective superintendent communication, if support for the initiative was to grow among all stakeholders. Superintendents or their designee need to be thoughtful and proactive in developing a public relations plan to be able to gain widespread support for the initiative. This study highlights different approaches to gaining acceptance taken in the five districts. But independent of the individual circumstances, we found that by framing the initiative, planning to deal with anticipated constraints, and strategically taking action a superintendent is well equipped to gain acceptance for a large-scale technology initiative.

Hire and empower technology leaders. Superintendents may or may not be the primary technology leader in the district. However, this study indicates the importance for superintendents to either identify the technology leaders in the district to lead this initiative or hire the right leaders for district-level and building-level positions. While acceptance of a large-scale project does depend on highly developed technical knowledge, we found that the superintendent need not possess technical expertise, so long as others in his administration or faculty do.

Anticipate obstacles. With federal and state departments of education implementing technology recommendations and mandates for districts, including online student assessments, an increase of funding for school districts is recommended. All of the superintendents in this study described some of the obstacles faced while trying to implement the technology initiatives in their districts. In addition to following the strategic actions that led to the superintendents in this study successfully gaining acceptance, it is recommended that uninitiated superintendents use this study to identify obstacles (constraints) they may encounter. The constraints that the superintendents in this study had to deal with are listed in the findings section. These constraints include financial constraints, political constraints, competing interests, and staffing constraints. While our list is undoubtedly not exhaustive, it will offer leadership an opportunity to plan ahead to be able to address staffing issues, financial hurdles, or a political climate that may stand in the way of acceptance. Additionally, as superintendents across the country deal with mandates from a federal, state, and local level, our results indicate that the competing initiatives negatively impact the rollout of a technology implementation. It is therefore recommended that the number of initiatives be prioritized and, when possible, reduced in order to put as much focus on the implementation of the technology initiative as possible.

Limitations

Embedded in the considerations for future study are some of the limitations of this study. Among the limitations of this study is the limited scope and number of districts included. By expanding both the number of districts and including a wider spectrum of districts, there could be more generalizability of the results. Another limitation is the lack of urban districts and larger districts than the five districts in this study. Interviews were conducted of superintendents and the district and building-level leaders identified by the superintendent in each district. Participants who were identified by the superintendents to take part in our study may have been skewed to support the superintendent. Participants who weren't identified by the superintendent to participate in this study may have been hesitant to speak freely.

This study did not interview teachers, students, or parents or examine the impact of 1:1 learning environments on student achievement. In addition, this study did not quantify the use of technology in classrooms and by students in the five districts that participated in this study. Nor did this study include districts where a large-scale technology initiative was attempted, but did not gain acceptance.

Considerations for Future Study

Taken collectively, the findings of this study as well as its limitations suggest several areas for possible future research. For example, a follow-up study could focus on the use of a diagnostic frame. Our study had just one district, Madison, where the diagnostic frame was explicitly utilized. Interestingly, this district had the lowest per capita income of the five districts in our study (bottom third in the state). To explore this possible connection between income level and the superintendent's use of diagnostic framing, a further study should include a larger sample of school districts from communities with lower income levels (whether they are urban, suburban, or rural). A study that focuses on districts where the diagnostic frame was utilized to gain acceptance may result in different outcomes. We argue that how superintendents frame a large-scale technology initiative matters in terms of gaining acceptance. However, with only one district of five that utilized diagnostic framing, a study with a larger sample would enhance our research and the existing literature.

As noted, one limitation of this study is the number of districts studied. Due to time constraints, this study focused on five districts. These districts consisted of four suburban districts and one rural district. Further research should study the similarities and differences of large-scale technology initiatives in rural, urban and suburban school districts. The five districts in this study demonstrate that there are different approaches to framing initiatives while moving towards a 1:1 learning environment. While these conditions may limit the legitimate generalization (Bem 2003) of the data, it is our belief that the data of this study can in fact be useful to districts of any size and in any location.

This study described the leadership actions in five districts that have gained acceptance for their technology initiative. This study did not, however, include any counter examples – districts where the technology initiatives were not supported. Therefore, a limitation of our study is that we are unable to estimate the role frame theory might play in a district that did not gain acceptance or where district leaders were unable to create resonance for the technology initiative. For example, in a study of districts where a technology initiative did not gain acceptance, we could examine the specific constraints district leadership faced.

Our study had a limited sample size of Bring Your Own Device (BYOD) districts. Future studies of BYOD districts could examine resources invested in technology and if technology use in classrooms is a lesser priority than in a school with district-funded devices.

While this study was focused on the leadership actions taken to gain acceptance for large-scale technology initiatives, future research could examine the impact of 1:1 learning environments in these five districts.

According to the research conducted for this study, there are a variety of approaches that can be taken when implementing a large-scale technology initiative. The study results highlight the many constraints superintendents face as they try to implement a technology initiative. These constraints included funding and competing initiatives. A related area of research would be an analysis of federal and state initiatives that interfere with time that could otherwise be utilized for professional development related to technology initiatives. Thus another related research topic could be the lack of funding that is missing from state and federally mandated initiatives in education. Without sustained funding, large-scale technology initiatives are at risk of failing after the initial budget is exhausted. This study highlights the creative ways in which districts are funding technology initiatives. If assessments of the Common Core are to be electronic and the national and state departments of education continue to push more technology in schools, a funding structure will need to be developed so that there is equity amongst all districts.

Another area for future study is to interview teachers in the districts that gained acceptance for technology initiatives. Our study did not measure the degree of resonance that was achieved in each district. This study was focused on leadership actions that led to acceptance for the technology initiative. This study defined acceptance as mobile devices in the hands of students. The study did not describe or investigate the rate of integration of technology into the curriculum. One possible future study would be to look at one or more of the districts studied here and include interviews of teachers, students, and parents with a focus on resonance rather than leadership actions. Such a study would be able further the research on instructional initiatives.

Conclusion

This study was conducted to help district leaders frame the implementation of a large-scale technology initiative for the purpose of gaining acceptance, and to contribute to the limited body of research detailing how leaders of organizations gain acceptance of a large-scale program, such as a 1:1 device initiative. The research team also conducted five thematic studies that address how superintendents utilize distributed leadership

(Turner, 2014), instructional vision (Flanagan, 2014), professional learning communities (Nolin, 2014), technology decision-making (Arnold, 2014), and the superintendent's use and attitudes regarding technology (Cohen, 2014). While all five research areas presented some very unique findings relative to the area of study that are found in each individual chapter, they also uncovered two common themes across these five spokes.

Superintendents' interaction with others. Whether implementing an instructional vision, developing professional learning communities or making decisions regarding the technology infrastructure, all superintendents in this study relied on interactions with district administrators and communication with all stakeholders to help gain acceptance of their large-scale technology initiative. As the study on distributed leadership concluded, superintendents relied on primary leaders/key framers of their district administrative team to develop and implement their technology initiative in all areas of the five individual studies.

The development of strategic processes. As outlined in this study, superintendents utilized a variety of strategic processes in connection with prognostic and motivational framing to generate acceptance of their technology initiative. Across all spokes of this study, superintendents identified district-wide issues related to the individual focus areas and charted out strategic plans to help address these issues. In preparing for the initiative, the instructional vision, professional learning opportunities, leadership teams, technology infrastructure and communication avenues were all considered as elements necessary to build buy-in for the initiative. These focus areas were continued throughout the implementation phase of the initiative.

Additionally, the strategic process of developing professional learning opportunities related to the initiative was also interwoven within the five spokes. Professional development focused on advancing the instructional vision of the district, and involved the assistance of primary leaders/key framers, took into account the technology tools and infrastructure of the district and was communicated by the superintendent through various avenues including social media, blogs, newsletter and the district website.

The study focuses on the leadership actions that superintendents employ when working to gain acceptance of a technology initiative. The study results show that the superintendent's framing of the technology initiative and strategic actions that are utilized throughout the initiative are vital to developing resonance, and ultimately acceptance by stakeholders.

This descriptive study of five school districts that have each gained acceptance for a large-scale technology initiative serves to inform leadership actions for district leadership considering a 1:1 learning initiative. A 2010 white paper from the Massachusetts Department of Elementary and Secondary Education states, "The superintendent has the responsibility to initiate and guide the transformation of the teaching staff from instructor/lecturer to mentors and guides who effortlessly utilize technology whenever it is appropriate and beneficial." There is a movement across all levels of education to put mobile devices in the hands of students. This study earnestly begins what we predict will be a growing body of research to better serve, inform, and evolve future implementations of large-scale technology initiatives.

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Appendices

Appendix A: Letter Inviting Accessible Population to Interview via Phone

Dear (name of person):

We are writing as current doctoral candidates in the Boston College PSAP program to invite you to participate in our dissertation research. The purpose of this study is to increase the knowledge about how superintendents make decisions and go about the process of gaining acceptance for large-scale technology initiatives in their school systems. We seek to uncover descriptions of superintendent leadership that bring about successful technology implementations. We invite you to signal your willingness to participate in our study by completing a 15-minute phone interview. The interview asks you some initial questions about your experiences.

If selected as a potential candidate for this study, you will be contacted to schedule a 1 hour interview with one of the five research team members at a location convenient for you, sometime during August-October. You will also be asked to sign the attached *Consent to Participate* form, and possibly to review the interview transcript sometime during September-October.

Participation in the research is voluntary, and you may withdraw at any time. Your responses will be confidential. The phone interview must be completed by August 15, 2013. To agree to participate, please email Anna Nolin at annanolin@aol.com. She will then send you the letter of consent required before the phone conversation can begin. If you have any questions about the study or the participant selection, please contact the principal investigator, Anna Nolin, annanolin@aol.com.

With respect,

Boston College EdD Candidates Class of 2014

Appendix B: Questions for Superintendents in Initial Phone Screening Interviews for Site Selection Purposes

1. What type of 1:1 initiative is in place? (design, grade levels) Were you the superintendent at the time of the 1:1 initiative's inception? How long has the 1:1 initiative been in place?
2. Is there a goal for technology use in a district plan that is related to an instructional vision?
3. Do you use social media to communicate with your school constituencies?
4. Was the use of a leadership team a critical part of the technology implementation process?
5. Does the district rely on a collaborative culture or professional learning communities (PLCs) to assist with program implementation efforts or with professional development?
6. Would you be interested in being interviewed for a study of superintendent leadership that inspires 1:1 implementations?

Appendix C: Consent to Participate in Phone Interviews (Superintendents)

You are being asked to participate in a research study titled Framing Innovation: What do Superintendents do to Gain Acceptance of Large-Scale Technology Initiatives?

You were selected to participate in this project because you are a superintendent who is implementing or has recently implemented an accepted large-scale technology implementation.

The purpose of this study is to discover, describe and explain the actions superintendents take to gain community and staff acceptance of such a technology implementation in their schools systems.

This portion of the study will be conducted through a brief six-question phone interview. This interview should take you approximately fifteen minutes to complete. There are no direct benefits to you, but you may feel gratified knowing that you helped further the scholarly work in this research area. You will not be compensated for the time you take to complete this survey. There are no costs to you associated with your participation. This Principal Investigator will exert all reasonable efforts to keep your responses and your identity confidential. In any sort of report we may publish; we will not include any information that will make it possible to identify you as a participant. Research records will be kept in a locked file in the home office and secured computer of the principal investigator of the team. All electronic information will be coded and secured using a password-protected file. Please note that regulatory agencies, the Boston College Institutional Review Board, and Boston College internal auditors may review research records.

Your participation is voluntary. If you choose not to participate it will not affect your relations with Boston College. You are free to withdraw or skip questions for any reason. There are no penalties for withdrawing or skipping questions.

If you have questions or concerns concerning this research you may contact the Principal Investigator, Anna Nolin at annanolin@aol.com.

If you have questions about your rights as a research participant, you may contact the Office for Research Protections, Boston College, at 617-552-3345 or irb@bc.edu.

This study was reviewed by the Boston College Institutional Review Board and its approval was granted on *xxxxxx*.

If you agree to the statements above and agree to participate in this study, please press the "Consent Given" button below.

Appendix D: Consent to Participate in Interview

Boston College Lynch School of Education

Informed Consent for Participation as a Subject in:

Framing Innovation: What do Superintendents do to Gain Acceptance of Large-Scale Technology Initiatives?

Investigators: Erik Arnold, Peter Cohen, Gina Flanagan, Anna Nolin, Henry Turner

PSAP EdD Candidates Class of 2014

Type of Consent: Adult Consent

Introduction

You are being asked to be in a research study to increase the knowledge about how superintendents make decisions related to large-scale technology initiatives.

You were selected as a possible participant because you are a superintendent who has recently taken a school district through a large-scale technology implementation which was accepted by your school district community. We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of study

The purpose of this study is to understand how superintendents implement large-scale technology initiatives and go about the process of gaining acceptance for these projects in their school systems. We seek to uncover descriptions of superintendent leadership that brings about such successful technology implementations.

The total number of participant districts in the study is expected to be five.

Members of the research team do not have any financial interest in the study.

Description of the Study Procedures

If you agree to be in this study, we would ask you to the following things: participate in a 1-1 ½ hour in-person interview. In addition, you will be given the opportunity, if you choose to do so, to review the interview transcript for accuracy; it is estimated that this will take approximately 1 hour.

Risks/Discomforts, Benefits of Being in the Study

There are no reasonable foreseeable risks to participation. There are no direct benefits to you from participating in the study. However, the findings may be useful to school leaders, school boards and superintendents, school districts and schools of education as they prepare administrators for school district leadership positions, and preparation programs.

Payments/Costs/Voluntary Participation

Your participation in this study is completely voluntary. There is no penalty for not participating. There are no payments to you, nor costs to you to participate in the study.

Confidentiality

The records of this study will be kept confidential. In any sort of report we may publish, we will make every effort not to include any information that will make it possible to identify a participant. Research records will be kept in a locked file in the home office and secured computer of the principal investigator of this study team. All electronic information will be coded and seared using a password protected file. Audio tape recordings will be held by the individual interviewer until a transcription has been completed and confirmed for accuracy. Those interview recordings will then be destroyed.

Access to the records will be limited to the researchers; however, please note that the Institutional Review Board and internal Boston College auditors may review the research records.

Voluntary Participation/Withdrawal

Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University. You are free to withdraw at any time for whatever reason. There is no penalty or loss of benefits for not taking part or for stopping your participation. You will be provided with any significant new findings that develop during the course of the research that may make you decide that you want to stop participating. In addition, if you are selected for the interview, you may refuse to answer individual questions but continue with participation in the study.

Dismissal From the Study

The investigator(s) may withdraw you from the study at any time for the following reasons: (1) withdrawal is in your best interests, (2) you have failed to comply with the study requirements, or (3) the study is terminated.

Contacts and questions

The researchers conducting this study are current doctoral students in the PSAP program at Boston College: Erik Arnold, Peter Cohen, Gina Flanagan, Anna Nolin and Henry Turner

For questions or more information concerning this research you may contact the principal investigator, Anna Nolin annanolin@aol.com.

If you have any questions about your rights as a research subject, you may contact: Director, Office for Research Protections, Boston College at (617) 552-4778, or irb@bc.edu

Copy of Consent Form

You will be given a copy of this form to keep for your records and future reference.

Statement of Consent

I have read the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my consent to participate in this study. I have received (or will receive) a copy of this form.

Signatures/Dates

Study Participant (Print Name)____

Participant Signature____

Appendix E: Interview Protocol & Guide

Notes to Interviewer

This interview guide is intended to provide consistency among interviewers using an exploratory format. Our goal is to explore the domains revealed in the literature to review under the categories of prognostic framing and collective action framing, and also under our individual spoke areas of interest: instructional focus, distributed leadership, strategic decision-making regarding technology, identify new domains. Further, the goal is to break those domains down into component factors and subfactors, within the context of each individual participants' situation. The tone of the interview should be conversational, informal and feel as though the participant has been asked to tell you a story; please employ an interviewer-as-listener approach. Stay alert and engaged in the discussion and respond with agility to turns in the conversation, the needs for further exploration, the participant's body language and facial expressions. Please take field notes while you are conducting the interview. Field notes should include any relevant body language, non-verbal cues, meanings of phrases, silences, pauses, etc. that may have impact on the line of questioning. These notes should be included in the NotesPlus App used for voice recording so the notes and the audio files travel in a unified fashion.

Tips for using the guide:

- Be responsive to the cues of the participant and be flexible about asking questions in a different order.
- Skip questions if the topic has already been covered.
- Ask probing follow-up questions to elicit richer, more thoughtful answers, and ask about topics the interviewee has not yet voluntarily identified.

- Respond to signals of reluctance if the participant seems to want to skip questions or end the interview.
- Do not solicit private information that is not related to the research question, and will dissuade revelation of irrelevant personal information if it happens spontaneously.
- If participants continue to talk after the recording device is turned off, ask permission to continue to record or to take notes to include the additional pertinent information.
- Limit your own discussion, affirmation of responses, and interaction with the subject save to establish and keep rapport.
- Keep a laser-like focus on the subject, the questions related to the central phenomenon and related sub questions.
- Participants must not be manipulated to respond to questions in a particular fashion.

Superintendent Interview Protocol

Thank you for agreeing to participate in our study.

My name is _______________ and I am one of five Boston College doctoral students conducting a study of district leaders and how they gain acceptance for a large-scale technology initiative.

First, let me explain the project.

The purpose of this study is to study how district leaders and teams gain acceptance for large-scale technology initiatives in their school district communities. We will also explore leadership distribution, strategic planning, communication modes, and the instructional and learning organization features of these districts to determine the relationship between leader actions and these constructs.

At the conclusion of this study we will prepare a report. We are happy to send you a copy of that report if you are interested. Shall we send the report to your email at

____? **YES** **NO**

Now, a little about the interview.

As a team we are interviewing approximately five participants.

We have several questions that we are asking all participants; I will try to pace the interview so that we can conclude within one hour. Please understand that your responses are completely confidential. If we use a quote in our report, we will make sure it is not attributable to any particular interviewee.

All questions are optional – if there is any question you want to skip or if you want to stop the interview at any time, just let me know. I plan to take notes while we are talking; is it OK if I also record the interview for transcription?

Do you have any questions before we begin?

We are going to begin by asking you some questions regarding your views on instruction. For the purpose of this study, instructional *vision* will be defined as the instructional and organizational practices, theories, philosophies and beliefs that lay the foundation to achieving educational goals. We will also be asking you questions on how these views relate to your views on technology.

1. What is your vision for teaching and learning in your district?
    a. How was this instructional vision developed (what was the process, who was involved)?
    b. What is your role in supporting the instructional vision?
2. What evidence is there of the instructional vision taking shape throughout your district (resources, programs, PD, etc.)?
3. What role do you think technology ought to play in teaching and learning?
    a. How is that communicated to all stakeholders (leadership team, teachers, students, parents)? Please explain.
4. Where did the idea of developing a 1:1 program come from? (policy window/strategic alignment)
5. What problem did you hope to solve by implementing the 1:1 or BYOD program in your district.

6. Please describe the technology initiative in its current state.
    a. What initiatives were also being implemented at the time of the technology implementation (to determine co-implementation)?

7. Who did you need to convince to get buy-in and how did you go about this?
8. Who helped you lead the district through this technology initiative?
    a. Why did you choose to work with these people?
    b. How did you know who you wanted to work with?
    c. What was it like to work with these people?
9. What did working with these different people look like?
    a. How did you choose to work with them individually or in a group?
10. In what ways did these people work with each other to implement the plan?
    a. Did you have a role in helping people work together?
    b. How did you know what they were working on?
11. What factors did you consider when determining how to fund the technology initiative? [possible responses: sustainability, SES of families in the district, political pressure, school budget]
12. How, if at all, did the funding design impact the acceptance of the 1:1 initiative?
13. What were the main reasons that led you to choose this specific mobile device? (not applicable if BYOD) [Possible responses: cost, reliability/durability, brand reputation, included support from the vendor, free or packaged software applications, warranty, battery life, photo/video capabilities, ease of use, portability]
    a. How did the mobile device that was chosen (or BYOD program) impact the use of the device among teachers & students?
14. Describe the reliability of your wireless network and how it has impacted the 1:1 initiative.

15. How did the capacity of your existing technology staff to support the initiative figure into your decision-making? [possible responses: limited staff, adequate staff, could/could not hire more]
16. Describe structures that exist in the district around educator collaboration--formal and informal related to teaching and learning.
    a. What are your expectations around collaboration--collaborative culture--structured collaboration around teaching and learning and how is that embedded in the culture?
    b. How is educator collaboration related to technology implementation?
    c. Related to implementation of any educational innovation in general, are there expectations for educator collaboration?
17. Does the collaboration of teachers play a role in the implementation of the technology initiative? Is there formal time set aside for teachers to collaborate?
18. What technologies are most important to your job? What do you actually spend the most time using? What about at home?
    a. Follow up with specifics about blogs and social media
19. What are the benefits of these technologies that you mentioned? What complaints do you have?
20. How does your district support technology use? What's your role?
    a. What training, activities, actions or documents helped to ease the implementation of this initiative in your system?
21. How do you feel about the direction your district is taking in regard to technology? Are these views you have shared with others?

22. In hindsight, would you have done anything differently with the implementation of the 1:1 initiative?
23. In what areas were you hoping this initiative would help your district?

Non-Superintendent Interview Protocol

Thank you for agreeing to participate in our study.

My name is _______________ and I am one of five Boston College doctoral students conducting a study of district leaders and how they gain acceptance for a large-scale technology initiative.

First, let me explain the project.

The purpose of this study is to study how district leaders and teams gain acceptance for large-scale technology initiatives in their school district communities. We will also explore leadership distribution, strategic planning, communication modes, and the instructional and learning organization features of these districts to determine relationship between leader actions and these constructs.

At the conclusion of this study we will prepare a report. We are happy to send you a copy of that report if you are interested. Shall we send the report to your email at

____? **YES** **NO**

Now, a little about the interview.

As a team we are interviewing approximately five districts.

We have several questions that we are asking all participants; I will try to pace the interview so that we can conclude within one hour. Please understand that your responses are completely confidential. If we use a quote in our report, we will make sure it is not attributable to any particular interviewee.

All questions are optional – if there is any question you want to skip or if you want to stop the interview at any time, just let me know. I plan to take notes while we are talking; is it OK if I also record the interview for transcription?

Do you have any questions before we begin?

We are going to begin by asking you some questions regarding your views on instruction. For the purpose of this study, instructional *vision* will be defined as the instructional and organizational practices, theories, philosophies and beliefs that lay the foundation to achieving educational goals. We will also be asking you questions on how these views relate to your views on technology.

1. What is the vision for teaching and learning in the district?
    a. How was this instructional vision developed (what was the process, who was involved)?
    b. What is your role in supporting the instructional vision?
2. What evidence is there of the instructional vision taking shape throughout the district (resources, programs, PD, etc.)?
3. What role do you think technology ought to play in teaching and learning?
    a. How is that communicated to all stakeholders (leadership team, teachers, students, parents)? Please explain.
4. Where did the idea of developing a 1:1 program come from? (policy window/strategic alignment)
5. Please describe the technology initiative in its current state.

    a. What initiatives were also being implemented at the time of the technology implementation (to determine co-implementation)?

6. Who needed to be convinced to get buy-in and how was that accomplished, or not accomplished?
7. Describe your role in the implementation of the 1:1 initiative?
    a. What was it like to work with the superintendent on the 1:1 initiative?
8. Who else was instrumental in implementing the 1:1 initiative?
    a. Did you work with them individually or in a group?
    b. What was it like to work with these people?
    c. In what ways did these people work with each other to implement the plan?
    d. Did you have a role in helping people work together?
    e. How did you know what they were working on?
9. What factors were considered when determining how to fund the technology initiative? [possible responses: sustainability, SES of families in the district, political pressure, school budget]
10. How, if at all, did the funding design impact the acceptance of the 1:1 initiative?
11. What were the main reasons that the specific mobile device was chosen? (not applicable if BYOD) [Possible responses: cost, reliability/durability, brand reputation, included support from the vendor, free or packaged software applications, warranty, battery life, photo/video capabilities, ease of use, portability]

    a. How did the mobile device that was chosen (or BYOD program) impact the use of the device among teachers & students?

12. Describe the reliability of the wireless network and how, it at all, it has impacted the 1:1 initiative.
13. How did the capacity of the existing technology staff to support the initiative figure into the decision-making about the 1:1 initiative? [possible responses: limited staff, adequate staff, could/could not hire more]
14. Describe structures that exist in the district around educator collaboration--formal and informal related to teaching and learning.
    a. What are the superintendent's expectations around collaboration--collaborative culture--structured collaboration around teaching and learning and how is that embedded in the culture?
    b. How is educator collaboration related to technology implementation?
    c. Related to the implementation of any educational innovation in general, are there expectations for educator collaboration?
15. Did the collaboration of teachers play a role in the implementation of the technology initiative? Is there formal time set aside for teachers to collaborate?
16. What technologies are most important to your job? What do you actually spend the most time using? What about at home?
    a. Follow up with specifics about blogs and social media
17. What are the benefits of these technologies that you mentioned? What complaints do you have?
18. How does the district support technology use? What's your role?

    a. What training, activities, actions or documents helped to ease the implementation of this initiative in your system?

19. How do you feel about the direction the district is taking with regard to technology? Do you share these views with others in the district?
20. In hindsight, should anything have been done differently with regards to the implementation of the 1:1 initiative?

Appendix F: Format for Interim Summaries

Case Analysis Form: ___________________________

(Adapted from Miles & Huberman, 1994, p. 78)

1. Main themes, impressions, summary statements about what is going on at the site/with the superintendent/leadership team:

2. Explanations, speculations, hypotheses: about what is going on at the site/with the superintendent/leadership team:

3. Alternative explanations, minority reports, disagreements site/with the superintendent/leadership team:

4. Next steps for data collection: follow up questions, specific actions, general directions field work should take:

5. Implications for revision, updating of coding scheme:

Appendix G: State School Districts With PLC Aspects

Randomized Web Search, May 2013

District Name	Web Post Involving PLC Aspects
Na**** Public Schools	District Plans involve mandatory PLC goals for all staff and schools
Ne**** Public Schools	District Plan and all school improvement plans indicate PLC (named GLDs) goals
No***** Public Schools	PLC resource page
Li***** Public Schools	Information about PLCs setting coordinated learning goals
Me**** Public Schools	Case study of their school system making improvement strides using PLC constructs
Ho******* Public Schools	Technology PLC is referenced prominently in strategic plan
Su***** Public Schools	School committee presentation indicating the 2011 implementation of PLCs in elementary schools around math achievement
No********** Public Schools	Published schedule of technology PLC meetings
So*** De******* Public Schools	Math PLC collaborative description K-8
Le******* Public Schools	District Improvement Goals Including PLCs writing new Common Core Curriculum and aligning using Atlas Rubicon.
Hu**** Public Schools	Adoption of PLC constructs into instructional improvement goals
Ch******** Public Schools	Videos of teachers discussing the power of collaboration in their PLCs for implementing UDL strategies in curriculum design.
Am***** Public Schools	Description of technology regional PLC group formed to learn about technology implementation
Wh********** Public Schools	Formal presentation to school committee detailing PLCs, what they are and why the district will use them and how
We********* Public Schools	Collaborative co-teaching study groups create common assessments and share results (school plan)
Ne********* Public Schools	Identified resource in school improvement plans
District Name	Web Post Involving PLC Aspects

Ho******* Public Schools	Identified resource in school improvement plans
Me****** Public Schools	Identified as core part of district operationsin school improvement plans
Mi**** Public Schools	Videos of teachers engaged in PLC work; identifying as “heart” of instructional work
Au**** Public Schools	Entire website devoted to the retooling of schedules, budget, training to embrace PLCs
Mi**** Public Schools	Initiative overview 2011-12 to begin PLCs in district
We**** Public Schools	District PD page overviews 30 hours of sustained PD for PLCs
We******* Public Schools	In various school improvement plans and posted school committee notes
As***** Public Schools	Posted a part of negotiated teacher contract
Gr***** Public Schools	Letter from NSA indicating that the technology PLCs in the town were impressive and grant worthy
Gr****-Du******* Schools	Job Description of curriculum leaders—primary role: leadership of PLCs
Ma***** Public Schools	Superintendent's Newsletter hiring new principal and citing his PLC experience as a plus
Av** Public Schools	School improvement plans/articles celebrating improvement due to PLCs
We****** Public Schools	PLCs defined in key glossary of district terms
Fr******-La******* Schools	5 -year plan relies on PLCs to implement goals

Appendix H: Scholarly Articles Referencing PLC Constructs in Describing Technology Leadership

PLC construct	Technology Leadership Characteristics	Leadership Characteristics for Effective Reform
Shared Mission, vision, values	Robertson et al. (2007) Flanagan & Jaconbsen, 2003 Anderson & Dexter (2000/2005) Robinson et al. (2008) Schrum et al. (2011) Phillips (2005) Christensen (2008) Owen & Demb (2004)	Leithwood et al. (2007) (types of alignment), Seashore et al. (2009) (leadership type dependent upon this area) Ertmer (2003) (teachers affected by beliefs around them) Mueller et al. (2008) (supporting teacher belief systems) Frank & Zhao (2003)
Collective inquiry	Williams et. al (2008) (learning how to learn together)	
Collaborative Teams	Williams et. Al. (2008) Hughes & Zacharia (2001) Robinson et. al, (2008) Christensen (2008)	Spillane (2010) (distributed leadership) Spillane & Diamond (2007) Spillane (2006) Leithwood et al. (2007) Seashore et al. (2009) (shared vs. distributed leadership & teacher self-organization) Frank & Zhao (2003)
Action Orientation/Experimentation	Shapely (2010) Phillips (2005) Christensen (2008)	
Continuous Improvement	Williams (2008) Anderson & Dexter (2000) Robinson (2008) Schrum et al. (2011)	Seashore et al. (2009/2010) (continuous reflection discussions)
Results Orientation	Flanagan & Jacobsen (2003) Schrum et al. (2011) Phillips (2005) Christensen (2008)	Seashore et al. (2009/2010) (instructional leadership and connection to student achievement)

Appendix I: Defined Terms

- **Social Media** - Technology used for communication and interactive dialogue (Nussbaum-Beach, 2012).
- **Web 2.0** - applications that facilitate information sharing and collaboration online (Nussbaum-Beach, 2012).
- **Blog** – web log or website or an online journal that is updated regularly by the blogger
- **Facebook** – social networking website
- **Twitter** – an instant messaging system that allows users to send messages of up to 140 characters in length to a list of followers
- **Acceptance** – (working definition) mobile devices in the hands of students
- **Large-scale technology initiative** – technology adoptions in public schools that seek to provide 1:1 computing or tablet device for every student in a section or level of the school system, e.g. one tablet or laptop for all students in grades 8-12.

Appendix J: Initial Codes - Instructional Vision & Technology Implementation

CODE	TYPE	DESCRIPTION
RQ1: 21st Century Learning Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision focuses on critical thinking, collaboration, problem solving, technology use
RQ Authentic Learning Focus	Superintendent Instructional Focus	Direct statement from the superintendent that instructional vision provides students with real world experiences and problem solving skills
RQ 1 Collaboration Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports the development of collaboration skills
RQ 1 College & Career Readiness Focus	Superintendent Instructional Focus	Direct Statement from the superintendent that the instructional vision provides student the skills for students to be prepared for college and career
RQ 1 Communication Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports the development of communication skills with students.
RQ 1 Creativity Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports the development of creativity and innovation skills with students
RQ 1 Critical Thinking Focus-	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports the development of critical thinking and problem solving skills with students
RQ 1 Literacy Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports for the development of reading and writing skills with students
RQ 1 Student Engagement Focus	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports students as active participants in the psychological and behavioral aspects of their learning
RQ 1 Technology Use	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports the development of technology use skills with students
RQ 1 Whole Child-	Superintendent Instructional Focus	Direct statement from the superintendent that supports the health and safety of each student and ensures they are engaged, supported and challenged by working with all stakeholders they are engaged, supported and challenged by working with all stakeholders
RQ 1 Differentiated Instruction	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision supports attending to the learning needs of a particular student or small group of students rather than the more typical pattern of teaching the class as though all individuals in it were basically alike

CODE	TYPE	DESCRIPTION
RQ 1 21st Century Learning	Superintendent Instructional Focus	Direct statement from the superintendent that the instructional vision focuses on critical thinking, collaboration, problem solving, technology use, real world experiences, creativity and innovation
RQ 2 21st Learning & Technology	Technology Instructional Focus	Example provided of how technology provides students the skills all 21st century learning skills
RQ Authentic Learning & Technology	Technology Instructional Focus	Example provided of how technology supports authentic learning experiences
RQ Collaboration & Technology	Technology Instructional Focus	Example provided of how technology supports collaboration
RQ 2 Literacy & Technology	Technology Instructional Focus	Example provided of how technology is used to support the development of reading and writing skills
RQ 2 Critical Thinking & Technology	Technology Instructional Focus	Example provided of how technology is used support critical thinking skills
RQ 2 CCR & Technology	Technology Instructional Focus	Example provided of how technology is used to support college & career readiness skills
RQ 2 Whole Child & Technology	Technology Instructional Focus	Example provided of how technology is used to support the whole child approach
RQ 2: Student Engagement & Technology	Technology Instructional Focus	Example provided of how technology supports student engagement
RQ 2 Communication & Technology	Technology Instructional Focus	Example provided of how technology supports communication skills
RQ 2 Creativity & Technology	Technology Instructional Focus	Example provided of how technology supports creativity skills
RQ 3 Supt. creates IV	Utilization of the Instructional Vision	Example provided of how the superintendent created the instructional vision
RQ 3 Supt. communicates IV	Utilization of the Instructional Vision	Example provided of how the superintendent communicates the instructional vision
RQ 3 Supt. helps implement IV	Utilization of the Instructional Vision	Example provided of how the superintendent helps to implement the instructional vision
RQ 3 Supt. IDs constraints with IV & Tech.	Utilization of the Instructional Vision	Constraint between the instructional vision and technology is identified by the superintendent
RQ 3 DA involved with IV development	Utilization of the Instructional Vision	District administrator states or gives an example of how he/she was involved in the development of the instructional vision

CODE	TYPE	DESCRIPTION
RQ 3 DA communicates the IV	Utilization of the Instructional Vision	District administrator communicates the instructional vision *Instructional visions articulated by each district administrator was categorized in the same manner as the superintendents (see RQ 1 list on this table)
IV Time	Utilization of the Instructional Vision	Time is created to provide support to the Instructional Vision
IV Data	Utilization of the Instructional Vision	Data is connected to the instructional vision
IV Resource	Utilization of the Instructional Vision	Resources are identified that help support the instructional vision
IV Communication	Utilization of the Instructional Vision	Instructional vision is communicated
IV Program	Utilization of the Instructional Vision	Programs are implemented to support the instructional vision
IV PD	Utilization of the Instructional Vision	Professional developed is offered to support the instructional vision
MO Frame	Frame Theory	Instructional vision used as motivational framing
PR Frame	Frame Theory	Instructional vision used as prognostic framing
DI Frame	Frame Theory	Instructional vision used for diagnostic framing

Note: RQ 1 is associated with research question one. RQ 2 is associated with research question two. RQ 3 is associated with research question number three.

Appendix K: Codes for Superintendent Technology Use & Attitudes

Parent Code	Child Codes				
Use of Technology	B = Blog	E = Email	G = Google Apps	I = iPad/tablet	L = Laptop
Use of Technology	PP = PowerPoint	SM = Social Media	SP = Smart Phone	T = Twitter	W = Word Processing/ Newsletters
Use of Technology	COL = for collaboration	COM = for communication	EV = for evaluation	PD = for professional development	
Attitudes About Technology	CCCC = for 21st century skills	CCR = for college and career ready	CE = to be cutting edge		
Attitudes About Technology	DATA = for data collection/use	DI = for differentiating instruction	IT = as tool for instruction	TO = as tool for time and organization	
Influence of Attitudes	BUD = secure funding, budget	MO = motivation and momentum of initiative	PD = provide professional development	SUS = Sustain the current direction	

Appendix L: Infrastructure Code Dictionary

Topic	Code	Description
1. Decision-Making Factors about Infrastructure	Device Cost	How much the device cost was a factor in it's selection
	Device Reliability	The reliability of the device was a factor in it's selection
	Device Brand Reputation	The reputation of the device manufacturer was a factor in it's selection
	Device Capabilities	The software and/or hardware capabilities (apps, keyboard, photo/video, memory) were a factor in it's selection
	Device Compatibility	The compatibility of the device with existing district technology or faculty knowledge was a factor in it's selection
	Device Battery Life	How long the battery would last when fully charged was a factor in it's selection
	Wi-Fi Reliability	The reliability of the Wi-Fi network was considered when making infrastructure decisions
2. Decision-Making about the Funding Design	Sustainability	The ability to financially sustain the initiative was considered in the planning.
	Equity	Making sure that all students would have a device of equal capabilities was a factor
	Parental Support	Parental support was a factor when considering how to fund the initiative
	School Committee Support	School committee support was a factor when considering how to fund the initiative
	School Fund Opportunity	School funds for the initiative were available due to budget conditions or a building project
	Technology Staffing	The capacity of the technology staff to support the initiative was a factor
3. Acceptance of the Initiative	Device	The device chosen is perceived to have had an impact on the acceptance of the initiative
	Funding	The funding design is perceived to have had an impact on the acceptance of the initiative
	Wi-FI	The reliability of the Wi-Fi network is perceived to have had an impact on the acceptance of the initiative
	Technology Staffing	The capacity of the technology staff is perceived to have had an impact on the acceptance of the initiative

Appendix M: PLC - Initial Set of Provisional Start-List Codes

PLC construct	Description	Code
Shared Mission, vision, values/Shared work	Shared understanding of the goals the group is working on for the school and their part in achieving the goal.	PLC-MVV
Collective inquiry	Group regularly reflects on where they are relative to shared goals and progress made toward those goals.	PLC-CI
Collaborative Teams	PLC educators work together interdependently within collaborative teams to achieve common goals for which they are mutually responsible.	PLC-CT
Action Orientation/Experimentation	Teams turn learning and insights into action. They recognize the importance of engagement and experience in learning and in testing new ideas.	PLC-AOE
Continuous Improvement	Members seek better ways to achieve mutual goals and accomplish their fundamental goals	PLC-CI
Results Orientation	Teams assess their efforts on the basis of evidence to inform and improve their practice.	PLC-RO
Shared Time	Time is provided during contractual school day or in a job-embedded fashion for working teams to collaborate.	PLC-ST

Adapted from DuFour, R., DuFour, R., Eaker, R., & Many, T. (2010). *Learning by doing: A handbook for professional learning communities at work*. Bloomington, IN: Solution Tree Press.

Appendix N: Descriptive Codes Distributed Leadership

CODE	TYPE	DESCRIPTION
CA	Concertive Action	Leadership is distributed in a more holistic fashion
CA-SC	Spontaneous Collaboration	Members with different skill sets (can be across organizational levels) form a team to solve a problem
CA-IW	Intuitive Working Relations	Members of the team are reliant on each other's skills and form a close working relationship
CA-IP	Institutionalized Practices	Organization establishes structures for team members to work together.
CO	Coordination	Management of tasks
CO-I	Coordination—Implicit	Task responsibilities clearly written down
CO-E	Coordination—Explicit	Task responsibilities fall outside clear job responsibilities

Appendix O: Pattern Codes

CODE	TYPE	DESCRIPTION
P-PATT	Primary Leader	One individual, identified by members of the technology leadership team and/or superintendent for taking primary leadership of the initiative
S-PATT	Secondary Leader	Additional member of technology team, identified by members of the technology leadership team and/or superintendent as being a vital contributor to the initiative.

Appendix P: Instructional Vision Interview Questions

Research question 1: What is the instructional vision of superintendents who implement large-scale technology initiatives in a 1:1 or BYOD environment?

1. Where did the idea of developing a 1:1 program come from? (policy window/strategic alignment)
2. What factors were considered when determining the design (BYOD, DPD, or blended for the technology initiative)?
3. What is the instructional vision for the district? How was that developed? Please explain.

Research question 2: How does the superintendent connect his or her instructional vision with the implementation of technology within the district?

1. Where did the idea of developing a 1:1 program come from? (policy window/strategic alignment)
2. In what areas were you hoping this technology initiative would help your district?
3. Who was involved in the planning & what steps we initially taken? Who did you need to convince to get buy-in and how did you go about this?
4. What and how were decisions made to implement technology infrastructure?
5. What is the vision for technology use in your district and how is that communicated to all stakeholders? Please explain.
6. How does the instructional vision and technology initiative relate to each other?
7. How is the instructional focus communicated out to all stakeholders?
8. How is the instructional vision used to gain acceptance for the technology initiative?
9. Who helps you integrate your technology program?
10. Who worked with teachers relative to implementing this new technology into classrooms?
11. Describe formal or informal structures at plan in the district around educator collaboration.
12. What training, activities, actions or documents helped to ease the implementation of this initiative in your system?
13. How do you communicate district initiatives?
14. How has your use of technology impacted the technology integration in the district?

Research question 3: How do building-level administrators make sense of the superintendent's instructional vision for technology?

1. Where did the idea of developing a 1:1 program come from? (policy window/strategic alignment)
2. Please describe the technology initiative in its current state.
3. What and how were decisions made to implement technology infrastructure?
4. What is the vision for technology use in your district and how is that communicated to all stakeholders? Please explain.
5. How does the instructional vision and technology initiative relate to each other?
6. How is the instructional focus communicated out to all stakeholders?
7. How is the instructional vision used to gain acceptance for the technology initiative?
8. Who helps you integrate your technology program?
9. Who worked with teachers relative to implementing this new technology into classrooms?
10. Describe structures that exist in the district around educator collaboration.
11. What training, activities, actions or documents helped to ease the implementation of this initiative in your system?
12. How do you communicate district initiatives?
13. How has your use of technology impacted the technology integration in the district?

Appendix Q: Communicated Instructional Vision

of Superintendents and District Administrators

	21st Cen	AU	Collab	CCR	Comm	Create	Criti. Think.	Lit.	SE	Tech Use	Whole Child	Diff. Inst.	Acces
WASHINGTON													
Supt. Brody	X			X					X	X			
IT HS Grace											X		
TIS Rylan													
TIS Ava													
TIS Caitlin													
TIS Grace													X
Net. Mgr. John													
Ethan MS Princ	X		X			X	X						
Grady MS Princ									X	X	X	X	
ADAMS													
Supt. Norman								X	X		X		
Howard Dtech			X			X			X				
Jim TIS				X						X			
Paul For HS Princ									X				
JEFFERSON													
Supt. David	X		X						X	X			
Charles HS principal									X		X		
Grace HS Asst. Principal							X		X				
MADISON													
Supt. Bob			X								X	X	
Brett- For. Dtec		X					X						
Rose El princip									X	X	X	X	
Teagan- Dir of Acac	X			X									
Theresa Gr Writ										X		X	
MONROE													
Monroe Supt						X				X			
Meagan Dtech		X										X	