Assessing School Technology Leadership Practices:

Perceptions from 1-to-1 Schools in the Context of Continuous Improvement

A Capstone Project

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Executive Summary

Increases in access to technology and the rise of digital integration within the field of education have led to new implications for school leaders. Further, technology initiatives focused on the deployment of portable devices such as laptops, netbooks, or tablet computers at a 1-to-1 device per student ratio, or 1-to-1 programs, are increasingly on the rise in schools (Penuel, 2006; Richardson et al., 2013; Sauers & McLeod, 2011). The complex web of factors necessary for effective implementation of 1-to-1 programs, such as those in the two middle schools studied here, calls for a system of targeted leadership practices. In spite of this, the school leaders in these two schools lacked a data-driven, systematic approach to examining their own technology leadership practices in order to plan for, implement, and sustain their school's 1-to-1 programs in the context of continuous improvement.

This mixed-methods, exploratory case study of two 1-to-1 middle schools used a school technology leadership assessment instrument to provide leaders multi-rater perspectives about their leadership. The schools were in a district where the superintendent was known for her technology leadership, the district practiced continuous improvement, the participating schools had 1-to-1 technology deployments across at least a full grade level, and the district was considering an increase in 1-to-1 technology deployments, all of which helped to define this as a problem of practice with each school serving as a unit of analysis

in this study. In the context of this study, the researcher conceptualized school technology leadership as a set of leadership practices distributed across multiple members of the school team and aligned to three broad categories of setting directions, developing people, and redesigning the organization. The researcher presented results from the school technology leadership assessment to members of the school leadership team at each school using a three-level rubric report and conducted focus groups to explore their reactions to the feedback and to the instrument, itself.

Findings from this study addressed (a) revelations about school technology leadership practices in two schools, (b) reactions to an assessment of leadership practices, and (c) intended uses of feedback from an assessment of leadership practices within the context of continuous improvement. The researcher found enabling and constraining factors impacting school technology leadership practices as well as varying areas of strengths and challenges aligned to eleven specific leadership dimensions.   Emergent areas included the use of data to monitor performance related to technology-supported teaching and learning as well as the use of formal processes to promote professional learning. Regarding the assessment instrument, while leaders identified benefits from both taking the survey and reviewing the results, the findings uncovered potential barriers to its use related to content, process, and technical functionality. Finally, the findings indicated that school leaders intend to use the data within the context of their four-step, iterative continuous improvement model, Plan-Do-Study-Act

(PDSA), in conversations with teachers regarding both current and future 1-to-1 deployments.

Findings from this study informed the creation of three action communication products targeting different audiences including: (1) a recommendation report to the district leaders, aligning the use of data about school technology leadership practices to their school improvement planning processes using the continuous improvement model already operationalized there; (2) a deployment guide for principals to reference when framing the school technology leadership assessment data collection process with their teachers; and (3) a user feedback summary report for instrument developers to consider in the validation and future development of the school technology leadership assessment instrument.

Keywords: school technology leadership, 1-to-1, continuous improvement, PDSA, leadership assessment

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APPROVAL OF THE CAPSTONE PROJECT

This capstone project, "Assessing School Technology Leadership Practices:

Perceptions from 1-to-1 Schools in the Context of Continuous Improvement," has

been approved by the Graduate Faculty of the Curry School of Education in

partial fulfillment of the requirements for the degree of Doctor of Education.

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April 8, 2014
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Date of Defense

DEDICATION

To my family…especially Dad.

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CHAPTER ONE: INTRODUCTION

In 2010, the National Educational Technology Plan issued "a call to action for education leaders" (p. 64) urging leaders to increase their understanding of how technology impacts learning and to effectively plan for the successful integration of technology by connecting it to curriculum and instruction, assessment, and professional learning using continuous improvement principles. Within the body of educational literature, there is also a call for additional research on school technology leadership (Davies, 2010; Dexter, 2011; McLeod & Richardson, 2011; Richardson, Bathon, Flora & Lewis, 2012; Tan, 2010), as leadership has been empirically linked to impacts on technology integration in schools (Anderson & Dexter, 2005). While much has been written in popular press about technology integration, school technology leaders faced with leading technology integration efforts lack ready access to research-based tools to support their integration efforts. This study contributes to the call for additional research on school technology leadership and addresses a specific problem of practice using an assessment of school technology leadership practices in two middle schools within a district that practices continuous improvement.

Background

Howard Valley School District is a public school system in the mid-Atlantic region serving over 13,200 students in grades Pre-K through 12. Seven elected school board members govern the district, and their superintendent has served

since 2006. Howard Valley School District utilizes the Baldrige Criteria for

Performance Excellence (National Institute of Standards and Technology:

Baldrige Performance Excellence Program, 2013) to guide their systems

management approach to continuous improvement, and they have adopted a 4-

step iterative cycle, known as the Deming Plan-Do-Study-Act (PDSA) Cycle, as

their model for implementing continuous improvement efforts (Deming, 1986,

1993). School and district leaders use PDSA to monitor organizational progress

on the strategic plan as well as in school improvement planning (SIP) processes

and in performance management systems. Throughout the district, the

implementation of PDSA varies in levels of formality. For example, the district

requires school leaders to document quarterly progress updates on their SIP

objectives and strategies as part of the study step in the PDSA cycle. School

leaders are expected to submit these to the district for review each quarter as a

report of their progress.   Personal goal setting and school improvement

processes require the use of data in the planning and studying stages of the

PDSA cycle to inform professional learning and organizational improvement

goals.   The language of PDSA is reflected in the tools leaders use to support

these processes including the SIP template (see Appendix A) as well as in

documents associated with the teacher performance appraisal and administrator

performance appraisal systems. Leaders and teachers use the term informally

when referring to their reflective processes, suggesting that PDSA is a mental

model that has become embedded into the culture.

Technology integration is a strategic priority to key leaders in the district

including the school board and the superintendent. An active participant in social networking including Twitter and blogging, the superintendent has been recognized at local, state, and national levels for her leadership in technology integration, and her leadership has influenced the organization's emphasis on integrating technology into the schools' teaching and learning programs.

A school board priority in the district's current strategic plan is to integrate supportive technologies into instructional programs, thus elevating the district's interest in technology integration. In Spring 2013, the district launched a grant-based innovation program in which the two middle schools in this study were awarded funds to implement 1-to-1 programs (i.e., technology devices distributed at a one device per student ratio) at a full grade level in the 2013-2014 school year. During that time, the CIO also presented a digital learning initiative proposal to the school board to explore a move towards district-wide 1-to-1 technology deployments, reinforcing the organization's commitment to expanding technology integration efforts in the future.

Problem Statement

The emerging 1-to-1 technology initiatives in Howard Valley School District have the potential to increase student learning and engagement, but school leaders lack a data-driven, systematic approach to examining their own technology leadership practices in order to plan for, implement, and sustain their school's 1-to-1 programs in the context of continuous improvement. Leaders' practices are important for schools to consider when planning, implementing, and sustaining technology initiatives (Anderson & Dexter, 2005; Davies, 2010;

Dexter, 2011; McLeod & Richardson, 2011; Richardson et al., 2012; Tan, 2010) because leaders are responsible for fostering the shared vision, professional development, and organizational conditions needed for successful integration of technology into the teaching and learning systems (Leithwood, Harris, & Hopkins, 2008).   When leaders have feedback about their own leadership practices, they are better equipped to create the necessary conditions for schools to be successful (Kelley & Halverson, 2012). In the context of school improvement, however, the leadership skills needed to support improvement processes may be unclear (Chicquette, 2010). A review of organizational documents revealed that leaders of the 1-to-1 schools in this study had already identified their desired outcomes for technology integration, but they lacked a method for collecting data about their own technology leadership practices to use within their school's continuous improvement model. Further, the CIO's presentation to the school board indicated that the school district had stated a desire to expand its 1-to-1 programs.

Objectives and Aims

The purpose of this project was to equip school leaders in two specific middle schools with data about their technology leadership practices to use as a resource as they continued to plan for, implement, and sustain 1-to-1 technology initiatives within the district's context of continuous improvement.   Teachers and school leaders within each participating school provided feedback about school technology leadership practices in their school by responding to an online survey organized into three domains of leadership practice found in the literature. These

domains include setting directions, developing people, and redesigning the organization (Leithwood et al., 2008; Leithwood & Jantzi, 2005; Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004).   School technology leadership team members received the results of their survey in a format aligned to growth-oriented rubrics, providing leaders with qualitative data about how to improve their practices in specific areas. Once the school leaders received their survey results and associated rubrics, the researcher conducted focus groups with members of the school technology leadership teams in each school to discuss their reactions to the survey instrument, the feedback gained from teachers through the survey administration, and their intended use of the data.

Findings from this study informed the creation of three action communication products targeting different audiences that were aimed to address the problem of practice. The first action communication product was a recommendation report to district leaders, aligning the use of data about school technology leadership practices to their school improvement planning process using the continuous improvement model already operationalized there. Specifically, this action communication product aligned the school technology leadership assessment data to the plan and study phases of the SIP process including the use of such data to support "gap evidence" found in the SIP template.   This approach has the potential for future use by school and district leaders in their PDSA cycle as they expand 1-to-1 technology deployments into other grades and schools. The second action communication product was a deployment guide to aid school leaders in framing the assessment's data

collection process with teachers. The deployment guide includes a collection of presentation slides, sample email communication to use prior to and after survey administration, and logistical recommendations as reference. Finally, a user feedback memo report was generated for instrument developers to consider in the validation and future development of the school technology leadership assessment instrument (see Appendix B for sample questions from the assessment instrument).

Research Questions

The research described was a mixed-methods, exploratory case study of two middle schools in a single school district.   As previously noted, the schools were in a district where the superintendent was known for her technology leadership, the district practiced continuous improvement, the participating schools had 1-to-1 technology deployments across at least a full grade level, and the district was considering an increase in 1-to-1 technology deployments, all of which helped to define this as a problem of practice with each school serving as a unit of analysis in this study. The research questions were:

- RQ1 (Focused on leadership practices): What does data from an assessment of school technology leadership reveal about the leadership practices of members of the school technology leadership team?

- RQ2 (Focused on the assessment instrument): How do school leadership team members perceive the usefulness of this assessment as a tool to support their development and the deployment of their 1-to-1 technology

initiative; what are their recommendations for improvement as a tool to support their work?

- RQ3 (Focused on the continuous improvement process): How do school leadership team members intend to use data from an assessment of school technology leadership as a part of their PDSA continuous improvement model and with existing processes to support their 1-to-1 technology initiative?

The mixed-methods case study approach permitted the researcher to engage in a study of these research questions within the leadership and implementation contexts in which future expansion in this school district will occur (Baxter & Jack, 2008).

Definitions

The following terms and definitions are used within the context of this study:

1. *1-to-1 programs* or *1-to-1 initiatives* refer to new technology initiatives implemented in two middle schools within the target district that provided each student in a single grade level access to a dedicated netbook;

2. *CANLEAD* is a research and development project focused on school technology leadership that is (a) funded by the U.S. Department of Education Institute for Education Sciences (IES), and (b) directed by the Dr. Sara Dexter at the University of Virginia. As detailed in Chapter Three, CANLEAD staff adapted the online assessment instrument used in this study from another existing instrument.

3. *Continuous improvement* refers to the systematic approach, already operationalized in Howard Valley School District, used to initiate and measure ongoing, incremental improvement efforts in organizational systems, programs, and processes;

4. *Gap evidence* is the term used in Howard Valley's school improvement plan (SIP) template to describe data used to support a school's rationale for addressing specific goals and objectives within their formal plan;

5. *OLF* is an acronym for Ontario Leadership Framework (Leithwood, 2012), the research-based leadership framework categorizing domains of leadership practices, including setting directions, developing people, and redesigning the organization, that form the basis for the survey instrument and conceptual lens used in this study;

6. *PDSA* is an acronym for Plan-Do-Study-Act, the iterative, 4-step improvement process from the quality management literature (Deming, 1986, 1993) used in Howard Valley School District to implement their continuous improvement model;

7. *School technology leadership* refers to a set of instructional leadership practices related to the integration of technology that are distributed across multiple members of each school team and aligned to three broad categories of setting directions, developing people, and redesigning the organization;

8. *School technology leadership assessment* refers to an online survey instrument aligned to the OLF used to collect data about school

technology leadership practices from teachers and administrators at participating schools.

Organization of the Study

This study is described in greater detail in the subsequent chapters. Chapter Two presents a review of the literature on school technology leadership and leadership considerations in 1-to-1 programs. Chapter Three addresses the research methodology and includes details on the conceptual framework, study participants, instrumentation, data collection process, research timeframe, and data analysis process. Chapter Four presents the research findings and argues a set of recommendations based on those findings. Also included in Chapter Four are possible impediments to implementation of the recommendations as well as implications for further research. Finally, Chapter Five provides a set of action communication products aligned to the study findings that are addressed to specific audiences within the context of this study. The researcher used pseudonyms and feminine pronouns throughout this report to protect the identity of study participants.

Role of Researcher

The role of the researcher in this capstone project was to address a specific problem of practice, the need for leaders in two 1-to-1 schools to have a method for collecting data about their own technology leadership practices to use within their school's continuous improvement model. As a former district-level leader in Howard Valley School District, the researcher had prior knowledge of some organizational systems and processes considered in the study (e.g., school

improvement planning), though she did not have direct experience with the implementation of school-based 1-to-1 programs in her role. She had never worked in either of the participating schools during her tenure with the district. She became aware of the problem of practice while still employed by the district, but left Howard Valley School District prior to initiating this case study. At the time of this study, she was working as a member of the research and development team at the University of Virginia responsible for the school technology assessment instrument used with the participating 1-to-1 schools.

As a practitioner-scholar formerly employed by the district, the researcher was aware of the potential for bias and her own subjective interpretation of findings. Consulting the literature, she attempted to control for the impact of bias and subjectivity through the use of multiple coding and review cycles in the analysis of anonymous focus group transcriptions created from audio recordings, by capturing and studying reflective notes and jottings throughout the data collection and analysis processes, and through a review of multiple organizational documents. Her qualifications include training and experience in district-level leadership, technology leadership, strategic planning, systems management, and continuous improvement processes. Prior to initiating the study, she had completed all research and evaluation coursework required for the Doctor of Education degree at the University of Virginia.

Limitations

This project aimed to address a specific problem of practice in two middle schools that had implemented 1-to-1 programs across a full grade level during

the year in which the study was conducted. The schools were situated within a broader district context of continuous improvement.   These contextual factors limit the usefulness and generalizability of the findings. Further, several specific study limitations should be noted related to the data collection, participants, and context. The study was conducted by a single researcher who exercised the code-recode process to establish reliability (Remler & Van Ryzin, 2011). The *School Technology Leadership Assessment* used to collect data was an adaptation of an existing instrument and had not yet undergone a full validation process. While focus group feedback will be used to inform the face validity and future improvements, it should be noted that the instrument was still under development at the time of the study. Additional limitations of this study include the small sample size and low survey participation rates. Teachers in 1-to-1 grades at two middle schools as well as school administrators were invited to participate in the online survey. In total, 37 survey invitations were sent and 20 were completed, yielding a 54% response rate. This limitation is further explored in Chapter Three.

The study was not intended to test the outcome of specific school changes enacted as a result of assessing school technology leadership practices, nor was it meant to be an assessment of the performance of individual school leaders. Rather, in the context of two schools, it was intended to provide multi-rater feedback on the state of distributed school technology leadership practices within the designated schools that could be used by leaders to inform continuous improvement efforts. In addition to addressing the specific problem of practice in

one school district, the study aimed to augment the limited body of literature around the assessment of school technology leadership practices and to inform the face and content validity of the school technology leadership assessment instrument used in this study. A topical review of the school technology leadership literature follows.

CHAPTER TWO: REVIEW OF THE LITERATURE

Increases in access to technology, the projected rise in online learning (Christensen, Horn, & Johnson, 2008), and digital integration efforts within the field of education have led to new implications for school leaders and given rise to an emerging field of study around school technology leadership. This lean but growing body of literature that combines aspects of school leadership and educational technology (McLeod & Richardson, 2011) is widely acknowledged to be important, but not widely investigated. The problem of practice in this study is that school leaders lack a data-driven, systematic approach to examining their own technology leadership practices in order to plan for, implement, and sustain their school's 1-to-1 programs in the context of their district's continuous improvement model. To better understand this problem of practice, the literature review seeks to clarify:

- How is school technology leadership defined within the literature?
- What does the literature say about the significance of school technology leadership?
- What are the considerations for school technology leaders when planning, implementing, and sustaining 1-to-1 technology programs in their schools?

The following review of the literature focuses on the conceptualizations and significance of (a) school technology leadership and (b) leadership

considerations when implementing 1-to-1 technology programs. These topics are situated within a brief overview of continuous improvement and leadership in education. To align with the model used by the participating district, this continuous improvement overview highlights the Plan-Do-Study-Act (PDSA) cycle advanced by Walter Shewhart and W. Edwards Deming, pioneers in quality management and improvement.

Continuous Improvement

In this age of accountability, the term "continuous improvement" is common in the rhetoric of schools and schooling, yet a review of the educational research reveals that it is broadly defined and loosely researched within public education (Anderson & Kumari, 2009; Detert, Schroeder, & Cudeck, 2003). The concept is associated with process-driven change, though various scholars conceptualize it differently including continuous improvement as a cyclical process of inquiry focused on the analysis of data to improve school (Anderson & Kumari, 2009) and student outcomes (Copland, 2003) within a culture embracing the process of reflective practice involving people throughout the organization (Anderson & Kumari, 2009; Eaker, DuFour, & DuFour, 2002; Sutherland, 2004). The educational literature presents continuous improvement research focused on system-level changes over spans of time (Hargreaves & Goodson, 2006) and, alternatively, as a concept for solving context-specific problems of practice within a system through the rapid refinements of practice (Bryk, 2009). In their Carnegie Foundation white paper on continuous improvement in education, funded through a cooperative agreement with the Institute for Education Sciences (IES), Park,

Hironaka, Carver and Nordstrum (2013) demonstrate that continuous

improvement may occur within the classroom (p. 11) as well as at the school or

district system level (p. 14), or across multiple organizations (p. 18).

The concept of continuous improvement is not unique to education, and an

initial exploration of the literature will reveal that continuous improvement has

been well documented in other industries like manufacturing and healthcare.

The continuous improvement models in these industries are rooted in

foundations of quality management and quality improvement (Detert et al., 2002;

Park et al., 2013). Two prevalent models emerging in the early 1900s from

quality management/improvement theory, Total Quality Management (TQM) and

Continuous Quality Improvement (CQI), are both associated with "customer

focus, data-based decision making, studying and evaluating processes, systems

thinking, and employee learning" (Detert et al., 2002). Organizations embracing

TQM- and CQI-based continuous improvement models may enact formal

processes to drive their examination of data or evidence in order to detect, and

react to, variations in expected and actual performance (Deming 1986, 1993;

Detert et al, 2002; Park et al., 2013; Schmoker & Wilson, 1993). Such

approaches to precision and standardization may well be warranted in industries

like manufacturing, but this strict approach does not translate to the needs and

organization of schools. Thus the concept of continuous improvement and its

implementation has been adapted from these quality management principles for

use in education (NIST, 2013; Schmoker & Wilson, 1993).

The PDSA continuous improvement model used in this case study has its roots in quality management and quality improvement. Statistician W. Edwards Deming, known for his contributions to the field of quality management, advanced the PDSA cycle, also known as the Deming cycle and Shewhart cycle, from the early conceptualizations of Walter Shewhart, a noted physicist, engineer, and statistician in the early 1900's who served as Deming's mentor (Blankenship & Petersen, 1999; Moen & Norman, 2010). Shewhart's early model of the cycle had origins in the scientific method, and he designed it to support improvements in mass production through the "dynamic scientific process of acquiring knowledge" (p. 45) organized into three steps that included (1) specification, (2) production, (3) inspection (Shewhart, 1939). The Shewhart cycle initially gained little attention in the United States, at least not until Deming used it in his quality management work with Japanese leaders to help rebuild their economy following World War II (Deming, 1993; Moen & Norman, 2010). Deming, recognizing the model's usefulness to organizations other than manufacturing, continued to shape and refine it and, in 1993, it became the four-step, data-driven PDSA model for continuous improvement used in multiple industries today (Moen & Norman, 2010).

The PDSA model has earned a place in the current dialogue of educational research advanced by Bryk (2009) and colleagues (Bryk, Gomez, & Grunow, 2010; Park et al., 2013) through their work in the Carnegie Foundation. In their call to reform the infrastructure of educational research through "The Six Core Principles of Improvement" (Carnegie Foundation, 2013), Byrk and colleagues

promote the use of "…rapid cycles of Plan, Do, Study, Act (PDSA) to test fast, learn fast, and improve quickly" as a means to "anchor practice improvement in disciplined inquiry" (Carnegie Foundation, 2013). In his doctoral research focused on process-based improvement planning driven by PDSA in a Wisconsin school district, Chicquette's (2010) findings echoed the importance of connecting a systematic process to improvement efforts.

Leadership in Education

Evidence from a large body of scholarship shows that educational leadership is important for various reasons.   School leaders have strong, significant effects on the organizational conditions that impact student outcomes (Leithwood & Jantzi, 1999, 2008; Leithwood et al., 2004), and they influence student engagement through the support structures and culture they promote (Leithwood et al., 2008; Leithwood & Jantzi, 2005; Leithwood et al., 2004). School leaders play a key role in optimizing teacher capital, which has a direct impact on students (Hargreaves & Fullan, 2012; Leithwood et al., 2004; Odden, 2011).   Based on their comprehensive review of the educational leadership literature, Leithwood et al. (2004) assert "leadership is second only to classroom instruction among all school-related factors that contribute to what students learn at school" (p. 5).

Across cultures, industries, and leadership models, there is evidence to suggest that effective leaders enact a common set of core practices.   These practices form the basis of successful leadership and can be organized into three broad categories of setting directions, developing people, and redesigning

organizations (Leithwood et al., 2008; Leithwood & Jantzi, 2005; Leithwood et al., 2004). These research-centered leadership categories provide a logical way in which to organize school technology leadership practices because they draw attention to the range of school and classroom conditions school technology leaders must address to support technology-enabled teaching and learning.

Setting directions. Leithwood and colleagues identify four key areas of focus within the category of setting directions (Leithwood et al., 2008; Leithwood & Jantzi, 2005; Leithwood et al., 2004). These include the identification and articulation of a shared vision, collaborative development of shared goals, creation of high performance expectations, and the promotion of effective communication throughout the organization. Successful reform efforts call for leaders who can inspire stakeholders, including parents, teachers, and community members, around a common goal of success for all students (Leithwood et al., 2008; Leithwood & Jantzi, 1999). A strong organizational vision can be a motivational driver (Mirvis et al., 2010), and the leader's communication about and commitment to the vision is key to shaping its impact (Barnett & McCormick, 2003; Leithwood et al., 2008). Organizational leaders that engage their primary stakeholders to co-author the vision can foster understanding and ownership in the process (Barnett & McCormick, 2003). Leaders can build staff engagement by communicating information on the organization's direction and key strategies, providing clear expectations, and demonstrating how their individual work contributes to the organization's vision and goals (Odden, 2011). When the vision is (a) developed in authentic ways;

(b) thoughtfully integrated into the organization's performance management systems; and (c) reinforced in constructs such as goal setting sessions, performance appraisal systems, professional learning communities, and instructional frameworks, connections are built between the day-to-day work and the future. These practices aim to align the individual and collective efforts towards a common purpose, and organizations that do manage to successfully mobilize their resources towards a shared, clear vision have the potential to perform more efficiently and effectively, an important consideration in the deployment of 1-to-1 programs.

Developing people. Louis, Leithwood, Wahlstrom, and Anderson (2010) suggest the core leadership practices associated with developing people are characterized as "providing individual support and consideration, offering individual stimulation, and modeling appropriate values and practices" (p. 68). Leaders strive to enact these practices by cultivating the strengths of individual teachers, recognizing and supporting their specific needs, enabling all teachers to develop in ways that support the school's mission, and modeling desired practices (Louis et al., 2010). "The primary aim of these practices is capacity building, understood to include not only of the knowledge and skills staff members need to accomplish organizational goals but also the disposition staff members need to persist in applying those knowledge and skills" (Louis et al, 2010, p. 68). Thus, developing people in this context extends to addressing their affective as well as intellectual needs. As described later in this chapter,

teachers' needs are a key consideration when planning for the implementation of 1-to-1 a program.

Redesigning the organization.   The four tasks associated with redesigning the organization, "building collaborative cultures, restructuring the organization to support collaboration, building productive relationships with families and communities, and connecting the school to the wider community, " (Louis et al, 2010, p. 68), focus leaders' practices on optimizing organizational processes, structures, and conditions to support the work of the school.   To promote collaborative cultures, expert educational leaders not only inspire others, but they also engage them in problem solving and decision making because they believe this can lead to better solutions, contribute to growth for those participating, and result in greater commitment to implementing the solution for those individuals who participate in the group process (Leithwood & Steinbach, 1995).   Leaders strive to align the allocation of resources, including time and expertise, to support the school's vision, and they work to leverage positive interactions with the larger community. Given the resource-intensive nature of 1-to-1 programs, this is an important domain of leadership practice to consider.

Today's school leaders must facilitate a culture of collaboration that leverages not only human capital, but the interconnections of social capital among teachers (Leana, 2011; Hargreaves & Fullan, 2012).   Further, as the complexity of school leadership has risen, leadership research has expanded beyond just that of the formal principal leader to a concept of distributed leadership practices spread across multiple members of a school community

(Spillane, Halvorsen, & Diamond, 2001, 2004). This framing draws attention to the interconnection between school leaders, followers, and their situations (Spillane et al., 2004). Further, it attends to the importance of leadership actions and the enactment of practices rather than to a single leadership role (Spillane et al., 2004). This combined effect of leadership has a strong relationship to teachers' perceived working conditions and has been attributed to significant positive variation in student achievement in comparison to those studies focused on the impacts of individual leaders (Leithwood et al., 2008). The importance of school leadership and of distributed leadership practices is evident in the school technology leadership literature, as well.

Conceptualizations and Significance of School Technology Leadership

While the significance of school technology leadership is evident within the literature, variation exists in the way in which it is defined and conceptualized and in the terms used to reference it. By various authors, school technology leadership is alternatively conceptualized as an extension of the school principal's role (Flanagan & Jacobsen, 2003), a composite of leadership indicators impacting technology outcomes (Anderson & Dexter, 2005), and a team-based model of school technology leaders involving various members from within the professional community (Dexter, Seashore Louis, and Anderson, 2009; Dexter, 2011; Gray, Thomas, & Lewis, 2010). When referring to technology leadership in K-12 schools, studies employ a range of terms including *information and communications technology (ICT) leadership* (e.g., Tondeur, Devos, Van Houtte, Van Braak, & Valcke, 2009; Yee, 2000), *information technology (IT)*

leadership (e.g., Hollingsworth & Mrazek, 2004), and *leadership for educational technology (ed tech)* (e.g., Schrum, Galizio, & Ledesma, 2011). In this literature review, the term *school technology leadership* is used to encompass all of these constructs.

An extension of the principal role. School principals possess formal influence and decision-making privilege within the school environment, thus the school principal has been a subject of selected studies in school technology leadership including Yee (2000), Schiller (2002), and Flanagan and Jacobsen (2003). Yee (2000) explored the impact of technology integration on the work of principals using case studies in ten technology-infused schools located across Canada, New Zealand, and the United States. As a result of her analysis from interviews with multiple stakeholders, focus groups, observations, and resource reviews, Yee (2000) suggested principals will face challenges in technology-infused environments and they will demonstrate their leadership in the way they respond to these challenges. She recommended a framework to categorize eight key roles exercised by principals when serving as school technology leaders. These roles include providing equitable access to hardware/software resources, conveying a focused vision aligned to student learning, fostering growth and leadership in others, and monitoring school progress.

In an exploratory study of twelve Australian elementary schools identified for their achieved levels of technology integration, Schiller (2002) investigated the influence of principals' interventions on technology implementation, concluding that the principal's active and ongoing involvement in the implementation

processes is critical. Flanagan and Jacobsen (2003) examined the literature on technology integration and suggested a framework for conceptualizing principals' roles and responsibilities as a model to guide their practices to support the goals of technology integration in their schools. Their framework advocated that principals attend to equity of access, student engagement, shared vision, ubiquitous networks, and effective professional development, as these are key elements to effective technology integration.

Most recently, in the Project RED large-scale national survey of 997 respondents from 828 schools in 49 states, change management leadership by principals and principal training were identified as key implementation factors linked to positive impacts, ranking second and ninth respectively in list of nine key factors (Greaves, Hayes, Wilson, Gielniak, & Peterson, 2010).   The amount and types of technology training received by school principals have been linked to the level of technology integration achieved in schools' teaching and learning systems (Dawson & Rakes, 2003), though a review and survey of programs suggests that little technology leadership training is actually required of the majority of leaders in formal preparation programs and licensure processes (Schrum et al., 2011).

A distribution of technology leadership practices. While the literature suggests that focusing on the principal as the school technology leader is important, the complexity of leadership actions needed to enact successful technology integration indicate a broader conceptualization of such leadership may be needed. Public schools report technology integration responsibilities are

often spread across staff members in different roles, and 31% of public schools in the U.S. have full-time staff responsible for technology support and/or technology integration (Gray, Thomas, & Lewis, 2010). In a study of technology coordinators from 22 secondary schools in New Zealand, Lai and Pratt (2004) found that although many of the technology coordinators were leading professional development for teachers, providing support for the curriculum, and influencing plans related to technology integration, they were not recognized as formal technology leaders. Most fulfilled their role as an "add-on" to another formal position and were not given additional time for planning or professional development to support growth in their technology coordinator roles. These findings suggest that limiting the scope of technology leadership to that of the principal can be counterproductive to empowering those individuals, such as technology coordinators, who play a key role in fulfilling important technology leadership practices.

Dexter, Seashore Louis, and Anderson (2009) examined the roles, practices, and staffing models of teams in nine schools noted for their achieved levels of technology integration. Using interviews, focus groups, observations, and review of artifacts, they determined that leadership practices and expertise were spread across a variety of administrative and non-administrative roles including some who were considered "support" staff. Individuals in the schools demonstrated this leadership through a variety of methods including participation on technology leadership teams, leading professional development, and co-planning with teachers on the integration of technology into teaching.

In a cross-case analysis of five middle schools, Dexter (2011) examined team-based technology leadership within the context of laptop implementations using input from both teachers and formal administrators. In survey responses from teachers, the technology leaders they identified most often were non-administrative technology leaders such as teachers who were technology specialists, media center specialists, and technical support specialists rather than principals. Further, teacher interviews at each school noted that teachers often gained ideas about technology from informal conversations with other teachers, signifying that some teachers were serving as informal technology leaders. Taken together, these studies imply that a more realistic and viable conceptualization of school technology leadership is one in which leadership practices are distributed across multiple roles including the principal, technology coordinator, and non-administrative technology leaders rather than limited to a single individual.

A composite of indicators, dimensions, and impacts. Leadership indicators are also used to frame the construct of school technology leadership within the literature. Using nationwide survey data gathered from teachers, administrators, and technology coordinators in more than 800 schools, Anderson and Dexter (2005) identified eight technology leadership indicators that were aligned to the National Educational Technology Standards for Administrators (NETS*A) to define a technology leadership composite index in order to investigate the role of leadership in technology outcomes. These indicators included the presence of a technology committee, school technology budget,

staff development policy, and intellectual property policy as well as principal days dedicated to technology administration and planning, principal email use, district support, and grant attainment.   Of the variables tested, technology leadership was found to be the strongest predictor of technology outcomes (e.g., technology use and integration), more significant than students per computer, infrastructure, and hardware/software expenditures.   Ng Wee (2008) surveyed 80 teachers using eight dimensions of transformational leadership to determine the extent to which the presence of these leadership dimensions impacted the integration of technology into their teaching practices. These dimensions included developing a shared vision, building consensus about goals, providing individual support, providing intellectual stimulation, modeling, holding high expectations, building collaborative structures, and strengthening school culture. As a composite variable for school technology leadership, the eight dimensions received a mean rating of 4.71 on a 6-point scale, with similar means associated with the individual dimensions. These results indicate that teachers believe transformational leadership practices have a positive influence on their technology integration (Ng Wee, 2008).

School technology leadership standards.   The National Educational Technology Standards for Administrators (NETS*A) are often cited as the recognized set of professional standards to guide the actions of school technology leaders (Richardson et al., 2012).   Developed in 2001 from a collaboration between key professional organizations including the National Association of Secondary School Principals (NASSP), the National Association of

Elementary School Principals (NAESP), the National School Board Association (NSBA), the International Society for Technology in Education (ISTE) and other interested parties, these standards were updated in 2009 to reflect changes in the field and in the larger society (Richardson et al., 2012; Schrum et al., 2011). They now characterize five broad standards and representative skills considered important for school leaders to possess (ISTE, 2009):

1. Visionary leadership

2. Digital age learning culture

3. Excellence in professional practice

4. Systematic improvement

5. Digital citizenship.

In spite of their popularity, the number of rigorous studies supporting their impact is minimal. A literature review of school technology leadership research published between 1997 and 2010 that included any focus on the NETS*A standards yielded only 37 articles, with 68% of them categorized as merely descriptive (Richardson et al., 2012). The reviewers suggest that the standards, themselves, lack the specificity needed to create changes in leadership practices (Richardson et al., 2012).

Tools for assessing technology leadership. Assessing the effectiveness of school leaders, particularly using data from multiple perspectives about what leaders actually do to support instruction, can be an important strategy in organizations striving for continuous improvement and, when used effectively, can lead to improvements in schools, build confidence by illuminating

accomplishments in individual performance, and promote professional growth in educational leaders (Goldring, Cravens, Murphy, Porter, Elliott & Carson, 2009; Goldring, Porter, Murphy, Elliott, & Cravens, 2009; Wallace, 2009).   Further, leadership assessments should be aligned to professional leadership standards, focused on instructional and organizational improvements, reliable and tested, flexible enough to fit different contexts, and linked to professional development to address gaps in performance (Goldring, Cravens, et al., 2009; Goldring, Porter, et al., 2009; Wallace, 2009). Yet, a content analysis of 65 district and state-level principal assessment instruments found these tools to be deficient in focus on ensuring rigorous curriculum and instruction and in providing leaders with the necessary feedback to improve (Goldring, Cravens, et al., 2009; Goldring, Porter, et al., 2009; Wallace, 2009). Less than half of the instruments provided information regarding their framework or research basis, and many used broad, nonspecific categories as their criteria for assessment of individual leaders rather than evaluating specific leadership practices (Goldring, Cravens, et al., 2009). In comparison, a recently developed evaluation and feedback system out of the University of Wisconsin-Madison is designed to assess distributed leadership tasks using observations from a variety of stakeholders including teachers (Kelley & Halvorsen, 2012). The Comprehensive Assessment of Leadership for Learning (CALL) is intended to provide formative feedback about leadership tasks using a three-level rubric (Kelley & Halvorsen, 2012). Drawing from Spillane et al. (2004), the authors posit that providing schools with formative feedback about leadership practices rather than about the performance of one

individual leader can lead to added performance improvement and motivation.

While there is variance in the definition of school technology leadership and scant research on the assessment of school technology leadership practices, several instruments designed to evaluate these roles and practices do exist. Drawing upon an early version of the aforementioned NETS*A standards, the UCEA Center for the Advanced Study of Technology Leadership in Education (CASTLE) developed a Principals Technology Leadership Assessment (PTLA) which is meant to assess an individual principal's behaviors based on the standards (UCEA, 2005). Questions are organized in into the six NETS*A standards and are designed to assess the extent to which principals perform certain technology leadership activities using a 5 point scale ranging from "not at all" to "fully" (UCEA, 2005). The LoTi Principal Evaluation system is an evaluation product aligned to the 2008 ISLLC Professional Standards for School Leaders and based on the Levels of Technology Implementation (LoTi) framework (Moersch, 1995). As with the PTLA, this instrument is focused on the principal as the school technology leader. The Partnership for 21st Century Skills (P21), a national coalition of businesses, education leaders, and policy makers, has developed a self-assessment survey that can be used by school and district leaders to assess perceived levels of "21st century skills integration" based on the framework developed by that organization (P21, 2013). The framework includes a category focused on educational leadership and perceived levels of technology integration in several broad domains using a continuum of three levels ranging from early stage to transitional stage to 21st century. Similarly, the

Alliance for Excellent Education, a policy and advocacy group focused on high school education, offers a digital readiness assessment designed as a self-evaluation tool for district-level leaders. Developed by the Metiri Group (n.d.), the digital readiness survey and associated results report are aligned to a framework of seven key categories that include (1) curriculum and instruction; (2) use of time; (3) technology and infrastructure; (4) data and assessment; (5) academic supports; (6) professional learning; (7) budget and resources. While each of these tools provide varying levels of insight into school technology leadership, an opportunity exists for the development of research-based instruments designed to give leaders feedback from teachers on the state of distributed school technology leadership practices within their school. As school technology integration efforts expand in education, the need for leaders to systematically have feedback about their practices is increasingly important.

Technology Leadership Considerations in 1-to-1 Programs

Defining 1-to-1 programs. Technology initiatives focused on the deployment of portable devices such as laptops, netbooks, or tablet computers at a 1-to-1 device per student ratio are increasingly on the rise in schools (Penuel, 2006; Richardson et al., 2013; Sauers & McLeod, 2011) and, as with the literature on school technology leadership, variance exists within the research on what constitutes a 1-to-1 program (Dunleavy, Dexter, & Heinecke, 2007; Penuel, 2006; Richardson et al., 2013; Sauers & McLeod, 2011).   Some studies broadly assign the 1-to-1 label to any situation in which students are assigned a dedicated computing device from the school or organization, while others include

"bring your own device" initiatives in the definition, thus including student-owned

equipment (Penuel, 2006; Richardson et al., 2013; Sauers & McLeod, 2011).

Studies may include smartphones as a "device," while others limit the definition

to the inclusion of more robust hardware like laptops and tablets. Earlier

literature even encompassed desktop computers or laptops without access to the

Internet (Penuel, 2006). Contemporary thought in the United States generally

refers to a range of wireless devices with access to the Internet.   Program scope

may range from a classroom deployment of 1-to-1 devices to a statewide

deployment. These differences in size may pose different challenges and, when

examining the literature, one must be aware of these differences in study

definitions, boundaries and scope.

Basis for implementation of 1-to-1 programs. Schools and districts

may implement 1-to-1 programs for a variety of instructional, ethical, and

strategic reasons, some more tightly aligned to the school's vision than others.

In his synthesis of the literature, Penuel (2006) found that the desired outcomes

expressed by most 1-to-1 schools could be categorized into the following broad

focus areas:

1. Increasing academic achievement;

2. Providing all students with equitable access to digital resources;

3. Increasing economic competitiveness;

4. Transforming the quality of instruction.

A cross-case analysis of five case studies in which laptops had been deployed at

the middle school level echoed Penuel's synthesis (Dexter, 2011). The five

schools' visions ranged from providing anytime anywhere access for students, to increasing equity for all students, to targeted objectives related to enhancing the curriculum (Dexter, 2011). This trend towards implementing 1-to-1 programs is increasing despite minimal research linking them to substantive improvements in student academic progress and other positive student outcomes (Penuel, 2006; Richardson et al., 2013; Sauers & McLeod, 2011). While a synthesis of the research did provide some evidence of a link between 1-to-1 programs and improvements in literacy and writing, fewer studies demonstrate that this technology-based intervention improves academic performance in math and science (Penuel, 2006). Beyond the limited evidence of links to academic performance, studies do support a connection between 1-to-1 programs and increases in student engagement, attendance rates, organization, and motivation (Greaves et al., 2010; Penuel, 2006; Zucker & McGhee, 2005). Greaves et al. (2010) asserted that schools with "properly implemented" 1-to-1 schools reported reductions in dropout rates and disciplinary actions. Opportunity remains for additional empirical research to substantiate the impact of these interventions.

   Challenges in implementing 1-to-1 programs. One-to-1 programs represent significant investments in both monetary and human resources that span well beyond the initial purchase price of the devices (Dunleavy et al., 2007). In addition to eliciting the need for ongoing technical and instructional supports, 1-to-1 programs can spawn a variety of new processes to address needs such as method of distribution and scheduling software updates. Further, they may be

catalysts for new policies to address matters like home use and who is responsible for replacement of damaged items (Greaves et al., 2010). Parent buy-in is important, but may be difficult to obtain (Greaves et al., 2010; Penuel, 2006). Failure to address infrastructure issues such as ensuring sufficient bandwidth to support the increased network utilization can lead to frustration and be a barrier to usage (Greaves et al., 2010). In Henrico County Public Schools, one of the largest early laptop deployments in the United States, participants cited a range of specific challenges including resource-related issues like laptop durability and battery life, management and discipline issues including students coming to class without laptops, and professional growth issues such as insufficient time for planning and ongoing development (Zucker & McGhee, 2005). Also noted were teachers' personal preferences and individual resistance.

Teachers' attitudes and beliefs may be impacted by the design of a 1-to-1 program implementation and their attitudes and beliefs can affect the overall success (Penuel, 2006). In his synthesis of the literature, Penuel (2006) identified the following ways in which teacher beliefs were cited as influencing 1-to-1 program implementation:

- Perceptions about access to subject matter content
- Concerns about unauthorized use of devices
- Beliefs about the role of computers in learning
- Beliefs about student capabilities.

Research indicates that a key challenge for school technology leaders is to provide the supports teachers need to integrate technology into teaching practices in relevant ways (Flanagan & Jacobsen, 2003), and that teachers are more likely to use technology when they take on more active roles within their own learning (Frank, Zhao, & Borman, 2004).

Role of leadership in effective 1-to-1 implementation.   It has already been established that technology leadership is predictive of the levels of technology use within schools and is a key factor in the integration of technology into the teaching and learning systems (Anderson & Dexter, 2005; Greaves et al., 2010; Zhao & Frank, 2003). Further, the leader's involvement in a school's technology integration efforts is linked to positive changes in teacher and student use (Anderson & Dexter, 2005) and, as previously noted, principal leadership was determined to be a key indicator of success in the large-scale national Project RED study (Greaves et al., 2010). The complex web of factors necessary for effective planning, implementing, and sustaining a 1-to-1 program can form the biggest barrier to success.

To achieve the desired impact, 1-to-1 programs require a targeted system of leadership practices (Dexter, 2011; Greaves et al., 2010). In Henrico County Public Schools, stakeholders attributed the success of the initiative, in part, to the broad and consistent communication of the vision by school and district leaders (Zucker & McGhee, 2005). In her case study analysis, Dexter (2011) found that visions tightly aligned to the teaching and learning systems warranted more targeted instructional support for teachers. Other factors identified in the

literature as being critical to effective implementation included access to ongoing formal and informal professional development aligned to instructional expectations (Dunleavy et al., 2007; Zucker & McGhee, 2005), opportunities for interactions among teachers themselves (Frank et al., 2004), access to timely technical as well as content-specific support (Zucker & McGhee, 2005), and availability of resources (Penuel, 2006). These practices can be thought of as setting directions, developing people, and developing the organization (Leithwood et al., 2004; Louis et al., 2010). The combination of factors critical to effective planning, implementing, and sustaining 1-to-1 programs warrant a systematic approach to school technology leadership in order to be successful.

Critique

Although much opinion has been written on the topic of educational technology, there is a disparity in the literature on a common definition of school technology leadership and a scarcity of empirical research focused on the topic. An analysis of school technology leadership literature between 1997 and 2009 highlighted a notable number of missing or underrepresented themes including scant research on digital-age learning cultures and pre-service leadership preparation (McLeod & Richardson, 2011). A recent comprehensive review of the literature related to key leadership standards informing leadership preparation (e.g., ELCC & UCEA) found significant shortcomings in research about the development of technology leadership practices (Reynolds et al., 2013).   In the case of technology leadership teams, while national data support the presence of technology teams in schools (Gray et al., 2010), there is less

clarity in the literature on how team members can coordinate their practices and interactions to effectively support technology integration into the teaching and learning systems (Dexter, 2011).

The literature that informs what is known about school technology leadership in K12 education is based on a range of studies short on data and methodological rigor. When compared to the broader body of literature around educational leadership, the conceptualization of school technology leadership lacks depth or ties to current, sound quantitative data. The aforementioned Richardson et al. review (2012) highlighted the low percentage of non-descriptive research on NETS*A. Yee (2000), among others in the educational technology leadership literature, served as the sole researcher on their studies. Anderson and Dexter (2005), often cited for their seminal contribution to the field, used data from a 1998 Teaching, Learning and Computing national survey (Becker & Anderson, 1998) which are now more than a decade old. Given that the ubiquitous nature of computing in school, access to online learning resources, prevalence of mobile devices, and emergence of social media have changed the landscape of computing in schools over time, several of the key indicators used in that study including School Technology Budget, District Support of Technology, and Principal Email Use may look very different today. While their contributions to the field should not be discounted, the field could benefit from a validation of findings using more current data framed in a stronger conceptualization of leadership. Finally, the scope of the national Project RED survey notwithstanding, it should be noted that the data were self-reported and

teacher input was largely absent, with over 90% of respondents defined as holding formal school or district-level leadership roles (Greaves et al., 2010). While the current body of research proposes the complex nature of school technology leadership and the importance of attending to leadership practices in technology integration efforts, many opportunities remain for additional contributions to both theory and practice.

Conclusion

Given the rapid proliferation of technology in schools and the projected rise in online learning (Christensen et al., 2008), there is an ongoing need for school technology leaders to hone their individual practices and examine their overall system of school leadership if they are to be successful in optimizing the environment for teachers and students. Whether it is conceptualized as an individual in a formal role, a collection of practices distributed among team members, or the presence of leadership attributes, the literature has demonstrated that school technology leadership is important. In the case of resource intensive 1-to-1 programs, these interventions have the potential to foster positive changes in student learning, but they are characterized by a range of potential challenges requiring leadership attention and involvement. The literature suggests, however, that school technology leaders may not have the information and preparation necessary to develop their practices (Schrum et al., 2011).

Without a clear picture of what school technology leadership should look like in the context of their school, leaders will be challenged to enact the

practices necessary for technology integration to be successful.   This study seeks to address this disconnect by drawing from what is widely accepted in the literature about educational leadership practices related to setting direction, developing people, and redesigning organizations (Leithwood et al., 2004) and applying it to the concept of school technology leadership to provide teams of leaders with a tool to assess their technology leadership practices. Leithwood's Ontario Leadership Framework (OLF) and Deming's PDSA cycle serve as key elements in the conceptual framework for this study, which is discussed further in the section that follows.

CHAPTER THREE: METHODOLOGY

Conceptual Framework

The framework for this study united concepts from the school leadership literature using Leithwood's (2012) aforementioned Ontario Leadership Framework and a continuous improvement model from the quality management literature discussed in Chapter Two, Deming's Plan-Do-Study-Act (PDSA) Cycle (1986, 1993). First, the researcher discusses each concept individually. She then presents an integration of the OLF and PDSA, explaining how this integrated framework was used as the conceptual framework in the context of this study. The section concludes with two potential scenarios illustrating uses of the conceptual framework in practice.

Ontario Leadership Framework (OLF): An approach to organizing leadership practices. The term "leadership" in the context of education represents a complex concept, constituting different things to different people if left undefined. The benefit of using a framework, such as the Ontario Leadership Framework (Leithwood, 2012), when addressing the concept of educational leadership is that it can "facilitate a shared vision of leadership in schools and districts" (p. 5) and "promote a common language that fosters an understanding of leadership and what it means to be a school or system leader" (p. 5). Organized by role, domain, and dimension, the OLF outlines successful individual and organizational-level leadership practices from the literature

categorically described as setting direction, developing people, and redesigning organizations (Leithwood, 2012; Louis et al., 2010), concepts previously reviewed in Chapter Two. In addition to promoting a common understanding of educational leadership between multiple stakeholders, the OLF also intends to support individual growth, serving as guidance for new leaders and as a source of self-reflection and self-assessment with experienced leaders (p. 3). Leithwood's focus on practices rather than competencies in the OLF aims to recognize the importance of context, relationships, flexibility, and the shared nature of leadership (p. 5). Thus, the practices highlighted in the OLF are designed to be general enough for adaptation within different contexts and specific enough to serve as a guide for leaders actively working in the field of education.

This case study focused on three of the five OLF domains for school-level leadership practices (Leithwood, 2012), based on their alignment with the three categories of leadership practices identified in the previous chapter for their prevalence in the literature (Leithwood et al., 2008; Leithwood & Jantzi, 2005; Leithwood et al., 2004). These three domains of leadership practices, along with eleven associated dimensions of leadership, served as organizing units for the instrument used to assess school technology leadership practices in this case study as well as for the associated rubrics.   Specifically, in the context of this case study, survey questions in the *School Technology Leadership Assessment* instrument and the results rubric report were aligned to the OLF at the dimension level (e.g., OLF Dimension 1.1 – Identifying and Articulating a Shared Vision) for

each of the dimensions in Table 1 (see next page). The *School Technology*

Leadership Assessment instrument was used to assess leadership practices in

this study from multiple perspectives (e.g., teacher and administrator input).

Further, results of the assessment were aligned to rubrics in levels ranging from

Emerging to *Proficient* to *Exemplary* to raise the levels of usefulness to leaders

and provide them with feedback about leadership practices along a growth

continuum (see Appendix C for rubrics).

Table 1

Ontario Leadership Framework Domains and Dimensions*

*Wording reflects CANLEAD staff adaption of Leithwood's 2012 Ontario Leadership Framework

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Domain 1.0 Setting Directions

Dimension 1.1   Identifying and Articulating a Shared Vision

Dimension 1.2   Identifying Shared and Specific Short Term Goals Aligned with the Larger Vision

Dimension 1.3   Creating High Performance Expectations and Means for Monitoring Performance

Dimension 1.4   Communicating the Vision and Goals

Domain 2.0 Building Relationships and Developing People

Dimension 2.1   Providing Support and Demonstrating Consideration for Individual Staff Members

Dimension 2.2   Stimulating Growth in the Professional Capacities of Staff

Dimension 2.3   Modeling the School's Values and Practices

Domain 3.0 Developing the Organization to Support Desired Practices

Dimension 3.1   Building Collaborative Cultures and Distribution of Leadership

Dimension 3.2   Structuring the Organization to Facilitate Collaboration

Dimension 3.3   Allocating Resources in Support of the School's Vision and Goals

Dimension 3.4   Connecting the School with the Wider Environment

---

Deming's Plan-Do-Study-Act (PDSA) Cycle: A process-driven model for continuous improvement. As previously established, the PDSA cycle is an iterative four-step process that emerged from the field of quality management (Deming, 1986, 1993; Moen & Norman, 2010). The four PDSA steps include:

1. Plan – Develop a plan for change or improvement using data as gap evidence;

2. Do – Execute the plan using evidence-based strategies to move from current state to desired state;

3. Study – Collect data and review performance indicators to inform progress;

4. Act – Adjust, adopt, or abandon the plan based on data (see Figure 1 on p. 44).

The PDSA cycle is operationalized in practice through the use of guiding questions aligned to each of the four process steps (see Appendix D). In the context of this case study, PDSA served to illustrate the process school leaders used to think about and implement ongoing organizational improvements within their school initiatives and programs. Specifically, in this study of school technology leadership practices in a 1-to-1 environment, the PDSA process framed how leaders could use data about their own practices in a systematic way to plan for their 1-to-1 initiative, implement their 1-to-1 initiative, study progress on their 1-to-1 initiative, and make adjustments to their 1-to-1 initiative.
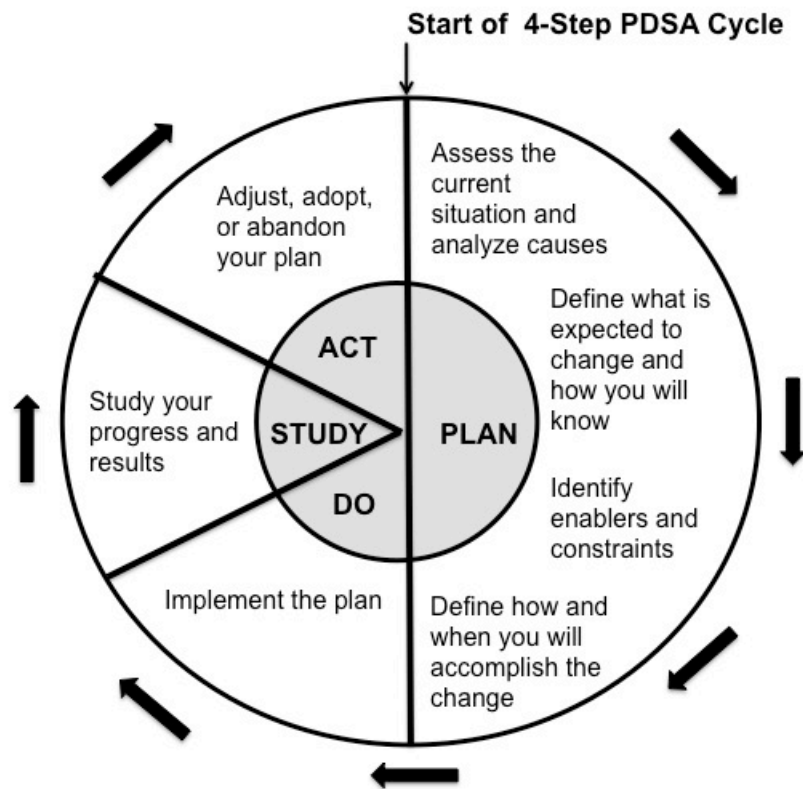
Figure 1. This figure is a basic model of PDSA, a four-step, iterative continuous improvement cycle. In the *plan* step, teams or individuals consider the need for change along with the desired objectives, progress indicators, enablers and constraints, and the details needed to enact the planned change. In the *do* step, teams or individuals implement the plan according to decisions made in the previous step. In the *study* step, teams or individuals analyze data to determine progress and to examine new information that may have emerged during implementation. In the *act* step, teams or individuals make decisions based on what they learned from the *study* step.   Decisions made in the *act* step inform what will happen in the next cycle of PDSA (Deming, 1993; Moen & Norman, 2010).

Integration of OLF and PDSA. The OLF provides a research-centered method for organizing key leadership practices to support a common language about school leadership, to enable a shared vision of leadership, and to assist leaders self-reflection and self-assessment (Leithwood, 2012). The PDSA cycle provides a process-driven model for continuous improvement already used by school leaders in this case study and embedded into their school improvement processes (see Figure 2). When integrated, the concepts frame how leaders can use data organized into dimensions of leadership practices with a process-driven improvement model for ongoing improvements. Individuals and teams can use the OLF to shape guiding questions around leadership practices within each step of the PDSA cycle, providing a common language with which to assess their own practices during the *plan* step, guide their practices in the *do* step, collaborate with teachers about their practices in the *study* step, and focus on improving specific leadership practices in support of the school's 1-to-1 implementation in the *act* step (see Figure 3).

OLF Domains and Dimensions
Setting Directions
Developing People
Redesigning the Organization

OLF (Leithwood 2012): A research-based approach to organizing leadership practices that can support common language and understanding.
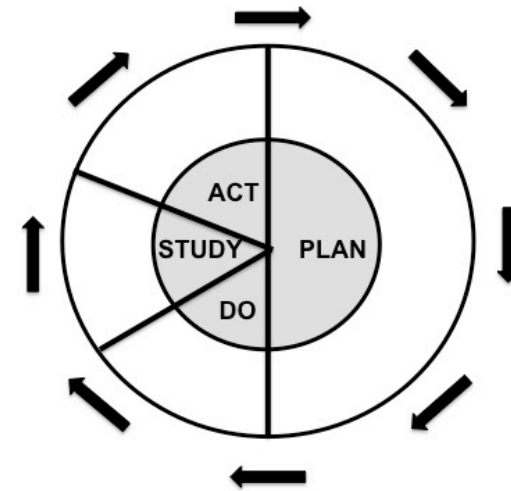
PDSA (Deming 1986, 1993): A process-driven continuous improvement model operationalized in practice through the use of guiding questions.

Figure 2: This figure illustrates the OLF and PDSA as individual elements of the conceptual framework.

Integrated Framework Uniting the OLF and PDSA for the Assessment of Leadership Practices in the Context of Continuous Improvement

As we continue with our 1-to-1 program what specific adjustments should we, as leaders, make to our practices, as defined in the OLF, to optimize the conditions for success?

What does an assessment of the school's leadership practices, arranged by OLF domains and dimensions, say about our readiness to implement a 1-to-1 program?

ACT

At this point, has the 1-to-1 program progressed as anticipated? Why or why not? How have our leadership practices, as defined in the OLF, impacted progress thus far?

STUDY

PLAN

Before we start, what is our evidence that we have defined and communicated our school's vision and goals for the 1-to-1? How will we measure our progress? (OLF Domain 1)

DO

During the implementation, how are our leadership practices, as defined in the OLF, constraining or enabling the school's 1-to-1 rollout? Are we modeling desired practices?

Before we start, what is our evidence that we have created a collaborative culture? Have we planned for, obtained and structured the necessary resources to implement our 1-to-1 and to support teachers' growth? (OLF Domains 2 & 3)

Figure 3: This figure illustrates the integrated conceptual framework uniting the OLF and PDSA. The PDSA cycle is operationalized in practice through guiding questions. In this integrated framework, the OLF scaffolds the language used in guiding questions throughout each step of the PDSA process. The OLF also shapes the answers to those guiding questions through the use of data (i.e., results) from the *School Technology Leadership Assessment* that are also aligned to the OLF domains and dimensions.

Using this integrated framework, the researcher conceptualized that school leaders could use data from the *School Technology Leadership Assessment* revealing opportunities for growth (i.e., areas identified as *Emerging* or *Proficient*) to inform the school's PDSA cycle of continuous improvement, particularly the school improvement planning cycle, as they planned for future expansion of 1-to-1 programs. Table 2 (p. 49) and Table 3 (p. 50) present two possible scenarios to illustrate the integrated framework considered in the study.   In both of these scenarios, the OLF helps leaders draw attention to particular facets of their practice, and the PDSA cycle anchors their improvement activities to a systematic process. The case study methods and methodology are explained in greater detail within the subsequent sections of this chapter.

Table 2

Scenario 1 Illustrating Use of the Integrated OLF/PDSA Framework in School

Improvement Planning Processes for a New 1-to-1 Program

Using data to plan
School Y is planning to implement their first 1-to-1 program in the 2014-2015 school year (the *plan* step in PDSA). The school improvement planning team believes the 1-to-1 initiative can help them reach key instructional goals in their school improvement plan (SIP) through differentiation and by promoting higher levels of conceptual understanding in students. As they engage in their planning, they ask "*Who will be impacted by this change and how?"* and "*How will we engage stakeholders and communicate with them?"* Before they formalize their SIP, the leaders decide to survey the teachers using the *School Technology Leadership Assessment* to assess current perceptions about the school's technology leadership and organizational readiness.

Talking with teachers about leadership practices organized into OLF dimensions
The results of the survey reveal *Emerging* scores related to identifying and articulating a shared vision for technology integration (OLF dimension 1.1), identifying shared goals (OLF dimension 1.2), creating high performance expectations (OLF dimension 1.3), and communicating the vision and goals (OLF dimension 1.4). The leaders first discuss *Emerging* scores, categorized in terms of the OLF dimensions, with members of the school improvement team who are surprised by the low results. They then talk with the grade-level teacher teams at their next series of faculty meetings. It is in the grade-level team discussions with teachers where they discover that teachers feel unclear about the school's vision for their upcoming 1-to-1 program implementation. Further, they are also concerned about how to communicate with parents about it since they are not clear, themselves. The leaders realize that, while they had been engaging in deep conversations with members of the school improvement team that included a few teacher representatives, they had not talked with the rest of the faculty about the vision, goals, and performance expectations.

Using what they have learned about leadership practices to adapt their plans
At their next SIP meeting, members of the school improvement team began to develop specific communications plans to engage both the teachers and parents in ongoing conversations about their planned 1-to-1 initiative. Although focused on different audiences, these plans will communicate a common vision.

Connecting the OLF and PDSA
Members of the school improvement team used data about how well they were establishing and communicating the vision, goals, and performance expectations (OLF dimensions 1.1, 1.2, 1.3 and 1.4) as they planned for their upcoming SIP initiative (the *plan* step in PDSA).

Table 3

Scenario 2 Illustrating Use of the Integrated OLF/PDSA Framework to Study and

Adjust Leadership Practices During the First Year of a 1-to-1 Deployment

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Using data to study progress
School Z has implemented a 1-to-1 program. The implementation has not gone as smoothly as anticipated, and the leaders have noticed increased levels of frustration among teachers. At the end of the first semester of their 1-to-1 implementation, school leaders administer the *School Technology Leadership Assessment* (i.e., leadership survey) to teachers to check perceptions about the school's progress and the leaders' impact on that progress. This periodic performance monitoring is done as part of the school's PDSA model (i.e., the *study* step in PDSA). They are seeking to answer the questions, "*Are we progressing as anticipated*?" and "*Why or why not*?"

Talking about leadership practices in terms of OLF dimensions
The results of the leadership survey reveal scores at the *Emerging* level for building collaborative culture and distributing leadership (OLF dimension 3.1). Specifically, the results rubric indicates that teachers and staff do not know how and why technology-related decisions are being made and that they are not involved in the decision-making processes impacting the instruction in their classrooms.

The leaders use this feedback about building collaborative cultures and distributing leadership (OLF dimension 3.1) to talk with teachers at their next team meeting. They discover that many of their teachers felt surprised and frustrated by numerous decisions associated with the 1-to-1 program. They also discovered that teachers felt like the decisions lacked consideration for important curricular and pedagogical implications. As a result, the teachers had been reluctant to focus on integrating the technology into their instruction.

Using feedback to adjust leadership practices for improvement
The leaders realize that although they had talked with the teachers about their high-level vision for technology, they had been working primarily with the district's technology department on their 1-to-1 program decisions. Consequently they had not systematized an approach for involving teachers in the technology-related decisions. To address this, leaders add the 1-to-1 integration as a recurring agenda item on their bi-weekly team meetings with teachers and use that time to collaborate with teachers on decisions related to integrating technology into teaching and learning (i.e., the *act* step in PDSA). They change something (the *act* step in PDSA) about their leadership practices (OLF dimension 3.1) as a result of the categorical feedback they received when using data to check their progress (the *study* step in PDSA).

Research Design

Research methodology should align with the problem of practice under investigation, the purpose of undertaking the study, the nature of research questions, and the characteristics of data to be collected (Roberts, 2010). The case study approach to research allows for the exploration of a phenomenon within a real-world case in which the researcher assumes that context will impact understanding (Yin, 2014). The case study approach can also be combined with quantitative methods such as a survey to broaden the data collection process and aid in the research investigation (Yin, 2014).

As previously mentioned in the overview provided in the first chapter, the researcher used an online survey and focus groups to conduct a mixed-methods, exploratory case study of two middle schools in a single school district, with each school serving as an embedded unit of analysis. In considering the research design for this study, the researcher recognized that the specific problem of practice under consideration was more pragmatic than theoretical in nature. To address the research questions, participants within the schools were informing the data collection processes. Further, the study's purpose was to address the problem in two schools situated within a district that practiced continuous improvement. The schools were selected for the study because they had both implemented 1-to-1 programs in their schools during the year in which the study was conducted. Context was assumed to influence understanding when exploring this problem of practice regarding technology leadership in 1-to-1 schools, and it was recognized to limit the generalizability of the findings.
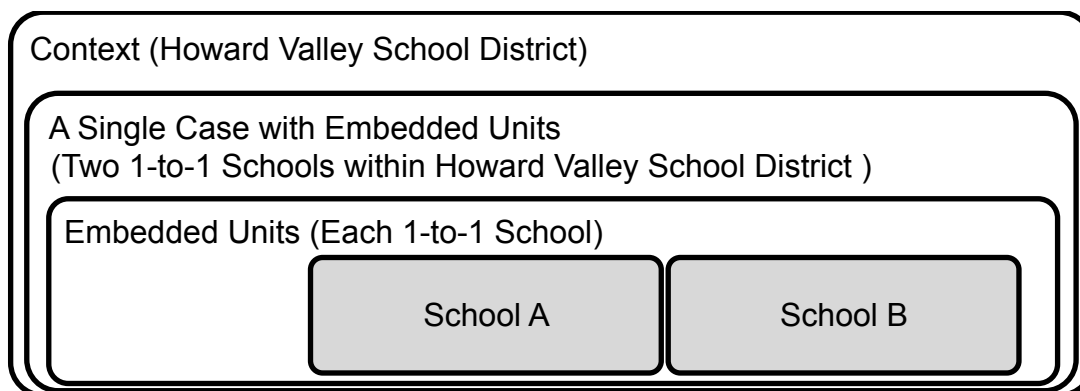
Figure 4. The case study design of embedded units within a single case illustrates the approach used in this study to treat each participating school as a unit of analysis within the broader context of Howard Valley School District. The context in this case is important because it situates both schools within the continuous improvement practices already operationalized within the district and used within both schools. Each school, or unit of analysis, had implemented a 1-to-1 program during the first semester of the research timeframe; however, each school implemented them in different grades and used varying approaches to their school technology leadership practices and to program implementation.

Given that the schools were in a district where the superintendent had been recognized at local, state, and national levels for her technology leadership, the district practiced continuous improvement, the participating middle schools had recently implemented 1-to-1 technology programs across at least a full grade level, and the district was considering increases in 1-to-1 technology deployments, the contextual considerations and timely need for data served to justify the case study approach used in this situation.

Research Access and Participants

The study involved a subset of administrators and teachers in two middle schools that had recently implemented 1-to-1 programs across a full grade level. School A, with 68 total staff members and an enrollment of approximately 550 students in grades 6 through 8, was led by a principal who had served in the role less than 5 years as well as one assistant principal. School B, with 65 total staff members and a student population of just over 600 students in grades 6 through 8, was led by an administrator who had served as their principal more than 5 years as well as one assistant principal. School A and School B had each just implemented 1-to-1 laptop programs in a single grade during the first semester of the school year in which the research was conducted.

To address the research questions in the initial data collection cycle, both administrators at each school as well as teachers in the 1-to-1 grades were asked to give input about the state of school technology leadership practices in their respective contexts using an online implementation of the survey of school technology leadership discussed in the next section. The specific teachers in the

research sample were identified for participation in the study because they were involved in the grade-level 1-to-1 programs at each of their respective schools. Specifically, to identify the sample, the principal emailed the researcher a list of names for teachers involved in the 1-to-1 grade for School A. At the request of the School B principal, the lead technology teacher emailed the researcher a list of names for teachers involved in the 1-to-1 grade there. In all, invitations to participate in the online survey were sent to 15 individuals for School A and 22 individuals for School B, totaling 37 individuals for the entire case study. Participation and response rates for each school are further detailed in data collection and analysis.

The second cycle of data collection involved a targeted subset of individuals from each participating school. Both schools had a small group of administrators, teachers and staff largely responsible for leadership considerations related to their 1-to-1 implementations. For purposes of the study, this team was referred to as the school technology leadership team. Members of the school technology leadership teams in each school informed the study's second cycle of data collection by serving as a small focus group, conducted separately at each school. They were identified for participation in the focus groups since they were the ones most likely to use data from the study in future decision-making related to their technology leadership practices.

The formality, size, and make-up of the school technology leadership team was a decision of the principal at each school and varied in each of these characteristics between School A and School B. School A included an ad hoc

group of 2 administrators, 1 grade-level lead teacher, 2 specialists, and 1 member of the technical support team. With the exception of the technical support staff member, all other individuals on School A's school technology leadership team were also on the school improvement team. The make-up of School B's school technology leadership team followed a more formal, tiered structure. This team included 2 administrators and 1 lead technology teacher who was responsible for assisting other teachers with the integration of technology. The lead technology teacher was a classroom teacher in the 1-to-1 grade who held multiple leadership roles, also serving as a member of the school improvement team, the coordinator for and liaison to a school-based technology council, and the leader of her school's "student help desk," an initiative in which students worked on troubleshooting computers during an elective class period. This small core leadership team worked in consultation the school-based technology council of volunteer teacher representatives and a staff representative from the district's technical support team.

Instrumentation

The researcher utilized three primary instruments in the data collection process. First, the researcher used an online survey, the *School Technology Leadership Assessment,* to survey teachers and administrators about technology leadership practices in their school. Second, following the survey administration, results were presented to school technology leaders in the form of a results rubric report (see Appendix C). Finally, a document containing guiding questions for each focus group was sent to each principal before the focus group began.

Each of these instruments are explained in greater detail on the pages that follow, with particular attention given to the modification process used to develop the *School Technology Leadership Assessment*.

School Technology Leadership Assessment Survey. The *School Technology Leadership Assessment* survey is an assessment of school technology leadership practices that evolved from the aforementioned Comprehensive Assessment of Leadership for Learning (CALL) instrument. CALL is a research-based, formative assessment of school leadership practices and associated feedback system developed at the University of Wisconsin-Madison (Kelley & Halvorsen, 2012). Researchers working on the University of Virginia's CANLEAD technology leadership project contacted CALL developers to inquire about the possibility of adapting CALL for technology-specific use. CANLEAD is a research and development project underway at the University of Virginia under the direction of Dr. Sara Dexter and funded by the U.S. Department of Education Institute for Education Sciences (IES). With permission from the original CALL scholars, University of Virginia researchers used an iterative process to adapt CALL survey questions for the assessment of school technology leadership practices; that is, the practices that impact organizational conditions for technology-supported teaching and learning.

In April 2013, to facilitate adaptation of the original instrument, University of Virginia researchers working on the CANLEAD project obtained an editable copy of the CALL survey instrument from the original scholars.   This source document included the survey questions as well as associated answer choices, question ID

codes, and user instructions. The instrument's 241 core questions were

originally grouped into 5 domains of leadership practices and further aligned to

21 subdomains. The survey also included a demographic section and one open-

ended question at the end for general comments.

Researchers at the University of Virginia began their modification process

with an initial reading of the entire survey, making hand notations on printed

copies where items could be adapted with technology-specific language. They

also marked questions that lacked relevance to school technology leadership for

deletion. Next, while tracking changes in the electronic copy of the CALL

instrument, questions were edited to include technology-specific language based

on written notations from the initial review. Those questions or domains lacking

relevance to assessment of school technology leadership practices were marked

for deletion using track changes.   Researchers then reviewed the survey content

for alignment with the Ontario Leadership Framework, first by generating a

crosswalk between the domains and subdomains of the CALL leadership

framework and the domains and dimensions of the Ontario Leadership

Framework (see Appendix E). Questions were then reordered and mapped to

the OLF to determine how many questions aligned to each leadership dimension.

In order to provide multiple measures of single construct, the target number of

questions per dimension ranged from 3 to 5. The proposed modifications, as

reflected in tracked changes, were shared with the original instrument developers

at University of Wisconsin-Madison for feedback and subsequently revised to

reflect their suggested language edits.

In June 2013, CANLEAD staff conducted a pilot, paper-based administration of the survey with members of school technology leadership teams at five middle schools (*n* = 22).   Following this pilot administration, the research team, incorporating respondent feedback, again reviewed the entire survey. Several questions were realigned to different OLF dimensions, and new questions were added, as needed, for dimensions containing less than three questions. Upon completion of this revision cycle in August 2013, all questions were re-numbered to reflect the updated order. The revised survey was again shared with the original scholars. Using the edited version of the electronic survey document as a guide, research staff added survey questions and answers into the CANLEAD technology system to allow for online administration, rather than paper-based administration, in the future.

In September 2013, the adapted survey underwent another significant update to reflect Leithwood's revisions to the OLF (2013) in which leadership dimensions were adapted or added.   Leadership dimensions in the revised survey were relabeled or added, as needed, to reflect the new OLF. In this revision, five new questions were added to address the dimension changes, two questions were reordered, and two questions were rewritten to clarify language. All items were renumbered to reflect the adjustments, and modifications were reflected in both the online survey content as well as by using track changes in the master electronic document.

The last version of *School Technology Leadership Assessment* contained 70 core questions, down from 241 in the CALL, and included the original,

unmodified, demographic section as well as the open-ended comment question.
In all, this version included the following types of questions:

- Descriptive - Single Answer Multiple Choice

- Rating a Single Item - Single Answer Multiple Choice

- Rating a Single Item - Rubric

- Filter - Single Answer Yes/No

- Open-Ended Demographic - Single Text Box

- Open-Ended Comment - Single Text Box (see Appendix B for sample

    questions).

Table 4 reflects a summary of key modifications between the original CALL

instrument and the revised *School Technology Leadership Assessment.*

Table 4

Summary of Key Changes between Original Comprehensive Assessment of Leadership for Learning (CALL) and School Technology Leadership Assessment

Instrument	Leadership Framework		Questions in Each Survey Section		
	Domains	Subdomains/ Dimensions	Core Content	Demographic	Comment
CALL	5	21	241	14	1
School Technology Leadership Assessment	3	11	70	14	1

Finally, following consultation with the original CALL scholars on their approach to scoring, University of Virginia researchers developed a scoring guide for the revised instrument. The first question in the survey did not receive a score as it requested the respondent's role, which was used as a filter to present role-based questions. The scoring guide addressed the remaining questions individually, and all answer choices received a value ranging from 0-5. Since the survey was designed to present aggregated school-wide results rather than individual respondent's choices, questions were configured to use the calculated mean of the responses. Of the 70 total questions, there were 5 instances where 2 questions were combined then averaged to achieve the mean score because one version of the question was worded for administrators and one was worded for teachers. Mean scores for each question, or set of questions, were then configured to align with a three-level rubric based on a scoring range of 0-1.9 (Emerging), 2.0-3.75 (Proficient), or 3.76+ (Exemplary). The rubric report is explained in greater detail in the next section.

School Technology Leadership Assessment Results Rubric Report. In addition to developing the technology-specific survey, University of Virginia researchers adapted rubrics for the *School Technology Leadership Assessment* from the original (CALL) rubrics established by Halverson (2005), who had developed them working in conjunction with the University of Pittsburgh Institute for Learning. The revised technology rubrics are grouped into 3 domains that are further divided into the 11 dimensions focused on specific areas of leadership practice aligned to Leithwood's Ontario Leadership Framework (Leithwood,

2012).   Using language from the survey questions, researchers created the rubrics. After completing the rubrics, researchers mapped the language between the two instruments, per guidelines in the scoring guide, establishing alignment between the survey responses and the results rubric report. These practice-centered rubrics are organized into three levels ranging from *Emerging* to *Proficient* to *Exemplary* (see Appendix C for rubrics).

Focus Group Questions.   The researcher provided focus group questions to each principal as a PDF email attachment in advance of the scheduled focus group meetings. The questions were divided into two categories. Questions in the first category centered on participants' reactions to the actual online assessment instrument (RQ2) and the perceived usefulness as a tool for school technology leadership (see Appendix F for focus group questions for this category). Feedback from this first category of focus group questions was intended to gather input from practitioners in order to improve the usefulness of the tool in this and future contexts.

Focus group questions in the second category investigated the participants' perceptions about the intended use of the results within their PDSA continuous improvement model and with existing improvement processes (RQ3) to better understand how a tool like the *School Technology Leadership Assessment* could support the use of gap evidence and could augment other planning processes within the school and district contexts (see Appendix G for focus group questions for this category). Feedback from this category was intended to address the participants' thoughts on what they would actually do

with the results, the actions they expected to take, to improve conditions within the context of their specific school's environment.

Research Time Frame

Upon confirming IRB and district research approval, the researcher initiated communication with school principals in December 2013 to coordinate the data collection schedule. An initial email contact was sent to the principal of each 1-to-1 school with a brief explanation of the study along with a request for a phone call to provide additional details and to discuss the possibility of participation. The researcher conducted separate phone conferences with the principal of School A and with the principal and assistant principal of School B to discuss the study details including the purpose and target participants which included the administrators at each school as well as teachers involved in the 1-to-1 grades.

After securing each school's agreement to participate, the scheduling options for data collection (i.e., survey and focus groups) were also discussed with consideration given to the winter holiday break, district professional development days, and end-of-semester activities at each school. Due to timing conflicts with a district-administered survey and each school's scheduling needs, data collection efforts were scheduled in January 2014. Specifically, at the request of the administrators from School B and with agreement from the principal at School A, the survey window for the *School Technology Leadership Assessment* was aligned with the district's teacher work days/professional development days starting January 16, 2014 through January 21, 2014. This

was done so that teachers would have the option to use workdays with no students if they chose to participate in the study. The principal of School A notified her target participants about the upcoming survey via email, and the lead technology teacher at School B notified that school's target participants via email prior to the start of the survey window.

The survey window opened the morning of January 16, 2014, an early release day for students, with half of the day dedicated for professional development on the district calendar. A system-generated email was sent to each participant with a unique link to take the survey. The survey's email invitation requested that respondents complete the survey by 5:00pm on Tuesday, January 21st (see Appendix H). Email reminders were sent to all potential participants again on January 20th (see Appendix I). In all, the survey window included two professional development half days, 1 weekend, 1 holiday, and 1 full professional development day. It is important to note that the survey was administered just as each school had completed their first full semester of 1-to-1 deployments. The timing of the survey emerged as a benefit during one of the subsequent focus groups.

Data analysis activities for survey data began at the end of the survey window, on January 22, 2014. Two participants submitted responses outside of the survey window, and the data set was updated to reflect their responses. Separate focus groups were conducted at each school on January 24th and January 27th at times coordinated with the principal. Transcription and coding activities for focus group correspondence began following the last focus group on

January 27th, with data analysis carrying through the February 2014. Research

activities spanned a three-month period (see Table 5).

Table 5

Timeline of Key Research Activities

Key Research Activity	Timeframe
Preliminary activities (i.e., research approval and coordination with schools)	December 1, 2013 to January 15, 2014
Data collection using online survey (i.e., initiating the online survey through an email invitation and leaving it open for respondents)	January 16, 2014 to January 21, 2014
Focus group preparation (i.e., emailing survey results rubric report and a copy of focus group questions to schools)	January 23, 2014 for School B January 26, 2014 for School A
Data collection using focus groups (i.e., conducting focus groups on site at each school)	January 24, 2014 for School B January 27, 2014 for School A
Data analysis (i.e., transcription, coding, analysis of quantitative and qualitative data from online survey, survey comments, focus group transcriptions, email correspondence, research notes and review of organizational documents)	January 21, 2014 to February 26, 2014
Position and response (i.e., synthesizing findings and creating action communication products)	February 1, 2014 to March 10, 2014

Data Collection Process

Case study evidence obtained from a variety of data sources may be used

for triangulation to substantiate findings and establish construct validity (Yin,

2014). Data were collected for the three research questions in this study using

multiple approaches as summarized in Table 6.   These methods are explained

further within this chapter.

Table 6

Research Questions and Data Collection Methods

Research Question	Data Collection Methods
RQ1: What does data from an assessment of school technology leadership reveal about the leadership practices of members of the school technology leadership team?	Online survey (quantitative) Online survey comments (qualitative) Focus groups Reflective notes
RQ2: How do school leadership team members perceive the usefulness of this assessment as a tool to support their development and the deployment of their 1-to-1 technology initiative; what are their recommendations for improvement as a tool to support their work?	Online survey comments (qualitative) Email correspondence Focus groups Reflective notes
RQ3: How do school leadership team members intend to use data from an assessment of school technology leadership as a part of their PDSA continuous improvement model and with existing processes to support their 1-to-1 technology initiative?	Focus groups Document review Reflective notes

School Technology Leadership Assessment. First, data were collected from administrators and teachers in 1-to-1 grades using an online assessment of school technology leadership practices (RQ1 and RQ2).   The *School Technology Leadership Assessment* was delivered using the CANLEAD web-based application. School leaders and teachers in the 1-to-1 grades at each school were asked to complete the *School Technology Leadership Assessment* using a unique link emailed to them during a timeframe coordinated with the participating principals.   Email addresses were used to track whether or not participants had completed the survey, although they were not used to identify responses. While the survey asked participants to indicate basic demographic information like role (teacher, administrator, other), years of experience, and subjects taught, it did not collect personally identifiable information such as name or address. Data from the assessment were stored in the CANLEAD system and automatically scored by the system using the aforementioned scoring guide and three-phase rubric aligned to the research-based Ontario Leadership Framework (OLF). Survey results were reported in the aggregate. Once the survey closed, members of the school technology leadership team received a results rubric report and agreed to share it with the remaining participants in their schools. Refer to Table 7 for a summary of survey response rates.

Table 7

Summary of School Technology Leadership Assessment Participation by School and by Role

School	Invitations	Completions (*n*)	Response Rate	Participation by Self-Identified Role	Open-ended Comments	Open-ended Comments by Self-Identified Role
School A	15	8	53.3%	Teacher – 5 Administrator – 2 Other – 1	2	Teacher – 1 Administrator – 1 Other – 0
School B	22	12	54.5%	Teacher – 9 Administrator – 2 Other – 1	4	Teacher – 3 Administrator – 1 Other – 0
Total	37	20	54.0%	Teacher – 14 Administrator – 4 Other – 2	6	Teacher – 4 Administrator – 2 Other – 0

Focus Groups. In addition to the online survey, data were also collected using focus groups conducted with school technology leadership team representatives at each school (RQ1, RQ2 & RQ3). Focus groups followed a semi-structured format and questions were sent to the principal along with the results rubric report in advance of each focus group meeting. The researcher conducted two small group meetings, one with three attendees and the other with five attendees, in an available conference room at each participating school at a time and location coordinated by phone or email with the school principal. Both the participants and researcher were seated around a rectangular table during each focus group. At School A, a projector was used to display the *Results Rubric Report* (i.e., feedback report) since two of the five attendees did not bring their laptops. At School B, each of the three focus group participants had their own laptops and used them to reference their electronic copies of the feedback report and focus group questions (see Table 8 on p. 72).

To augment the information gained in response to the focus group questions sent to each principal in advance, the facilitator also asked each focus group for feedback on what they had learned during their first semester of 1-to-1 implementation that they wish they had known at the onset. Participants' responses and group dialogue were captured using a recording for backup purposes, the recording was transcribed, and the transcribed data were stored in a secure location on a non-networked drive. While focus group design did not permit anonymity, all focus group data were treated confidentially. The

researcher intentionally omitted focus group transcriptions from inclusion in this capstone to protect the confidentiality of study participants.

Table 8

Summary of School Technology Leadership Team Focus Group Participation by School and by Role

School	Focus Group Participants (*n*)	Focus Group Participants by Role
School A	5	Principal – 1 Assistant Principal – 1 Technology Lead Teacher (Non-Classroom)* – 1 Lead Teacher in 1-to-1 Grade (Classroom) – 1 Other Staff (Non-Classroom)* - 1 *(*Not a classroom teacher)*
School B	3	Principal – 1 Assistant Principal – 1 Technology Lead Teacher (Classroom)* – 1 (**Served multiple roles including a classroom teacher in the 1-to-1 grade and facilitator of the school's tech council*)
Total	8	Principal – 2 Assistant Principal – 2 Technology Lead Teacher (Classroom) – 1 Technology Lead Teacher (Non-Classroom) – 1 Lead Teacher in 1-to-1 Grade (Classroom) – 1 Other Staff (Non-Classroom) - 1

Documents. In case study research, a variety of documents can be used to substantiate and strengthen findings, though they should be carefully critiqued for bias or inaccurate information (Yin, 2014). To strengthen the data collection processes in this study and to inform the broader context, the researcher reviewed several publically accessible district and school artifacts. These artifacts included school board agenda items posted between June 2013 and February 2014 related to the district's 1-to-1 programs and expanding digital integration efforts, the district's standard template for the school improvement process, planning tools related to the PDSA process, announcements on school and district web sites related to the 1-to-1 deployments, and the publicly accessible school improvement plans for both participating schools. The researcher chose these documents for review because they provided information about the schools' and district's continuous improvement processes, particularly the school improvement process and the 1-to-1 implementations. Case study documents also included email correspondence exchanged during the research period with members of the school technology leadership teams.

Researcher notes and reflections.   The researcher recorded notes and reflections in an electronic document throughout the data collection and data analysis processes. Some notes were meant to serve as a written record of telephone conversations with members of each school's leadership team or to serve as reminders of email communication exchanged with the instrument developers. These notes contained dates associated with specific activities along with a summary of the activities. Other notes were more reflective in

nature and captured the researcher's thoughts as the data collection and subsequent analysis processes unfolded, including after the completion of each focus group.

Data Analysis Process

To approach the data analysis process for this study, the researcher reviewed the literature on analyzing case study evidence (Yin, 2014), coding qualitative data (Auerbach & Silverstein, 2003; Berkowitz, 1997; Saldaña, 2009), establishing reliability as a sole researcher (Remler & Van Ryzin, 2011; Saldaña, 2009), and maintaining participants' confidentiality throughout the analytic process (Corden & Sainsbury, 2006; Kaiser, 2009; Yin, 2014). She drew from the conceptual framework to shape her thinking through the analysis process, using the eleven OLF dimensions and guiding questions from the 4-step PDSA continuous improvement model as a touchstone for organizing and considering the findings as they emerged. Further, to aid in the reflexive process of analyzing and coding qualitative data elements, she used Berkowitz's (1997) suggested questions for analyzing qualitative data in a mixed-methods study to guide her thinking:

- "What patterns and common themes emerge in responses dealing with specific items? How do these patterns (or lack thereof) help to illuminate the broader study question(s)?

- Are there any deviations from these patterns? If yes, are there any factors that might explain these atypical responses?

- What interesting stories emerge from the responses? How can these stories help to illuminate the broader study question(s)?

- Do any of these patterns or findings suggest that additional data may need to be collected? Do any of the study questions need to be revised?

- Do the patterns that emerge corroborate the findings of any corresponding qualitative analyses that have been conducted? If not, what might explain these discrepancies?" (para. 6)

A description of the process used to analyze the quantitative survey results, survey comments, focus group transcriptions, email correspondence, and supporting documents follows.

    Analysis of Survey Results. Results for each school's administration of the *School Technology Leadership Assessment* were automatically calculated by the CANLEAD system using the guidelines outlined in the aforementioned scoring guide. The researcher subsequently verified scores for both schools by calculating the mean for each question using Excel and cross-referencing each score with the CANLEAD system-generated score. Four questions related to curriculum writing and curriculum mapping were dropped from OLF dimension 3.1 as were three questions in OLF dimension 3.3 related to instructional coaching due to technical issues associated with those questions in the survey presentation and delivery. The technical issues were resolved prior to the end of the survey administration, but could have impacted answer choices of some respondents during the survey window. Upon confirming all other scores, the researcher generated a *Results Rubric Report* for each school, designating

whether specific practices in each of the eleven OLF leadership dimensions were *Emerging, Proficient,* or *Exemplary* based on the scoring ranges. A summary of each school's rubric level designation by dimension is included in Chapter Four, and Appendix C includes a sample *Results Rubric Report.*

    Coding of Qualitative Data. Conversations from both focus groups were transcribed from digital recordings and were initially reviewed as a whole, noting general impressions on a separate document. After ensuring the anonymity of all data contained therein, the researcher printed out transcripts from each focus group and reviewed them again, this time jotting repeating ideas (e.g., survey length), initial themes (e.g., negative reactions to survey) and broad categories (e.g., reflections on assessment instrument) in the margin of each transcript. The researcher then sorted the themes and categories, abbreviating them into a preliminary list of codes and sub-codes that she recorded into a Word document. Next, she imported the transcribed focus group conversations, survey comments, and email correspondence into Dedoose version 4.12, SocioCultural Research Consultant's qualitative data analysis software (2014), and configured preliminary codes within the software application.

    Using the initial codes, data elements were coded to test viability of the coding scheme.   Following the first round of coding, two additional themes emerged related to leadership *enablers* and *constraints* and were added to the coding scheme. One category within the scheme, *stakeholders*, was eliminated because it did not serve to inform findings of the three research questions. Finally, one category related to comments about the assessment instrument was

modified to include the three sub-codes of *benefits*, *barriers*, and *suggestions*.

This modification was made because the original sub-codes of *positive* and

negative did not allow for accurate categorization of all comments about the

instrument. For example, one leader's suggestion to add the distribution of

scores in a future iteration of the results report was neither positive nor negative.

The revised codes were further grouped by research question as well as by the

data source (i.e., school, role, media) for the purposes of comparing and

contrasting. The researcher finalized the coding list based on emergent themes

(see Figure 5 on p. 78) and updated them in the qualitative analysis software to

reflect final changes. Data were recoded using the final coding scheme three

times, exercising the code-recode process to establish reliability (Remler & Van
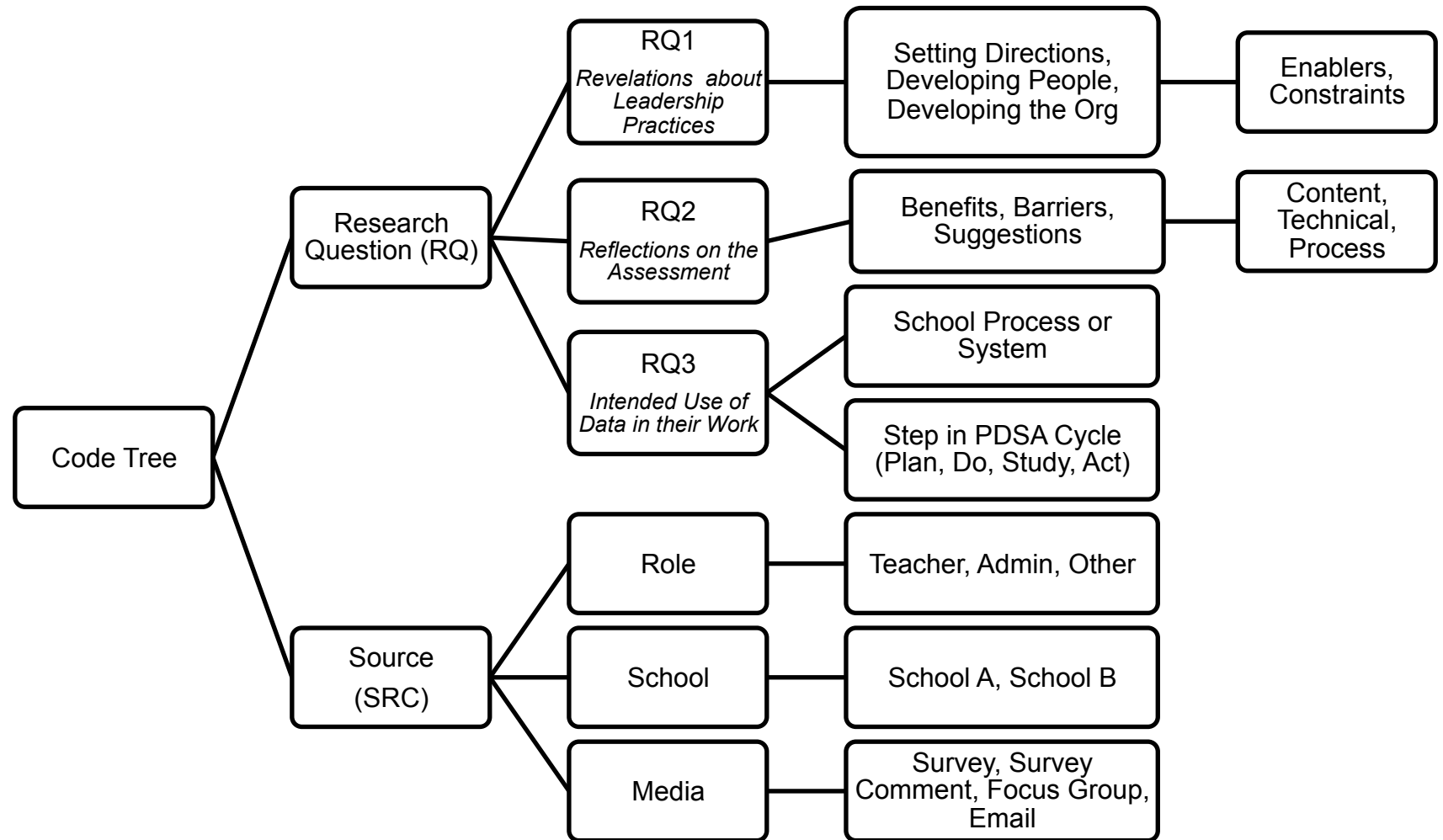
Ryzin, 2011).

Figure 5: Themes Used to Develop Coding Scheme for Qualitative Data Analysis

Review of documents and researcher notes.   The researcher analyzed

a collection of documents associated with the two schools and the school district

in the study. For context, the researcher thoroughly read each school's 2013-

2014 improvement plan, recording reflective notes about linkages between the

stated gap evidence, objectives, strategies, and anticipated obstacles within each

plan. She also considered each school's use of the PDSA process in their

respective improvement plans. She followed the same analysis process for two

presentations and supporting documentation presented to the school board by

the district's chief information officer regarding the proposed expansion to

Howard Valley School District's 1-to-1 programs. She reviewed each school's

web site for content related to their respective 1-to-1 programs. Finally, the

researcher reviewed her own reflective notes recorded throughout the data

collection and analysis process. She again drew from Berkowitz's (1997)

questions, considering how revelations from the documents aligned to or

contrasted with themes from focus group findings. The researcher noted, for

example, that lack of common planning time was mentioned during School A's

focus group as a possible cause for one of their emerging areas of leadership

practice, a factor also cited in the school's SIP as an anticipated obstacle for

reaching one of their school's stated SIP goals.

Summary

The mixed-methods, case study approach described here allowed the

researcher to explore a specific problem of practice related to technology

leadership in two 1-to-1 middle schools within the context of the district's

continuous improvement model. The integrated OLF-PDSA conceptual

framework influenced the data collection and analysis processes by framing how

leaders used categorically organized information about their practices within a

process-driven continuous improvement model. Chapter Four contains details of

the findings for each of the three research questions originally listed in the first

chapter.

CHAPTER FOUR: POSITION

This chapter presents a description of findings that emerged from this study following data analysis and outlines recommendations based on those findings.   To arrive at the proposed recommendations, the researcher developed themes from the ideas that repeated among multiple data sources and then drew upon them, along with the literature, to craft the recommendations (Auerbach & Silverstein, 2003).   Findings are grouped by research question and incorporate conclusions that arose from analysis of the *School Technology Leadership Assessment* results, including responses from the open-ended comments section of the survey, as well as findings from the analysis of focus group feedback. After the presentation of findings, the researcher offers three key recommendations to address the problem of practice, that school leaders lack a data-driven, systematic approach to examining their own technology leadership practices in order to plan for, implement, and sustain their school's 1-to-1 programs in the context of their district's continuous improvement model, along with implications and possible impediments to implementation of the recommendations. The recommendations put forth in this chapter form the basis for the action communication products presented in Chapter Five.

Findings Related to Leadership Practices (RQ1)

Findings for RQ1 addressed what data from the *School Technology Leadership Assessment* revealed about leadership practices in two middle

schools that had recently implemented 1-to-1 programs. Specifically, RQ1 addressed, "what does data from an assessment of school technology leadership practices reveal about the leadership practices of members of the school technology leadership team?" These findings were based on an analysis of aggregated survey results for each school as well as qualitative focus group data. Findings categorically described as (a) setting directions, (b) building relationships and developing people, and (c) developing the organization to support desired practices (Leithwood, 2012; Louis et al., 2010) are first explained followed by the enablers and constraints that seem to explain the pattern of school technology leadership practices in each school.

Domain one: Setting directions. School leaders set direction by building a shared vision (OLF dimension 1.1), fostering shared goals (OLF dimension 1.2), creating and monitoring high performance expectations (OLF dimension 1.3), and communicating the strategic direction (OLF dimension 1.4), practices that promote focus on the work of the school (Louis et al., 2010). Scores from the *School Technology Leadership Assessment* indicated that both schools were predominantly proficient in these four dimensions of leadership practices, with two exceptions (see Table 9). Both School A and School B yielded scores at the emerging level for leadership practices related to monitoring performance (OLF dimension 1.3), particularly those efforts involving the collection and analysis of data as a performance management strategy for the schools' technology initiatives.   Responses to the survey questions within this dimension identified gaps regarding the use of data to monitor the effectiveness

of professional development, the use of data to monitor technology use for school improvement purposes, and the use of data to monitor current state versus desired state for the school's technology integration efforts.   School leaders acknowledged that the emerging scores were likely accurate and that they had not yet operationalized many formal measures related to monitoring technology integration. They expressed difficulty in identifying valid measures for those constructs, a constraint in that dimension of leadership practice. They also indicated that the unexpected amount of time they spent in the first semester troubleshooting and dealing with logistical matters took focus away from the establishment of formal data collection processes.

In contrast, however, School B scored at the exemplary level for establishing a technology plan that was focused on building teacher capacity and student engagement rather than on the technology alone (OLF dimension 1.1). According to their school technology leaders, they deliberately worked with teachers to start with the instructional strategies first, and looked for ways to "infuse" the technology instead of the opposite approach. This was done, in part, by using existing meeting structures where teachers and administrators were already addressing instructional strategies. Those leaders used the words "integration" and "embed" when talking about their practices.

Domain two: Building relationships and developing people. School leaders build relationships and develop people by providing support for individuals (OLF dimension 2.1), enabling the professional growth of teachers (OLF dimension 2.2), and modeling the school's values (OLF dimension 2.3),

practices that build professional capacity and demonstrate respect (Louis et al., 2010). Both schools scored at either the proficient or exemplary level for this last dimension, modeling the school's values and practices, suggesting that the leaders were regularly visible, active participants in the schools' technology integration efforts. Survey questions inquiring into dimension 2.2 showed they also scored at the proficient level for providing teachers with resources to promote their development, enabling expert teachers to support and train others, and offering teachers time to reflect on their own practices. Emerging areas of leadership practices surfaced in dimension 2.1 and included the effective use of follow-up meetings after conducting classroom observations, as well as the presence of formal, individualized professional development plans related to technology. The latter was described by focus group participants as a result of the district's integrated approach to professional development in which technology skills development and integration training are embedded into broader, instructionally-focused professional development plans rather than treated as separate plans.

Domain three: Developing the organization to support desired practices. School leaders develop the organization by developing a culture of collaboration and distributing leadership (OLF dimension 3.1), structuring the organization to facilitate collaboration (OLF dimension 3.2), allocating resources in alignment with the vision and goals (OLF dimension 3.3), and connecting the school with the external environment (OLF dimension 3.4), all of which are practices aimed at building an organizational environment that enables success

(Louis et al., 2010). In this context, the allocation of resources included time, hardware/software resources, instructional materials, and professional expertise. Both schools scored at the proficient level for the allocation and sustainment of hardware/software resources (OLF dimension 3.3). They also scored either proficient or exemplary for their allocation of time, particularly meeting time, for teachers to engage in curricular co-planning opportunities (OLF dimension 3.2), to discuss strategies related to the use of technology to support instruction (OLF dimension 3.2), and to discuss student work made with technology (OLF dimension 3.3).   There were two exceptions to this. School A scored at the emerging level in fostering opportunities for teachers to collaborate on the creation of plans to improve their technology-supported teaching practices (OLF dimension 3.1). One leader speculated that this was due to the teachers' lack of common planning time in the master schedule. School B scored at the emerging level in the allocation of time for teachers to specifically discuss formative assessments related to the use of technology (OLF dimension 3.1).

There were two areas within this domain where both schools scored at the emerging level, and both areas were related to the establishment of systematic processes. First, scores indicated that both schools lacked an approach for allowing teachers to team-teach or observe one another using technology to support their development (OLF dimension 3.2).   Also, the survey feedback indicated that neither school had a process to coordinate teacher or administrator attendance at conferences or professional development related to technology (OLF dimension 3.4). Leaders at both schools attributed their emerging score

regarding conference attendance and professional development to the district's central administration of these processes.

Findings for RQ1 revealed areas of strengths and opportunities for growth in both schools. In spite of the small sample size and low participation rates, school leaders were not surprised by most of their scores on the *Results Rubric Report* related to setting directions, developing people, and developing the organization.   Regarding gaps in leadership practice dimensions, the findings suggest school leaders should focus on the use of data to support performance monitoring and the development of formal processes to promote teacher growth. Table 9 summarizes each school's rubric level designation by dimension based on aggregated, mean scores for questions on the *School Technology Leadership Assessment*.

Table 9

School Technology Leadership Assessment Results: Overall Categorical Rating and Number of Questions, by OLF Dimension, Scored to Each Rubric Level after Calculating Mean Scores for Each School

OLF Dimension	Number of Questions by Rubric Level					
	School A			School B		
	Emerging	Proficient	Exemplary	Emerging	Proficient	Exemplary
1.1 Shared Vision	0	4	0	0	3	1
1.2 Shared Goals	0	4	0	0	4	0
1.3 Performance Expectations	3	3	0	3	3	0
1.4 Communicating Vision and Goals	0	4	0	0	4	0
2.1 Individual Support	2*	3	0	3	3	0
2.2 Professional Growth	3	5	0	1	7	0
2.3 Modeling School Values	0	3	0	0	2	1
3.1 Collaborative Culture	1	7	0	0	8	0
3.2 Structuring the Organization	3	2	0	2	3	0
3.3 Allocating Resources	1	4	0	1	3	1
3.4 Connecting to Wider Environment	1	2	0	1	2	0

*No response for one question in Dimension 2.1

Enablers. Focus group findings revealed a series of enabling factors that begin to explain the effective leadership practices that arose in the survey results. These surfaced during discussions among members of each school technology leadership team as they talked about their respective results. The formal administrators in both schools benefited from harnessing the technology expertise of specific teacher leaders to support the school's desired outcomes (OLF dimension 2.1) and empowering them as members of the school technology leadership team (OLF dimension 3.1). Leaders from each school cited instances where highly motivated teachers took time outside of class to configure content on the district's Blackboard system that would benefit the rest of their teachers (OLF dimension 2.1). One leader from School B specifically attributed progress of her 1-to-1 program to her highly motivated staff (OLF dimension 3.1), suggesting that other schools planning future1-to-1 deployments may encounter barriers if they were staffed with less motivated teachers.   Both schools took advantage of professional development workshops coordinated by district staff to support teacher growth and attainment of their school goals (OLF dimension 2.2). They also used connections with leaders at other 1-to-1 schools to share best practices (OLF dimension 3.4).

Constraints. As focus group participants discussed their respective results within their school technology leadership teams and attempted to make sense of them, several constraining factors surfaced to explain challenges they faced in the enactment of their leadership practices. The majority of these constraints related to the impact that externally controlled resources (e.g.,

technical support) and interactions with external stakeholders (e.g., parents) had on school's already limited time. A primary constraint was the level of technical support available to 1-to-1 schools from the district in order to keep computers working and to provide access to necessary systems for instructional use (OLF dimension 3.3). Both schools described how, during the first semester of their 1-to-1 implementation, teachers and administrators were forced to take time away from instructional practices to troubleshoot technical support issues. This led to high levels of stress and frustration. Citing concerns with responsiveness and mixed messages, leaders in one school explained that lack of access to these externally controlled assets sometimes prevented the schools from achieving instructional objectives that were reliant upon specific technology-supported resources.

A similar constraint involved the funding source and staffing model for hiring and allocating instructional technology integration specialists (OLF dimension 2.2), both of which were controlled at the district level. The staffing model relied upon a team of instructional coaches, generalists rather than instructional specialists, who circulated between schools. While these instructional coaches were highly regarded, the design of the staffing model did provide schools with access to site-based instructional technology specialists. Consequently, teachers and administrators in each school often assisted with these efforts in attempts to provide timely support for technology use in the classroom.

Leaders in both schools discussed challenges related to the increased

level of teacher stress in their 1-to-1 grades during the first semester. This was attributed to a number of factors including the increased work associated with managing and supporting equipment (OLF dimension 3.3) as well as elevated performance expectations brought about by the individuals, themselves, and by pressures felt from others (OLF dimension 1.3). As one teacher leader explained, high achieving teachers at her school wanted to do everything "exceptionally well." To them, this meant knowing how to troubleshoot computers, attending to new classroom management challenges, managing logistics related to the organization of the equipment as well as students' electronic resources, communicating with parents about these changes, and managing the "big stuff" related to instructional content and strategies, all of which took additional time. The formal, administrative leaders talked about their attempts to assuage stress levels by encouraging teachers (OLF dimension 2.1), assuring teachers that imperfection did not equal failure (OLF dimension 3.1), and attempting to address their technical support matters to the best of their ability given the constrained resources (OLF dimension 3.3). Citing Dweck's (2006) research around mindset, one leader talked about her efforts to be transparent about her own challenges, modeling perceived "failures" as opportunities to learn (OLF dimension 2.3).

Regarding stakeholders, school technology leaders had to wrestle with new, unique challenges related to communicating with and educating parents on their 1-to-1 goals and expectations (OLF dimension 1.4). This new level of interaction with parents involved online and face-to-face trainings as well as the

establishment of new processes related to equipment distribution and record-keeping. In all, additional time and resources were required in order to engage with them effectively.

Finally, and perhaps most significantly, findings from the *School Technology Leadership Assessment* as well as the focus group discussions clearly showed that school technology leaders in 1-to-1 environments are uncertain how to identify effective methods for measuring the impact of these technology initiatives (OLF dimension 1.3). Even in a district that practices ongoing data collection and analysis within the context of their continuous improvement model, leaders were perplexed about how to best evaluate the cost of their initiatives in relation to the benefits to teachers and students as well as the effectiveness of their implementations. Considering that the "cost" factors involved in complex 1-to-1 deployments include management of technology resources, changes in classroom management, curricular and pedagogical changes, increases in parent training, and a rise in teacher stress levels, all of which are evolving at different paces over time, leaders struggled with how to measure their progress…particularly if they lacked tightly aligned objectives from the onset of their initiative. This issue was further exacerbated by confusion about the district's performance expectations.

Findings Related to the Assessment Instrument (RQ2)

Three key themes related to RQ2, about the assessment instrument, developed from an analysis of the focus group transcriptions and open-ended survey comments. These themes are classified as (a) benefits of use, (b)

barriers to use, and (c) suggestions for improvement. The data revealed that

leaders gained benefits from both the experience of taking the *School*

Technology Leadership Assessment as well as from the feedback and data

gathered as a result of taking the survey. Between the two schools, however,

data from the focus groups exposed variance in each school's perceptions of the

benefits, with School A emphasizing the value they gained just by reading and

thinking about the questions (i.e., the process of taking the survey), and School B

emphasizing the value they gained from receiving teacher feedback that

confirmed or disconfirmed their perceptions as leaders (i.e., the results).

Leaders in both schools primarily identified barriers associated with their

experiences when taking the survey rather than with the results they received.

Participants often framed those perceived barriers in comparison to their

previous survey-taking experiences. Based on patterns that emerged during

analysis of the data, the barriers to use and suggestions for improvement were

further organized into three sub-categories of process, content, and technical

functionality as explained in the next section.

Benefits related to self-reflection and learning. Participants in both

schools' focus groups indicated that the process of reading the survey questions

gave them opportunities, as individuals, to reflect on matters related to school

technology leadership. Three of the five participants in one focus group

mentioned that reading the questions while taking the survey brought ideas or

points to their minds that they might not have otherwise considered. One leader

specifically voiced that as she was taking the survey, she realized she and others

would have different answers because they were not all privy to the same information. This led her to conclude that the school needed to establish a more formal technology leadership team, something they had during a previous school administration, to aid in keeping everyone informed and to systematize their approach to performance management. A leader in the other focus group reflected on her own growth since the beginning of her school's 1-to-1 implementation, commenting that she would not have even known what many of the questions meant if she had taken the survey at the start of the school's 1-to-1 initiative. She perceived that she had developed an understanding of many of the technology leadership practices presented in the survey through her experience in implementing the 1-to-1 program during the school's first semester.

Benefits related to supporting conversations with others. While leaders at both schools expressed regret for the low response rates, each leader also believed that the results were surprisingly close to what they would have anticipated. In spite of the scant representation, they remarked that the results reports were valuable and could be used to initiate discussions with teachers. The leaders mentioned using the results in discussions with current 1-to-1 teachers as well as those teachers in grades planning 1-to-1 deployments during the upcoming school year. Reflecting on language in the questions as well as the rubric report, one leader cited the value of having the wording available in front of them to use as a common reference in conversations with teachers. Another member of the same school envisioned using the report to talk with teachers about future direction of their current 1-to-1 program. One leader

commented on the benefits of having data from teachers to use in conversations with district leaders about the need for additional resources to support their 1-to-1 program.

Benefits related to uncovering varying perspectives. Questions in the *School Technology Leadership Assessment* addressed the use of formal processes within each domain of leadership practices. For example, the survey addressed the presence of formal action plans or school improvement plans for technology-integrated teaching and learning (OLF dimension 1.3). Questions also explored the leaders' use of formal individual and department-wide professional develop plans to support technology integration (OLF dimension 2.1 and 2.2) as well as formal processes for teachers to team-teach or observe other teachers using technology in their instruction (OLF dimension 3.2). Varying perspectives arose, even among members of each school technology leadership team, on the need for formalizing processes such as these as is demonstrated in the following example.

School technology leaders in School B's focus group engaged in a targeted discussion about the necessity for teachers to recognize that the formal school improvement plan exists if they are engaged in the work of it. One leader felt that it was, indeed, important for teachers to recognize that the school improvement plan outlined the work they did, and to make an association between the plan and the work. Another participant voiced that the ability to talk about or identify the school improvement plan, in name, was not important as long as teachers knew about the work through some means and supported it. A

third member cited her experience in a previous school where everyone could recite the words in the school improvement plan and would reference it in shallow ways, but they did not use it effectively to drive actual improvements. This team's conversation arose in reaction to a lower than expected rating for OLF dimension 1.3.   In this instance, the survey feedback helped to not only uncover differing perspectives among teachers and leaders, but also among members of the leadership team, as well.

Benefits related to confirming and disconfirming perceived effectiveness of efforts already implemented. Members of both school technology leadership teams commented on the value of receiving teacher feedback about organizational conditions to assist them in the validation or negation of their own assumptions about how things were going. Further, they felt the timing of the assessment was beneficial since they had just completed their first semester of 1-to-1 programs in each school. Reflecting on her school's feedback related to professional development (OLF dimension 2.2), a leader in School A considered whether or not she should adopt a more systematic approach to her team's use of bi-weekly teacher meetings to better support teachers' needs. A leader in School B was pleased that the teachers felt supported in the allocation of resources (OLF dimension 3.3) since the school had made strategic decisions related to that topic, but she found herself questioning a recent decision to change her school's meeting structures after the results report indicated these meetings were effective (OLF dimension 2.2, 3.1, 3.2, and 3.3). In both instances, leaders felt the survey results gave them a

platform to explore the issues further with teachers.

Benefits related to identifying areas for improvement or where more information is needed. The use of the three-level rubric helped school technology leaders identify areas for improvement, a benefit cited in both focus groups. As members of the School B focus group talked about how they scored on the use of formative assessments (OLF dimension 3.3), it led to a discussion about an internal survey they had intended to implement, but had not yet done so. The results report served as a reminder about their previous decision to survey teachers on more specific matters related to the 1-to-1 program. School A focus group members also talked about the possible need for additional surveys to gather more information in two specific areas. The first survey would be to obtain information from teachers about what had been learned during the first semester of their 1-to-1 program (OLF dimension 1.3). The second survey was envisioned to gather feedback from parents about their perspectives on the 1-to-1 program (OLF dimension 1.4).

While leaders in both schools expressed a range of benefits from using the *School Technology Leadership Assessment* as a tool to support their work, they also identified barriers to use of the instrument and suggestions for improvement. These barriers and suggestions have been organized into three areas related to process, content, and technical functionality, and they are explained in more detail next. While some of their suggestions were connected to specific barriers, others were proposed enhancements to increase usability.

Barriers and suggestions related to process. The issue of survey

length, and the time needed to complete it, emerged consistently in the findings as a significant barrier to utilization of the *School Technology Leadership Assessment.* Although the survey guidelines cited 30 minutes as the estimated time for completion, feedback indicated that this estimate was too low given the length of the survey and focus needed to process each question. Participants expressed that the survey was not easy to take in comparison to other surveys they were used to completing, saying it was mentally demanding. One leader described how the questions started to blur together as she moved through the survey. Comments from other participants described how questions started to sound repetitive as their attention waned over time. One teacher leader drew parallels between her experience of taking the survey and the disengagement her students feel when they are given a text-heavy school assignment. Findings indicate the length of time and cognitive processing needed to answer each question effectively were prohibitive to future use by busy educators trying to fit the survey in amidst other responsibilities.

Although the *School Technology Leadership Assessment* was administered during a series of professional development days, leaders did not specifically allocate a protected block of time for their teachers to complete it. Once they realized how long it took, leaders in School A's focus group suggested that, in the future, it should be administered during one of their regularly scheduled technology meetings as part of the meeting activities. Also, since the estimated time to complete it was reported as being too low, one leader suggested raising it to a full hour to provide survey participants ample time to

process each question thoroughly.   Another leader suggested merging or eliminating questions so that the entire survey took no more than 15 minutes to complete.

Finally, two members of School A's focus group suggested that their participation rates may have been impacted by confusion about the email invitation. As a system generated message, the email displayed CANLEAD as the sender rather than the name of the researcher. Even though the subject line included information about the survey, the focus group members speculated that teachers may have just noticed the name of the sender and skipped over it.

Barriers and suggestions related to content. Study participants identified multiple barriers related to survey content that included unfamiliar or unclear terminology as well as confusion about questions related to leadership decisions that, for them, were made by district leaders, but the survey only allowed responses related to school leaders. A key finding dealt with misunderstandings about who constituted the school technology leaders in their schools. Data gathered from focus groups, comments, and an email from one school's principal suggested that survey participants where unclear how to define and think about the term "school technology leaders" when answering the survey questions.   As the literature suggests, there is variance in the way school technology leadership is conceptualized (Anderson & Dexter, 2005; Dexter et al., 2009; Dexter, 2011; Flanagan & Jacobsen, 2003; Gray et al., 2010).   At the time of the study, School A lacked a formal technology team, but indicated that most technology decisions were made by an small team that included the formal

administrators, the testing coordinator (a former instructional coach specializing in technology integration), and the technical support staff, in consultation with the teaching staff. School B's core technology leadership team was comprised of the two administrators and a lead technology teacher who acted as the liaison to and coordinated the work of a formal technology council.   Since the survey instructions did not include specific guidance on how to define school technology leaders, teachers taking the survey were uncertain how to answer some questions.

Survey questions in four sections of the survey (OLF dimensions 1.3, 2.2, 2.3, and 3.2) used the word "department" or "departments" when referencing teams of teachers within the same subject area (e.g., middle school math teachers or middle school science teachers). The use of the word "department" led to confusion for some participants, as expressed in survey comments, email correspondence, and focus groups, since the schools in this study did not refer to their teams using that term. In the context of Howard Valley School District, the word "department" was generally reserved for operational units within the organization such as the transportation department or food services. Given that School A and School B both deployed their 1-to-1 programs across grade-level boundaries, their team meetings involved teachers from all content areas. In this context, use of the term "grade-level team" would have been clearer to survey participants.

In addition to the use of the word "department," another contextual barrier emerged revealing disconnects in how questions were worded within the survey

and how Howard Valley School District conducted certain organizational processes including the administration of their teacher professional development system, staffing of instructional technology specialists, and funding of participation in external professional development activities.   One survey question asked about the use of "formal professional development plans" for individual teachers to help them use technology. The district's teacher performance appraisal system, a growth-oriented system, called for the integration of technology into the professional learning plan for individual teachers rather than the use of a separate, technology-specific plan. Both schools scored at the emerging level of the results rubric for this question, and one leader attributed this to the district's integrated approach to technology-related professional development. She noted that the question, as worded, suggested a more isolated approach to professional development than what they sought. Similarly, both schools scored at the emerging level for hiring or training specialists to support technology. Leaders in the School B group noted that those positions are staffed at the district level rather than the school level, and they considered the impact that the answer choices could have had since they did not allow for responses related to district leadership. Finally, both schools scored at the emerging level on a question related to processes for coordinating participation in professional conferences and organizations. Leaders in both focus group explained that those processes were under the purview of the central office leaders rather than school leaders and, as such, could have had a bearing on responses since the answer choices did not include options related to

district leadership.

In addition to barriers related to terminology or misalignment with organizational processes, three themes related to content surfaced in the findings that were broader in nature. First, data gathered from focus group participants in School B and survey comments identified the need for a "does not apply" or "not enough information" option within the survey response choices. One participant felt she was forced to make inaccurate answer selections because none of them applied, but she felt she needed to answer each question. Two other focus group members said they skipped questions because they were not relevant to them, or they lacked enough information to answer them accurately. These participants expressed concerns about contributing to misrepresentation in the data or to inaccurate results. Furthermore, participants in both focus groups expressed the general need for questions and answers to be reviewed and reworded in more succinct, practitioner-friendly language. The use of the word "foci" in one question was cited as an example of language not typically used by teachers. Finally, leaders in both focus groups suggested that the survey should address leadership practices related to school-parent interactions, the availability of and access to instructional systems, the reliability of the school's network infrastructure, and levels of technical support as those were key, unique considerations when initiating their 1-to-1 programs.

To clarify several ambiguous or unfamiliar terms, participants suggested adding information to the directions given at the start of the survey. For example, one participant suggested adding a clarifying statement about the definition of

school technology leaders that would emphasize inclusion of not only the formal administrators, but also teacher leaders. Members of the same focus group suggested expanding the use of the word "department" to also include other types of teams such as grade-level teams. Finally, both groups strongly suggested the need for review and revision of the entire survey, adding a "does not apply" option while striving for more parsimonious language.

Despite concerns about the survey length, several participants made suggestions for adding content. For example, in addition to the generic, open-ended comment box at the end of the survey, one teacher leader suggested adding another open-ended question that specifically asks teachers for any additional thoughts about the supports they need to more easily integrate technology.   She felt this might give teachers the opportunity to provide data about their need for resources that are controlled by district leaders, rather than school leaders. Another participant suggested that the survey should address leaders' practices in relation to parents. Finally, both focus groups' members noted the increase in teacher stress levels during their 1-to-1 implementations, and suggested the need for gauging this through systematic means.

Regarding the *Results Rubric Report,* the only suggested modification was a request to add information about the distribution of scores for each question to give leaders better insight into the story behind their results. One leader suggested this could enhance her ability to understand the data. In small sample sizes such as the ones in this study, participants in both focus groups acknowledged the possibility that an outlying score could skew their results.

Barriers and suggestions related to technical functionality. As previously mentioned in Chapter Four, two technical issues were identified during the survey administration that affected the presentation of seven questions. Four questions related to curriculum writing and curriculum mapping were dropped from dimension 3.1 due to an issue where the answers to one set of questions would appear to automatically populate the answers to the subsequent set of questions. In addition, three questions related to instructional coaching in dimension 3.3 were dropped because the page containing them was not displaying under certain conditions. Although those issues were resolved, the seven questions were dropped from data analysis given the potential impact of those technical issues on participants' responses.

Two suggestions emerged related to technical functionality in the open-ended survey comments and focus group dialogue. First, participants noted that the survey lacked a "back button" which prevented them from revisiting previous pages or questions. One leader specifically remarked that she had tried to return to the directions given at the start of the survey in order to verify her understanding about terminology, but then realized the survey lacked that capability.   In addition to the back button, leaders in both focus groups expressed the need for a progress bar clarifying the number or percentage of questions remaining. This suggestion was identified in a survey comment, as well.   Participants believed this feature was particularly important due to the length of the survey. One leader explained how she typically likes to block out time in her schedule to complete surveys, but she ran into challenges with this

one because the estimated time to complete it was too low and she could never tell how far along she was once she started it.

Taken together, the findings for RQ2 related to benefits (see Table 10), barriers (see Table 11), and suggestions are significant.   Instrument developers can use the findings to aid in validation processes for the *School Technology Leadership Assessment*. Furthermore, these findings can inform improvements to the instrument to support future use by school technology leaders in this and other contexts.

Table 10

Summary of Focus Group Feedback about School Technology Leadership Survey (RQ2): Benefits

Type of Benefit	Focus Group Feedback about Benefits of Assessment Instrument
Catalyst for self-reflection and learning	• The process of reading the survey questions prompted reflection on specific matters related to school technology leadership • The process of reading the survey questions led to self-evaluation about how much a leader had learned since the beginning of the 1-to-1 implementation
Catalyst for promoting conversation with others	• The information in the results report could be used in conversations with teachers to discuss the current 1-to-1 implementation • The information in the results report could be used in conversations with teachers to discuss plans for expanding 1-to-1 implementations • The information in the results report could be used in conversations with district leaders to discuss teachers' perceptions about resource needs
Framework for identifying varying perspectives among leaders	• Talking about the results uncovered varying perspectives even among the leaders, themselves, leading to further conversation
Confirming or contradicting leaders' perceptions about state of 1-to-1	• Leaders carefully compared the results of teacher input to their own expectations, reflecting on the perceived impact of their decisions thus far in the 1st semester
Framework for identifying areas needing improvement	• The presentation of results in the OLF domains and dimensions within a three-level rubric gave specific information about areas needing improvement (e.g., using data to monitor 1-to-1 program implementation and outcomes)
Framework for focusing additional surveying efforts	• Discussion about the information presented in the results report led to conversations about the need for additional surveys to gather detailed feedback in specific areas

Table 11

Summary of Focus Group Feedback about School Technology Leadership Survey (RQ2): Barriers and Suggestions

	Focus Group Feedback about Assessment Instrument		
	Process	**Content**	**Technical**
Barriers to Use	• Confusion about who sent the survey email invitation • Length of survey • Cognitively demanding due to wordiness of questions and answers	• Unfamiliar terminology (e.g., departments) • Unclear terminology (e.g., school technology leadership team)	• Temporary problem during survey administration impacting the presentation of questions *(resolved)*
Suggestions for Improvement	• Increase the estimated time to complete the survey • Combine or eliminate some questions	• Add a "does not apply" or "not enough information" answer choice for practices involving district-level rather than school-level leaders • Reword using practitioner-friendly language • Add questions about parent communication • Add questions about technical support and access to instructional systems • Add distribution of scores to results report	• Add a back button, or functionality allowing participants to return to previous pages/questions • Add a progress bar

Findings Related to Intended Use of Data and PDSA (RQ3)

Intended use. School technology leaders intend to use data from the *School Technology Leadership Assessment* in two primary ways: (1) discussions with teachers about the current 1-to-1 program and (2) planning with teachers for future 1-to-1 programs in other grades within the school. Leaders in both schools intend to share their *Results Rubric Report* with teachers in upcoming meetings related to the current 1-to-1 programs at their respective schools. In both schools, the meetings are already a part of each team's regular meeting cycle, though the agendas of School B's meetings are more formalized than those of School A. As mentioned in the benefits section, a leader from School A wondered if she should develop more formalized plans for using bi-weekly meetings to support professional development (OLF dimension 2.2). Leaders intend to share the *Results Rubric Report* in its entirety as a catalyst to promote talks with teachers about the current state of each 1-to-1 program (Study in PDSA process) as well as to discuss incremental next steps for their respective 1-to-1 programs this year (Act in PDSA process). They expressed this in mostly general terms, although members of the School B team gave several specific examples and predicted that the data would help her school to grow. First, the leader plans to address matters related to the school improvement plan with more explicit language than she has in the past so that teachers will more clearly understand the linkages between the plan and their work based on the rubric score related to the school improvement plan (OLF dimension 1.3). A leader from School B also intends to use the data to address

matters that extend beyond the current school year. Besides talking with
teachers from the school's existing 1-to-1 program, she specifically aims to share
the information with teachers in grades where 1-to-1 programs are planned next
year as part of their planning process for 1-to-1 deployments in those grades
(Plan in PDSA process). Following the school's continuous improvement model,
she will use lessons learned this year to inform improvements in next year's 1-to-
1 efforts.

     In addition to using the survey data as a conversation starter with
teachers, school technology leaders speculated about other possible uses,
though they mentioned them with less certainty than the previous examples.
Leaders may use the results as a guide for initiating additional surveys to
explore, in more detail, areas of discrepancy or low scores. They may also use
them in conversations with district leader to show teachers' perspectives on the
need for additional technical support resources.

     PDSA.   Using the district's continuous improvement framework as a
guide, the researcher aligned each example of intended use to a step in the
district's PDSA process as outlined in Table 12.

Table 12

Intended or Proposed Use of School Technology Leadership Assessment Results Aligned to District's PDSA Model

Proposed Use	PDSA Step and Guiding Questions
Use results report as a catalyst to talk with teachers about how things are going with the school's current 1-to-1 program	**Study** • What has been accomplished at this point with our school's 1-to-1 program? • What is our evidence of this? • Are we progressing as anticipated? Why or why not?
Referring to the growth rubric, use the results to consult with teachers and make decisions about next steps in the school's current 1-to-1 program with teachers	**Act (i.e. adjust, adopt or abandon)** • Does anything need to be modified with our school's 1-to-1 program? (adjust) • Have we achieved our intended outcomes and can these changes be integrated into other areas? If so, how? (adopt) • Should we abandon the current course in light of new information? (abandon)
Use results as a reference point to work with teachers in planning for future 1-to-1 program deployments	**Plan** • Based on what we have learned from our current 1-to-1 deployment, how can we better prepare for our 1-to-1 expansion next year? • What resources are needed to accomplish these planned changes? • Who will be impacted by this, and how? • When and how will we monitor our progress in implementing this improvement?
Use feedback to adjust the way in which the principal references the school improvement plan in conversations with teachers.	**Act** • Do I need to modify anything in my leadership practices related to the school improvement plan? (adjust) • When will I evaluate my progress in this area again, and how? (adjust) • Have I achieved my intended outcomes related to my teachers' understanding of the school improvement plan? (adopt)

Summary of Findings

Findings from this study addressed (a) revelations about school technology leadership practices in two schools, (b) reactions to an assessment of leadership practices, and (c) intended uses of feedback from an assessment of leadership practices within the context of continuous improvement. The researcher found enabling and constraining factors impacting school technology leadership practices, including those related to the availability and use of time as a resource, as well as varying areas of strengths and challenges aligned to specific leadership dimensions. Emergent areas included the use of data to monitor performance related to technology-supported teaching and learning (OLF dimension 1.3) as well as the use of formal processes to promote professional learning (OLF dimensions 2.1 & 3.2). Regarding the assessment instrument, while leaders identified benefits from both taking the survey and reviewing the results, the findings uncovered potential barriers to its use related to content, process, and technical functionality. Finally, the findings indicated that school leaders intend to use the data in conversations with teachers regarding both current and future 1-to-1 deployments (Planning, Studying, and Acting in PDSA process). The researcher used these findings to inform the recommendations that follow.

Recommendations

The researcher presents three recommendations based on the study findings and a review of the literature. Each recommendation, along with its target audience, is first summarized in Table 13 and explained in more detailed in the remainder of this section. Recommendation 1 addresses the problem of practice outlined in this study, that is, the need for school technology leaders to capture and use data about their practices to inform continuous improvement. Recommendation 2 supports successful implementation of first recommendation, but is targeted to a different audience. Recommendation 3 addresses the instrument itself, and is directed to its developers. These recommendations form the basis for the action communication products in Chapter Five.

Table 13

Recommendations for Systematizing a Data Collection Strategy to Support the Assessment of School Technology Leadership Practices in the Context of Continuous Improvement and Expanding 1-to-1 Initiatives within Howard Valley School District

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Recommendation 1: District leaders should adopt a specific data collection solution to aid school leaders in the assessment of their own school technology leadership practices.

> ***Audience****: Members of the Executive Cabinet in Howard Valley School District*

Recommendation 2: School leaders should follow a systematic approach to framing and deploying the school technology leadership assessment with teachers.

> ***Audience****: School leaders using the School Technology Leadership Assessment*

Recommendation 3: Instrument developers should use participant feedback to modify the assessment instrument.

> ***Audience****: Developers of the School Technology Leadership Assessment*

Recommendation 1: District leaders should adopt a specific data collection solution to aid school leaders in the assessment of their own school technology leadership practices. Districts play a key role in promoting the success of school leaders through their use of leadership development strategies and organizational supports (Duke, 2010; Louis et al., 2010). Higher performing districts have been shown to establish and communicate expectations for leadership practices, and to provide growth opportunities for principals in support of district expectations (Louis et al., 2010). Also, districts shape how school leaders approach their use of data and can influence the types of data school leaders collect as well as their data analysis and decision-making processes (Louis et al., 2010), an important consideration in the context of this study focused on the assessment of school technology leadership practices. District support of school leaders can be particularly important during complex organizational change processes (Duke, 2010) such as the 1-to-1 implementations underway in this study. One way in which central office leaders can aid school leaders in their leadership efforts is by supplying the necessary resources and building policy to support school-level practices (Duke, 2010; Honig, 2001).

The district in this study currently lacks a formal approach to collecting data from teachers about school technology leadership practices in their schools. Yet, such data are an important consideration in the context of the district's continuous improvement model given the steady expansion of technology integration initiatives, specifically 1-to-1 programs. When school leaders in this

study were presented with results of the *School Technology Leadership Assessment,* they indicated that they valued such feedback from teachers about their school technology leadership practices. Specifically, they intended to use the feedback in discussions with teachers about their current 1-to-1 initiatives and as they planned for expanding 1-to-1 programs into other grades. Further, results from the *School Technology Leadership Assessment* catalyzed plans for additional data collection efforts to explore specific areas in more detail.

Leaders' use of a process-driven model, such as PDSA, can impact the effectiveness of continuous school improvement efforts, and the leaders, themselves, are a critical component of that process (Chicquette, 2010). To provide school leaders throughout the district with a systematic approach to collecting data about their school technology leadership practices, the researcher recommends that district leaders adopt and organize an explicit data collection solution as part of their continuous improvement model and align it with leadership best practices as outlined in the literature on creating high expectations and monitoring performance. More precisely, the researcher recommends that this district adopt one of the following three approaches to collecting data about school technology leadership practices as they expand 1-to-1 deployments and align it to their PDSA continuous improvement process:

1. *School Technology Leadership Assessment* - Review the revised version of the *School Technology Leadership Assessment* piloted in this study, following modifications to the instrument based on user feedback, to see if it adequately addresses the identified barriers.

Implement this instrument if modifications are satisfactory. Doing so will provide leaders with specific feedback from teachers about their leadership organized categorically into research-based domains and dimensions of practices. As the study findings indicated, the *Results Rubric Report* provided a common framework to support leaders conversations with teachers about their practices in relation to the schools' 1-to-1 programs.

2. *Other Existing Instruments* - Evaluate and pursue other tools such as the self-evaluation tools for leaders offered through Project Red or CASTLE (see Chapter Two) to investigate whether they meet the need of school technology leaders as outlined in the study findings and found in the literature.

3. *Customized Tool* – Customize an existing tool for use by leaders within the district that is aligned to a research-based leadership framework and grounded in the literature related to 1-to-1 programs. Such a tool should adopt accurate language about the organization, systems, and processes of the district's context.

By adopting a systematic approach to collecting data about school technology leadership practices, the district will be providing school leaders with a resource to aid in their school improvement efforts, specifically those related to technology integration and their expanding 1-to-1 programs. In relation to the district's PDSA model, the survey and feedback report will assist school leaders in answering important questions such as "what needs to be improved in my

leadership practices to support our school's 1-to-1 program" and "what data support the need for these improvements in my leadership practices?"

Recommendation 2: School leaders should follow a systematic approach to framing and deploying the school technology leadership assessment with teachers. Framing, or the way in which an individual characterizes an issue when presenting it, can impact the way the people receive and interpret the issue (Scheufele, 2000) as well as the eventual action they take (Hoy & Tarter, 2008). In the case of surveys, framing of the survey request has been suggested to impact response rates (Tourangeu & Ye, 2009). In one study (n = 15,652) of the impact of survey invitation design on response rates for campus-wide, web survey, findings indicated that using multiple contact attempts and mixed modes to invite participation led to higher participation levels than invitations sent through email alone (Kaplowitz, Lupi, Couper & Thorp, 2012). Further, Kaplowitz et al. (2012) found that the mention of an authoritative, familiar figure (e.g., a formal leader) in the subject line of email invitations had a positive impact on survey response rates, leading to higher rates than subject lines simply stating the purpose of the survey. These findings suggest that they way principals frame their request for teacher participation in the *School Technology Leadership Assessment,* both what they say and how they say it, can influence teacher feedback. This suggestion is supported by Louis et al. (2010) who found that principals play a significant role in "establishing the purposes and expectations for data use" (p. 179) in schools.

Findings from this case study suggested that teacher feedback on an

instrument such as the *School Technology Leadership Assessment* can be impacted by a several factors including misunderstandings about importance of their feedback in relation to the school's technology initiatives, confusion about terminology, the timing of the survey window in relation to other initiatives, and the time needed to complete it. To address this, the researcher recommends that school technology leaders use a systematic, research-based approach to administering the *School Technology Leadership Assessment* drawn from the literature on leadership practices by (a) framing the data collection activities in relation to the school's overall vision and shared goals (i.e., setting direction for use of the data), (b) clarifying the importance of hearing teacher feedback as an element of the school's performance monitoring efforts (i.e., engaging teachers in informing the conditions that impact their own work), and (c) giving teachers protected time to complete the assessment that is free from distractions (i.e., structuring the organization to facilitate collaboration). The researcher recommends that school leaders conduct key communication related to the administration of the *School Technology Leadership Assessment* in a face-to-face environment rather than over email alone (i.e., making their expectations known through their actions), and "demonstrate the importance of continuous learning through visible engagement in their own professional learning" (Leithwood, 2012, p. 19). The face-to-face approach also allows teachers to ask clarifying questions about terminology and provides the opportunity for them to build shared understanding about the importance of assessing school leaders' practices. Further, once leaders have gathered teacher feedback, the researcher

recommends that data be used in a transparent and collaborative manner within the school's PDSA processes to inform continuous improvement efforts, thus reinforcing its value in performance monitoring by helping teachers see the link between "…group processes and outcomes" (Leithwood, 2012, p. 22). This step helps teachers form connections between the feedback they provided and the changes that were implemented.

Recommendation 3: Instrument developers should use participant feedback to modify the assessment instrument. The *School Technology Leadership Assessment* instrument used in this study had not undergone a full validation process at the time it was administered. As such, the feedback provided by teachers and administrators in focus groups and survey comments contribute valuable insight into the face and content validity. The findings for RQ2 show that certain barriers exist to adoption of the survey in its current state. Specifically, findings propose the need to reduce the survey length, to refine the survey content by using more succinct, "practitioner friendly" language, to include a "does not apply" answer option, to enhance technical functionality, and to improve the design of the online survey presentation. Elements of this feedback were similar to feedback received by the original CALL developers during their instrument validation process in which focus groups raised concerns about survey length, terminology, and lengthy wording of both questions and answers (Kelley & Halvorsen, 2012). While the feedback obtained in this case study offers important insights into the survey participants' perspectives, it should be considered in light of the broader literature around web surveys and best

practices in survey design.

Researchers have studied the cognitive aspects of survey methodology (CASM) since the early 1980s to better understand the mental processes used by individuals to interpret and answer survey questions (Ryan, Gannon-Slater & Culbertson, 2012; Schwarz, 2007; Tourangeau, 2003). The CASM literature suggests that survey participants engage in four primary steps when reading and answering survey questions that include (1) comprehending the question, (2) retrieving information, (3) making a judgment and, (4) documenting their response (Ryan, Gannon-Slater & Culbertson, 2012; Schwarz, 2007; Tourangeau, 2003). Summarizing key findings from the CASM literature around inaccuracy in responses, Tourangeau (2003) suggests that participants "give inaccurate or unreliable answers because they don't really understand the questions, can't remember the relevant information, used flawed judgment or estimation strategies, have trouble mapping their internal judgments onto one of the response options, or edit their answers in a misleading way before they report them" (p. 5). These challenges can be exacerbated by the use of complex, detailed wording or unfamiliar terms as well as by mismatches between a respondent's formulated response and the answer choices provided (Ryan et al., 2012). In his literature review of best practices for web surveys, Umbach (2004) identified multiple design principles that can impact completion rates including those related to survey length and the use of progress timers. Based on his review of the literature, he recommended keeping surveys no longer than 20 minutes and providing progress indicators to keep participants engaged. In

light of the case study findings around barriers to use of the *School Technology Leadership Assessment* and a limited review of the literature, this researcher recommends that the instrument developers consider participant feedback about language, answer choices, survey length, and technical functionality in future modifications of the instrument in an effort to increase the its usability and adoption.

Implications of Recommendations

There are implications associated with each of the aforementioned recommendations.

Recommendation 1 implications. Recommendation 1 assumes that leaders in Howard Valley School District are familiar with analyzing and using data in decision-making processes within the context of their continuous improvement model, that they have time to do so, and that supports are in place to aid leaders in these processes. To catalyze the enactment of this recommendation, leaders in Howard Valley School District will receive an overview of the study, a summary of findings including a sample *Result Rubric Report*, and a written statement of the recommendation with supporting rationale. If the district leaders choose to follow the researcher's recommendation, they will need to make several key decisions related to (a) strategic communication about the purpose of the instrument and expectations for its use, (b) selection of the specific instrument to be deployed, (c) approach to be used in deployment of the instrument, and (d) ongoing use of the instrument.

District messaging related to the purpose and importance of the instrument should be consistent, stressing that it is non-evaluative in nature but, rather, a resource to gather input for use in continuous improvement efforts as the district expands 1-to-1 programs. District leaders, in delivering the message, should connect the use of the assessment instrument to their overall vision and performance expectations related to technology integration and leadership development (i.e., setting direction). They should explain how it integrates into existing processes to support current work (e.g., provides gap evidence for use in school improvement planning).   Further, they should decide and clarify certain policy level decisions such as whether use of the instrument is optional or required, whether the instrument will be used in all schools or only those initiating new technology initiatives, how often it should be used, and how they will allocate time for its use.   Timing of data collection should be considered in relation to other surveys requiring teacher input to minimize teacher burden.

If the district leaders decide not to use the revised *School Technology Leadership Assessment,* they will need to evaluate other technology leadership assessment instruments and identify one that most closely fits their needs. This is best done with input from the school leaders and teachers who will actually be implementing it, and could be accomplished by forming a committee or by using an existing advisory group.   School technology leaders should be notified of the instrument evaluation process before it begins and be given opportunities to participate in the evaluation. While many of the assessment instruments are

available free of charge, some may require funding. In this case, the district funding source would need to be identified and budgeted accordingly.

Once the instrument is identified, district leaders will need organize its deployment, continuing to communicate with school leaders throughout the district so they are all aware of what solution was chosen, why it matters, and how to use it in their own school improvement efforts. A district-level leader should be appointed to "own" the messaging and support processes associated with use of the school technology leadership assessment instrument so school leaders have someone specific to contact if they need assistance. This will preferably be someone familiar with the use of data, the school improvement processes, and the PDSA process. Implementation of this recommendation implies that leaders in the district will use the identified instrument to learn about and improve their technology leadership practices.

Recommendation 2 implications. The second recommendation is meant to augment recommendation 1 by addressing specific conditions to support school leaders in the deployment and administration of a school technology leadership assessment instrument with their teachers. If the district adopts a specific instrument as recommended, school-based leaders will be charged with implementing it at their schools. As such, they should strategically frame what it is, and why it is important, with teachers. What they say about the assessment process, and how they say it, will set the tone for teacher participation and feedback. Teachers should be given an opportunity to ask clarifying questions before their participation, and leaders should allocate

protected time for them to complete the survey. Further, following the survey administration, school leaders should share the results and engage teachers in collaborative conversations about how their feedback will be used to inform future direction. All of these considerations will take time and advanced planning on the part of school leaders and should adhere to a set of consistent guidelines, allowing enough flexibility to meet the unique needs of each individual school. This recommendation implies the need for a clear set of written guidelines for school leaders to use in the deployment of the technology leadership assessment instrument. It further implies that such guidelines will be followed school leaders and will increase the fidelity of the assessment process.

Recommendation 3 implications. To implement the final recommendation, it is implied that survey developers will receive a summary of participant feedback regarding the *School Technology Leadership Assessment* instrument and that they will consider the feedback, within the boundaries of best practices related to survey design, to adjust and improve the instrument. Once this is done, Howard Valley School District should be notified so they can to evaluate the revised instrument for future use. A broader implication is that the changes made to the assessment instrument will benefit not only this district, but future users of the instrument in other schools and districts, as well.

Possible Impediments and Suggested Mitigation Strategies

Lack of clarity around purpose and expectations. School and district leaders play a key role in creating the organizational conditions that impact data use by clarifying the purpose for use, expectations for use, and by providing

resources to support its use (Louis et al., 2010).   A possible impediment to the

implementation of recommendations 1 and 2 is that the purpose and expectation

for implementing the technology leadership assessment are not presented with

fidelity from district leaders to school leaders and, in turn, from school leaders to

teachers. Lack of clarity could present barriers to adoption. Put simply, district

and school leaders need to take the time to talk with participants in face-to-face

meetings, allowing time for clarifying questions, rather than opting for electronic

messaging, alone, making every effort to explain misunderstandings or address

concerns. Louis et al. (2010) found that "…the scope and complexity of data use

in schools mirrored the data use orientations, practices, expectations, and

support shown by district office leaders" (p. 193).

Insufficient level of support.   School technology leaders may have

questions about the leadership assessment, analysis of data, or they may require

other types of support before, during, or after its use. If so, the level of support

available to them could present a barrier if it is deemed untimely or inadequate.

As previously recommended, district leaders should attempt to mitigate this

impediment by ensuring that a central office leader trained in data analysis and

the district's improvement processes is identified to serve as a support to school

leaders.

Survey fatigue. As an organization focused on continuous improvement,

this district already administers a variety of data collection efforts. In fact, the

timing of the initial data collection window for this study was altered, at the

request of administrators in one school, due to concerns that teachers were

already being asked to participate in a district-initiated survey. If teachers feel like they are being asked to complete too many surveys, they may be less likely to participate. While the literature on survey fatigue is mixed, there is evidence to suggest that back-to-back surveys can negatively impact cooperation (Porter, Whitcomb, & Weitzer, 2004). As such, the timing of the school technology leadership assessment should be considered in relation to other district- or school-wide surveys, with sensitivity to teacher burden or survey fatigue.

Concerns about confidentiality and use of feedback. The *School Technology Leadership Assessment* asked teachers to provide input about the leadership conditions in their school. While their data were treated confidentially in this study and only reported in the aggregate to school leaders, this may not be the case with other instruments. If teachers are concerned that their honest feedback about school leaders could be misused, they may adjust their answers. Great care should be given to ensure confidentiality and anonymity of feedback, assuring teachers of this. If an instrument other than the *School Technology Leadership Assessment* is used, it should be administered with the oversight of the district's research and assessment office to ensure that all data are treated confidentially.

Perceptions of the instrument. In its current state, the *School Technology Leadership Assessment* instrument, itself, serves as an impediment to its adoption. If participant feedback is not used to address the two issues most often identified as barriers, length and wordiness, the perceived challenges of taking the survey may outweigh its value to school technology leaders and

prevent future use. School leaders can aid in addressing this matter by following

the second set of recommendations listed above in order to clarify and

contextualize the use of the instrument, allocating a protected block of time for

teachers to complete it. Developers can aid in addressing this matter by

incorporating the participants' feedback in future versions of the instrument.

Limitations and Declarations

This project aimed to address a specific problem of practice within the

context of two middle schools and, as such, there are limits to the usefulness and

generalizability of the findings. The study was conducted by a single researcher

who exercised the code-recode process to establish reliability (Remler & Van

Ryzin, 2011). In addition, several specific study limitations should be noted

related to the data collection, participants, and context. The *School Technology*

Leadership Assessment used to collect data was an adaptation of an existing

instrument and had not yet undergone a full validation process. While focus

group feedback will be used to inform the face validity and future improvements,

it should be noted that the instrument was still under development at the time of

the study.

Response rates to the *School Technology Leadership Assessment* were

low for both schools, 53.3% at School A and 54.5% at School B. In addition,

survey participants included only a subset of teachers who were teaching in the

1-to-1 grades and, consequently, their responses may not have given the entire

perspective of school technology leadership practices in each school. Regarding

the instrument, seven questions were eliminated during the data analysis

process due to difficulties encountered during the survey administration. Also, since the study focused on two middle schools already in the midst of new 1-to-1 initiatives, the survey results and findings may not apply to schools in other stages of technology implementation and integration. Further study could be conducted to compare and contrast the relationship between the survey outcomes and the focus group data, exploring possible correlations between the two.

Results from the *School Technology Leadership Assessment* were intended to:

- provide teams of school leaders with data, aligned to research and mapped to growth-based rubrics, to serve as formative feedback about their practices;

- prompt reflection and conversation;

- integrate into existing improvement planning processes;

- help leaders improve conditions for technology-supported teaching and learning; and

- address a specific problem of practice.

In doing so, the study intended to also contribute to the limited body of literature around the assessment of school technology leadership practices. The researcher acknowledges that the presence of data, alone, does not elicit improvement, and the myriad conditions needed to successfully integrate data into improvement planning processes are beyond the scope of this study. However, this topic has potential for future research as a follow-up case study

focused on the extent to which school technology leaders actually used data about their practices to make positive changes in the school or how the practices outlined in the OLF were distributed across the various members of each school technology leadership team. There is also potential for additional research following modifications to the *School Technology Leadership Assessment* as well as in other contexts such as different grades, in schools without 1-to-1 programs, or in schools that do not practice continuous improvement.

CHAPTER FIVE: ACTION COMMUNICATION PRODUCTS

Chapter Five presents three action communication products aligned to the findings and recommendations identified in Chapter Four (see Figure 6):

1. A recommendation report to Executive Cabinet

2. A *School Technology Leadership Assessment* deployment guide

3. A user feedback memo report.

A summary table precedes each action communication product with details identifying the distinct target audience, purpose, connection to the recommended actions, and guidelines for deployment. A copy of each action communication product is provided as an individual unit following each summary table.

Identification of repeating ideas in data
⬇
Development of themes based on groupings of repeating ideas
⬇
Development of findings following thematic analysis
⬇
Review/re-review of the literature
⬇
Development of recommendations
⬇
Development of action communication products
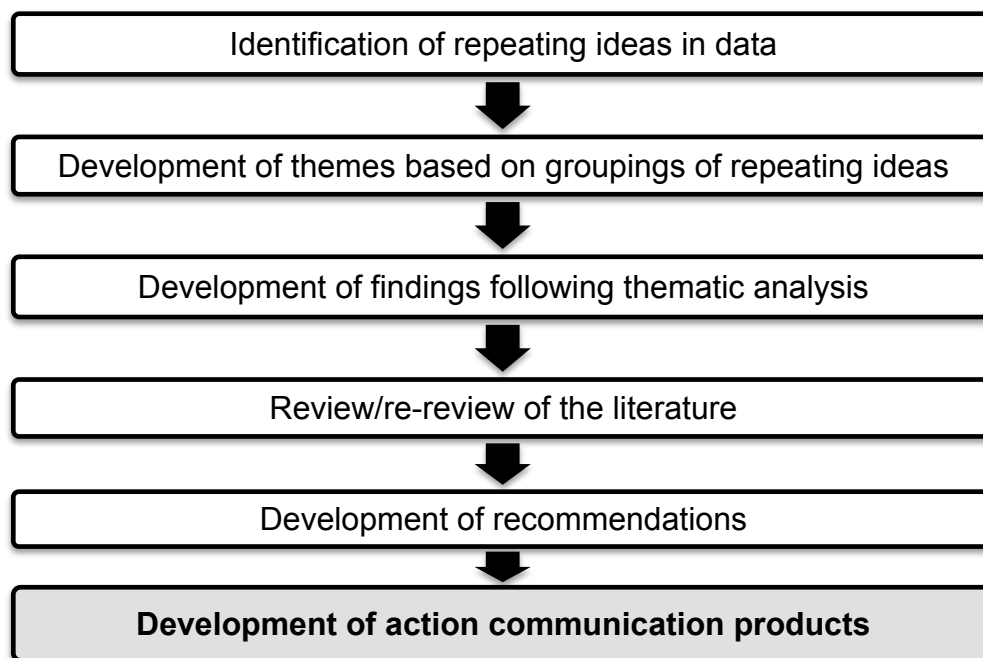
Figure 6. A multi-step, systematic process was used to develop the action communication products.

Action Communication Product 1

Table 14

Key Elements of Recommendation Report to Executive Cabinet

Format
Recommendation report w/transmittal letter (12 pages) along with deployment guide (19 pages) and sample *Results Rubric Report* (11 pages - see Appendix C)

Audience
This action communication product is intended for members of Howard Valley School District's Executive Cabinet with decision-making authority over school improvement planning, continuous improvement, technology planning, and data collection. These include the Superintendent, Assistant Superintendent, and Chief Information Officer.

Purpose
The purpose of this action communication product is to highlight the need for adopting a specific approach to systematically collecting and using data about school technology leadership practices.

Recommendation Addressed
This action communication product addresses recommendation 1 in which the researcher advocates, "District leaders should adopt a specific data collection solution to aid school leaders in the assessment of their own school technology leadership practices."

Guidelines for Deployment
Mail the completed recommendation report and accompanying transmittal letter to the Superintendent of Howard Valley School District along with a copy to the Assistant Superintendent in charge leadership development, continuous improvement processes, and school improvement efforts as well as a copy to the Chief Information Officer in charge of data collection for the district.

Melissa Anderson Morgan
Ed.D. Candidate in Educational Leadership
Curry School of Education, University of Virginia

April 8, 2014

Superintendent
Howard Valley School District
Mid-Atlantic State

Dear Superintendent:

I recently conducted a case study on the assessment of school technology leadership practices at two schools in your district. The study was for my dissertation research at the University of Virginia, and was focused on school technology leadership practices, particularly in 1-to-1 programs, within a context of continuous improvement. I am writing to report on recommendations based on findings from that study.

To conduct the study, I gathered input from teachers in two 1-to-1 schools about the school's technology leadership practices using an online assessment instrument. Once the survey was complete, I presented the aggregated results to members of each school's technology leadership team using a three-level rubric and conducted focus groups to explore their reactions to the feedback and to the instrument, itself. Leaders identified benefits from both taking the survey and reviewing the results, indicating they intend to use the data in conversations with teachers regarding both current and future 1-to-1 deployments. Regarding the instrument, findings uncovered some potential barriers to its use as well as solutions to address those barriers. I summarize the findings in the attached recommendation report. I also include a *Deployment Guide* that I developed to aid school leaders in their administration and use of the assessment instrument.

Leaders' practices are a key consideration when planning, implementing, and sustaining technology initiatives. As you expand the integration of technology into the district's teaching and learning programs, I hope these recommendations will prove beneficial by providing a way for leaders to use data about their own practices in ongoing improvement efforts. If you have any questions about this recommendation report or would like to discuss anything further, please feel free to contact me. I can be reached at <email>.
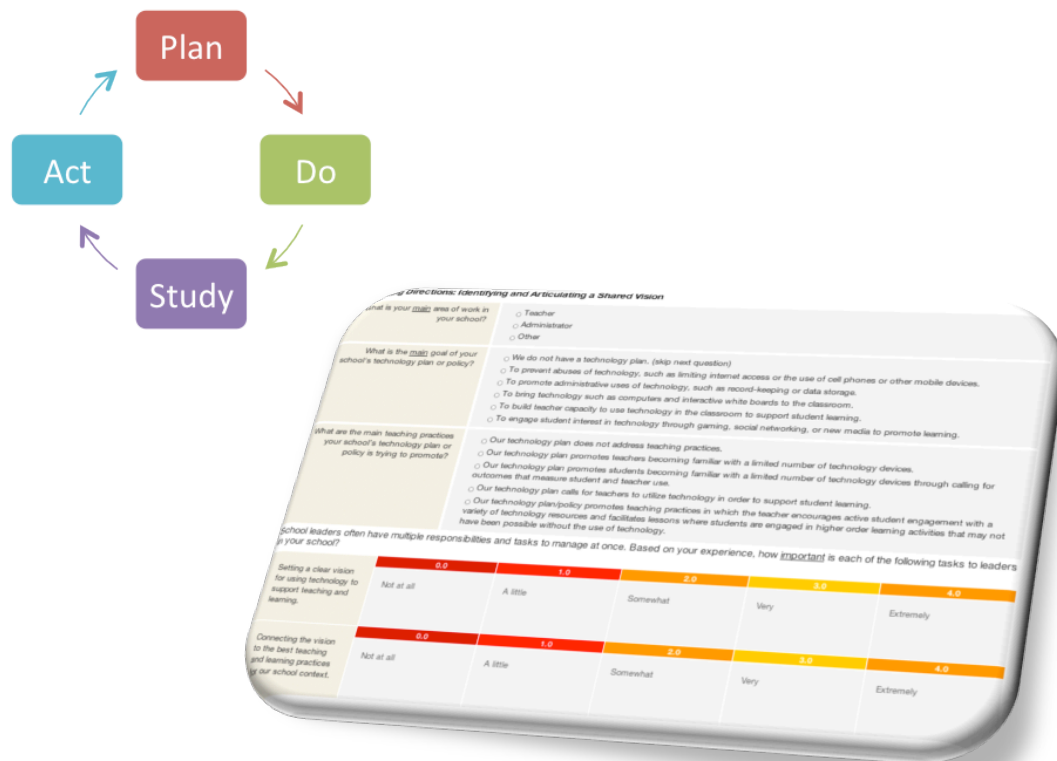
Best regards,
Melissa Anderson Morgan

Attachments (2)
cc: Assistant Superintendent
        Chief Information Officer

School Technology Leadership Assessment

Recommendation Report to Howard Valley School District

~Using Teacher Feedback for Continuous Improvement~

Study Overview

In the context of the district's continuous improvement model, I conducted a mixed-methods, exploratory case study of two 1-to-1 middle schools in Howard Valley School District. The study took place at the end of the first semester during the 2013-2014 school year and involved administrators at both schools as well as teachers in the 1-to-1 grades. I first asked teachers to complete an online assessment of school technology leadership practices.   The assessment instrument was organized into three, research-based domains of leadership practices that included (a) setting directions, (b) developing people, and (c) developing the organization to support desired practices. These domains of leadership practices were further divided into eleven dimensions. In all, 20 participants completed the assessment.

Once the survey closed, the assessment was scored using the calculated mean for each question. Possible point values ranged from 0 to 5. I presented the results to leaders in a rubric report of leadership practices categorized into three levels ranging from *Emerging (0 - 1.9)* to *Proficient (2.0 – 3.75)* to *Exemplary (3.76+)*. Based on calculated responses for each school, their report contained highlighted information about their levels of performance (i.e., emerging, proficient, or exemplary) for specific leadership practices in each dimension as indicated it the following example:

1.1 Identifying and Articulating a Shared Vision
Putting forth efforts to establish a vision and directions that embody the best thinking about teaching and learning, which gives the organization a shared sense of purpose that inspires commitment.

Emerging	Proficient	Exemplary
The school lacks a clear, shared vision for technology integration. The school does not have a technology plan/policy OR the goal of the technology plan/policy is to limit access and prevent abuses of technology. The school's technology plan/policy does not promote best practices for teaching and learning. School leaders have not connected the vision for technology integration to best practices for teaching and learning.	**The school has a vision for technology integration.** The goal of the school's technology plan/policy includes promoting administrative uses of technology and bringing technology into the classroom. **The school's technology plan/policy promotes the integration of technology into teaching and learning practices. School leaders have somewhat connected the vision for technology integration to best practices for teaching and learning.**	The school has a clear, shared vision for technology integration. **The goal of the school's technology plan/policy is to build teacher capacity to support student learning and to promote student engagement.** The school's technology plan/policy promotes best practices for teaching and learning in which the teacher fosters active student engagement using a variety of technology resources. School leaders demonstrate the importance of setting a clear vision for technology integration and effectively connect the vision to best practices for teaching and learning which gives the organization a shared sense of purpose that inspires commitment.

Please see Attachment 1 for a complete example of the *Results Rubric Report*.

Following the survey administration, I led focus groups with members of each school's technology leadership team to explore their reactions to the feedback and to the instrument, itself. I conducted two small group meetings of 3 and 5 people each in an available conference room at each participating school at a time and location coordinated with the school principal. Findings from the online assessment and focus groups informed this recommendation report as well as a report to the instrument developers about the users' experiences.

Key Findings

Findings from the focus groups revealed that leaders gained benefits from both the experience of taking the *School Technology Leadership Assessment* as well as from the feedback and data gathered as a result of taking the survey. Participants in both focus groups indicated that the process of reading the survey questions gave them opportunities, as individuals, to reflect on matters related to school technology leadership. Regarding the *Results Rubric Report,* leaders commented on the value of receiving teachers' feedback about organizational conditions to assist them in the validation or negation of their own assumptions about how things were going. The three-level rubric helped them identify areas needing improvement and gave them wording to use as a common reference in conversations with teachers.

School technology leaders indicated they intend to use data from the *School Technology Leadership Assessment* in two primary ways. First, leaders in both schools intend to share their *Results Rubric Report* with teachers in upcoming meetings related to the current 1-to-1 programs at their respective schools. In both schools, the meetings are already a part of each team's regular meeting cycle. Leaders intend to share the results as a catalyst to promote talks with teachers about the current state of each 1-to-1 program as well as to discuss incremental next steps for their respective 1-to-1 programs this year. Second, besides talking with teachers about existing 1-to-1 programs, leaders also intended to use the results to talk about their expanding 1-to-1 deployments next year. Following the school's continuous improvement model, they will use lessons learned this year to inform improvements in next year's 1-to-1 efforts.

In addition to using the survey data as a conversation starter with teachers, school technology leaders speculated about other possible uses, though they mentioned them with less certainty than the previous examples. Leaders may use the results as a guide for initiating additional surveys to explore, in more detail, areas of discrepancy or low scores. They may also use them in conversations with district leader to show teachers' perspectives on the need for additional technical support resources.

Regarding the assessment instrument, the *School Technology Leadership Assessment* used to collect data is an adaptation of an existing instrument and had not yet undergone a full validation process. The study shows that certain

barriers exist to adoption of the survey in its current state. Specifically, findings propose the need to reduce the survey length, to refine the survey content by using more succinct, "practitioner friendly" language, to include a "does not apply" answer option, and to add a progress bar. These findings have been summarized and will be shared with the instrument developers to inform the face validity and future improvements. The focus group feedback also informed the creation of a *Deployment Guide* designed to aid school leaders in the administration of the assessment instrument. I have included a copy of this guide as an attachment for your review. In spite of the challenges, I reiterate that leaders identified benefits from both taking the survey and from reviewing the *Results Rubric Report*. The study suggests that if the instrument developers address these issues, school leaders will find increased value in its utility.

Recommendation

To provide school leaders throughout the district with a systematic approach to collecting data about their school technology leadership practices, I recommend that the district adopt and organize an explicit data collection solution as part of their continuous improvement model and align it with leadership best practices as outlined in the literature on creating high expectations and monitoring performance. More precisely, I recommend that Howard Valley School District adopt one of the following three approaches to collecting data about school technology leadership practices as they expand 1-to-1 deployments and align it to their PDSA continuous improvement process:

1. *School Technology Leadership Assessment* - Review the revised version of the *School Technology Leadership Assessment* piloted in this study, following modifications to the instrument based on user feedback, to see if it adequately addresses the identified barriers. Implement this instrument if modifications are satisfactory. Doing so will provide school leaders with specific feedback from teachers about their leadership organized categorically into research-based domains and dimensions of practices. As the study findings indicated, the *Results Rubric Report* provided a common framework to support leaders' conversations with teachers about their practices in relation to the schools' 1-to-1 programs.

2. *Other Existing Instruments* - Evaluate and pursue other tools such as the self-evaluation tools for leaders offered through Project Red (http://www.projectred.org) or CASTLE (http://schooltechleadership.org/research/projects/ptla/) to investigate whether they meet the needs of school technology leaders as outlined in the study findings and found in the literature. While they would not provide the full benefit of teacher perspective, they would offer school leaders an approach to evaluating their own leadership practices.

3. *Customize an Existing Tool* – Customize an existing tool for use by school leaders that is aligned to a research-based leadership framework and

grounded in the literature related to 1-to-1 programs. Such a tool should adopt accurate language about the organization, systems, and processes of the district's context.
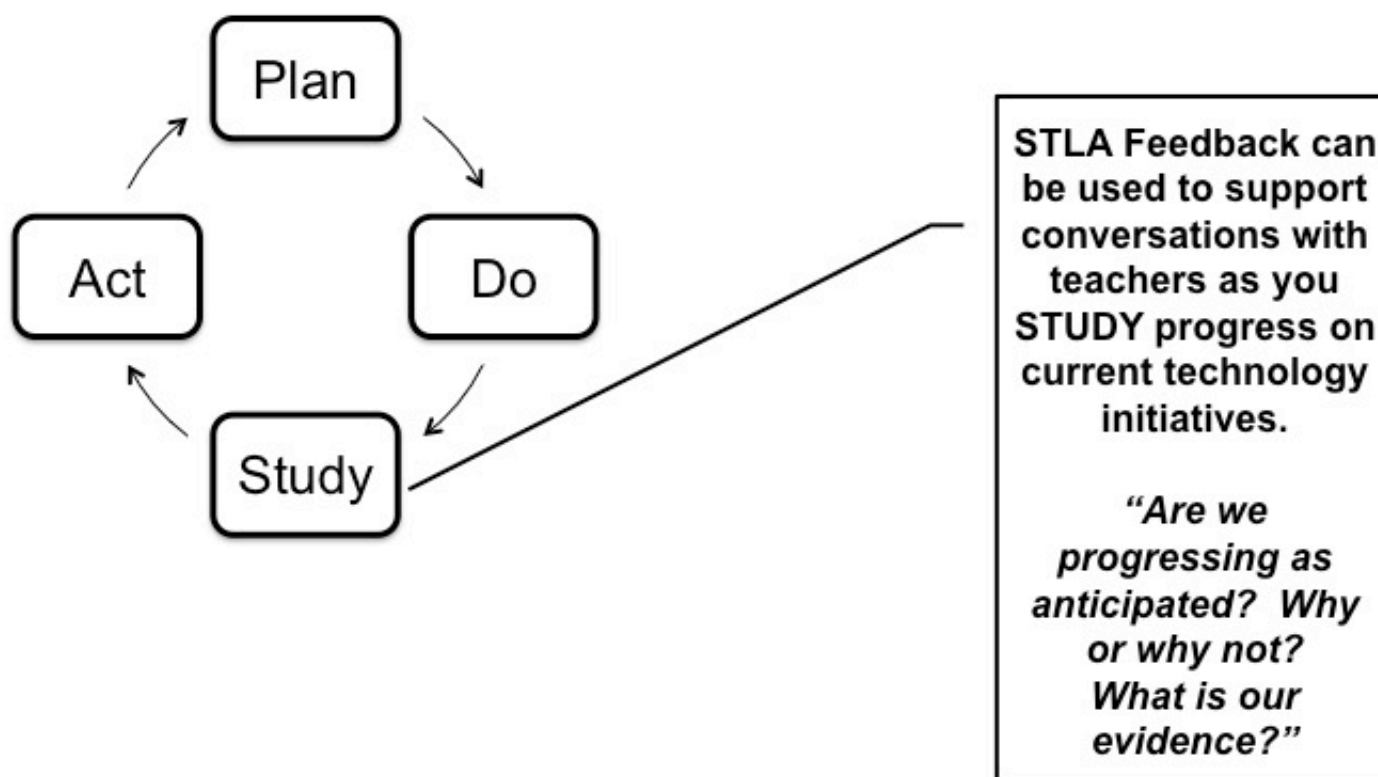
By adopting a systematic approach to collecting data about school technology leadership practices, your district will be equipping school leaders with a resource to aid in their school improvement efforts, specifically those related to technology integration and their expanding 1-to-1 programs. In relation to the district's PDSA model, the survey and feedback report will assist your school leaders in answering important questions such as "what needs to be improved my leadership practices to support our school's 1-to-1 program" and "what data support the need for these improvements in my leadership practices?"

In the context of your adopted continuous improvement model and use of the PDSA process, I propose four specific benefits of adopting the *School Technology Leadership Assessment*. Two of these benefits have already been identified above in the focus group findings, and two are my conclusions based on a review of the district's school improvement process and supporting documentation:
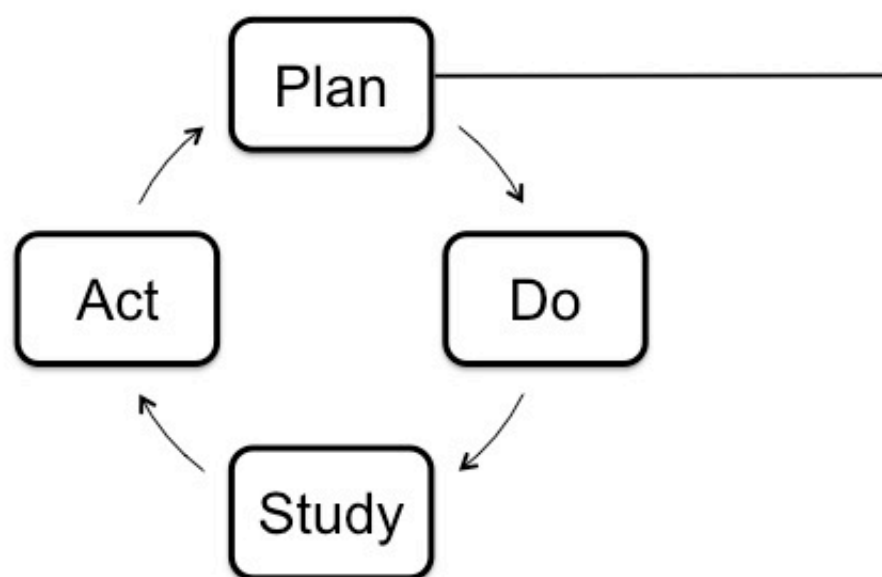
1. **Benefit #1 (see page X)** – School technology leaders can use STLA feedback to support conversations with teachers as they STUDY progress on current technology initiatives. It can inform the answers to questions such as, "Are we progressing as anticipated?"
2. **Benefit #2 (see page X)** - School technology leaders can use STLA feedback to support conversations with teachers as they PLAN for new technology initiatives. It can inform the answers to questions such as, "What needs to be improved to support a successful implementation?"
3. **Benefit #3 (see page X)** – School technology leaders can use feedback about "emerging" leadership practices, those that are in need of improvement, as supporting data/ gap evidence in school improvement planning to show the need for focusing on certain areas. For example, if school leaders scored at the "emerging" level for monitoring the effectiveness of professional development, they could use the *Results Rubric Report* as "evidence" that they need to focus more on this in order to make sure teachers are getting the professional learning opportunities necessary to support the school improvement plan.
4. **Benefit #4 (see page X)** – School technology leaders can use the *Results Rubric Report* to identify best practices, those that are outlined in the "exemplary" level of the rubrics, to identify key strategies that will support school improvement efforts. For example, a school leader may discover the need to improve his or her assessment of the impact that technology professional development is having on teaching practices through the use of classroom observations.

I provide a visual depiction of each benefit on the pages that follow.
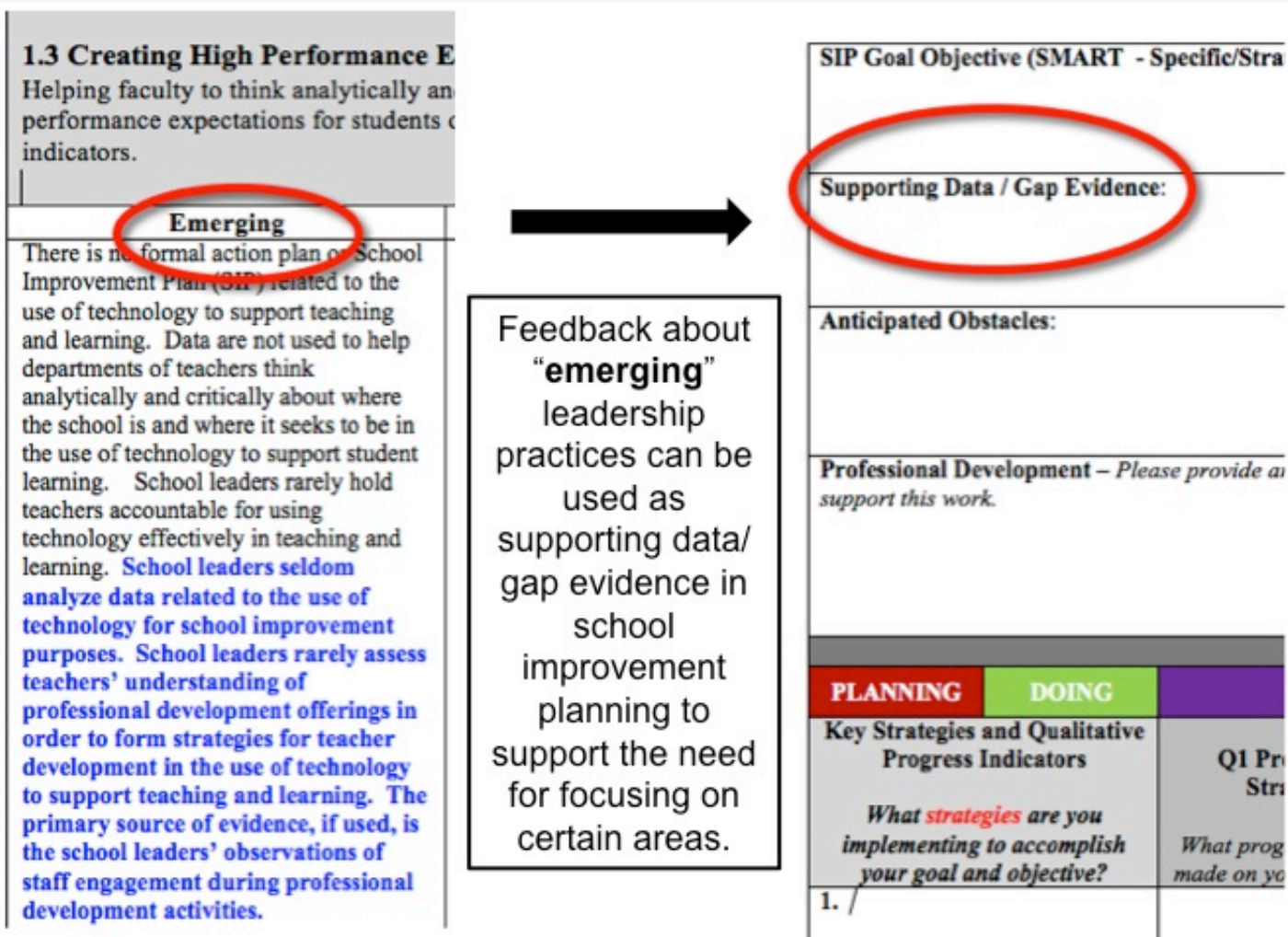
Benefit #1 – Studying Current Initiatives

STLA Feedback can be used to support conversations with teachers as you STUDY progress on current technology initiatives.

"Are we progressing as anticipated? Why or why not? What is our evidence?"

Benefit #2 – Planning New Initiatives

Benefit #3 – Results Provide Gap Evidence

1.3 Creating High Performance E

Helping faculty to think analytically an
performance expectations for students
indicators.

Emerging

There is no formal action plan or School
Improvement Plan (SIP) related to the
use of technology to support teaching
and learning. Data are not used to help
departments of teachers think
analytically and critically about where
the school is and where it seeks to be in
the use of technology to support student
learning. School leaders rarely hold
teachers accountable for using
technology effectively in teaching and
learning. **School leaders seldom
analyze data related to the use of
technology for school improvement
purposes. School leaders rarely assess
teachers' understanding of
professional development offerings in
order to form strategies for teacher
development in the use of technology
to support teaching and learning. The
primary source of evidence, if used, is
the school leaders' observations of
staff engagement during professional
development activities.**

Feedback about **"emerging"** leadership practices can be used as supporting data/ gap evidence in school improvement planning to support the need for focusing on certain areas.

SIP Goal Objective (SMART - Specific/Stra

Supporting Data / Gap Evidence:

Anticipated Obstacles:

Professional Development – *Please provide a* *support this work.*

PLANNING	DOING	
Key Strategies and Qualitative Progress Indicators		**Q1 Pr Stra**
What strategies are you implementing to accomplish your goal and objective?		*What prog made on yo*
1.		

Benefit #4 – Rubrics Inform SIP Strategies

oring Performance
d where it seeks to be, and setting
ress and then assessing based on those

Exemplary

A formal action plan or School Improvement Plan (SIP) related to the use of technology to support teaching and learning is developed, actively followed, and is improving student learning through the use of technology. The plan incorporates the use of data to help departments of teachers think analytically and critically about where the school is and where it seeks to be and to guide actions and decisions that are improving student learning. School leaders regularly hold teachers accountable for using technology effectively in teaching and learning. The analysis of data related to the use of technology for school improvement purposes is extremely important. School leaders regularly assess teachers' understanding of professional development offerings. This is done through observed levels of staff engagement; teacher satisfaction surveys observed changes in teaching practices and changes in student learning in order to form strategies for teacher development in the use of technology to

By outlining research-based leadership practices, the *Results Rubric Report* can help define key strategies to support school improvement efforts related to technology initiatives.

SIP Goal Objective (SMART - Specific/Strategi

Supporting Data / Gap Evidence:

Anticipated Obstacles:

Professional Development – *Please provide an ov support this work.*

PLANNING **DOING**

Key Strategies and Qualitative Progress Indicators

What strategies are you implementing to accomplish your goal and objective?

1.

2.

3.

Implications to Consider

In my recommendation, I make the assumption that your school leaders are already familiar with analyzing and using data in decision-making processes within the context of your district's continuous improvement model, that leaders can allocate time to do so, and that supports are in place to aid leaders in these processes. If you choose to follow the recommendation, you will need to make several key decisions related to (a) strategic communication about the purpose of the instrument and expectations for its use, (b) selection of the specific instrument to be deployed, (c) approach used in deployment of the instrument, and (d) ongoing use of the instrument.

I recommend that your district's messaging related to the purpose and importance of the instrument should be consistent, stressing that it is non-evaluative in nature but, rather, a resource to gather input for use in continuous improvement efforts as the district expands 1-to-1 programs. Your district leaders, in delivering the message, should connect the use of the assessment instrument to their overall vision and performance expectations related to technology integration and leadership development, and explain how it integrates into existing processes to support current work (e.g., provides gap evidence for use in school improvement planning). Further, the district leaders should decide and clarify certain policy-level decisions such as whether use of the instrument is optional or required, whether the instrument will be used in all schools or only those initiating new technology initiatives, how time will be allocated to administer the instrument and use the results, and how often it should be used. Timing of data collection should be considered in relation to other surveys requiring teacher input so as to minimize teacher burden.

If you decide not to use the revised *School Technology Leadership Assessment,* you will need to evaluate other technology leadership assessment instruments and identify one that most closely fits their needs. This is best done with input from the school leaders and teachers who will actually be implementing it, and could be accomplished by forming a committee or by using an existing advisory group. School technology leaders should be notified of the instrument evaluation process before it begins and be given opportunities to participate in the evaluation. While many of the assessment instruments are available free of charge, some may require funding. In this case, you would need to identify the funding source and budget accordingly.

Once the instrument is identified, your district leaders will need organize its deployment, continuing to communicate with school leaders throughout the district so they are all aware of what solution was chosen, why it matters, and how to use it in their own school improvement efforts. If your leaders choose to use the *School Technology Leadership Assessment,* school leaders should refer to the *Deployment Guide* (see Attachment 2) to support successful administration of the assessment with teachers. A district-level leader should be appointed to "own" the messaging and support processes associated with use of the school

technology leadership assessment instrument so school leaders have someone specific to contact if they need assistance. This will preferably be someone from your staff who is familiar with the use of data, the school improvement processes, and the PDSA process. Implementation of this recommendation implies that your leaders in the district will use the identified instrument to learn about and improve their technology leadership practices.

Conclusion

Howard Valley School District currently lacks a formal approach to collecting data from teachers about school technology leadership practices in your schools. Yet, such data are an important consideration in the context of your district's continuous improvement model given the steady expansion of technology integration initiatives, specifically 1-to-1 programs. Without a clear picture of what school technology leadership should look like in the context of their school, leaders will be challenged to enact the practices necessary for technology integration to be successful. As the district continues to expand your technology initiatives as outlined in the strategic plan, this issue will become increasingly important. My recommendations seek to address this issue by providing your leaders with a tool to assess their technology leadership practices and inform ongoing improvement efforts.

Attachments

I include two attachments to support this recommendation report. They are:

1. Sample *Results Rubric Report*
2. Deployment Guide for the *School Technology Leadership Assessment*

Action Communication Product 2

Table 15

Key Elements of School Technology Leadership Assessment Deployment Guide

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Format
Deployment guide (19 pages) along with sample *Results Rubric Report* (11 pages - see Appendix C) as an attachment

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Audience
This action communication product is intended for principals and other members of the school technology leadership team.

Purpose
The purpose of this action communication product is to support school technology leaders by providing guidelines and resources to aid in the setup, administration, and use of the *School Technology Leadership Assessment.*

Recommendation Addressed
This action communication product addresses recommendation 2 in which the researcher advocates, "School leaders should follow a systematic approach to framing and deploying the school technology leadership assessment with teachers."

Guidelines for Deployment
Email a copy to each of the participating principals in this case study for future reference and use. Also, include these guidelines as an appendix in the recommendation report to the district.

School Technology Leadership Assessment

Deployment Guide

Deployment Guide
Table of Contents   **Page**

OVERVIEW OF THE SCHOOL TECHNOLOGY LEADERSHIP ASSESSMENT

The *School Technology Leadership Assessment* (STLA) is an assessment and feedback report designed to help school technology leaders create the organizational conditions necessary for successful technology-supported teaching and learning.   The STLA results are based on input from the school's teachers and administrators. While the assessment is administered using an online survey design, the STLA is not your typical survey. It is a comprehensive assessment designed to gauge perceptions about the state of specific technology leadership practices that help shape the organizational conditions for teachers to be successful in their technology-integration efforts. As such, the STLA questions are detailed, probing, and thought-provoking.   The STLA questions and corresponding results are organized into three research-based domains of leadership practices that include:

1. *Setting Directions*
2. *Building Relationships and Developing People*
3. *Developing the Organization to Support Desired Practices*

These domains of leadership practices are further divided into eleven dimensions. The STLA *Results Rubric Report* indicates the school's aggregated survey results in each of the 11 dimensions of leadership practices based on a three level rubric ranging from *emerging* to *proficient* to *exemplary*. By presenting the school's results in this format, the rubric report provides leaders with information on how to grow in each leadership dimension.

PURPOSE OF THIS DEPLOYMENT GUIDE

This **Deployment Guide** is meant to assist leaders in the setup and administration of the STLA, and in using the *Results Rubric Report* as formative feedback to make positive changes in specific leadership practices.   To create the best conditions for administration of the STLA, this **Deployment Guide** provides a set of guidelines for leaders to follow and includes a set of resources to support their efforts.   The desired outcome is that teachers will be given the time and information needed to thoughtfully complete the STLA and leaders, in turn, will gain valuable perspectives from teacher as well as growth-oriented rubrics to make positive changes in their practices

DEPLOYMENT GUIDELINES

Framing
As the leader, the way in which you frame communication about the STLA will set the tone for its use. Help teachers connect the STLA to the school's larger vision for student learning by explaining how it supports the school's vision of _____ by providing data about teachers' perceptions of the support conditions created by school technology leaders.   As you talk with teachers, give them the opportunity to ask questions and to clarify any areas of misunderstanding about its use.

Estimated Completion Time and Logistics
The estimated time to complete the STLA is 30-45 minutes. Since it is a comprehensive assessment designed to gauge perceptions about the state of specific technology leadership practices, it takes longer than your "typical" survey. The questions are detailed and probing, so it takes extra time to read through each one carefully.

Teachers will complete the STLA online, therefore it is important that they bring their laptop, or have a computer lab available, on the day of the STLA administration.   Leaders should review the pre-administration presentation with teachers before they take the STLA. This will take approximately 15 minutes to complete and can be done with a projection system or by sharing the presentation and allowing everyone to follow along on their on laptop.

Recommended Timeline
Schools may want to consider administering the STLA twice, at the beginning and end of the year OR at the start and completion of a major technology initiative, in order to gauge changes in their practices. Following is a recommended timeline of activities.

Timeframe and Activity	Supporting Resource
At least 1 month before STLA administration Reserve 1 hour of uninterrupted time at an upcoming meeting or on a PD day for teachers to take the STLA	N/A
1 month before STLA administration Face-to-face announcement about upcoming STLA administration to teaching staff, if possible. In lieu of face-to-face announcement, send email notification	Sample Email #1
1 week before STLA administration Send reminder email	Sample Email #2
Day of STLA administration • Welcome & pre-administration presentation (15 min) • STLA administration (45 min)	Sample Presentation
1 Day after STLA administration	Sample Email #3

Send follow-up email thanking teachers for participation	
1 week to 1 month after STLA administration Share *Results Rubric Report* with teachers and begin conversations on how it will inform future direction	Results Rubric Report, Action Plan Template

This ***Deployment Guide*** includes a collection of sample resources on the remaining pages to aid leaders in communication and messaging.

PRE-ADMINISTRATION SAMPLE EMAIL MESSAGES

Sample Email Message #1 - Initial Announcement
To: Teachers **From**: Principal **Subject**: Opportunity to Provide Your Feedback on the School's Technology Leadership
In the coming weeks, I will be seeking your confidential feedback on the school technology leadership practices in our school. Your input will provide members of the school technology leadership team with insights on how to improve the organizational conditions to best support our technology-integration efforts. We will be using an online instrument called the *School Technology Leadership Assessment* to gather your feedback. While the assessment is administered using an online survey design, the STLA is not your typical survey. It is a comprehensive assessment designed to gauge perceptions about the state of specific technology leadership practices and, as such, the STLA questions are detailed, probing, and thought-provoking. I will allocate uninterrupted time on <date> for you to complete the assessment, and will provide additional information prior to that time. I look forward to getting your feedback on the school technology leadership in our school. Your input will help us shape our future direction in support of our vision to <insert words about school vision or goals>.

Sample Email Message #2 - Reminder Prior to Administration
To: Teachers From: Principal Subject: Reminder about Upcoming School Technology Leadership Assessment
Just a reminder that we will be allocating time at our <meeting> on <date> to take the *School Technology Leadership Assessment.* Please remember to bring your laptop as the survey will be administered online. Your voice is an important part of this learning process, and I look forward to your collective feedback on the state of our school's technology leadership practices.

PRE-ADMINISTRATION PRESENTATION

Sample presentation slide #1

School Technology Leadership Assessment
Pre-Administration Overview

Sample presentation slide #2

What is the School Technology Leadership Assessment (STLA)?

The STLA is a survey and feedback report designed to

gather input on the state of those technology leadership

practices in a school that impact organizational conditions for

technology-supported teaching and learning.

Sample presentation slide #3

Why are we participating in the STLA?

The STLA will help us get feedback from teachers about the environment school leaders are creating for technology integration here in our school. In doing so, we will be able to better identify our strengths and opportunities for growth. We will use this feedback in our continuous improvement planning.

Sample presentation slide #4

How long will the STLA take to complete?

The estimated time to complete the STLA is 30-45 minutes. Since it is a comprehensive assessment designed to gauge perceptions about the state of specific technology leadership practices, it takes longer than your "typical" survey. The questions are detailed and probing, so it takes extra time to read through each one carefully.

Sample presentation slide #5

Who are our "school technology leaders"?

The survey asks questions about the "school technology leaders" in our school. Here at _____, this includes:

<fill in names of those administrators and teacher leaders in your school who are considered a part of the school technology leadership team>

Sample presentation slide #6

What if I don't know an answer?

Please select the answer that most closely matches your understanding of the conditions in your school. There is a comment box at the end of the survey if you feel it is necessary to provide additional clarification.

Sample presentation slide #7

What will happen to my answers after I complete the STLA?
All responses will be aggregated and no respondents will be identified by name, so <u>your answers will be confidential</u>. The aggregated responses will be used to develop a *Results Rubric Report* that will give school leaders insights into how to improve the conditions to optimize technology-supported teaching and learning in our school.

Sample presentation slide #8

Sample *Results Rubric Report*

One: Setting Directions

sion	Emerging	Proficient	Exemplary
ying and lating a Vision	**The school lacks a clear, shared vision for technology integration.** The school does not have a technology plan/policy OR the goal of the technology plan/policy is to limit access and prevent abuses of technology. The school's technology plan/policy does not promote best practices for teaching and learning. **School leaders have not connected the vision for**	The school has a vision for technology integration. The goal of the school's technology plan/policy includes promoting administrative uses of technology and bringing technology into the classroom. **The school's technology plan/policy promotes the integration of technology into teaching and learning practices.** School leaders have	The school has a clear, shared vision for technolog integration. **The goal of th school's technology plan/policy is to build teacher capacity to suppo student learning and to promote student engagement.** The school' technology plan/policy promotes best practices for teaching and learning in which the teacher fosters active student engagement

Sample presentation slide #9

We will use the results to…

<fill in specific school information>
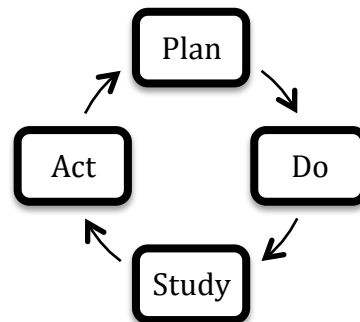
Sample presentation slide #10

Questions?

POST-ADMINISTRATION SAMPLE EMAIL MESSAGE

Sample Email Message #3 - Post Administration Thank You
To: Teachers From: Principal Subject: Thank You for Completing the *School Technology Leadership Assessment*
I am writing to thank each of you for completing the *School Technology Leadership Assessment* last <date>.   Your perspectives will provide valuable insights to the leadership team about our practices, and will help guide our school's collective efforts to meet our goals of <insert language about school's technology-related goals or student learning goals>. I will be sharing the aggregated results with you at <date or future meeting> as we engage in ongoing improvement efforts.

STLA POST-ADMINISTRATION ACTION PLAN TEMPLATE – PART I (OPTIONAL)

This template is meant to help you answer the question, "What changes will I make in my leadership practices based on my school's feedback from the STLA?" You will complete a separate table on the following pages for each leadership dimension you intend to address.

School Name:

The dimensions that stand out as our areas of **STRENGTH** are: • • • •	The dimensions that stand out as our **OPPORTUNITIES FOR IMPROVEMENT** are: • • • •

STLA POST-ADMINISTRATION ACTION PLAN TEMPLATE – PART II (OPTIONAL)

Leadership Dimension to Address in this Action Plan
<Referring to the opportunities for improvement, indicate the dimension number and name of the leadership dimension(s) you are addressing in this action plan – ex. 1.1 Identifying and Articulating a Shared Vision>

Leadership Dimension:

Strategies to Address this Leadership Dimension	Person(s) Responsible	Timeline	Performance "Look-fors" *(to tell you how well you are progressing)*	Resources Needed
<Insert strategies and/or actions>				
<Insert strategies and/or actions>				
<Insert strategies and/or actions>				
<Insert strategies and/or actions>				
<Insert strategies and/or actions>				

Potential or Anticipated Obstacles
<Indicate any known or anticipated obstacles>

Action Communication Product 3

Table 16

Key Elements of User Feedback Memo Report

Format
Memo Report, 5 pages

Audience
This action communication product is intended for the *School Technology Leadership Assessment* development team.

Purpose
The purpose of this action communication product is to improve the survey instrument based on practitioner feedback.

Recommendation Addressed
This action communication product addresses recommendation 3 in which the researcher advocates, "Instrument developers should use participant feedback to modify the assessment instrument."

Guidelines for Deployment
Email the completed *User Feedback Memo Report* to:

Sara Dexter, Ed.D.
Project Director, CANLEAD
Associate Professor, Department of Leadership, Foundations & Policy
Curry School of Education, University of Virginia
sdexter@virginia.edu

To: Sara Dexter, Ed.D.
Project Director, CANLEAD
Associate Professor, Department of Leadership, Foundations &
Policy
Curry School of Education, University of Virginia

From: Melissa Anderson Morgan
Ed.D. Candidate in Educational Leadership
Curry School of Education, University of Virginia

Date: April 8, 2014

RE: User Feedback from *School Technology Leadership Assessment*
Pilot

Introduction

In January 2014, I used the *School Technology Leadership Assessment* to collect data from users (n = 20) in two middle schools for a case study assessing leadership practices in 1-to-1 technology environments. Following the survey administration and distribution of results, I conducted focus groups as a part of that study with members of the school technology leadership teams in both schools to gain feedback on their perceptions of the instrument and its utility in their work. While users identified benefits from both taking the assessment and reviewing the results, the findings uncovered potential barriers to its use related to content, process, and technical functionality. I am writing to report on my findings and recommendations.

Overview of Pilot and Data Collection

School leaders and teachers in the 1-to-1 grades at each school (n = 37) were asked to complete the *School Technology Leadership Assessment* using a unique link emailed to them on January 16, 2014. The email invitation requested that respondents complete the survey by 5:00pm on Tuesday, January 21st. Eighteen respondents submitted their survey responses by that deadline, and 2 participants submitted responses outside of the survey window. In all, the response rate was 53.3% (8/15) for one school and 54.5% (12/22) for the other school.

Following the survey administration, I conducted two focus groups with members of each school's technology leadership team. These small-group meetings, one with 3 people and the other with 5 people, took place in an available conference room at each participating school. Focus groups lasted one hour and followed a semi-structured format. I sent a copy of the focus group questions to each

principal in advance of the meeting, along with the *Results Rubric Report* summarizing their school's survey results.

While leaders in both schools expressed a range of benefits from using the *School Technology Leadership Assessment* as a tool to support their work, they also identified barriers to use of the instrument and offered suggestions for improvement. I have organized these barriers and suggestions into three areas related to process, content, and technical functionality. I present a summary of their feedback for your consideration.

Summary of User Feedback

Barriers and suggestions related to process. The issue of survey length (i.e., the number of questions), and the time needed to complete it, emerged consistently in the findings as a significant barrier to utilization of the *School Technology Leadership Assessment.* Although the guidelines cited 30 minutes as the estimated time for completion, participants indicated that this estimate was too low given the length of the survey and focus needed to process each question. One leader suggested raising the time estimation to a full hour to give participants ample time to process each question thoroughly.   Another leader suggested merging or eliminating questions so that the entire process took no more than 15 minutes to complete. Participants expressed that the survey was not easy to take in comparison to other surveys they were used to completing, saying it was mentally demanding. Findings indicate the length of time and cognitive processing needed to answer each question effectively were prohibitive to future use by busy educators trying to fit the assessment in amidst other responsibilities.

Barriers and suggestions related to content. Study participants identified several barriers related to content that included unfamiliar or unclear terminology as well as confusion about questions related to district leadership decisions. A key finding dealt with misunderstandings about who constituted the school technology leaders in their schools. Data gathered from focus groups, comments, and an email from one school's principal suggested that participants where unclear how to define and think about the term "school technology leaders" when answering the survey questions. Since the instructions did not include specific guidance on how to define school technology leaders, teachers were uncertain how to answer some questions. One participant suggested adding a clarifying statement in the instructions about the definition of school technology leaders that would emphasize inclusion of not only the formal administrators, but also teacher leaders.

Questions in each section of the assessment used the word "department" or "departments" when referencing teams of teachers within the same subject area (e.g., middle school math teachers or middle school science teachers). The use of the word "department" led to confusion for some participants, as expressed in

survey comments, email correspondence, and focus groups, since the schools in this study did not refer to their teams using that term. In the context of this district, the word "department" is generally reserved for operational units within the organization such as the transportation department or child nutrition department. Given that both schools deployed their 1-to-1 programs across grade-level boundaries, their team meetings involved teacher from all content areas. In this context, use of the term "grade-level team" or "content team" would have been clearer to the participants.

In addition to the use of the word "department," another contextual barrier emerged revealing disconnects in how questions were worded and how the district in this study conducted certain organizational processes. For example, question #22 asked about the use of "formal professional development plans" for individual teachers to help them use technology. One participant felt that the question, as worded, suggested a more isolated approach to professional development than what they sought. The district's teacher performance appraisal system, a growth-oriented system, called for the integration of technology into the professional learning plan for individual teachers rather than the use of a separate, technology-specific plan. Similarly, focus group participants explained that the processes for hiring and training technology specialists and for coordinating participation in professional conferences were both handled by central office leaders rather than by school leaders. They were not sure how to answer these questions since the answer choices did not provide the option to say that district-level leaders rather than school leaders handled these processes.

A few themes related to content surfaced in the findings that were broader in nature. First, participants expressed the need for a "does not apply" or "not enough information" option within the survey response choices.   One participant felt she was forced to make inaccurate answer selections because none of them applied. Several others said they skipped questions because they were not relevant to them, or they lacked enough information to answer them accurately. These participants expressed concerns about contributing to misrepresentation in the data or to inaccurate results.   Participants expressed the general need for questions and answers to be reviewed and reworded in more succinct, practitioner-friendly language. The use of the word "foci" in question #54 was cited as an example of language not typically used by teachers.

Despite concerns about the assessment length, several participants made suggestions for adding content. For example, in addition to the generic, open-ended comment box at the end of the online survey, one teacher leader suggested adding another open-ended question that specifically asks teachers for any additional thoughts about the supports they need to more easily integrate technology.   She felt this might give teachers the opportunity to provide data about their need for resources that are controlled by district leaders, rather than school leaders. Leaders in both focus groups suggested that the assessment

should address leadership practices related to school-parent interactions, infrastructure (e.g., access to technology systems), and technical support as those were key, unique considerations when initiating their 1-to-1 programs. Finally, both focus groups' members noted the increase in teacher stress levels during their 1-to-1 implementations, and suggested the need for gauging this through systematic means.

Regarding the *Results Rubric Report,* the only suggested modification was a request to add information about the distribution of scores for each question to give leaders better insight into the story behind their results. One leader suggested this could enhance her ability to understand the data. In small sample sizes such as the ones in this study, participants in both focus groups acknowledged the possibility that an outlying score could skew their results.

Barriers and suggestions related to technical functionality. Two suggestions emerged related to technical functionality in the open-ended survey comments and focus group dialogue. First, participants noted that the survey lacked a "back button" which prevented them from revisiting previous pages or questions. One leader specifically remarked that she had tried to return to the instructions at the start of the assessment in order to verify her understanding about terminology, but then realized the instrument lacked that capability. In addition to the back button, leaders in both focus groups expressed the need for a progress bar clarifying the number or percentage of questions remaining. This suggestion was identified in a survey comment, as well. Participants believed this feature was particularly important due to the length of the assessment.

Concluding Remarks

The schools involved in this study were located in a district that practices continuous improvement. Although the district is expanding their technology integration efforts, school leaders currently lack a data-driven, systematic approach to examining their own technology leadership practices in order to plan for, implement, and sustain their school's 1-to-1 programs in the context of continuous improvement. While the *School Technology Leadership Assessment* may address this need, the findings from this study suggest that barriers exist to adoption of the assessment in its current state. Specifically, findings advise the need to reduce the overall length, to refine the content by using more succinct, "practitioner friendly" language, to include a "does not apply" answer option, and to enhance technical functionality.

The feedback provided by the teachers and administrators in these focus groups, together with the survey comments, offers valuable perspective on the practical use of the instrument by educators in a school environment. While I acknowledge that this feedback should be considered in relation to the broader literature around web surveys and best practices in survey design, the findings obtained in this case study offers important insights into the participants' perspectives. As

such, I respectfully request that you consider this participant feedback as you continue in the instrument validation processes and in future modifications of the instrument.

Finally, I would like to offer a personal perspective on references to the instrument. Throughout my research, based on the design and delivery mechanism of the instrument, I found myself using the words "survey" and "assessment" interchangeably when referring to the *School Technology Leadership Assessment* with study participants*.* Perhaps as a consequence, members of both focus groups framed their experiences with the *School Technology Leadership Assessment* in relation to their prior survey-taking experiences. My sense is that if participants approached the *School Technology Leadership Assessment* as "another survey," it felt oppressive and cumbersome in comparison to previous surveys that were shorter and required less concentration. Given that this instrument is more "assessment-like" than "survey-like" based on the depth of the questions and nuanced wording, it may be helpful to work with leaders and staff members to avoid the use of the word "survey" when framing its use with participants.

REFERENCES

Anderson, R. E., & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly*, *41*(1), 49-82.

Anderson, S., & Kumari, R. (2009). Continuous improvement in schools: Understanding the practice. *International Journal of Educational Development, 2009,* 281-292.

Auerbach, C.F., & Silverstein, L.B. (2003). *Qualitative data: An introduction to coding and analysis*. New York: New York University Press.

Barnett, K., & McCormick, J. (2003). Vision, relationships and teacher motivation: A case study. *Journal of Educational Administration, 41*(1), 55-73.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559.

Becker, H., & Anderson, R. (1998). *Teaching, learning and computing survey.* Retrieved from http://www.crito.uci.edu/tlc/html/tlc_home.html on November 11, 2013.

Berkowitz, S. (1997). Analyzing qualitative data. In J. Frechtling, L. Sharp, and Westat (Eds.), *User-friendly handbook for mixed method evaluations* (Chapter 4). Retrieved from

http://www.nsf.gov/pubs/1997/nsf97153/chap_4.htm on February 24, 2014.

Blankenship, B. & Petersen, P.B. (1999) W. Edwards Deming's mentor and others who made a significant impact on his views during the 1920s and 1930s. *Journal of Management History (Archive)*, *5*(8), 454-467.

Bryk, A.S. (2009). Support a science of performance improvement. *Phi Delta Kappan, 90*(8), 597-600.

Bryk, A.S., Gomez L.M., & Grunow A. (2010). *Getting Ideas Into Action: Building Networked Improvement Communities in Education*. Carnegie Foundation for the Advancement of Teaching. Stanford, CA. Retrieved from http://www.carnegiefoundation.org/spotlight/webinar-bryk-gomez-building-networkedimprovement-communities-in-education.

Carnegie Foundation for the Advancement of Teaching. (2013). Retrieved from http://www.carnegiefoundation.org/improvement-research/approach.

Chicquette, L.J. (2010). *The design and implementation of an effective continuous school improvement process* (Doctoral dissertation). Retrieved from ProQuest at http://search.proquest.com/docview/828353307?accountid=14678 (Order No. 3438130).

Christensen, C. M., Horn, M. B., & Johnson, C. W. (2008). *Disrupting class: How disruptive innovation will change the way the world learns.* New York: McGraw-Hill.

Copland, M.A. (2003). Leadership of inquiry: Building and sustaining capacity for

school improvement. *Educational Evaluation and Policy Analysis*, *25*(4), 375-395.

Corden, A., & Sainsbury, R. (2006). *Using verbatim quotations in reporting qualitative social research: researchers' views*. University of York. 11-14. Retrieved from http://www.sjsu.edu/people/rachel.omalley/courses/methods/s6/corden%20verbatim%20quotations%202006.pdf.

Davies, P.M. (2010). On school educational technology leadership. *Management in Education*, *24*(2), 55-61.

Dawson, C., & Rakes, G. C. (2003). The influence of principals' technology training on the integration of technology into schools. *Journal of Research on Technology in Education*, *36*(1), 29-49.

Dedoose Version 4.12. (2013) [web application for managing, analyzing, and presenting qualitative and mixed method research data]. Los Angeles, CA: SocioCultural Research Consultants, LLC (www.dedoose.com).

Deming, W. E. (1986). Out of the crisis. *Center for Advanced Engineering Study*. Cambridge, MA: Massachusetts Institute of Technology.

Deming, W. E. (1993). The new economics. *Center for Advanced Engineering Study.* Cambridge, MA: Massachusetts Institute of Technology.

Detert, J.R., Schroeder, R.G., & Cudeck, R. (2003). The measurement of quality management culture in schools: development and validation of the SQMCS. *Journal of Operations Management, 2003,* 307-328.

Dexter, S. (2011). School technology leadership: Artifacts in systems of practice.

Journal of School Leadership, *21*(2), 166-189.

Dexter, S., Seashore Louis, K., & Anderson, R.E. (2009). The roles and practices of specialists in teamed instructional leadership. *Journal of School Leadership, 19*(4), 445-465.

Duke, D.L. (2010). *The challenges of school district leadership.* New York: Routledge.

Duke, D., & Stiggins, R. (2008). Effective instructional leadership requires assessment leadership. *Phi Delta Kappan*, *90*(4), 285-291.

Dunleavy, M., Dexter, S., & Heinecke, W.F. (2007). What added value does a 1:1 student to laptop ratio bring to technology-supported teaching and learning? *Journal of Computer Assisted Learning*, *23*, 440–452. doi: 10.1111/j.1365-2729.2007.00227.

Dweck, C. S. (2006). *Mindset: The new psychology of success.* New York: Random House.

Eaker, R.E., DuFour, R., & DuFour, R.B. (2002). *Getting started: Reculturing schools to become professional learning communities*. Bloomington, IN: National Educational Service.

Flanagan, L., & Jacobsen, M. (2003). Technology leadership for the twenty-first century principal. *Journal of Educational Administration*, *41*(2), 124-142.

Fleischer, H. (2012). What is our current understanding of one-to-one computer projects: A systematic narrative research review. *Educational Research Review, 7*(2), 107-122.

Frank, K., Zhao, Y., & Borman, K. (2004). Social capital and the diffusion of

innovations within organizations: Application to the implementation of computer technology in schools. *Sociology of Education, 77*(2), 148-171.

Goldring, E., Cravens, X.C., Murphy, J., Porter, A.C., Elliott, S.N., & Carson, B. (2009). The evaluation of principals: What and how do states and urban districts assess leadership? *The Elementary School Journal*, *110*(1), 19-39.

Goldring,E., Porter, A., Murphy, J., Elliott, S., & Cravens, X. (2009). Assessing learning-centered leadership: Connections to research, professional standards, and current practices. *Leadership and Policy in Schools, 8*, 1-36.

Gray, L., Thomas, N., & Lewis, L. (2010). *Educational technology in U.S. public schools: Fall 2008* (NCES 2010– 034). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Greaves, T., Hayes, J., Wilson, L. Gielniak, M., & Peterson, R. (2010). *The technology factor: Nine keys to student achievement and cost-effectiveness*. Shelton, CT: Market Data Retrieval. Retrieved from http://pearsonfoundation.org/downloads/ProjectRED_TheTechnolgyFactor.pdf on November 18, 2013.

Halverson, R. (2005). Rubrics. Retrieved from http://website.education.wisc.edu/halverson/wp-content/uploads/2012/09/CALL-Rubrics.pdf on March 11, 2013.

Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching*

in every school. New York: Teachers College Press.

Hollingsworth, M., & Mrazek, R. (2004). *Information technology leadership in education: An Alberta needs assessment*. Learning and Technology Research, Stakeholder Technology Branch, Edmonton, Alberta: Alberta Learning.

Honig, M.I. (2001). Building policy from practice: District central office administrators' role and capacity for implementing collaborative education policy. *Educational Administration Quarterly, 39*(3), 292-338.

Hoy, W.K., & Tarter, C.J. (2008). *Administrators solving the problems of practice (3rd ed.).* Boston, MA: Pearson/Allyn and Bacon.

International Society for Technology in Education (ISTE). (2009). *NET*S for administrators.* Retrieved from http://www.iste.org/docs/pdfs/nets-a-standards.pdf?sfvrsn=2.

Kaiser K. (2009). Protecting respondent confidentiality in qualitative research. *Qualitative Health Research*, *19*(11), 1632–1641. doi: 10.1177/1049732309350879.

Kaplowitz, M.D., Lupi, F., Couper, M.P., & Thorp, L. (2012). The effect of invitation design on web survey response rates. *Social Science Computer Review*, *30*(3), 339-349.

Kelley, C., & Halverson, R. (2012). The comprehensive assessment of leadership for learning: A next generation formative evaluation and feedback system. *Journal of Applied Research on Children: Informing Policy for Children at Risk*, *3*(2), 4.

Lai, K., & Pratt, K. (2004). Information and communication technology (ICT) in secondary schools: the role of the computer coordinator. *British Journal of Educational Technology*, *35*(4), 461–475. doi: 10.1111/j.0007-1013.2004.00404.x

Leana, C. R. (2011). The missing link in school reform. *Stanford Social Innovation Review, 9*(4), 1-11.

Leithwood, K. (2012). The Ontario leadership framework 2012. Retrieved on from http://iel.immix.ca/storage/6/1360068388/Final_Research_Report_-_EN_REV_Feb_4_2013.pdf.

Leithwood, K. (2013). The Ontario leadership framework: A school and system leader's guide to putting Ontario's leadership framework into action. Retrieved from

http://iel.immix.ca/storage/6/1380680840/OLF_User_Guide_FINAL.pdf.

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

Leithwood, K., & Jantzi, D. (1999). The effects of transformational leadership on organizational conditions and student engagement with school. *Journal of Educational Administration. 38*(2), 112-129.

Leithwood, K., & Jantzi, D. (2005). A review of transformational school leadership research 1996-2005. *Leadership and Policy in Schools. 4*(3), 177-199.

Leithwood, K., Patten, S., & Jantzi, D. (2010). Testing a conception of how school leadership influences student learning. *Educational Administration*

Quarterly, *46*(5), 671-706.

Leithwood, K., Seashore Louis, K., Anderson, S., & Wahlstrom, K. (2004). A review of research: How leadership influences student learning. Retrieved from http://www.wallacefoundation.org/knowledge-center/school-leadership/key-research/Documents/How-Leadership-Influences-Student-Learning.pdf on November 18, 2013.

Leithwood, K., & Steinbach, R. (1995). *Expert problem solving.* New York: SUNY Press.

Louis, K.S., Leithwood, K., Wahlstrom, K., & Anderson, S. (2010). Learning from leadership: Investigating the links to improved student learning. *Final report of research to the Wallace Foundation.* University of Minnesota-University of Toronto: The Wallace Foundation. Retrieved from http://www.wallacefoundation.org/knowledge-center/school-leadership/key-research/Pages/Investigating-the-Links-to-Improved-Student-Learning.aspx on February 27, 2014.

Mcleod, S., & Richardson, J. W. (2011). The dearth of technology leadership coverage. *Journal of School Leadership*, *21*(2), 216-240.

Metiri Group. (n.d.). *Digital readiness survey.* Retrieved from http://plan4progress.org/tool/self-assessment/ on March 14, 2014.

Mirvis, P., Googins, B., & Kinnicutt, S. (2010). Vision, mission, values: Guideposts to sustainability. *Organizational Dynamics*, *39*(4), 316-324.

Moen, R. D., & Norman, C. L. (2010). Circling back. *Quality Progress*, *43*(11), 22-28.

Moersch, C. (1995). Levels of technology implementation (LoTi): A framework for measuring classroom technology use. *Learning and Leading with Technology*, *23*, 40-40.

National Institute of Standards and Technology (NIST): Baldrige Performance Excellence Program. (2013). *Education criteria for performance excellence.* Retrieved from http://www.nist.gov/baldrige/publications/education_criteria.cfm on March 17, 2014.

Ng Wee, L. (2008). Transformational leadership and the integration of information and communication technology into teaching. *Asia-Pacific Education Researcher, 17*(1), 1-14.

Odden, A. (2011). *Strategic management of human capital in education: Improving instruction and student learning in schools*. New York: Taylor & Francis.

Park, S., Hironaka, S., Carver, P., & Nordstrum, L. (2013). *Continuous improvement in education* (White paper)*.* Carnegie Foundation for the Advancement of Teaching. Stanford, CA. Retrieved from http://www.carnegiefoundation.org/elibrary/continuous-improvement-in-education.

Partnership for 21st Century Skills (P21). (2013). MILE guide: Self assessment tool. Retrieved from http://www.p21.org/our-work/resources/for-educators on November 18, 2013.

Penuel, W.R. (2006). Implementation and effects of one-to-one computing

initiatives: A research synthesis. *Journal of Research on Technology in Education*, *38*(3), 329-348.

Porter, S. R., Whitcomb, M. E., & Weitzer, W. H. (2004). Multiple surveys of students and survey fatigue. *New Directions for Institutional Research*, *2004*(121), 63-73.

Remler, D.K., & Van Ryzin, G.G. (2011). *Research methods in practice: Strategies for description and causation*. Thousand Oaks, CA: Sage.

Reynolds, A., Anderson, E., Whiteman, R.S., Crow, G. M., Orr, M.T., Tucker, P.D., Reed, C., Pounder, D.G., & Mawhinney, H. (2013, November). Slide presentation. In M.D. Young (Chair), *What is the research base for the standards (e.g., ELCC and UCEA) that guide UCEA program content and features?* Symposium conducted at the meeting of University Council for Educational Administration 2013 Convention in Indianapolis, IN.

Richardson, J.W., Bathon, J., Flora, K.L., & Lewis, W.D. (2012). NETS*A scholarship: A review of published literature. *Journal of Research on Technology In Education*, *45*(2), 131-151.

Richardson, J.W., McLeod, S., Flora, K., Sauers, N.J., Kannan, S., & Sincar, M. (2013). Large-scale 1:1 computing initiatives: An open access database. *International Journal of Education & Development Using Information & Communication Technology*, *9*(1), 4-18.

Roberts, C.M. (2010). *The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation.* 2nd ed. Thousand Oaks, CA: Corwin.

Ronnkvist, A., Dexter, S., & Anderson, R. (2000). *Technology support: Its depth, breadth, and impact on America's schools: Teaching, learning, and computing 1998 survey (Report No. 5).* Irvine, CA: Center for Research on Information, Technology, and Organizations. Retrieved from http://www.crito.uci.edu/tlc/findings/technology-support/ .

Ryan, K., Gannon-Slater, N., & Culbertson, M.J. (2012). Improving survey methods with cognitive interviews in small- and medium-scale evaluations. *American Journal of Evaluation*, *33*(3), 414-430.

Saldaña, J. (2009). *The coding manual for qualitative researchers.* Thousand Oaks, CA: Sage.

Sauers, N., & McLeod, S. (2011). What does the research say about school one-to-one computing initiatives. *Castle Brief–UCEA Center for the Advanced Study of Technology Leadership in Education*. Retrieved from http://schooltechleadership.org/wordpress/wp-content/uploads/2012/06/CASTLEBrief01_LaptopPrograms.pdf.

Scheufele, D.A. (2000). Agenda-setting, priming, and framing revisited: Another look at cognitive effects of political communication. *Mass Communication & Society*, 3(2/3), 297.

Schiller, J. (2002). Interventions by school leaders in effective implementation of information and communications technology: Perceptions of Australian principals. *Technology, Pedagogy, and Education, 11*(3), 289-301.

Schmoker, M., & Wilson, R. (1993). Transforming schools through total quality education. *The Phi Delta Kappan, 74*(5), 389-395.

Schrum, L., Galizio, L., & Ledesma, P. (2011). Educational leadership and technology integration: An investigation into preparation, experiences, and roles. *Journal of School Leadership*, *21*(2), 241-260.

Schwarz, N. (2007). Cognitive aspects of survey methodology. *Applied Cognitive Psychology*, *21*(2), 277-287.

Shewhart, W.A. (1939). *Statistical method from the viewpoint of quality control.* W. E. Deming (Ed.). Washington, D.C.: The Graduate School, The Department of Agriculture.

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

Spillane, J.P., Halverson, R., & Diamond, J.B. (2004). Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies, 36*(1), 3-34. doi:10.1080/0022027032000106726.

Sutherland, S. (2004). Creating a culture of data use for continuous improvement: A case study of an Edison Project school. *American Journal of Evaluation*, *25*(3), 277-293. doi:10.1177/109821400402500302.

Tan, S.C. (2010). School technology leadership: Lessons from empirical research. In C.H. Steel, M.J. Keppell, P. Gerbic & S. Housego (Eds.), *Curriculum, technology & transformation for an unknown future. Proceedings Ascilite Sydney 2010,* 896-906. Retrieved from http://ascilite.org.au/conferences/sydney10/procs/Seng-chee-tan-full.pdf

Tondeur, J., Devos, G., Van Houtte, M., Van Braak, J., & Valcke, M. (2009).

Understanding structural and cultural school characteristics in the relation to educational change: The case of ICT Integration. *Educational Studies, 35*(2), 223-235.

Tourangeau, R. (2003). Cognitive aspects of survey measurement and mismeasurement. *International Journal of Public Opinion Research*, *15*(1), 3-7*.*

Tourangeau, R., & Ye, C. (2009). The framing of the survey request and panel attrition. *Public Opinion Quarterly*, *73*(2), 338-348.

Umbach, P.D. (2004), Web surveys: Best practices. *New Directions for Institutional Research*, *2004*(121), 23–38. doi: 10.1002/ir.98.

U.S. Department of Education, Office of Educational Technology. (2010). *Transforming American education: Learning powered by technology – National education technology plan 2010.* Washington, D.C. Retrieved from http://www.ed.gov/sites/default/files/netp2010.pdf.

Wallace Foundation. (2009). *Assessing the effectiveness of school leaders: New directions and new processes.* Retrieved from http://www.wallacefoundation.org/knowledge-center/school-leadership/principal-evaluation/Documents/Assessing-the-Effectiveness-of-School-Leaders.pdf.

UCEA Center for the Advanced Study of Technology Leadership in Schools. (2005). Principals technology leadership assessment. Retrieved from http://schooltechleadership.org/wordpress/wp-content/uploads/2010/02/ptla_info_packet.pdf on September 11, 2013.

Yee, D. (2000). Images of school principals' information and communications technology leadership. *Technology, Pedagogy, and Education, 9*(3), 287-302.

Yin, R.K. (2014). *Case study research: Design and methods (5th ed.).* Thousand Oaks, CA: Sage.

Zhao, Y. & Frank, K.A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal, 40*(4), 807-840.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J.L. (2002). Conditions for classroom technology innovations. *Teachers College Record, 104*(3), 482-515.

Zucker, A., & McGhee, R. (2005). A study of one-to-one computer use in mathematics and science instruction at the secondary level in Henrico County Public Schools. *SRI International. SRI Project.*

Appendix A

Sample Extracted from Howard Valley School District -School Improvement Plan Template

PLANNING
One Student-Centered Strategic Goal
Board Priority(ies)
SIP Goal:
SIP Goal Objective (SMART - Specific/Strategic, Measurable, Attainable, Results-Oriented, Timebound):
Supporting Data / Gap Evidence:

Anticipated Obstacles:

Professional Development – *Please provide an overview of how you will develop, institute, and evaluate the professional development needed to support this work.*

PLANNING & DOING	STUDYING & ACTING			
Key Strategies and Qualitative Progress Indicators ***What strategies are you implementing to accomplish your goal and objective?***	**Q1 Progress on Strategies** *What progress has been made on your strategies?*	**Q2 Progress on Strategies** *What progress has been made on your strategies?*	**Q3 Progress on Strategies** *What progress has been made on your strategies?*	**Q4 Progress on Strategies & EOY Reflections** *What progress has been made on your strategies?*
1.				
2.				
3.				

4.				
PLANNING & DOING	**STUDYING & ACTING**			
Measurable Quantitative Indicators *What measure/data (ex. discipline data) will you use indicating progress towards your SIP Goal?*	**Q1 KPI Data** *What does the data say about your progress so far?*	**Q2 KPI Data** *What does the data say about your progress so far?*	**Q3 KPI Data** *What does the data say about your progress so far?*	**Q4/EOY KPI Data** *What does the data say about your progress so far?*
1.				
2.				

Appendix B

Sample Questions from School Technology Leadership Assessment

Domain One: Setting Directions
1.1 Identifying and Articulating a Shared Vision

1. What is the main goal of your school's technology plan or policy?

a) We do not have a technology plan (skip next question)
b) To prevent abuses of technology, such as limiting internet access or the use of cell phones or other mobile devices
c) To promote administrative uses of technology, such as record-keeping or data storage
d) To bring technology such as computers and interactive white boards to the classroom
e) To build teacher capacity to use technology in the classroom to support student learning
f) To engage student interest in technology through gaming, social networking, or new media to promote learning

2. What are the main teaching practices your school's technology plan or policy is trying to promote?

a) Our technology plan does not address teaching practices
b) Our technology plan promotes teachers becoming familiar with a limited number of technology devices
c) Our technology plan promotes students becoming familiar with a limited number of technology devices through calling for outcomes that measure student and teacher use
d) Our technology plan calls for teachers to utilize technology in order to support student learning
e) Our technology plan/policy promotes teaching practices in which the teacher encourages active student engagement with a variety of technology resources and facilitates lessons where students are engaged in higher order learning activities that may not have been possible without the use of technology

School leaders often have multiple responsibilities and tasks to manage at once. Based on your experience, how important is each of the following tasks to leaders in your school?

	Not at all	A little	Somewhat	Very	Extremely
3. Setting a clear vision for using technology to support teaching and learning.	a.	b.	c.	d.	e.
4. Connecting the vision to the best teaching and learning practices for our school context.	a.	b.	c.	d.	e.

For more information about the *School Technology Leadership Assessment,* please contact CANLEAD Project Director, Dr. Sara Dexter (sdexter@virginia.edu).

Appendix C

School Technology Leadership Assessment

Sample Results Rubric Report

Directions: Identifying and Articulating a Shared Vision

What is your main area of work in your school?	○ Teacher ○ Administrator ○ Other
What is the main goal of your school's technology plan or policy?	○ We do not have a technology plan. (skip next question) ○ To prevent abuses of technology, such as limiting internet access or the use of cell phones or other mobile devices. ○ To promote administrative uses of technology, such as record-keeping or data storage. ○ To bring technology such as computers and interactive white boards to the classroom. ○ To build teacher capacity to use technology in the classroom to support student learning. ○ To engage student interest in technology through gaming, social networking, or new media to promote learning.
What are the main teaching practices your school's technology plan or policy is trying to promote?	○ Our technology plan does not address teaching practices. ○ Our technology plan promotes teachers becoming familiar with a limited number of technology devices. ○ Our technology plan promotes students becoming familiar with a limited number of technology devices through calling for outcomes that measure student and teacher use. ○ Our technology plan calls for teachers to utilize technology in order to support student learning. ○ Our technology plan/policy promotes teaching practices in which the teacher encourages active student engagement with a variety of technology resources and facilitates lessons where students are engaged in higher order learning activities that may not have been possible without the use of technology.

School leaders often have multiple responsibilities and tasks to manage at once. Based on your experience, how important is each of the following tasks to leaders in your school?

Setting a clear vision for using technology to support teaching and learning.	0.0 Not at all	1.0 A little	2.0 Somewhat	3.0 Very	4.0 Extremely
Connecting the vision to the best teaching and learning practices for our school context.	0.0 Not at all	1.0 A little	2.0 Somewhat	3.0 Very	4.0 Extremely

Purpose

The School Technology Leadership Assessment (STLA) is a survey and feedback report designed to gather input on the state of those technology leadership practices in a school that impact organizational conditions for technology-supported teaching and learning. The results of the STLA are intended to help school technology leaders create the conditions necessary for teachers and students to be successful in technology-supported teaching and learning.

Teachers and school leaders within each participating school provide feedback about school technology leadership practices in their school by responding to an online survey.
The STLA questions and corresponding results are organized into three research-based domains of leadership practices that include:

1. *Setting Directions*
2. *Building Relationships and Developing People*
3. *Developing the Organization to Support Desired Practices*

These domains of leadership practices are further divided into eleven dimensions. The STLA Results Rubric Report indicates the school's aggregated survey results in each of the 11 dimensions of leadership practices based on a three level rubric ranging from *emerging* to *proficient* to *exemplary*. Your school's aggregated results are indicated in **bold font** on the pages that follow. By presenting the school's results in this format, the rubric report provides leaders with information on how to grow in each leadership dimension.

School Quick Facts

Audience – Survey invitations were sent to teachers and leaders involved in the 1-to-1 program
Dates of data collection – 1/16/2014 to 1/21/2014
Percentage of respondents – XX% (XX out of XX)
Respondents by self-reported role
- o   Teacher – X
- o   Administrator – X
- o   Other - X

Sample STLA Results Rubric Report

Domain 1 - Setting Directions

The *Setting Directions* domain includes understanding that a sense of purpose, and the extent to which it is shared, stimulates the work of teachers to benefit students.

1.1 Identifying and Articulating a Shared Vision

Putting forth efforts to establish a vision and directions that embody the best thinking about teaching and learning, which gives the organization a shared sense of purpose that inspires commitment.

Emerging	Proficient	Exemplary
The school lacks a clear, shared vision for technology integration. The school does not have a technology plan/policy OR the goal of the technology plan/policy is to limit access and prevent abuses of technology. The school's technology plan/policy does not promote best practices for teaching and learning. School leaders have not connected the vision for technology integration to best practices for teaching and learning.	The school has a vision for technology integration. The goal of the school's technology plan/policy includes promoting administrative uses of technology and bringing technology into the classroom. The school's technology plan/policy promotes the integration of technology into teaching and learning practices. School leaders have somewhat connected the vision for technology integration to best practices for teaching and learning.	The school has a clear, shared vision for technology integration. The goal of the school's technology plan/policy is to build teacher capacity to support student learning and to promote student engagement. The school's technology plan/policy promotes best practices for teaching and learning in which the teacher fosters active student engagement using a variety of technology resources. School leaders demonstrate the importance of setting a clear vision for technology integration and effectively connect the vision to best practices for teaching and learning which gives the organization a shared sense of purpose that inspires commitment.

Sample STLA Results Rubric Report

1.2 Identifying Shared and Specific Short-Term Goals Aligned with the Larger Vision

Fostering clear, whole-group understanding and acceptance of goals to promote unified actions through teacher involvement in the determination of the goals.

Emerging	Proficient	Exemplary
School leaders rarely or never discuss any vision for the use of technology to support teaching and learning with teachers. There is minimal or no effort on the part of school leaders to create a common understanding of the vision, to build teacher acceptance, or to promote unified actions in support of the vision for using of technology to support teaching and learning. Teachers do not typically talk about using technology or, if they do, they lack a shared understanding of the effective use of technology.	School leaders promote the school's vision for the use of technology to support teaching and learning in interactions with teachers such as faculty meetings and subject area meetings. School leaders attempt to create a common understanding of the vision, to build teacher acceptance, and to promote unified actions in the use of technology to support teaching and learning. Teachers have developed shared understanding and acceptance of the effective use of technology within subject/specialty areas.	School leaders promote the school's vision for the use of technology to support teaching and learning in interactions with teachers such as faculty meetings and during subject area meetings. School leaders have successfully fostered a common understanding of the vision among teachers. Leaders have built teacher acceptance of the vision. They promote unified actions among teachers in the use of technology to support teaching and learning. Teachers have fully developed a shared understanding and acceptance of and unified actions toward the effective use of technology within subject/specialty areas.

1.3 Creating High Performance Expectations and Means for Monitoring Performance

Helping faculty to think analytically and critically about where the school is and where it seeks to be, and setting performance expectations for students or staff. Establishing indicators of progress and then assessing based on those indicators.

Emerging	Proficient	Exemplary
There is no formal action plan or School Improvement Plan (SIP) related to the use of technology to support teaching and learning. Data are not used to help departments of teachers think analytically and critically about where the school is and where it seeks to be in the use of technology to support student learning. School leaders rarely hold teachers accountable for using technology effectively in teaching and learning. School leaders seldom analyze data related to the use of technology for school improvement purposes. School leaders rarely assess teachers' understanding of professional development offerings in order to form strategies for teacher development in the use of technology to support teaching and learning. The primary source	A formal action plan or School Improvement Plan (SIP) related to the use of technology to support teaching and learning is developed and followed. The plan incorporates the use of data to help departments of teachers think analytically and critically about where the school is and where it seeks to be and to guide actions and decisions. School leaders hold teachers accountable for using technology effectively in teaching and learning. They analyze data related to the use of technology for school improvement purposes. School leaders periodically assess teachers' understanding of professional development offerings. This is done through observed levels of staff engagement, teacher satisfaction surveys, and/or observed changes in teaching practices in	A formal action plan or School Improvement Plan (SIP) related to the use of technology to support teaching and learning is developed, actively followed, and is improving student learning through the use of technology. The plan incorporates the use of data to help departments of teachers think analytically and critically about where the school is and where it seeks to be and to guide actions and decisions that are improving student learning. School leaders regularly hold teachers accountable for using technology effectively in teaching and learning. The analysis of data related to the use of technology for school improvement purposes is extremely important. School leaders regularly assess teachers' understanding of professional development offerings. This is

Sample STLA Results Rubric Report

of evidence, if used, is the school leaders' observations of staff engagement during professional development activities.	order to form strategies for teacher development in the use of technology to support teaching and learning.	done through observed levels of staff engagement; teacher satisfaction surveys observed changes in teaching practices and changes in student learning in order to form strategies for teacher development in the use of technology to support teaching and learning.

1.4 Communicating the Vision and Goals

Communicating to stakeholders using intentional strategies (e.g. in person, email, publications, information sessions). Seeking to establish a flow of information among school stakeholders (internal and/or external) to inform parties about various activities, goals, initiatives, and perspectives that are relevant to the attainment of the mission, vision, and goals.

Emerging	Proficient	Exemplary
School leaders rarely or never engage teachers, teacher teams, or others in the school community in conversations about goals for the use of technology to support teaching and learning. If they do talk with people about the role of technology in teaching and learning, school leaders limit their discussions to the activities related to using technology.	School leaders engage teachers, teacher teams, and others in the school community in conversations about goals for the use of technology to support teaching and learning. They talk with people about the role of technology in teaching and learning and discuss activities, goals, and perspectives related to the use of technology to support teaching and learning.	School leaders regularly engage teachers, teacher teams, and others in the school community in monthly conversations about goals for the use of technology to support teaching and learning. They talk with people about the role of technology in teaching and learning and discuss activities, goals, perspectives, and results related to the use of technology to support teaching and learning.

Domain 2 - Building Relationships and Developing People

The *Building Relationships and Developing People* domain is marked by emotionally intelligent leadership practices that address not only the structures of the organization but also take into consideration teachers' individual needs through personalized attention.

2.1 Providing Support and Demonstrating Consideration for Individual Staff Members

Attempting to harness as much of the professional expertise and strength that each individual teacher possesses to enhance the collective expertise of the school by maintaining close working relationships with teachers, demonstrating concern and respect for teachers as individuals within and outside of school—particularly as it relates to change, and continually considering how individual strengths can be aligned with positive outcomes for the school and individual needs for growth can be addressed.

Emerging	Proficient	Exemplary
School leaders rarely or never demonstrate the importance of working individually with teachers to help them use technology to support teaching and learning. They rarely or never attempt to harness the expertise and strengths of individual teachers to support positive technology-related outcomes for the school. Formal professional development plans to help individual teachers use technology for teaching and learning are not yet in place. If present at all, classroom observations and follow-up meetings between school leaders and individual teachers are ineffective in helping teachers improve their use of technology. School leaders or instructional coaches rarely or never return to the classroom to see how well teachers have followed recommendations for improving the use of technology to support teaching and learning.	School leaders demonstrate the importance of working individually with teachers to help them use technology to support teaching and learning. School leaders do attempt to harness expertise and strengths of individual teachers to support positive technology-related outcomes for the school. Formal professional development plans to help individual teachers use technology for teaching and learning are in place and actively followed. Classroom observations and follow-up meetings between school leaders and individual teachers result in some improvements in teachers' use of technology to support teaching and learning. If requested, school leaders or instructional coaches return to the classroom to see how well teachers have followed recommendations for improving the use of technology to support teaching and learning.	School leaders demonstrate the very high importance of working individually with teachers to help them use technology to support teaching and learning, and they attempt to harness as much of the expertise and strengths that each individual teacher possesses to enhance the collective expertise of the school. Formal professional development plans to help individual teachers use technology for teaching and learning are in place, actively followed, and improve the use of technology to support student learning. Classroom observations and follow-up meetings between leaders and individual teachers result in significant improvements in teachers' use of technology to support teaching and learning. School leaders or instructional coaches routinely return to the classroom to see how well teachers have followed recommendations for improving the use of technology to support teaching and learning.

Sample STLA Results Rubric Report

2.2 Stimulating Growth in the Professional Capacities of Staff
Enabling faculty to gain skills and knowledge aligned with advancing desired outcomes through formal, informal, and independent modes, which are characterized by adult learning theory, to include features such as self- and group- constructed, technology-supported, socially situated, and job embedded.

Emerging	Proficient	Exemplary
School leaders rarely or never demonstrate the importance of developing the expertise of teachers. They seldom hire or train specialists to support effective technology use in the classroom. Teachers are left on their own to look for ideas and resources. Formal department-wide professional development plans to help teachers use technology are not yet in place. Collaborative processes are not yet developed. Professional learning has little or no impact on the use of technology to support teaching practices.	School leaders demonstrate the importance of developing the expertise of teacher leaders and others. They may hire and/or train specialists to support effective technology use in the classroom. School leaders provide teachers with resources to develop their expertise. School leaders work to connect teachers to relevant ideas for improving instruction or to professional networks. Department-wide professional development for technology integration reflects the instructional goals of the school and needs for teacher learning. Professional development may be designed and delivered using the expertise of teachers. Formal department-wide professional development plans to help teachers use technology are developed and actively used. Collaborative processes to help teachers meet department-wide goals are developed and followed. Professional learning allows teachers to reflect and make some improvements in their technology-supported practices.	School leaders demonstrate the very high importance of developing teacher leaders and others by regularly providing them with dedicated resources and access to specialists or others to support effective technology use in the classroom. School leaders work to connect teachers to relevant ideas for improving instruction and to professional networks and they dedicate school resources to addressing teacher learning needs. Department-wide professional development for technology integration reflects the instructional goals of the school and is differentiated to address the various learning needs of teachers. Professional development is designed and delivered using the expertise of teachers. Formal department-wide professional development plans to help teachers use technology are developed, actively used, and improve technology-supported student learning. They support teachers' understanding of how multiple representations aid student learning. Collaborative processes to help teachers meet department-wide goals are developed, actively followed, and support teachers' understanding of how multiple representations aid student learning. Professional learning allows teachers to reflect and make significant improvements in their technology-supported practices.

Sample STLA Results Rubric Report

2.3 Modeling the School's Values and Practices
Paying attention to leading by example, in a manner that is marked by authenticity and visibility, with the intent to influence by demonstrating behaviors and attitudes aligned with the school's values and goals.

Emerging	Proficient	Exemplary
School leaders rarely participate in team-level professional learning activities about using technology to support teaching and learning. They rarely or never emphasize the importance of technology integration through their actions or in conversations with individual teachers, teams of teachers, faculty meetings, or meetings with parents and external stakeholders.	School leaders regularly attend team-level professional learning activities about using technology to support teaching and learning. They are known to emphasize the importance of technology integration through their actions or in conversations with individual teachers, teams of teachers, faculty meetings, or meetings with parents and external stakeholders.	School leaders regularly attend and productively participate in team-level professional learning activities about using technology to support teaching and learning. They regularly emphasize the importance of technology integration through their actions and in conversations with stakeholders in all environments including interactions with individual teachers, teams of teachers, faculty meetings, or meetings with parents and external stakeholders.

Domain 3 - Developing the Organization to Support Desired Practices
This domain deals with establishing working conditions that allow teachers to make the most of their motivation and capacity to work towards the improvement agenda indicated in the *Setting Directions* domain*.*

3.1 Building Collaborative Cultures and Distributing Leadership
Fostering culture to include shared norms or values, or mutual trust internal to the school organization, all of which contributes to the teachers' sense of goals and how they will be achieved.

Emerging	Proficient	Exemplary
School leaders rarely or never foster opportunities for teachers to collaborate on the creation of plans to improve technology-supported teaching practices. Teachers create plans on their own without input from others or there are no formal planning processes. [Teachers rarely or never work together on curriculum writing and mapping activities; If present, these activities have little or no impact on improving the use of technology to support teaching and learning in the school.] If leaders do give teachers opportunities to meet together, teachers use the time for their own purposes. Discussions between teachers rarely, if ever, focus on the use of technology to support teaching and learning. If ideas about technology are discussed, they are focused on managing student behavior. Leaders discourage teachers from trying new uses of technology to support their practices. Teachers and staff do not participate in decision making related to technology resources or technology-supported instruction. Teachers and staff do not know how and why technology-related decisions are made. School leaders may not introduce significant changes related to the use of technology that affect the classroom or, if they do, teachers and staff work against the changes.	School leaders foster opportunities for many teachers to collaborate on the creation of plans to improve technology-supported teaching practices. Teachers get together to discuss the use of technology to support teaching and learning. [Teachers may work together on curriculum writing and mapping activities, and these activities improve the use of technology to support teaching and student learning in the school.] When leaders give teachers opportunities to meet together about technology-supported teaching and learning, teachers use the time to talk about goals for student learning and may develop formal strategies. Their discussions include the use of student learning data. Leaders encourage teachers to try new uses of technology in their classroom and to share their experiences with others. Teachers and staff participate in some decision making related to technology resources and the use of technology to support instruction. There is clear communication among staff about how many of the technology-related decisions are made. Teachers and staff are likely indifferent about or generally supportive of changes related to the use of technology that affect the classroom.	School leaders foster school-wide opportunities for almost all teachers to collaborate on the creation of plans to improve technology-supported teaching practices. They frequently get together to discuss the use of technology to support teaching and learning. [Teachers regularly work together on curriculum writing and mapping activities, and these activities significantly improve the use of technology to support teaching and student learning in the school.] When leaders give teachers opportunities to meet together about technology-supported teaching and learning, teachers use the time to talk about goals for student learning and develop formal strategies with ongoing reflection on their effectiveness. Their discussions include the use of student learning data for improving technology-supported teaching practices. Leaders encourage teachers to try new uses of technology in their classroom and assign responsibility and provide resources for teachers to help shape the use of technology in their practices. Teachers and staff participate in most or all decision making related to technology resources and the use of technology to support instruction. Decision-making processes are fully transparent and there is clear communication among staff about how and why almost all technology-related decisions are made. Teachers and staff generally work with school leaders to make changes related to the use of technology that affect the classroom.

3.2 Structuring the Organization to Facilitate Collaboration

Furthering organizational vision by modifying or improving alignment of organizational structures such as appraising performance or allocating budget and resources, as well as organizing the use of time and space. Utilizing processes to gather input from multiple and diverse stakeholders/ staff within the school organization (e.g. teachers or another sub-section of stakeholders), for the purpose of making decisions and plans to improve organizational functioning.

Emerging	Proficient	Exemplary
Department meetings are primarily focused on upcoming events, student behavior, and school management. Expert teachers are not encouraged to mentor their colleagues in using technology or are not given time to do so. Formal processes for teachers to team-teach or observe other teachers using technology to support instruction have not yet been developed. Formal processes for teachers to work together to plan curricula for using technology to support instruction have not yet been developed.	Department meetings encompass a range of foci from events, student behavior, and school management to activities for team and culture-building. Department meetings sometimes include presentations about technology-supported instruction. Expert teachers are encouraged to mentor their colleagues in using technology to support instruction and are given time to do so. Formal processes for teachers to team-teach and observe other teachers using technology to support instruction have been developed and may be followed. Formal processes for teachers to work together to plan curricula for technology-supported instruction have been developed and may be followed.	Department meetings encompass a wide range of foci from events, student behavior, and school management to activities for team and culture-building. Department meetings include presentations about technology-supported instruction and opportunities for teachers to have sustained discussions about technology-supported instruction. Expert teachers are encouraged to mentor their colleagues in using technology to support instruction and are given time and resources to do so. Formal processes for teachers to team-teach, observe other teachers, and work together to plan curricula for using technology to support instruction have been developed, are actively followed, and improve the use of technology to support student learning.

3.3 Allocating Resources in Support of the School's Vision and Goals

Distributing resources of all types in ways that support vision and goal attainment, as well as overall improvement. Securing and sustaining adequate funding for the school's needs and budgeting that money with a sense of stewardship that is marked by continual reassessing and realignment based up strengths and areas for improvement.
Note: "Resources" include time, curriculum material, staff expertise.

Emerging	Proficient	Exemplary
Leaders rarely or never schedule time for teachers to discuss student work or strategies related to the use of technology to support instruction. They rarely or never schedule time for teachers to discuss formative assessments related to the use of technology. [Expert teachers and coaches are not assigned to work with teachers on using technology to support instruction. If they work with teachers, the decision to do so is based on convenience or availability and 25 percent or less	Leaders periodically schedule time for teachers to discuss student work made with technology. They periodically schedule time for teachers to discuss strategies related to the use of technology to support instruction. They periodically schedule time for teachers to discuss formative assessments related to the use of technology. [Expert teachers and coaches are assigned to work with teachers on using technology to support instruction based on their	Leaders schedule time for teachers to discuss student work made with technology at least monthly. They schedule time for teachers to discuss strategies related to the use of technology to support instruction at least monthly. They schedule time for teachers to discuss formative assessment related to the use of technology to support instruction at least monthly. [Expert teachers and coaches are encouraged to work with teachers on using technology to support

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of their work time is spent working directly with teachers in the school.] Leaders may acquire and allocate hardware/software resources with little or no regard to the school's vision or instructional goals, and they do not secure the resources needed to maintain, upgrade, and refresh them.	expertise. Up to 75 percent of the coaches' total work time is spent working directly with teachers in the school. They are assigned to work with new and/or struggling teachers.] Leaders acquire and allocate hardware/software resources based on the school's vision and instructional goals, and they secure and sustain the resources needed to maintain, upgrade, and refresh them.	instruction, and they are given the time and resources to do so. The majority of coaches' time, up to 100%, is spent working directly with teachers. They are assigned to work with all teachers to improve learning for all students.] Leaders acquire and allocate hardware/ software resources based on the school's vision and with the level of specificity needed to address content-level instructional goals. They secure and sustain the resources needed to maintain, upgrade, and refresh them.

3.4 Connecting the School with the Wider Environment

Networking with other school leaders, district personnel, and/or experts in policy or research to stay abreast of ongoing developments in best practices for reaching all learners.

Emerging	Proficient	Exemplary
There is no process to coordinate participation in professional conferences and organizations so teachers and administrators can find new ideas about using technology to support teaching and learning. Leaders in the school place little importance on networking with leaders and experts at other schools. Teachers are not encouraged to network with other professionals outside of their own school.	A process to support participation in professional conferences and organizations has been developed and is sometimes followed so teachers and administrators can find new ideas about using technology to support teaching and learning. Leaders in the school place importance on connecting the school with the wider environment and on networking with leaders and experts at other schools to stay abreast of ongoing developments in best practices. Teachers are sometimes encouraged to network with other professionals outside of their own school.	A process to support teacher and administrator participation in professional conferences and organizations has been developed, is actively followed, and improves the use of technology to support student learning. Leaders in the school place very high importance on connecting the school with the wider environment and on networking with leaders and experts at other schools to stay abreast of ongoing developments in best practices. Teachers are regularly encouraged to network with other professionals outside of their own school.

Sample STLA Results Rubric Report

Appendix D

PDSA Guiding Questions adapted from Howard Valley School District

PLAN
• What needs to be improved and what <u>specific</u> outcomes need to occur?
• What do we expect to change as a result of this improvement?
• What research, data, and/or current conditions support the need for this change?
• What strategic goal does this change support?
• Who will be impacted by this change and how? How will we engage stakeholders in the process? How will we communicate with them throughout the process?
• What human resources and financial resources may be needed in order to accomplish the improvement? What human resources and financial resources may be needed in order to sustain the improvement?
• When and how will we measure our progress in implementing this improvement? When and how will we evaluate the overall success of this change in achieving the expected outcomes?
• What are our enablers and constraints related to this change? How will we address them?

DO
• Have additional considerations arisen in the midst of implementation?
• Are we implementing with fidelity?

STUDY
• What has been accomplished at this point?
• What is the evidence of this?
• Are we progressing as anticipated based on original planning and forecasted changes? Why or why not?

ACT
• Does anything need to be modified at this point? (Adjust)
• Should we abandon the plan in light of new information? (Abandon)
• Have we achieved our intended outcomes and can these changes be integrated into other areas of the organization? (Adopt) If so, how?
• When will this be evaluated again and by whom?
• Are there additional considerations as we enter our next PDSA cycle?

Appendix E

List of CALL Leadership Domains/Sub-domains and School Technology Leadership Assessment

Domains/Dimensions

CALL Leadership Domains and Subdomains	School Technology Leadership Assessment Domains and Dimensions from the Ontario Leadership Framework
Domain 1.0 Focus on Learning • *Subdomain 1.1* Maintaining a School-Wide Focus on Learning • *Subdomain 1.2* Formal Leaders are Recognized as Instructional Leaders • *Subdomain 1.3* Collaborative Design of Integrated Learning Plan • *Subdomain 1.4* Providing Appropriate Services for Students who Traditionally Struggle	**Domain 1.0** Setting Directions • *Dimension 1.1* Identifying and Articulating a Shared Vision • *Dimension 1.2* Identifying Shared and Specific Short Term Goals Aligned with the Larger Vision • *Dimension 1.3* Creating High Performance Expectations and Means for Monitoring Performance • *Dimension 1.4* Communicating the Vision and Goals
Domain 2.0 Monitoring Teaching and Learning • *Subdomain 2.1* Formative Evaluation of Student Learning • *Subdomain 2.2* Summative Evaluation of Student Learning • *Subdomain 2.3* Formative Evaluation of Teaching • *Subdomain 2.4* Summative Evaluation of Teaching	**Domain 2.0** Building Relationships and Developing People • *Dimension 2.1* Providing Support and Demonstrating Consideration for Individual Staff Members • *Dimension 2.2* Stimulating Growth in the Professional Capacities of Staff • *Dimension 2.3* Modeling the School's Values and Practices
Domain 3.0 Building Nested Learning Communities • *Subdomain 3.1* Collaborative School-Wide Focus on Problems of Teaching and Learning • *Subdomain 3.2* Professional Learning	**Domain 3.0** Developing the Organization to Support Desired Practices • *Dimension 3.1* Building Collaborative Cultures and Distribution of Leadership

• *Subdomain 3.3* Socially Distributed Leadership • *Subdomain 3.4* Coaching and Mentoring	• *Dimension 3.2* Structuring the Organization to Facilitate Collaboration • *Dimension 3.3* Allocating Resources in Support of the School's Vision and Goals • *Dimension 3.4* Connecting the School with the Wider Environment
Domain 4.0 Acquiring and Allocating Resources • *Subdomain 4.1* Personnel Practices • *Subdomain 4.2* Structuring and Maintaining Time • *Subdomain 4.3* School Resources are Focused on Student Learning • *Subdomain 4.4* Integrating External Expertise into School Instructional Program • *Subdomain 4.5* Coordinating and Supervising Relations with Families and the External Communities	
Domain 5.0 Maintaining a Safe and Effective Learning Environment • *Subdomain 5.1* Clear, Consistent and Enforced Expectations for Student Behavior • *Subdomain 5.2* Clean and Safe Learning Environment • *Subdomain 5.3* Student Support Services Provide Safe Haven for Students Who Traditionally Struggle • *Subdomain 5.4* Buffering the Teaching Environment	

Appendix F

Focus Group Questions for Category 1 (RQ2) – Reactions to the Instrument

as a Tool to Support the Work of School Technology Leaders

NOTE: For Questions 1 & 2, please use the following scale to answer the first part of the question:

1-Very Useful, 2-Somewhat Useful, 3-Not Very Useful, 4-Not at All Useful

1. Using the scale above, how useful were the data in informing considerations related to the school's 1-to-1 technology initiative? Please explain using specific examples.

2. Using the scale above, how useful were the data in informing needs for school technology leadership development? Please explain using specific examples.

3. Which questions and/or dimensions were the most useful? Why?

4. Which questions and/or dimensions were the least useful? Why?

5. What should be added to the survey to increase the usefulness?

6. In addition to anything already mentioned, how could the assessment instrument and presentation of results be improved to increase value for school technology leaders?

Appendix G

Focus Group Questions for Category 2 (RQ3) – Intended Use of Data within

PDSA Continuous Improvement Model and with Existing Improvement

Processes

1. In what ways do these data help you in your strategic planning and school improvement planning efforts? How do you intend to use them for this purpose?

2. In what ways do these data help you make decisions about your own leadership development? How do you intend to use them for this purpose?

3. In what ways do these data help you support the professional development of and environmental conditions for teachers to be successful? How do you intend to use them for this purpose?

4. Are there other ways in which you intend to use these data in the context of your work?

Appendix H

Initial Email Invitation to Survey Participants

Email Subject: Providing your feedback on the technology leadership in your school for its 1-to-1 program underway this year.

Email Body:
Dear {{first name}},

I am writing to ask for your participation in a research study seeking teachers' feedback on the leadership for your school's 1-to-1 program underway this year. Below is your unique link to log you in to take the online survey. It should take about 30 minutes to complete. Please take time to do this by 5:00pm on Tuesday, January 21st. Your answers will provide your school's technology leadership team with insights on how to improve the 1-to-1 program and its impact on teaching and learning at your school. Thus, it is very important that all of the teachers participating in the 1-to-1 program at your school make their voices heard about teaching and learning in a 1-to-1 technology environment.

All teachers in the 1-to-1 program are being invited to participate, along with the school's technology leaders. All responses will be aggregated and no respondents will be identified by name, so your answers will be confidential. The aggregated responses will be available for all participants to see, and will be used as feedback to the technology leaders at the school. These results and the leaders' reactions to and utilization of this feedback will also be a part of my dissertation research at the University of Virginia on the facilitation of school technology leadership practices, particularly in 1-to-1 programs.

SURVEY LINK
* Here is the your link to the School Technology Leadership Survey. {{survey_name}} link: {{survey_link}}   By following this link, you are consenting to the details provided below in the informed consent agreement; please read it carefully before you decide to participate in the study.

* We value your time and know you are busy. If you must stop mid-way through the questions, the survey will save your responses so far. Save this email to access your link to the survey and pick up where you left off. Only if you complete all of the survey questions and see the completion screen at the end will your responses be included in this study.

*If you have any questions about the survey or have any trouble accessing it, please contact Melissa Anderson by email at mha9r@virginia.edu.

Thank you for considering participation in this study!
Melissa Anderson

========Please read the informed consent agreement carefully before you decide to participate in the study. =======

Purpose of the research study:
The purpose of the study is to understand how best to create the support systems teachers need to use technology in their classrooms.

What you will do in the study:
(1) You will be asked to take an online survey sharing your perceptions and experiences about the leadership for technology in your school. Survey responses will be anonymous. You may skip any question that makes you feel uncomfortable and you can stop the survey at any time.

(2) If you serve on your school's technology leadership team (or technology committee), you may also be asked to participate in a group interview (focus group) conducted by the researcher.

Time required:
The online survey will take 30 minutes or so to complete. If you participate in a group interview/focus group, it will require about one hour of your time.

Risks:
There are no anticipated risks in this study.

Benefits:
The technology leadership survey results (reported in the aggregate) will be made available to all study participants. These data may help your school's technology leaders make decisions about how to facilitate your technology-supported teaching. The study may help the researchers understand how technology leaders form support conditions and networks in a school, which can then be used to develop more effective professional learning environments in a school.

Confidentiality:
The information that you give in the study will be handled confidentially. Your survey responses will not be personally identifiable, and are only reported as a collective set of data. Your name will not be used in any report. If you participate in a focus group, because of the nature of the data collection, your data will only be confidential outside of that group. Others in the focus group will know what you have said.

Voluntary participation:
Your participation in the study is completely voluntary.

Payment:
You will receive no payment for participating in the study.

Right to withdraw from the study:
You have the right to withdraw from the study at any time without penalty. If you have participated in a focus group, your digitally reported contributions will be deleted from the transcription.

How to withdraw from the study:
If you want to withdraw from the study, please close the survey window or tell this to the researcher and ask them to leave the room, or stop the interview. There is no penalty for withdrawing. If you would like to withdraw after your materials have been submitted, please email: sdexter@virginia.edu

If you have questions about the study, contact:
Sara Dexter, Ed.D.
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Curry School of Education
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If you have questions about your rights in the study, contact:
Tonya R. Moon, Ph.D.,
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone:(434) 924-5999 Email: irbsbshelp@virginia.edu Website: www.virginia.edu/vprgs/irb

Appendix I

Email Reminder to Survey Participants

Email Subject: Reminder – If you haven't already, there is still time to provide your feedback on the technology leadership in your school for its 1-to-1 program

Email Body:

Last Thursday, January 16th, you received an email invitation to provide your feedback on the technology leadership in your school for its 1-to-1 program underway this year. If you have already completed the online survey, thank you very much for taking time out of your busy schedule to provide your perspective. If you have already completed the survey or if you have chosen not to participate, please feel free to disregard this message without reading any further. However, if you would like to have your feedback included in the results, please complete the survey by 5:00pm on Tuesday, January 21st. To do this, please follow the unique link provided to you in the email sent last Thursday, January 16th. The purpose of the study and additional details are contained in that original message.

Thank you for considering participation in this study, and best wishes for the remainder of your school year!

Melissa Anderson